Evaluation of the 2012 Health Care Cost Containment Law in Massachusetts

OFFICE OF THE MASSACHUSETTS STATE AUDITOR | SUZANNE M. BUMP | JUNE 2017

Table of Contents

Credits

Office of the State Auditor Research Team

Humberto Reynoso-Vallejo
Pamela Lomax
Michelle Porche
Qiong Louie-Gao
Cynthia Tschampl
Christophe Stuck-Girard
Mark Holske

CHAPTER 4
Neeta Fogg*
Paul Harrington*
Ishwar Khatiwada*
Rebekah Lashman**
Nancy Snyder**
Raija Vaisanen**

**Center for Labor Markets and Policy, Drexel University*
*** Commonwealth Corporation*

Evaluation Plan Advisors

Wendy Everett
Stuart Altman
Jeffrey Sanchez
David Seltz
Áron Boros
John McDonough
Marcia Fowler

Advisory Committee

Corinne Broderick*
Joanne Calista
Michael Caljouw
Bernie Carey*
Lois Cornell
Vic DiGravio
John Erwin
Wendy Everett
Tim Foley
James W. Hunt, Jr.
Pat Kelleher
Christine Klucznik*
Rick Lord
David Matteodo
Danna Mauch
John McDonough
David Morales
Ned Morse
Lynn Nicholas
Amanda Oberlies
Timothy O'Leary*
Lora Pellegrini
Julie Pinkham
Barbra Rabson
Brian Rosman
Matthew Selig
David Seltz
Amy Whitcomb Slemmer*
John True
Veronica Turner*
Bill Vernon
Steve Walsh

**Former member*

Report Draft Reviewers

CHAPTER 1
Wendy Everett
David Seltz
Paul Hattis

CHAPTER 2
Wendy Everett
John McDonough

CHAPTER 3
Carol Allen
David Matteodo
Timothy O'Leary

CHAPTER 5
Thomas Land
Jean Zotter
Jennifer Barrelle
Carlene Pavlos
Maria McKenna
Laura Nasuti

Statistical Analysis Support

Steve Fournier

Participants in the Qualitative Interview (Follow-Up with Key Stakeholders)

Paul Hattis
David Cutler
Matthew Selig
Brian Rosman
Áron Boros
Marylou Sudders
Jon Hurst
David Matteodo
Michael Caljouw
Dolores Mitchell
Daniel Mumbauer
Wendy Everett
Thomas Concannon

Special Thanks to the Following for Providing Data

Áron Boros (CHIA)
Joan Senatore (MassHealth)
Thomas Land (DPH)
Sharon Long (Urban Institute)
Marilyn Kramer (CHIA)
Allen Fremont (RAND Corporation)
Joel Weissman (Brigham and Women's Hospital)
Hermik Babakhanlou-Chase (Bureau of Substance Abuse Services)
Rebecca Balder (Health Safety Net)
Interuniversity Consortium for Political and Social Research (University of Michigan)

Copy Editing

Sarah Welch DeMayo

Design

Kaajal Asher

Executive Summary

This section presents summarized findings and corresponding policy implications from the Office of the State Auditor Chapter 224 report, Evaluation of the 2012 Health Care Cost Containment Law In Massachusetts. The findings reflect many key results from the report's various measures. This section also presents—in two parts, one led by OSA (for Chapters 1, 2, 3, and 5) and one led by Commonwealth Corporation (for Chapter 4)—recommended future directions for research, policy, and practice.

CHAPTER 1

Summary of Findings

While some progress in controlling health care costs has been made, many challenges remain.

Total health expenditures in the Commonwealth grew at a slowing pace for nearly a decade, but the growth rate started to increase again in 2014 and surpassed the benchmark set by Chapter 224 in 2014 and 2015.

Key cost drivers include waste, price variation, provider consolidation, and prescription drug spending.

Although the Commonwealth's insurance rate is still the highest in the nation, Latinos, people with low incomes, new residents, and young adults are at much higher risk of uninsurance. Moreover, increasing health care cost burdens relative to incomes threaten access and insurance levels, as do proposed national policy changes.

There were increases in the share of the population enrolled in alternative payment model (APM) plans and in the proportion of people with employer-sponsored insurance (ESI) from self-insured employers.

Between MassHealth and the Group Insurance Commission (GIC), the Commonwealth is a major purchaser of health services.

Policy Implications

Obstacles to meeting the annual cost-growth benchmark remain.

The legislature, the executive branch, the GIC, private payers, and other key stakeholders should continue to develop and implement interventions to address provider price variation.

The Commonwealth could develop strategies to reduce prescription drug costs and unwarranted price variation.

The Commonwealth could monitor the effect of high-deductible and tiered-network plans on care utilization to ensure these plans are not limiting access to care.

The Commonwealth and its insurers may continue to reach out to populations most likely to be uninsured, including Latinos, people with low-incomes, young men, and new Massachusetts residents.

APMs will continue to be an important strategy for controlling health care costs.

The GIC and MassHealth should continue to use their market clout to explore innovations in plan design and care delivery reform.

More time, more data, and improved data quality are needed to assess the full impact of Chapter 224.

CHAPTER 2

Summary of Findings

For measures focused on the health of vulnerable patient populations, there were some areas of improvement and some negative trends.

Overall, Massachusetts maintained broad access to care but continued to grapple with high levels of hospital readmissions and avoidable ED visits.

Disparities persisted for children, older adults, people with low incomes, and people with disabilities. Access to pediatric primary care improved, though children and adolescents with commercial insurance still accessed primary care more often than youth enrolled in MassHealth.

Regarding adults aged 65 and older, cancer screening rates were sufficient, although significant room for improvement remained in other prevention measures, such as osteoporosis care and influenza vaccinations.

Among people with low incomes, cancer screening rates generally improved, but access to care remained inconsistent. For instance, adult oral-health coverage and cervical screening rates decreased among MassHealth enrollees.

Among people with disabilities, the data were insufficient to calculate trends, though it is clear this population faces substantial barriers to achieving satisfactory health outcomes.

Policy Implications

Additional investment in data collection and cleaning is needed to better understand the current state of affairs and to inform progress.

To reduce unplanned readmissions and avoidable emergency department visits, possible interventions include strengthening care coordination, ensuring that post-discharge plans are rigorous and provided to patients' providers, educating patients about urgent care centers, and increasing the capacity of primary care practices to treat behavioral health needs.

People with low incomes suffer from persistent disparities. They need all stakeholders to assist by expanding adult oral-health coverage, improving cervical cancer screening, and increasing well-child visits.

Among people with disabilities, new data measures and data-collection capacity are needed.

CHAPTER 3

Summary of Findings

Findings related to primary care and behavioral health indicated as many areas of progress as those with negative trends.

Two major primary care goals of Chapter 224, encouraging coordination of care and shifting more visits to non-physician PCPs, have not yet been achieved.

There has been an inadequate supply of behavioral health treatment resources, despite some expansion in the capacity of psychiatric beds and treatment among heavy alcohol users.

Compared to national averages, Massachusetts residents have higher rates of substance use involving alcohol and marijuana. Moreover, the opioid epidemic contributed to increased morbidity/mortality and treatment needs. In the near future, stakeholders should evaluate the results of diverse initiatives to combat opioid addiction and provide treatment services.

Policy Implications

All stakeholders need to improve care coordination and behavioral health. Possible strategies include direct investment by the Commonwealth in new facilities, increasing MassHealth reimbursement rates for behavioral health, reforming medical licensing to allow out-of-state providers to practice in Massachusetts, and furthering the integration of primary care and behavioral health.

Future actions to address the opioid epidemic may include the enforcement of provider checks with prescription-monitoring data, granting legal amnesty to people who turn over opioids to law enforcement, and making overdose-reversal medicines more widely available and affordable.

CHAPTER 4

Summary of Findings

Like in many other industries, the job market in health care has experienced growth in high-skilled jobs that require a bachelor's degree or higher and in low-skilled jobs that require little or no certification.

Health care providers are redesigning delivery systems to allow workers to work at the top of their licenses and to increase efficiencies and quality. The health care industry employs greater shares of women, African Americans, and Latinos than all other non-health industries combined, so any changes affecting the health care workforce will impact these groups.

Demand is rapidly growing for home health aides and personal care assistants, yet wages for these direct care jobs have held stagnant since 2004. Along with certified nursing assistants, these positions require similar knowledge, skills, abilities, and behaviors and very little or no certification, so they are highly substitutable for one another. Employers seeking to fill these positions are increasingly competing with employers in retail, food service, and other industries. Third-party reimbursement rates have constrained the ability of home health agencies to raise wages in order to respond to this labor supply challenge.

Policy Implications

The health care industry is in the process of transforming care delivery systems and shifting focus from inpatient to outpatient settings.

From a workforce perspective, this transformation has required training current workers to continuously improve systems, upgrading staff in positions that are being re-designed and deployed differently, and raising the requirements for skills and credentials in positions like nursing.

Postsecondary education institutions will need to monitor these shifts and adapt their programs to meet changing hiring requirements, while health care providers will likely need to continue investing in incumbent workers' skills.

Home and community-based care providers face many challenges to meet the rapidly growing demand for direct care workers.

CHAPTER 5

Summary of Findings

Among population-health measures, there were some positive trends but also many areas of concern or stasis.

Cancer screenings and overall cancer deaths improved. The level of morbidity/mortality related to many non-cancer conditions increased (e.g., obesity, diabetes, STIs) or remained unchanged (e.g., asthma, dental visits, high blood pressure, coronary heart disease, stroke). Nevertheless important improvements were observed in the smoking rate and the impact of HIV/AIDS.

Based on available public health indicators, Asians had the most positive results, followed by Whites, Latinos, and African Americans.

Asians had the best outcomes on more than half of the measures, including high blood pressure, breast and colorectal cancer mortality, and smoking. Additionally, Asians had improving trends for five of 27 measures with statistically significant results.

Whites had the second-best set of outcomes, including the best rank on eight measures, including having a personal health care provider, making a recent dental visit, and birthweight. However, Whites had unfavorable trends for five of 27 measures, including lifetime adult asthma prevalence, pre-diabetes and diabetes, routine checkup in the last year, and dental visit in the last year.

Latinos (among the commercial population) had the most favorable outcomes on six measures, including lung cancer mortality, stroke mortality, and screening for breast and cervical cancer. However, Latinos struggled in measures related to access, such as skipping needed care due to cost. Additionally, the group had only one worsening trend (dental visit in the last year) and three improving trends: current smoker, overall cancer deaths, and breast screening among people aged 50 to 74.

African Americans had the worst results on more than half of the measures, including prostate cancer mortality, infant mortality, oral health, HIV/AIDS, and overweight/obesity. Nevertheless, there were improvements in five measures, including smoking, prostate cancer mortality, and breast screening among people aged 50 to 74 with commercial coverage.

These population-health findings show much room for improvement in the Commonwealth, which was a goal of Chapter 224.

Positive indicators came from prevention-and-wellness programs created under Chapter 224.

Policy Implications

Priority areas for improvement include improving oral health and reducing chronic conditions such as obesity, diabetes, asthma, and coronary heart disease.

Increased investment in public health systems is essential to capitalize on current progress, scale prevention-and-wellness initiatives, increase positive trends, and decrease disparities. Actions to reduce disparities include further research into barriers to care, the social determinants of health, and population health approaches.

The social determinants of health are powerful predictors of health outcomes and help drive racial/ethnic differences. Another crucial factor contributing to health disparities is exposure to what is known as "structural violence." This concept refers to discriminatory social structures—economic, political, legal, religious, and cultural—that impede the ability of individuals, groups, and societies to reach their full potential and satisfy fundamental human needs, including access to comprehensive health care. In addition, further understanding of population health, in terms of the differences in outcomes within groups constructed as racial/ethnic, is needed. For instance, more research is necessary to understand the factors within Asian American subgroups that account for this population's relatively positive health outcomes. Subgroup differences within the Latino population should also be further explored.

Lastly, more data are needed to investigate the impact of prevention-and-wellness programs in population health.

FUTURE DIRECTIONS

For Chapters 1, 2, 3, and 5

Future health systems and policy research in the Commonwealth should continue to focus on questions of access, quality, health equity, and cost, particularly ways to further reduce costs and increase gains in access and quality.

More population-health research is necessary to better understand differences among and within racial/ethnic groups. (For example, which Asian subgroups are driving the wide gap in successful outcomes? Why have Latinos not shown stronger improvement? Why do African Americans lag by such large margins?) Research on the intersection of social determinants of health and population health is essential to this analysis.

The most urgent need, however, is for more and better data, as follows:

- Firstly, monitoring the impact of policies is already challenging given significant contextual uncertainty. For example, the Massachusetts legislative and executive branches are considering new cost-containment initiatives starting in 2017 (such as insurer-to-provider cost-growth caps), and there are numerous proposals for dramatic change at the federal level (such as restructuring Medicaid into block grants or per capita caps). Additional quality data will help evaluators account for this contextual uncertainty.

- Secondly, no new initiative to improve the health care system can be fully evaluated without improvements among data systems. To the extent possible, future evaluations should be initiated concurrently with policy initiatives and include data collection and analysis plans a priori.

OSA plans to release an update to this report in June 2018.

For Chapter 4

Based on their analyses of population projections and the associated rise in the incidence of disability as the state ages, the authors predict a sharp rise in the demand for health care and related support services among frail older adults. The health care system and state government finances will face major challenges in meeting what is likely to be a massive increase in service requirements while limiting the impact on taxpayers. Therefore, stakeholders will have to resolve very serious imbalances in the direct care labor market and improve protections for direct care workers and consumers. In short, understanding the direct care labor market—including compensation, public assistance participation among workers, and changing skill requirements—will be key.

Requirements for health care professional and technical occupations are also changing rapidly. In these heavily regulated labor markets, one of the most important developments is the increasing propensity for workers to work at the top of their licenses, meaning they practice to the full extent of their education and training. The rising demand for cost containment will put intense pressure on health care professionals and technicians to be more effective and efficient. The resulting impact on wages and working conditions, as well as the potential for increased turnover and other adverse impacts, are important concerns that should be closely monitored.

Emotional, cognitive, and drug-induced disorders have risen sharply in Massachusetts, yet little is known about the labor markets for behavioral health care. Indeed, the authors are unaware of even a simple measure of this labor market's size in the Commonwealth. Therefore, a baseline study of behavioral health care workers would be useful.

Introduction

Chapter 224 of the Acts of 2012—"An Act Improving the Quality of Health Care and Reducing Costs Through Increased Transparency, Efficiency and Innovation"—was enacted with the goal of controlling health care spending growth while improving access and quality. The law created numerous mechanisms for pursuing this goal, including:

- New agencies to monitor health care cost growth and market dynamics;
- Incentives to encourage the wide adoption of alternative payment methodologies (APMs) by private and public payers, including MassHealth;
- Directives to increase price transparency;
- New funding for wellness and prevention programs, including workplace wellness initiatives; and
- An expansion of the roles of non-physician primary care providers, namely nurse practitioners and physician assistants.

Section 251 of the law posed research questions and directed the Office of the State Auditor (OSA) to "conduct a comprehensive review of the impact of [Chapter 224] on the health care payment and delivery system in the Commonwealth and on health care consumers, the health care workforce, and general public." OSA was further required to report the results of its review, as well as policy recommendations, to the House and Senate Committees on Ways and Means and the Joint Committee on Public Health. This report is the product of OSA's work.

RESEARCH DESIGN

Each chapter in this report answers a research question presented in Section 251, as noted below. Chapter 4, which was subcontracted to Commonwealth Corporation, addresses several questions.

Research Question for Chapter 1: What are the changes to health care costs, including the extent to which savings have reduced out-of-pocket costs to individuals and families, health insurance premium costs, and health care costs borne by the Commonwealth?

Research Question for Chapter 2: What are the changes to access to health care services and quality of care in different regions of the state and for different populations, particularly for children, the elderly, low-income individuals, individuals with disabilities, and other vulnerable populations?

Research Question for Chapter 3: What are the changes to access and quality of care for specific services, particularly primary care and behavioral health (which includes substance use disorders and mental health services)?

Research Questions for Chapter 4: How did the industrial, occupational, and geographic structure of health care employment in the Commonwealth change?

a) What is the proper definition of the health care industry (in statistical terms) to measure the size and composition of the state's health care workforce?

b) What is the impact of structural changes in the health care industry on skill requirements for employment in the state's health care delivery system as well as impacts on earnings?

c) How did access to employment for racial/ethnic groups, dependence on foreign-born workers for labor supply in some health care occupations, and "benefit cliff effects" on labor supply choices in occupations in which substantial shares of workers participated in non-cash income transfer programs change?

d) What is the most likely future growth path for employment in the health care service sector?

Research Question for Chapter 5: What are the changes to public health, including, but not limited to, reducing the prevalence of preventable health conditions, improving employee wellness, and reducing racial/ethnic disparities in health outcomes?

To respond to these questions, OSA developed a mixed-methods (quantitative and qualitative), quasi-experimental design for the evaluation. The study explored Chapter 224's impact on the following:

- Health care costs, access to health care services, and quality of care in different regions of the Commonwealth and for particular populations,
- Access and quality of care for specific services,
- The health care workforce, and
- Public health.

Because the study touched on numerous matters related to health, health systems, population health, and fiscal policy, OSA sought data from many secondary sources, mainly state and federal agencies. OSA conducted unique analyses of datasets from several of these sources, including Massachusetts' All-Payer Claims Database (APCD), the Massachusetts Department of Public Health, and the Massachusetts Health Reform Survey.

OSA also extensively utilized peer-reviewed and other sources such as the Substance Abuse and Mental Health Services Administration, the National Survey on Drug Use and Health, Centers for Disease Control and Prevention, Healthcare Effectiveness Information and Data, and reports from foundations, including the Kaiser Family Foundation and the Blue Cross Blue Shield of Massachusetts Foundation.

Quantitative methods

OSA used of a variety of statistical methods for its quantitative research, as follows:

- The logistic regression model to estimate the probability of the dichotomous outcome variables;
- The method of generalized estimating equations to analyze longitudinal data, which accounts for the correlation inherent in using multiple observations for each individual;
- For group comparisons: the Chow test to test whether the coefficients estimated for one group are equal to those for another group;
- For the survey data: complex sampling procedures, including statements for stratification, clustering, and sample weights; and
- For mortality data: age-adjusted rates calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, both produced by the National Center for Health Statistics. The rates were then age-adjusted to per-100,000 of the 2000 U.S. Standard Population.

Qualitative methods

Qualitative study components included two elements: (1) a brief online survey with key stakeholders, published in fall 2015[1] and (2) in-depth, semi-structured interviews with key stakeholders, excerpts from which appear as quotations throughout this report.

STUDY LIMITATIONS

OSA encountered several barriers while attempting to conduct its analyses:

- First, for many health care domains (such as people with disabilities), a paucity of longitudinal data is available to show Massachusetts trends. In addition, some data are available for only group subsets, which do not necessarily reflect trends among the entire group. For example, among people enrolled in MassHealth, many measures used data from the Healthcare Effectiveness Data and Information Set, which reflects only the MassHealth managed care population (approximately 60% of MassHealth enrollees).
- Second, although OSA obtained APCD claims data, data from earlier than 2010 were not available, which impacted the accuracy of some measures, including cancer screenings.
- Third, in some cases, available data were insufficient to calculate whether observed trends were statistically significant.

Another major limitation was OSA's inability to control for the impact of societal changes and contemporary policy reforms, most importantly Chapter 58 of the Acts of 2006 and the Patient Protection and Affordable Care Act of 2010 (ACA). In addition to these policy changes, other contextual influences, such as an improving economy and societal shifts relating to risk factors (including rates of tobacco use and obesity), contributed to the trends reported here. These limitations in the quality and breadth of the available data prevented OSA from identifying and allocating causal relationships.

Moreover, many provisions of Chapter 224 had little to no time to take root as of the time of OSA's analyses, as follows:

- The Health Policy Commission launched certification programs for patient-centered medical homes and accountable-care organizations in 2016 and 2017, respectively.
- The law's call for transparency among prices of hospital services remains aspirational, though the Center for Health Information and Analysis plans to debut a medical pricing website in 2017.
- A mandated price-variation commission was replaced with a special commission on price variation (composed of legislators, governor's appointees, and representatives from stakeholder groups), which reported its findings in March 2017.
- The Pharmaceutical Cost Commission and the Diagnostic Accuracy Task Force proscribed by the law have not convened, and a report on telemedicine due in 2013 has not been issued.

If and when these and other provisions are implemented, it may take several years for their effects to be observed in longitudinal data. Therefore, OSA's analysis should be viewed as a provisional and not a final verdict on the impact of Chapter 224.

Finally, it is important to note that OSA finalized the content of this report starting in late 2016, so it may not reflect subsequent developments in relevant federal and state policy.

1 Reynoso-Vallejo, H., Porche, M., & Stuck-Girard, C. (2015). Chapter 224: stakeholders study. Retrieved April 18, 2017, from mass.gov/auditor/docs/chapter-224/100615-224-stakeholders-survey.pdf

CHAPTER 1

Health Care Costs, Out-of-Pocket Costs, Insurance Premiums, Costs Borne by the Commonwealth, and the Uninsured

Section 1.i:
Introduction

The matter of health care costs is tremendously complex, and costs can be categorized in any number of ways. In this chapter, the OSA presents analyses using measures from four perspectives—national, state, employer, and consumer—as follows:

- Section 1.1 covers the growth of overall health expenditures (in Massachusetts and nationally), trends in insurance coverage, and the uninsured population.
- Section 1.2 focuses on the cost of health care to consumers and employers. Topics include problems paying medical bills, cost-sharing (deductibles, copayments, and coinsurance), insurance premiums, and medical loss ratio rebates.
- Finally, section 1.3 contains the following measures: total health care expenditures; MassHealth spending and enrollment trends; expenditures by the Group Insurance Commission, the Health Safety Net, and other Massachusetts health programs; and the Medicare program.

A NOTE ABOUT THE DATA

OSA used quantitative and qualitative components to conduct its analysis. Quantitative data sources for longitudinal analyses include:

- The Center for Health Information and Analysis (CHIA), including the Massachusetts Health Insurance and Employer Survey and the annual performance of the Massachusetts health care system reports
- Health Policy Commission (HPC), especially its annual cost trends reports
- State government sources, including the Executive Office of Administration and Finance, the Executive Office of Health and Human Services (EOHHS), Group Insurance Commission (GIC), and the Health Safety Net (HSN)
- The Massachusetts Health Reform Survey (MHRS), which is administered by the Blue Cross Blue Shield of Massachusetts Foundation
- Federal sources, including the Agency for Healthcare Research and Quality (AHRQ), Centers for Medicare and Medicaid Services (CMS), and the National Health Interview Survey (NHIS)
- The Kaiser Family Foundation
- The Commonwealth Fund
- The Massachusetts Medicaid Policy Institute
- The Center for Health Law and Economics

Qualitative data is presented through quotes conveying the opinions of various stakeholders in the Commonwealth. These data were collected using in-depth, semi-structured interviews and do not reflect any endorsement by OSA.

Section 1.1:
Overall Health Expenditures and Insurance Coverage[1]

A NOTE ABOUT THE DATA

This section contains measures regarding:

- The growth of overall health care spending, nationally and in Massachusetts, and
- Trends in insurance coverage, including the uninsured population.

Data sources for the longitudinal analyses in this section include:

- CHIA, including the Massachusetts Health Insurance and Employer Survey
- HPC, especially its annual cost trends reports
- MHRS
- Federal sources, including AHRQ, CMS, and NHIS

For the majority of measures in this report, OSA provides some national and state background information followed by text and charts regarding the specific data analyzed.

OVERVIEW

A national picture

The U.S. has the highest health spending in the world. Although growth in national health expenditures (NHE) slowed during the early 2000s, the U.S. spent 17.8% of GDP on health care in 2015.[2] This is approximately 80% more than the average among peer industrialized nations.[3] Indeed, NHE averaged more than $10,000 a person for the first time in 2016.[4] A key concern is that the nation's high health spending will result in less discretionary revenue to spend on everything else.[5] States will have less for services such as education and infrastructure, businesses will have less for wage and salary increases, and families will continue to see health bills rise.

In 2012, a group of health policy experts—including current HPC Commissioners Stuart Altman, Donald Berwick, and David Cutler—published recommendations for containing health care costs at a systems level.[6] Their proposals included increasing the role of nurse practitioners and physician assistants, expanding the Medicare ban on provider self-referrals (informally known as the Stark law), better price transparency, using competitive bidding for all health care commodities, and reducing the costs of defensive medicine and malpractice by providing a stronger legal shield to providers who adhere to established best practices.[7] Other experts have recommended market-based incentives,[8] though this did not address de facto monopolistic power and other market failures in many regional and sub-regional markets.[9, 10]

Key cost drivers

Awareness of wasteful spending in health care rose to particular prominence with the Dartmouth Atlas of Health Care.[11] Berwick and Hackbarth argued that cutting waste is essential to making health care sustainable while preserving access to essential health benefits without "rationing" needed care.[12] According to conservative estimates, the following categories collectively account for more than 20% of total health spending:[13]

- Overtreatment (e.g., surgery when watchful waiting is preferable)
- Failures of care delivery (i.e., the lack of adoption of known best practices, including screenings)
- Failures of care coordination (resulting in complications and hospital readmissions, especially among the chronically ill)
- Administrative complexity (inefficient or misguided rules and processes, including a lack of standardized forms and information technology systems)
- Pricing failures (e.g., MRI and CT prices, which are several times higher in the U.S. than in other countries)
- Fraud and abuse (including scams and fraudulent billing)

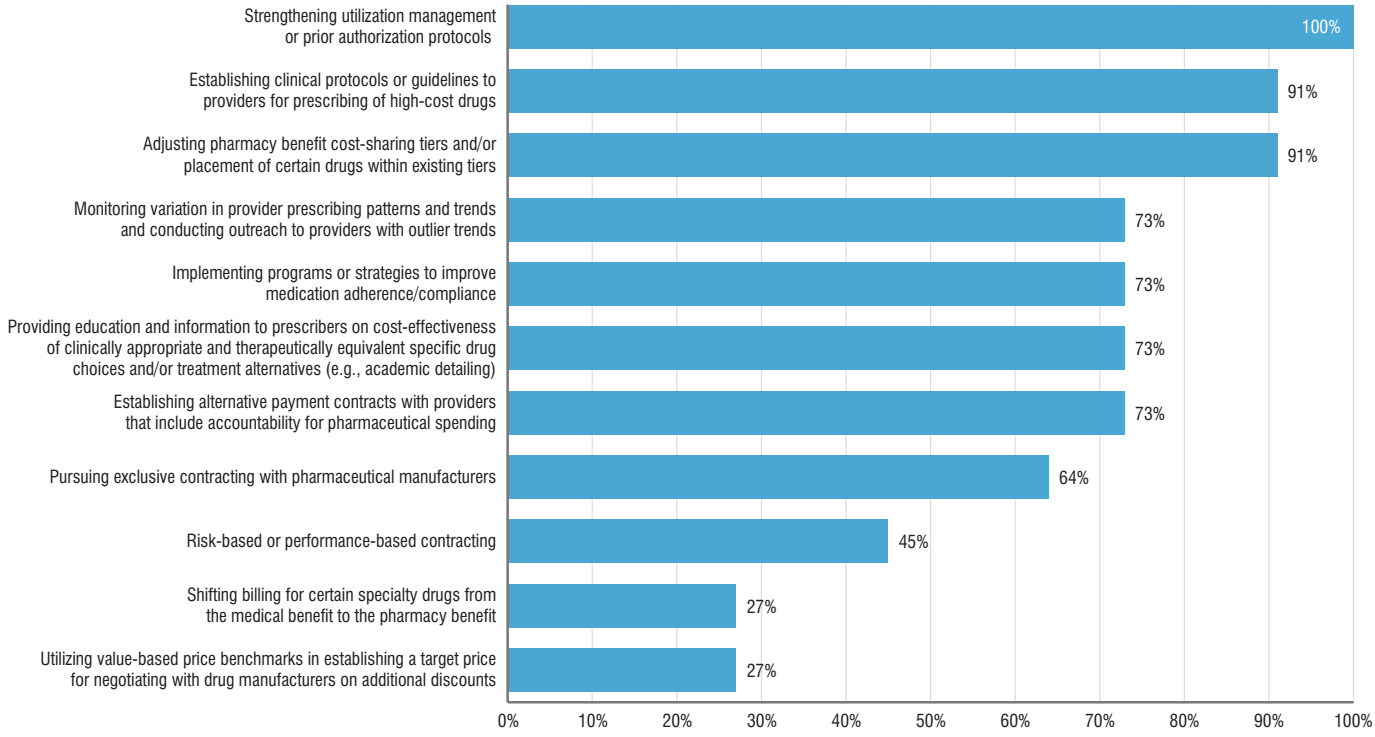
> "We spend $1.3 billion in this state on post-acute care, and ... we have one of the highest readmission rates in the country. ... You can't be driving up both these costs at the same time. It defies common sense."
>
> **— Wendy Everett, Commissioner, HPC**

In addition to waste, there are other key spending drivers. According to testimony filed prior to HPC's 2016 Cost Trends Hearings, the top concerns among Massachusetts providers were prescription drug costs, labor costs, and commercial payment rates for behavioral health.[14] Among payers in the Commonwealth, primary concerns included provider consolidation and price variation, and all payers expressed concern about drug costs.[15] Figure 1.1.1 shows payers' strategies to contain drug costs.

Price variation

Price variation—the variation of costs among different providers for similar services—deserves special attention, as high prices have been identified

Figure 1.1.1. Strategies Massachusetts payers are using to address pharmacy costs



Source: HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 116 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-costtrends-hearing/2016/cth16-presentation.pdf

as the leading driver of spending growth nationally[16] and in the Commonwealth. Prices vary extensively in the Commonwealth for the same types of services, and care increasingly is provided by the highest-priced providers. Over the past few years, many reports have explored price variation's impact on the Massachusetts health system, as follows:

- In its 2015 Cost Trends Report, HPC found that among the three largest commercial payers, the highest-priced hospitals and physician groups have prices up to four times higher than their lowest-priced peers.[17] Further, though some price variation supports constructive functions (e.g., physician training or provision of specialized services such as burn units), a large share of the disparity, particularly among inpatient services, is "likely unwarranted."[18]
- A 2015 report by the Office of the Attorney General (AGO) also analyzed price variation in the Commonwealth, finding that "price variation unexplained by quality persists, contributing to providers having different levels of resources to carry out their mission," and that pricier providers continue to draw a higher volume of patients.[19] The authors urged the promotion of better patient access to and comprehension of health care price information.[20]
- A 2016 report by a Massachusetts workgroup—comprising hospital leaders from community and teaching hospitals and academic medical centers—confirmed the existence of unwarranted price variation. It also found that low commercial-payer reimbursement levels puts many community hospitals at risk, because the commercial rates do not compensate adequately for low public-payer reimbursements.[21] The workgroup proposed interventions including improving the design of alternative payment models (APMs) and tiered networks, utilizing bundled payments and limited networks, and increasing transparency among payers and providers.[22]

"I know we have trouble when both Health Care For All and the Pioneer Institute agree that we don't have [price] transparency in the Commonwealth."

— Marylou Sudders, Secretary, Executive Office of Health and Human Services

- In spring 2016, HPC convened three meetings between providers, payers, advocates, and government officials to discuss provider price variation. These stakeholders agreed that the prevailing price variation "creates dangerous financial conditions for lower-priced hospitals."[23] Moreover, stakeholders generally agreed that action should be taken to address these variations, though there was no agreement on what should be done.
- A 2017 report by the state legislature's Special Commission on Provider Price Variation (composed of 23 members, including legislators, insurers, providers, employers, and other stakeholders) found that higher payments are justified for providers that care for high-cost patients and for high-quality providers.[24] However, the commission concluded that market power (negotiating leverage), brand, geographic isolation, government payment shortfalls, and the costs of research activities do not warrant price variation. The commission's recommendations included greater price transparency, broader adoption of tiered health plans, and expanding consumer protections in out-of-network "surprise billing" scenarios.[25]

Unfortunately, OSA found insufficient data to directly explore the cost drivers mentioned above, although these drivers certainly influence—or are influenced by—the majority of measures explored throughout this report.

Growth in Health Care Spending

OVERVIEW

From 2002 to 2015, the U.S. annual rate of growth for health spending declined from 9.7% to 5.8%, as shown in Figure 1.1.2.[26,27] The rate was particularly low from 2009 to 2013, the period following the financial crisis, which may have limited health spending due to consumers choosing cheaper plans with fewer benefits and more workers becoming unemployed and losing their insurance coverage.[28] Nevertheless, this slowing trend had already been evident before the start of the Great Recession. Another contributing factor to the slowdown of annual growth was the 2012–2013 decline of Medicare's per-enrollee spending due to one-time payment reductions, provisions of the Patient Protection and Affordable Care Act (ACA), and budget sequestration.[29]

Some argue that under an improved economy, consumer spending will bounce back and health spending will grow more quickly.[30] Others posit that technological innovations and efforts by providers to cut costs account for the slowdown and may have more lasting impact.[31] Nevertheless, an increase in growth was measured in 2014–2015, largely due to increased coverage under full implementation of the ACA and retail prescription drug spending.[32]

According to a projection by CMS, U.S. health spending growth is projected to average 5.8%[33] from 2016 to 2025, 1.3 percentage points faster than projected GDP growth.[34] Though widespread adoption of health plans with increased cost-sharing is expected to help constrain costs, growth in hospital and drug prices, increased Medicare enrollment, and the potential for further Medicaid expansion at the state level all foreshadow increased expenditures.[35]

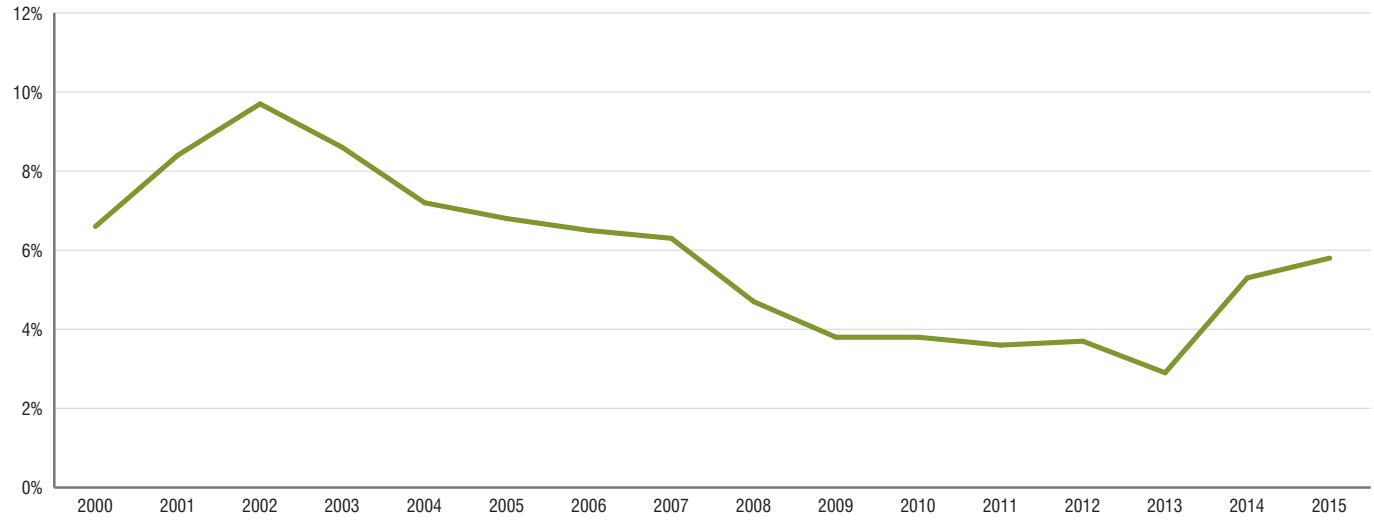
ANNUAL GROWTH IN PER CAPITA HEALTH EXPENDITURES

Background

In 2015 NHE reached $9,990 per capita, up from $8,141 in 2009.[36] Massachusetts' 2015 total health care expenditures (THCE)[37] were $57.4 billion ($8,441 per capita), a 4.1% increase from 2014 and half a percentage point higher than the health care cost growth benchmark.[38] The Massachusetts economy grew 3.9% per capita over this period.[39]

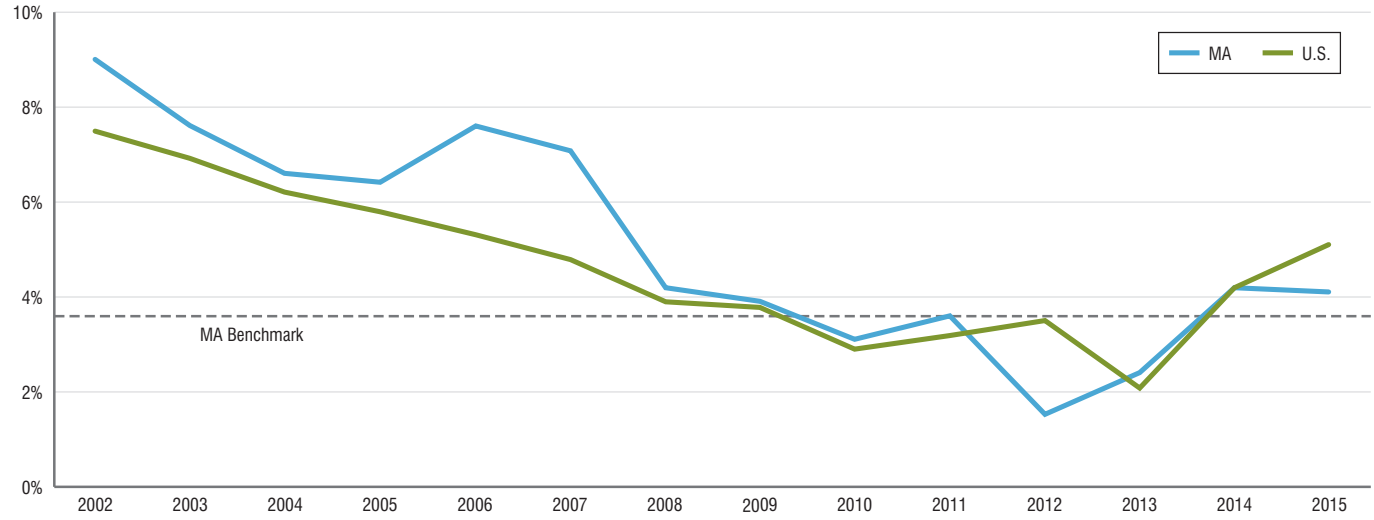
Growth among public payers such as Medicare and MassHealth was 3.8%, and commercial spending grew 5.3%. Pharmacy spending, which was a major cost driver in 2014, continued to increase, with 10.2% growth in 2015.[40]

Figure 1.1.2. Annual growth in national health expenditures



Source: CMS. (2015, December). National health expenditure data, historical. Retrieved January 11, 2015, from cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nationalhealthaccountshistorical.html

Figure 1.1.3. Annual growth in per-capita health care spending



Note: U.S. data includes Massachusetts. Data show spending growth from previous year to year indicated.
Source: HPC. (2017). 2016 Cost Trends Report. Retrieved from p. 14 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

Massachusetts trend, 2002–2015

From 2002 to 2015, Massachusetts per capita health spending increased less than U.S. per capita health spending, as shown in Figure 1.1.3. However, both growth rates showed an overall declining trend over the period.

ANNUAL GROWTH IN PER CAPITA GDP

Background

A consistently growing economy can moderate the impact of increasing THCE, which may be why steadily increasing THCE was not considered a major problem during the boom times of the last century. However, if health spending keeps growing and either household incomes or the economy does not keep pace, the burden of health spending grows heavier.

The national per capita GDP grew from $47,053 in 2009 to $56,210 in

2015.[41] In comparison, the median household income went from $49,777 to $56,516 nationally, and from $59,373 to $67,861 in Massachusetts, during that period.[42]

Massachusetts trend, 2011–2015

Massachusetts had higher GDP per capita than the U.S., though, from 2011 to 2015, Massachusetts GDP per capita grew at 12.1% and was slightly slower than the 13.2% increase at the national level, as shown in Figure 1.1.4.

Trends in Insurance Coverage

HEALTH INSURANCE COVERAGE

Background

In 2015, about 154 million people nationwide under the age of 65 (57%) had health insurance through their or a family member's employer.[43] An additional 10 million people accessed private insurance through the marketplaces created by the ACA.[44]

In Massachusetts and nationwide, insurance rates are lowest among people aged 19 to 64. Most adults in this age cohort do not qualify for public insurance programs, such as Medicaid and Medicare, in part due to the expectation they will obtain private coverage through their employer or the individual market. Additionally, many of these adults earn too much to be eligible for Medicaid, while some choose to remain uninsured—especially younger, healthier adults—even if they must incur tax penalties for lacking insurance.

Starting in 2007, Chapter 58 health reform expanded insurance access to the aged-19-to-64 cohort through a combination of mandates on employer coverage, subsidized private plans, and increased MassHealth eligibility. Since then, coverage rates have been stable.

Massachusetts trend, 2006–2015

In 2015, 88.6% of Massachusetts adults aged 19 to 64 were insured all year, compared to 87.8% in 2010, as shown in Figure 1.1.5. The share who were uninsured or insured for only part of the year declined slightly.

TYPES OF HEALTH INSURANCE

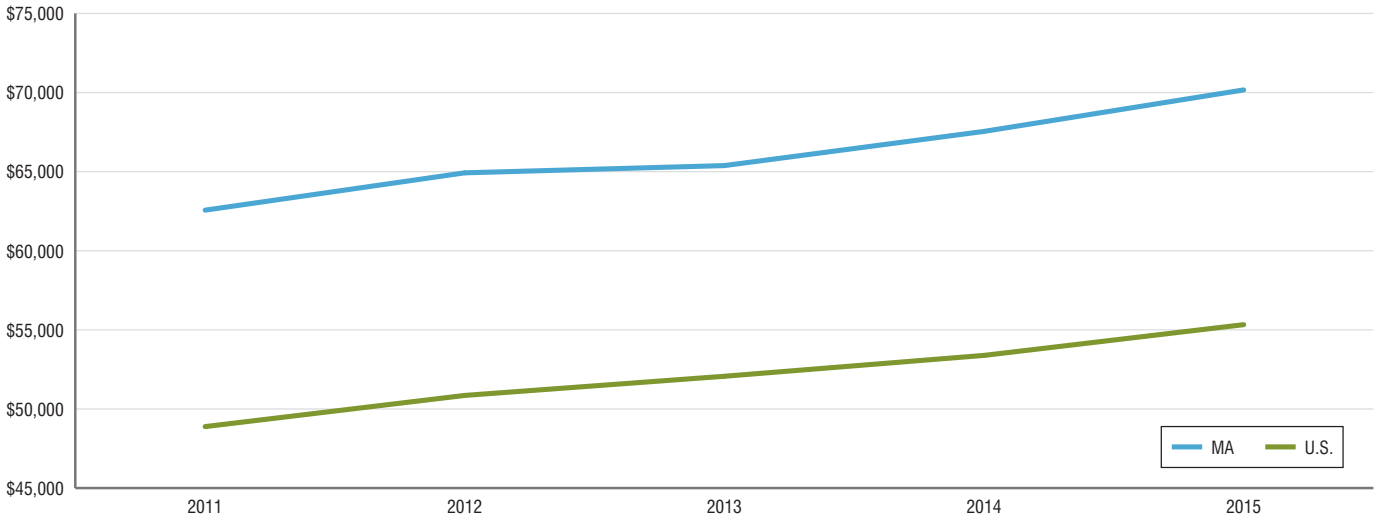
Background

Nationally in 2014, 55.4% of the population had employer-sponsored insurance (ESI), 14.6% purchased commercial coverage directly, 19.5% were enrolled in Medicaid, 16% had Medicare, and 4.5% had military coverage.[45] Overall, covered commercial lives increased 1.8 percentage points over 2013, while government-based enrollees increased by 2 percentage points.[46] Non-employer-based commercial coverage (largely purchased on ACA marketplaces) increased by 3.2 percentage points in one year.[47]

In Massachusetts, 31% of residents were covered by public insurance in 2015,[48] and about two-thirds were covered by commercial insurance.[49] Most residents (55%) received insurance through their employer, though 1 in 10 residents purchased commercial coverage on the individual market. From 2014 to 2015, commercial enrollment increased by 1.7%, slightly outpacing state population growth.[50]

More so than at the national level, ESI is broadly accessible in Massachusetts. In 2009 and 2014, 76% of Massachusetts employers offered health insurance.[51] In 2014, 73% of eligible employees obtained that coverage.[52] Because Massachusetts has a high level of ESI coverage, health care industry interests and private payers have significant influence on

Figure 1.1.4. GDP per capita



Massachusetts source: Total Gross Domestic Product for Massachusetts. (2016, March 30). Federal Reserve Bank of St. Louis. Retrieved October 13, 2016, from https://research.stlouisfed.org/fred2/series/MANGSP#
U.S. source: Gross Domestic Product. Retrieved October 13, 2016, from fred.stlouisfed.org/series/GDP

health care policy and insurance design in the Commonwealth. From 2011 to 2014, the share of Massachusetts part-time employees working at firms offering health coverage was stable, around 84%. However, the share of employees eligible for that coverage dropped substantially, to 21.4%.[53] Nearly all Massachusetts firms with at least 50 workers offered health coverage in 2011 and 2014; however, the share of smaller firms offering coverage dropped a few points, to 32.2%, over that period.[54]

The Massachusetts commercial market is dominated by a few insurers. The top insurer, Blue Cross Blue Shield, covers 39.4% of the market; Harvard Pilgrim Health Care and Tufts Health Plan together cover 27.0% of the market; other insurers cover the remaining 33.6%.[55]

Massachusetts trend, 2011–2015

Figure 1.1.6 shows that from 2011 to 2015, ESI coverage decreased by about four percentage points, and the prevalence of public insurance coverage increased. A portion of the increase starting in 2014 was due to broadened eligibility during complications with the Connector.

PERCENTAGE OF PRIVATE SECTOR ENROLLEES IN SELF-INSURED PLANS

Background

A self-insured health plan is one in which an insurer provides administrative services, but the employer assumes financial risk for providing health benefits to its employees. Instead of paying a fixed premium to an insurance carrier, self-insured employers—typically larger employers who can assume the financial risk—pay claims as they are incurred.[56] Smaller firms lack a risk pool large enough to hedge against major health claims by employees.[57] Self-insured plans are regulated by federal law, not state law, so employers are not required to cover health care services for state-mandated benefits,[58] can customize benefits to meet their workforce's needs, and do not have to pay state health insurance premium taxes.[59] Additionally, firms that self-insure reduce administrative overhead and stand to benefit if employee wellness programs improve the health of its workers.

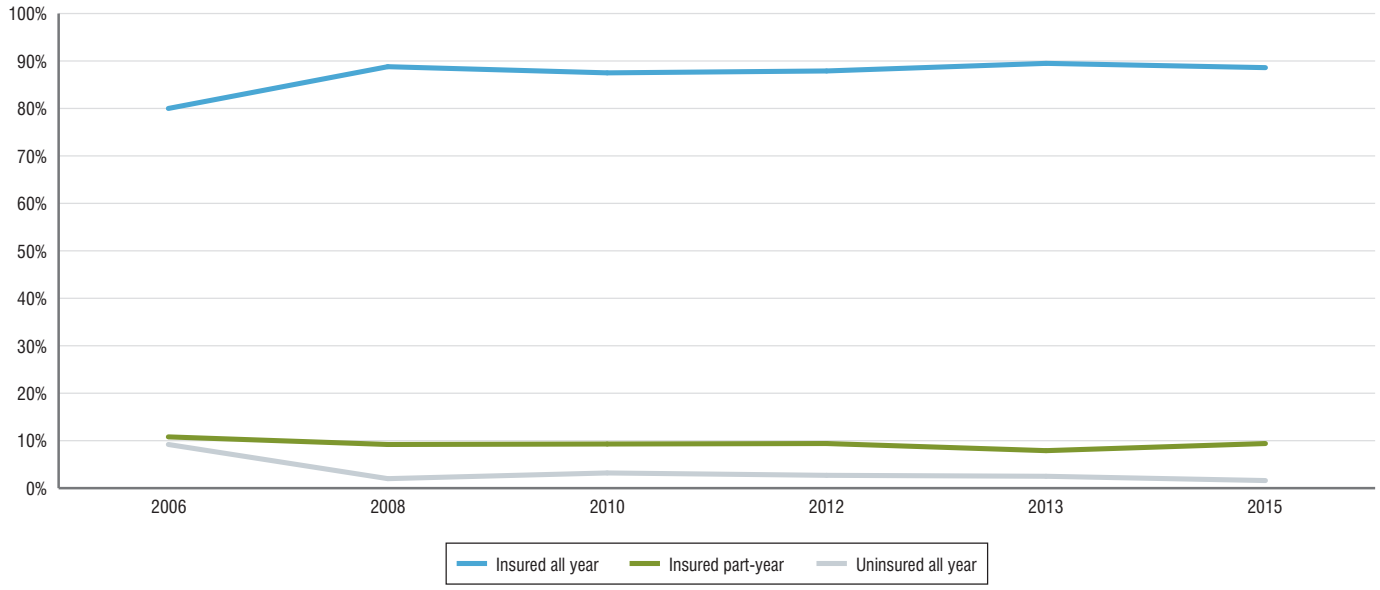
Nationally and in Massachusetts, the percentage of covered workers in self-insured plans has been increasing. In 2016, 61% of U.S. workers with ESI were in a self-insured plan, up from 44% in 1999.[60] In 2015, self-insured plans in the Commonwealth accounted for nearly 60% of commercial membership (2.7 million members).[61]

In the Commonwealth, the rate of enrollment in self-insured plans has been increasing since the mid-1990s, especially among employers with 1,000 or more employees.[62] Employees of large firms in Massachusetts are most likely to be covered by a self-insured plan. In 2016, 83% of residents receiving coverage through a firm of more than 500 employees were covered by a self-insured plan. Among smaller employers—especially firms with fewer than 101 employees—self-insurance adoption remains low, around 5%.

Massachusetts trend, 2011–2015

Among market enrollees with ESI, the prevalence of self-insured plans increased 8.7% from 2011 to 2015, as shown in Figure 1.1.7. The largest increase, from 14.8% to 35.3%, was among firms with 100 to 999 employees.

Figure 1.1.5. Health insurance coverage (Massachusetts adults, aged 19–64)



Note: U.S. data includes Massachusetts. Data show spending growth from previous year to year indicated.
Source: HPC. (2017). 2016 Cost Trends Report. Retrieved from p. 14 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

"[One] major driver of cost in Massachusetts is that it's a high-income state. When you're a high-income state, you spend more money on everything."

— Áron Boros, former Executive Director, CHIA

ENROLLMENT IN ALTERNATIVE PAYMENT METHODS PROGRAMS

Background

Encouraging wider use of alternative payment methods (APMs) is one of the top goals of the federal Medicare Access and CHIP[63] Reauthorization Act of 2015[64] and the Commonwealth's Chapter 224. Whereas traditional "fee-for-service" billing pays providers for each procedure and test they perform, APMs pay providers based on other factors, including the quality of care provided, patient health outcomes, and the intensity of patient health needs. Policymakers hope that shifting payment incentives to these factors will help reduce unneeded spending while encouraging the provision of quality care. Early signs are encouraging: Among provider groups in Massachusetts, higher AMP adoption is associated with lower growth in total medical expenses in subsequent years.[65]

Chapter 224 directed MassHealth to move 80% of its members into APMs by July 2015.[66] The agency did not meet this ambitious goal; only 22% were enrolled in 2014.[67]

Among the six largest Massachusetts-based commercial insurers, APM adoption ranged from 28.7% (Fallon) to 69.8% (Health New England) in 2015.[68] Indiana-based UniCare (which primarily covers Group Insurance Commission, non-Medicare, retirees) placed 42% of its Massachusetts commercial members in APMs in 2015.[69]

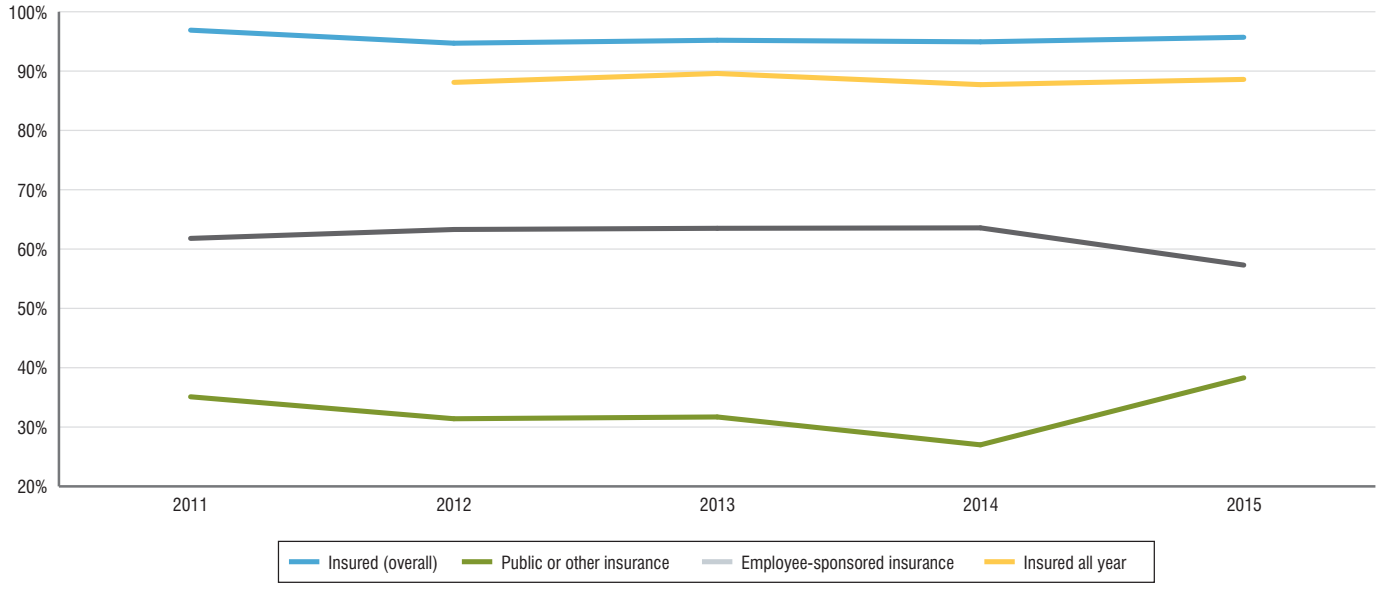
According to a 2015 report by the AGO, global payments—a form of APM—encourage care coordination and efficiency yet have reinforced historic payment disparities, with lower-cost providers receiving lower payments per patient.[70] This can already be seen among "global budget" plans, which pay providers a flat rate per member per month (PMPM). In 2013, base payments for these programs ranged from about $370 to $515 PMPM.[71]

Tiered-network insurance plans are another product design meant to encourage higher-value care choices. Members of these plans have lower copayments when they visit lower-cost, high-quality providers in their network and higher copayments when they visit other providers. From 2011 to 2015, enrollment in tiered networks increased from 9% of the commercial market to 16%.[72,73] However, as of 2015, these plans had not shifted patient volume away from higher-priced providers in Massachusetts.[74] The AGO recommends that differences in copayment levels be increased to more aggressively encourage consumers to visit higher-value providers.[75]

Massachusetts trend, 2012–2015

As shown in Figure 1.1.8, the share of insured Massachusetts residents (of all ages) enrolled in an APM increased from 2012 (29%) to 2015 (35.1%). The increase was largest among the MassHealth Primary Care Clinician (PCC) Plan and MassHealth Managed Care Organization (MCO)[76] populations. APM adoption in the traditional Medicare program has been lower than in Medicare Advantage: in 2015, 38% of traditional Medicare beneficiaries, and 58% of Medicare Advantage beneficiaries, were in APMs.[77]

Figure 1.1.6. ESI versus public insurance coverage (Massachusetts adults, aged 19–64)



Source (2011/2014): CHIA. (2013, January). Massachusetts Health Insurance and Employer Survey chartbook updates for 2011, p. 5. Urban Institute tabulations on MHIS.
Source (2012–13/2015): MHRS

"Individual doctors are often paid in a fee-for-service manner. And we're obviously moving away from that and there's more awareness of cost efficiency."

— Áron Boros on incentive-based payments

UNINSURANCE DEMOGRAPHICS

In 2016, 8.9% of respondents to the National Health Interview Survey were uninsured at the time of the survey.[78] The following factors contribute to higher uninsurance rates among some groups:

- Lower awareness of available subsidies (particularly among Latinos and young adults)
- Concerns about plan affordability
- Difficulty selecting plans during the enrollment process
- Insufficient assistance with selecting plans
- The coverage gap created by having income too high for a premium subsidy and being too young to enroll in Medicare
- The ACA's exclusion of immigrants without legal status from coverage expansions.[79]

In Massachusetts, young adults, unmarried adults, males, Latinos, non-citizens, and the low-income are most likely to be uninsured, according to 2011–2012 data.[80] About 60,000 people, or 1% of the population, were uninsured for all of 2011 and 2012, although most of this population had incomes low enough to qualify for free or low-cost health coverage. Those who were uninsured for part or all of 2011 were at high risk of being uninsured for at least part of 2012.[81]

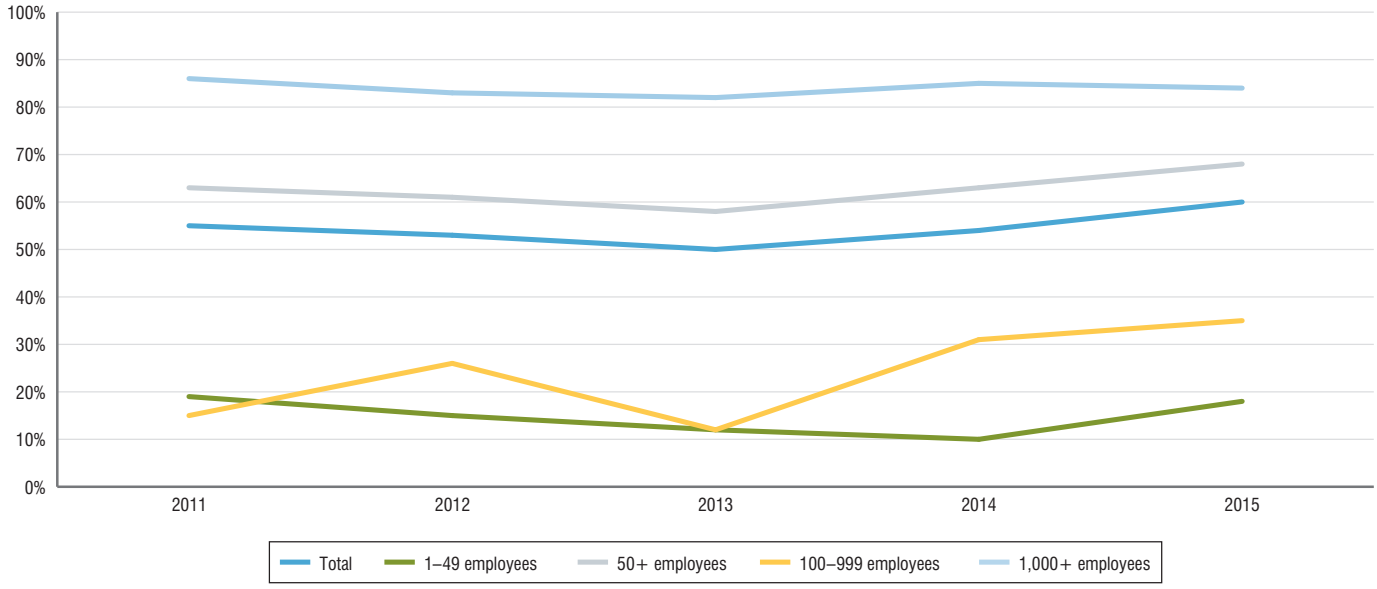
Despite the Commonwealth's low uninsurance rate, pockets of high uninsurance persist. From 2010 to 2014, the mean uninsured rate among communities ranged from 0% to 18.8%, and 1 in 10 communities had an uninsurance rate of at least 6.6%.[82] On a community level, the strongest predictors of high uninsurance are poverty and household income; these variables also capture associated variables, including relatively low employment, low-wage employment, low educational attainment, and a high share of income spent on housing.[83]

Figure 1.1.9 shows the average uninsured rate over the 2010 to 2014 period, by census area. Communities with high uninsurance were concentrated in parts of Boston, Cape Cod, the Islands, and the southern Berkshires. Communities with very low uninsurance were spread throughout the state, including a concentrated ring near Boston.

As shown in Figure 1.1.10, many uninsured individuals eligible for MassHealth following the program's 2014 eligibility expansion resided near major Massachusetts cities, including Boston, Fall River, Gloucester, Lawrence, Lowell, New Bedford, Pittsfield, and Springfield.

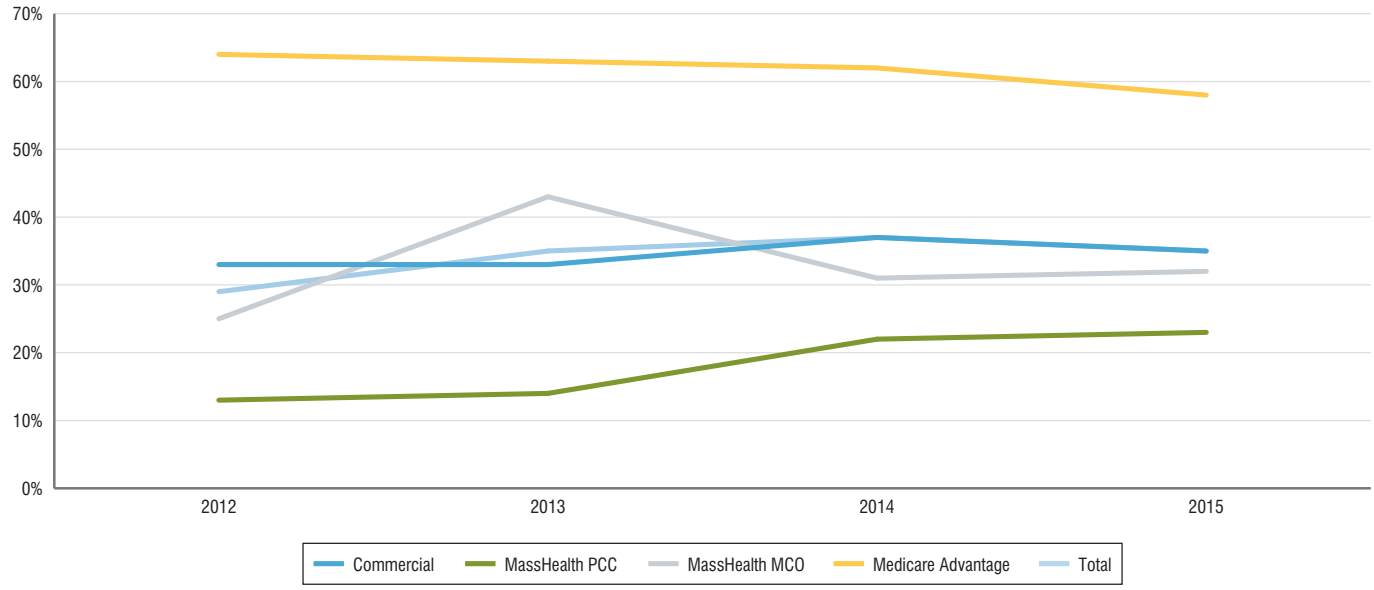
Figure 1.1.11 shows the national uninsured rate declined from 15.1% in 2011 to 8.8% in 2016. In Massachusetts, uninsurance is almost non-existent among adults older than 64 years and is very low (below 2%) among children.

Figure 1.1.7. Percentage of employees enrolled in self-insured plans at companies that offer insurance (by firm size, Massachusetts)



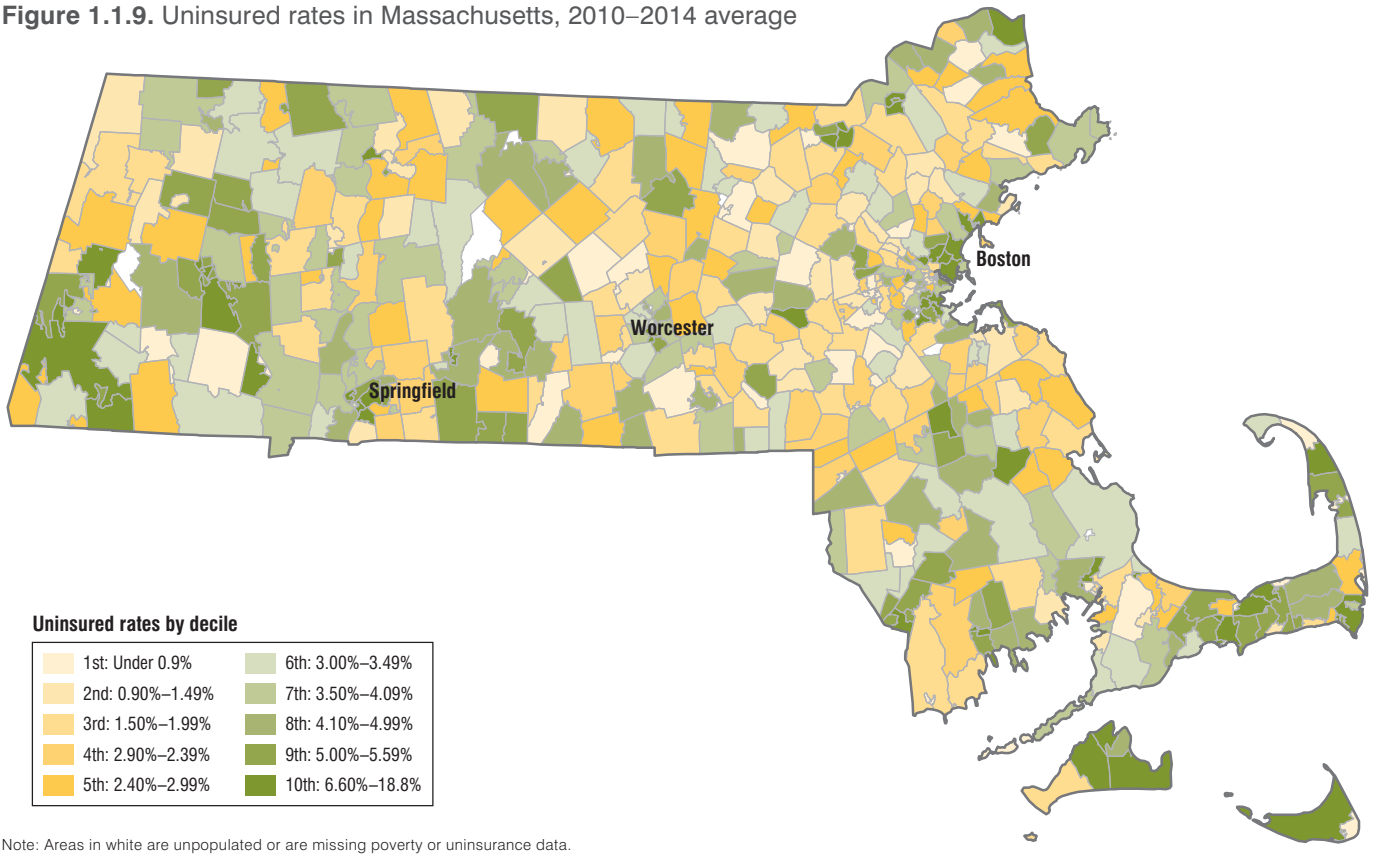
Source: AHRQ Medical Expenditure Panel Survey 2011–2015. Retrieved October 27, 2016, from meps.ahrq.gov/mepsweb

Figure 1.1.8. Percentage of members enrolled in APMs (Massachusetts)



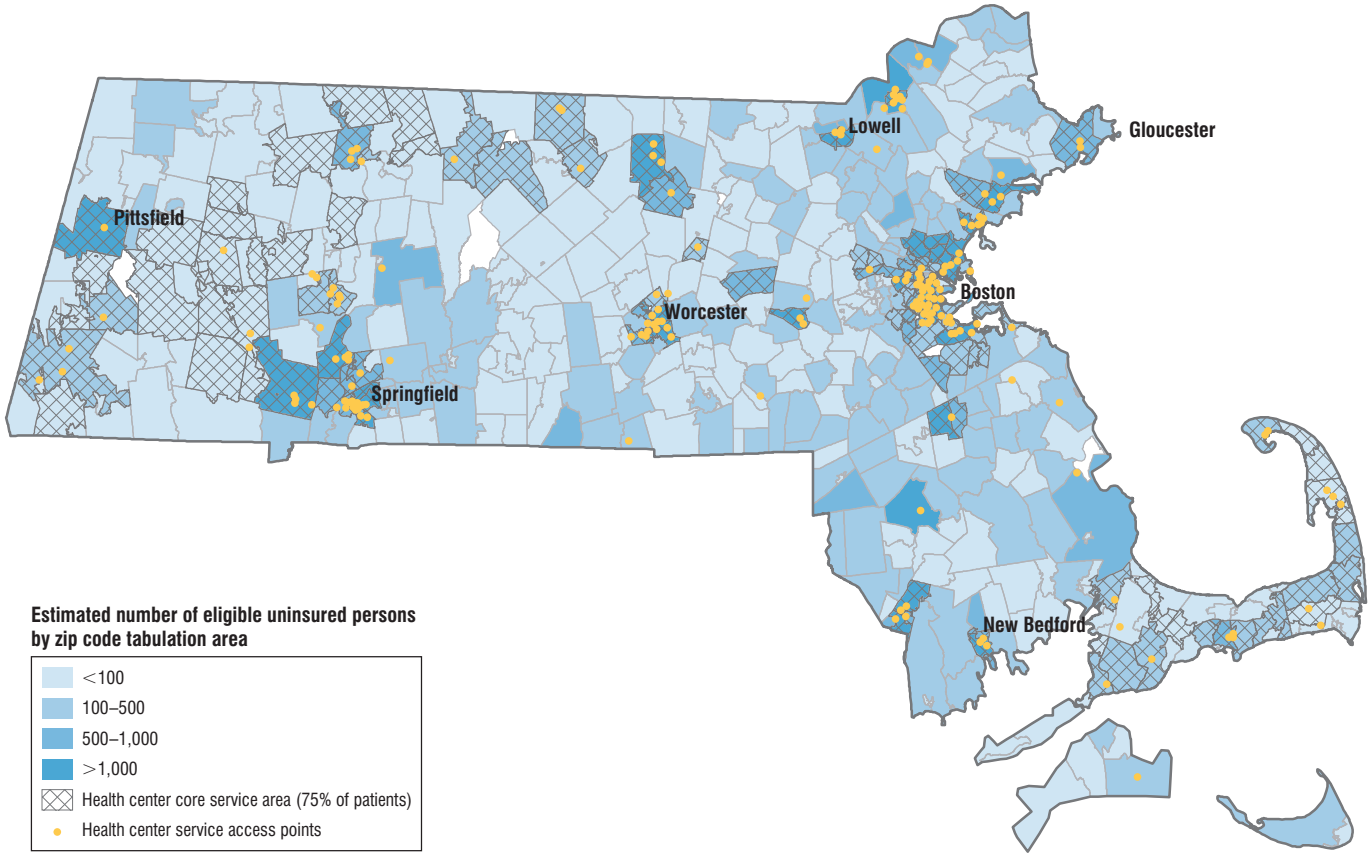
Note: Data for 13 Massachusetts payers that account for 99% of the commercial market.
Source 1 (MassHealth PCC data): HPC. (2015, January). 2014 Cost Trends Report. Retrieved January 29, 2015, from p. 55 of http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/2014-cost-trends-report.pdf
Source 2 (2015 data): Center for Health Information & Analysis. (2016, September). Performance of the Massachusetts health care system. Retrieved September 28, 2016, from p. 24 of http://www.chiamass.gov/assets/2016-annual-report/2016-Annual-Report.pdf
Source 3 (other data): Center for Health Information & Analysis. (2015, January). Performance of the Massachusetts health care system series: adoption of alternative payment methods in Massachusetts, 2012–2013. Retrieved January 26, 2015, from p. 2 of http://chiamass.gov/assets/Uploads/APM-Policy-Brief.pdf

Figure 1.1.9. Uninsured rates in Massachusetts, 2010–2014 average



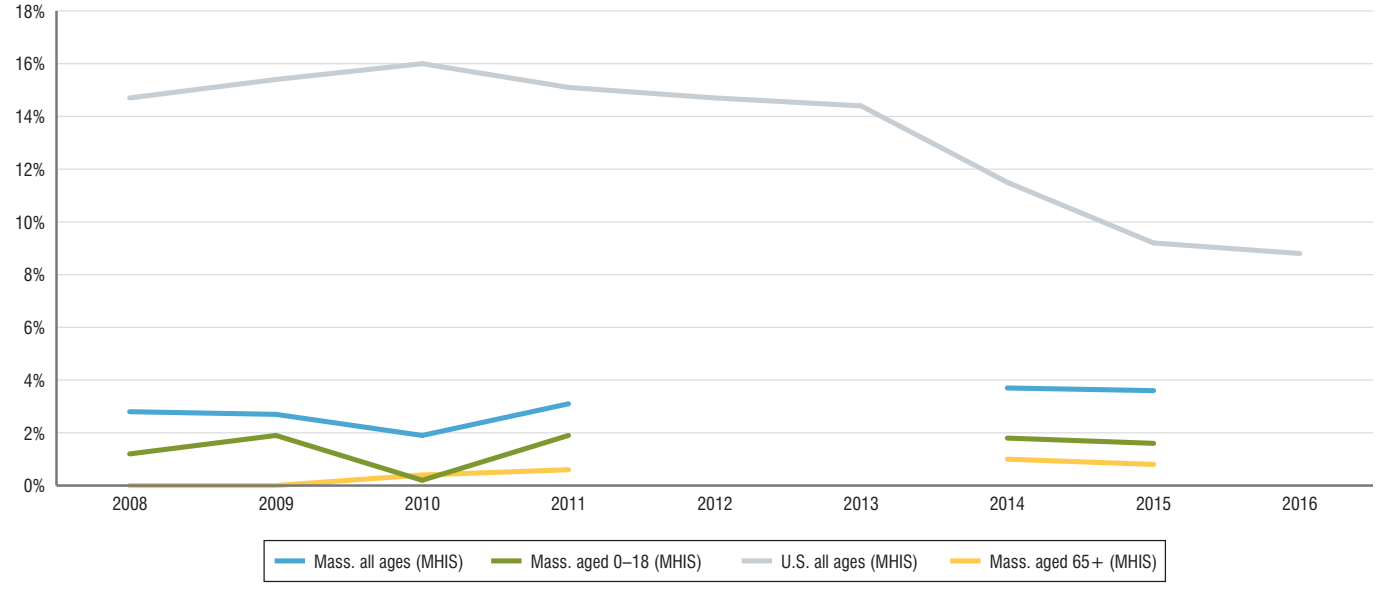
Note: Areas in white are unpopulated or are missing poverty or uninsurance data.
Source: Blue Cross Blue Shield of Massachusetts Foundation. (2016, December). Community matters: exploring the link between community characteristics and uninsurance in Massachusetts. Retrieved December 23, 2016, from bluecrossmafoundation.org/sites/default/files/download/publication/CommunityMatters_Dec2016_final.pdf

Figure 1.1.10. Uninsured population eligible for MassHealth after ACA expansion



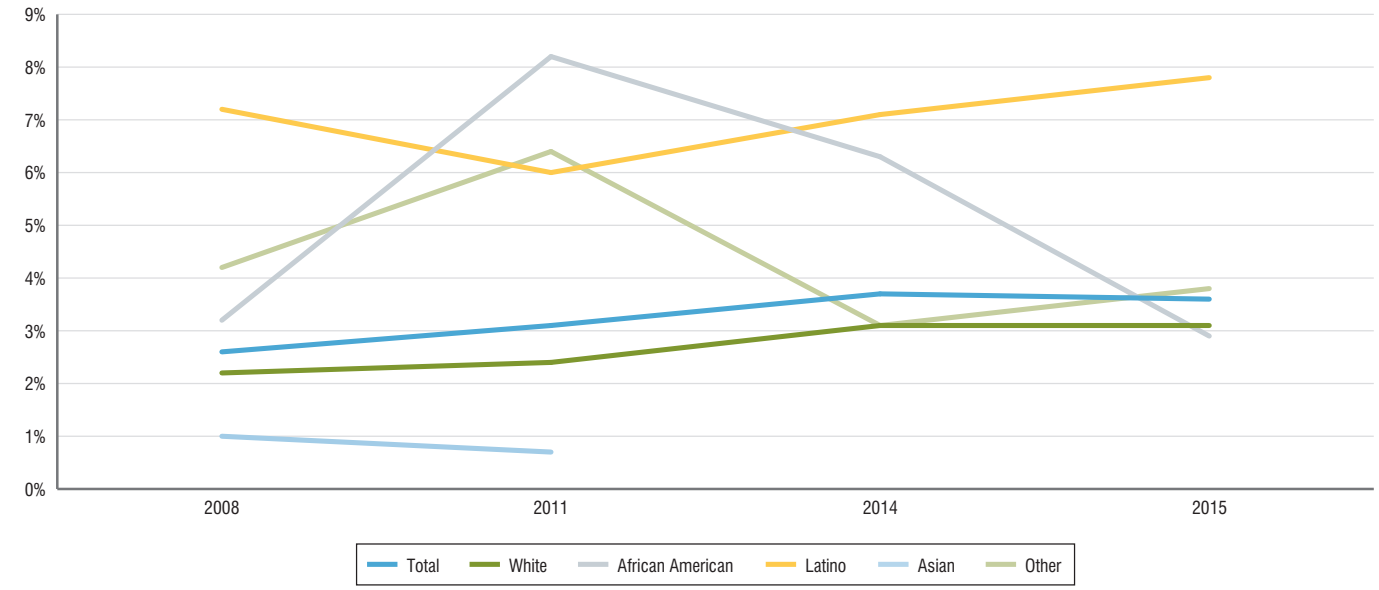
Note: Map shows eligible uninsured persons below 138% of the federal poverty level (FPL).
Source: The uninsurance explorer. (2014). Health Resources and Services Administration, Bureau of Primary Health Care (HRSA/BPHC). Retrieved from udsmapper.org/docs/uninsured_maps/Massachusetts.pdf

Figure 1.1.11. Uninsured rate (Massachusetts and U.S.)



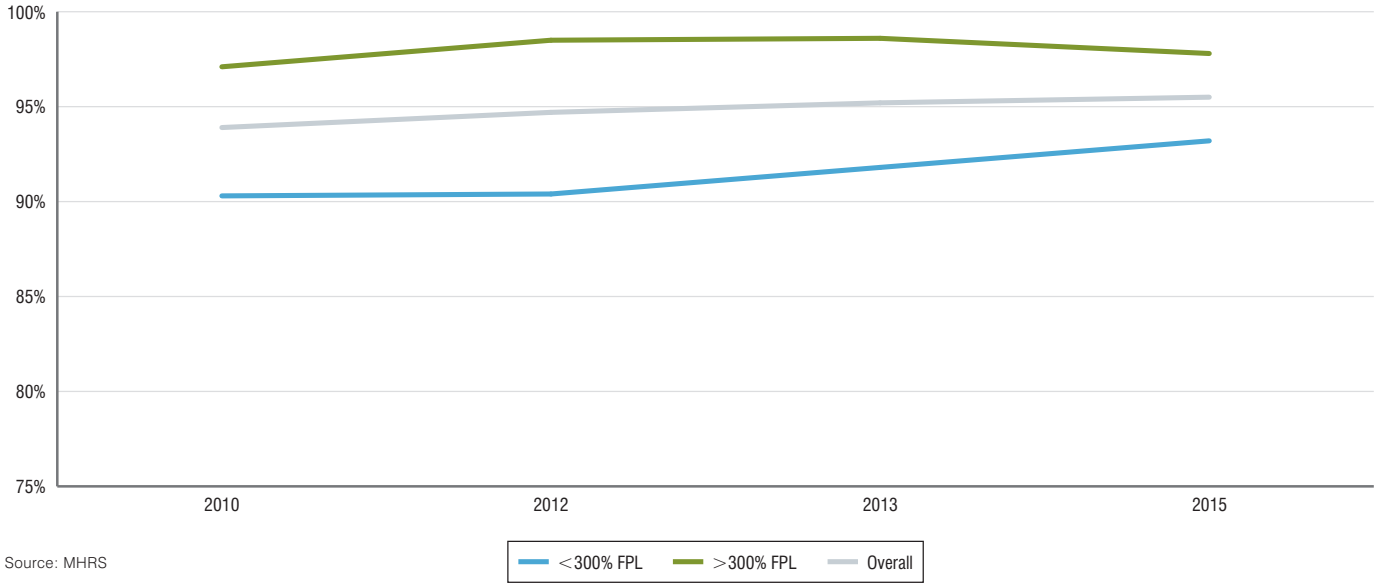
Note: Data unavailable in years surveys were not administered (MHIS 2012–2013).
Source 1: MHIS, 2008–2015
Source 2: National Health Interview Survey, 2008–2016

Figure 1.1.12. Uninsured rate by race/ethnicity (Massachusetts)



Note: The survey was not conducted in 2012 and 2013. Asians were not included in the 2014 and 2015 surveys.
Source: Massachusetts Health Insurance Survey

Figure 1.1.13. Insurance coverage by income (Massachusetts, aged 19–64)



Source: MHRS

UNINSURANCE BY RACE/ETHNICITY

Background

Uninsured rates by race/ethnicity vary significantly. Nationwide in 2016, among people aged 0–64, 7.5% of Whites were uninsured, compared to 19% of Latinos, 11.6% of African Americans, and 6.3% of Asians.[84]

Latinos[85] are a growing share of the uninsured population nationwide, rising from 29% in 2013 to 40% in 2016.[86] Factors contributing to high uninsurance among Latinos include:

- Younger adults are more likely to be uninsured, and Latinos on average are younger than the overall U.S. population.[87]
- Latinos make up the largest group of immigrants, and the uninsured

rate for non-citizens is more than three times that for U.S.-born persons,[88] in part because the ACA explicitly disallows purchase of insurance by immigrants living in the U.S. without authorization.[89] Moreover, except for limited emergency services, they continue to be ineligible[90] for government-subsidized insurance programs (including Medicare[91] and Medicaid[92]), despite paying taxes and contributing to the overall economy in many ways.

- Lower-income adults are more likely to be uninsured, and Latino median income is lower than the national median.[93]
- Some uninsured Latinos may fear signing up for insurance due to their immigration status, which also reduces enrollment in programs to which other family members are entitled (e.g., parents of a citizen child who is eligible for CHIP).[94]
- Other obstacles, such as language barriers and a lack of culturally-relevant enrollment outreach programs.[95]

Massachusetts trend, 2008–2015

From 2008 to 2015, uninsurance increased slightly among all Massachusetts residents. There was a slight increase among Whites and among Latinos, who have the highest uninsured rate, as shown in Figure 1.1.12. The uninsurance rate among African Americans rose substantially before ultimately falling to a rate in 2015 that was lower than the 2008 rate.

INSURANCE COVERAGE BY INCOME

Background

Since before Chapter 58 health reform, Massachusetts residents with family incomes >300% FPL have been more likely to have health coverage than their lower-income peers. Adults with family income <139% FPL are eligible for MassHealth and those with income <401% FPL are eligible for subsidies on Health Connector plans. But due to cost, lower literacy, not knowing how to obtain insurance, and (in some cases) disinterest, lower-income adults are less likely to have coverage.

As premiums rise, even subsidized coverage can be too costly for some. Indeed, a growing share of health plans have a deductible greater than $1,000 per person,[96] which may especially impact people 139–400% FPL who qualify for smaller subsidies than those at <139% FPL but have less disposable income than those >400% FPL.

In Massachusetts, total spending on health care (including employer contributions) is as high as 30% of income for a family of three at 300% FPL. Roughly a quarter of Massachusetts households have income around this level.[97]

Among low-income adults, changes in insurance coverage over time, known as "churning," is associated with disruptions in access to physician care and medications, increased emergency department use, and decreased self-reported health status.[98] These changes are typically due to fluctuations in income or employment and can lead to negative outcomes even if the enrollee experiences no gap in time with coverage.[99]

Massachusetts trend, 2010–2015

From 2010 to 2015, insurance coverage increased slightly in Massachusetts, as shown in Figure 1.1.13. Coverage grew slightly among wealthier residents and rose three percentage points among lower-income residents.

Section 1.2: Cost-Sharing and Premiums

A NOTE ABOUT THE DATA

This section focuses on the cost of health care to consumers and employers. Topics include problems paying medical bills, cost-sharing, insurance premiums for various types of plans, and medical loss ratio rebates.

OSA utilized several secondary data sources to present a longitudinal perspective, including:

- CHIA, including the Massachusetts Health Insurance and Employer Survey
- HPC, especially its annual cost-trends reports
- The Kaiser Family Foundation
- The Commonwealth Fund
- CMS

OVERVIEW

Consumers with health insurance have seen their share of health care costs increase in recent years. These costs, known as cost-sharing provisions, include the following:

- Premiums, the amount a consumer pays for health insurance each month;
- Co-insurance, the percentage of costs of a covered health service a consumer pays (for example, 20%) after paying the deductible.
- Copayments, a fixed amount that a consumer pays for covered health services; and
- Deductibles, (the amount a consumer pays for covered health services before the insurance plan starts to pay[1]).

Consumers have long been accustomed to paying premiums and copayments,[2] but deductibles have become more common and larger. Payers hope if consumers have "more skin in the game," it will encourage their frugal use of health services.

Health care is one of many priorities in household budgets, and out-of-pocket costs can make it more difficult for consumers, especially those with low incomes, to access needed care. Cost-sharing represents a barrier to preventive care, prescription drugs, and chronic condition management.[3] According to a 2015 survey by the Federal Reserve, only 53% of respondents say they could pay a $400 emergency expense without selling something or borrowing.[4] Even non-poor households struggle to build savings; households slightly above the poverty line (100%-250% FPL) have a median $766 in liquid assets, according to 2013 data.[5]

As payers augment cost-sharing mechanisms, this economic context is inescapable. In 2012, nearly 1 in 10 Massachusetts nonelderly adults reported cost-sharing spending greater than 10% of family income. Additionally, 1 in 5 reported having outstanding medical bills they were paying off over time.[6] Although those with outstanding medical bills were more likely to have been uninsured at some point over the past year, health insurance coverage does not eliminate the cost burden.

The phenomenon of having high health costs relative to income despite being covered by insurance for the full year is sometimes called "underinsurance."[7] Underinsurance can lead to higher rates of unmet health needs and may be of particular concern for individuals not eligible for Medicaid (especially those close to the poverty line). Specifically, households are underinsured when they:

- Spend at least 10% of income on premiums (7% if <200% FPL); or
- Have a deductible of at least 5% of income; or
- Excluding premiums, spend at least 10% of income on health care (5% if <200% FPL).[8]

OUT-OF-NETWORK BILLING

In certain scenarios, even patients with quality insurance coverage can get "surprise" bills if they receive out-of-network care, often without their knowledge. For example, a patient may get a bill from an out-of-network provider after receiving care at an in-network facility in an emergency. One result of this may be balance billing, when a patient receives a bill for the difference between the insurer's negotiated payment (the "allowed amount") and the provider's charges.[9]

There is no standardized approach to addressing these billing concerns among Massachusetts insurers, and patients may not be aware of their rights to contest such bills. HPC has been exploring possible steps the Commonwealth could take to protect consumers, including prohibiting balance billing, compelling insurers and providers to arbitrate to resolve disputes over these bills, and requiring facilities to inform patients which providers are in their network.[10]

According to a 50-state analysis of 2.2 million emergency department (ED) visits, of visits that occurred at in-network facilities, 22% involved out-of-network physicians.[11] In Massachusetts, the eastern part of the Commonwealth has the highest proportion of ED visits involving out-of-network physicians; central Massachusetts has the lowest proportion.[12]

"Reference pricing [is useful]. ...You can go online and figure out how much you would pay out-of-pocket for getting a CT scan at different places. But very few people actually know that they can do that."

— David Cutler, Commissioner, HPC

RESIDENTS REPORTING PROBLEMS PAYING MEDICAL BILLS

Background

In 2015, a national survey found that 25% of people with commerical insurance had high health care cost burdens relative to income.[13] Among those <200% FPL, 53% had these burdens.[14] Moreover, 16.4% of persons under age 65 were in families having problems paying medical bills in the past 12 months, although this represents a statistically significant decrease since 2011.[15]

The situation in Massachusetts is similar, as 18.3% of insured adults had problems paying medical bills in 2015 after a statistically significant decrease from 2006.[16] Among adults who had health insurance all year, 15.9% had problems paying medical bills; however, this same group had a significant increase in medical bills being paid off over time (17.2% in 2006 to 21.3% in 2015).[17] Those in fair or poor health had the most problems (32.3%) paying medical bills in 2015.[18]

In 2015, one in five Massachusetts adults (aged 19 to 64) used a strategy to address high health care costs: 17.1% cut back on other spending, 15.2% cut back on savings, 11.4% cut back on health spending, 9.8% worked more, and 8.8% borrowed money.[19]

In 2013, Long and colleagues found that a high-deductible health plan (HDHP)—defined by the Internal Revenue Service as any plan with a deductible of at least $1,300 for an individual or $2,600 for a family[20]—increased the likelihood of Massachusetts residents having problems due to health care costs by 21.7 percentage points.[21] Surprise bills and balance billing also contribute to this issue.

Massachusetts trend, 2011–2015

From 2011 to 2015, the total share of Massachusetts residents with problems paying medical bills decreased slightly, as shown in Figure 1.2.1. The largest decrease was among older adults (from 11.3% to 8.3%). However, there was no decline among adults aged 19 to 64, who reported the most problems paying medical bills.

PER MEMBER PER MONTH SPENDING ON MEDICAL CLAIMS

Background

Rising health care costs can lead consumers, employers, and government to reduce their spending on other priorities, including retirement savings, worker raises, investment by businesses, and non-health governmental programs.[22] As prices continue to rise, further increases to per member per month (PMPM) spending on health care services are expected.

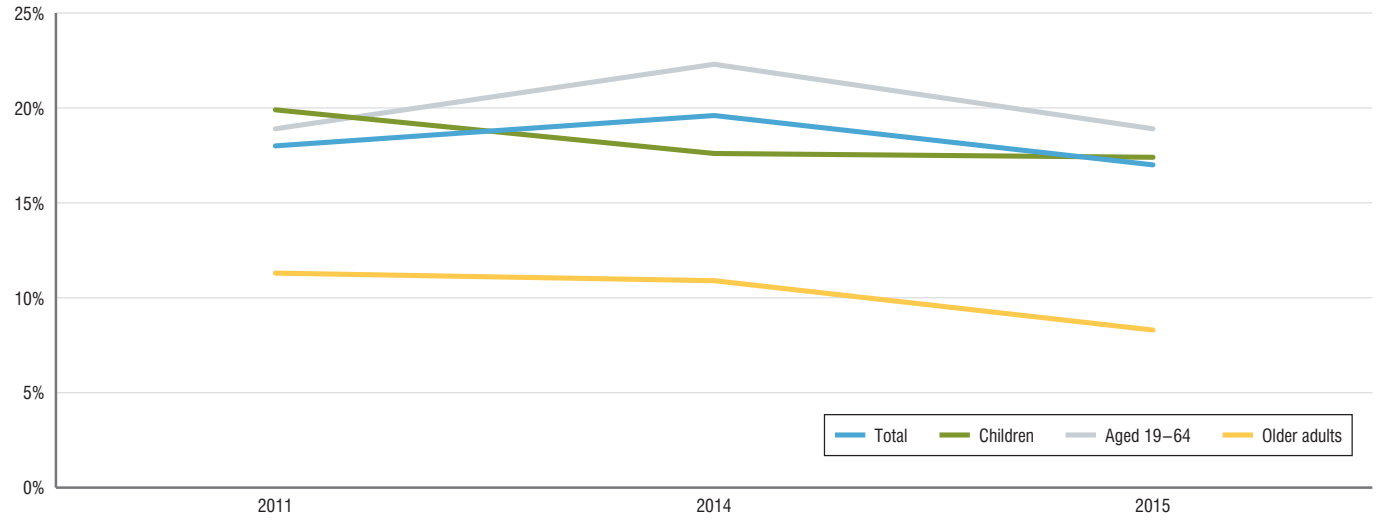
Massachusetts trend, 2010–2015

As shown in Figure 1.2.2, PMPM spending on commercial medical claims rose 10.5% from 2010 ($400) to 2015 ($442), including a 2.7% increase from 2014 to 2015.[23]

"Consumers certainly end up with medical bills that they're not expecting. ... We see a lot of people who go into a doctor's office thinking that they're covered, and they're really not."

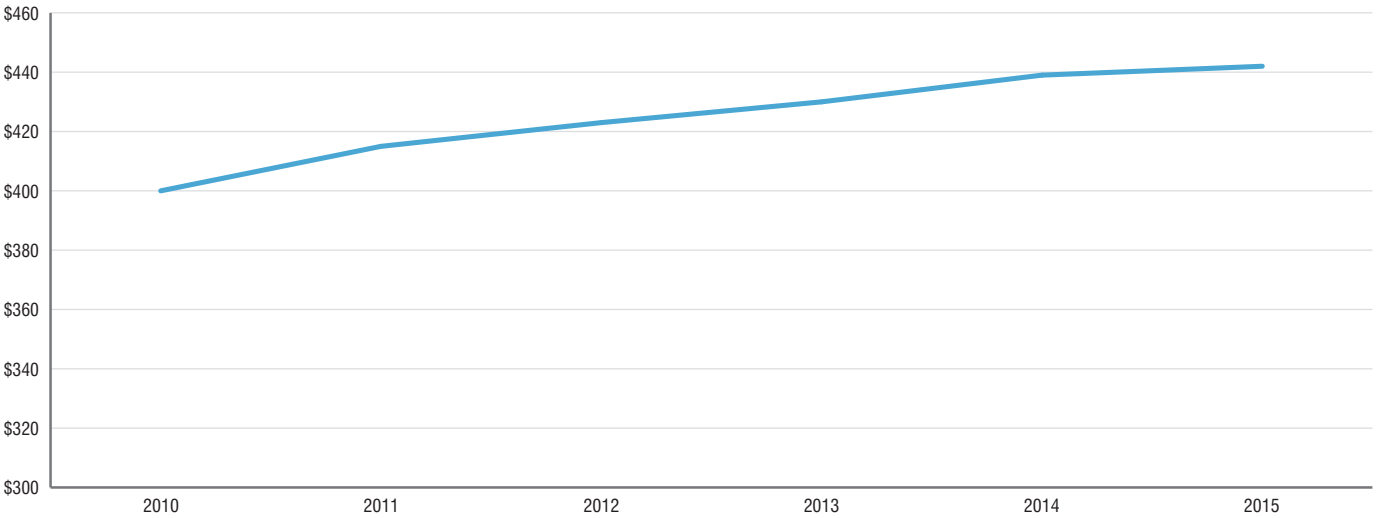
— Matt Selig, Executive Director, Health Law Advocates

Figure 1.2.1. Problems paying medical bills (all Massachusetts residents)



Note: The survey was not administered in 2012 and 2013.
Source: MHIS

Figure 1.2.2. PMPM spending on medical claims (commercial)



Note: The figure shows the full amount paid to providers for covered health care services delivered to a payer's member population (payer and member cost-sharing payments combined).
Source: CHIA performance of the Massachusetts health care system annual reports. Retrieved from chiamass.gov/annual-report

PATIENT COST-SHARING AS A SHARE OF TOTAL MEDICAL CLAIMS

Background

Nationally, commercial insurance coverage has become less comprehensive, as evidenced by the sharper increase in average annual cost-sharing by patients.[24] Much of this increase has been driven by the 256% increase in the average deductible from 2004 to 2014,[25] as well as a 107% rise in co-insurance over this period.[26]

In Massachusetts, 17.8% of commercial enrollees had a HDHP in 2013, up from 10.3% in 2008.[27] Membership in these plans has continued to grow, with 21% of commercial enrollees in a HDHP in 2015.[28]

HDHPs are more prevalent in the small group (47% of plans) and mid-size markets (37% of plans) than in the large market (26% of plans) or the jumbo market (16% of plans).[29] (Generally, the small group market serves companies with fewer than 100 employees. The large group market serves larger companies.)

In 2015, the average member of a Massachusetts commercial insurance plan spent $47 a month on cost-sharing (deductibles, copayments, and coinsurance), an increase from $43 in 2013.[30] This increase was larger than inflation and wage growth.[31]

Among fully-insured plans, cost-sharing was $51 PMPM; among the self-insured, it was $44 PMPM. Members of firms with at least 500 employees, which are largely self-insured, paid $43 PMPM; those with fewer than 50 paid $61 PMPM.[32]

Massachusetts trend, 2011–2015

From 2011 to 2015, cost-sharing as a share of total medical claims increased from 7.2% to 10.63%, thanks in part to adoption of HDHPs, as shown in Figure 1.2.3.

COST-SHARING AND FAMILY INCOME (COMMERCIAL)

Background

From 2010 to 2013, cost-sharing as a share of family income increased substantially in Massachusetts. Among those <300% FPL, the percentage of households spending at least 10% of family income on cost-sharing increased from 6.8% in 2010 to 12.2% in 2013.[33] Among those 300–399% FPL, the share rose from 3.8% to 5.4%. Among those >400% FPL, the share fell from 2.5% to 2.1%.[34]

Lower- and higher-income employees pay similar health insurance premiums in the Commonwealth: At low-wage firms (those where most employees earn less than $25 an hour), the average monthly premium for single coverage was $489 in 2014; at high-wage firms, the average was $539.[35] Annual cost-sharing levels are also very similar for individuals in low- and high-income areas of the state.[36]

Cost-sharing was particularly high for Massachusetts residents with behavioral health conditions in 2014.[37] For example, individuals with mood disorders paid for 8% of their medical bills through cost-sharing, compared to those with cancer, who paid for less than 4%.[38]

Nationally, deductibles rose more quickly than income from 2008 to 2014.[39]

Massachusetts trend, 2005–2014

From 2011 to 2014, the average share of income that families spent on premiums and cost-sharing declined slightly, even as premiums continued to rise, as shown in Figure 1.2.4.

COPAYMENTS

Background

Nationally, among the commercially insured, average total annual copayments decreased 26% from 2004 to 2014.[40] This is a unique trend among cost-sharing categories and is likely due to the ACA provision that reduced cost-sharing for certain prevention-related visits.[41]

Despite this decline, copayments can have negative effects on patient access to care. Boosting cost-sharing for prescriptions appears to increase spending on inpatient hospitalizations and emergency department services by beneficiaries who are elderly or recipients of public assistance.[42] Moreover, increasing copayments can depress the use of preventive care services, substance-use treatment, and mental health care.[43]

Massachusetts trend, 2009–2012

From 2009 to 2011, among those with ESI, Massachusetts copayments for each tier of prescription drugs increased by $5, as shown in Table 1.2.1. Copayments also increased 33% for emergency department visits. Among this cohort, copayments overall were stable from 2011 to 2014.

> "I'm a health policy commissioner. I'm the consumer advocate. I'm a physician. ... I try to choose wisely [on seeking a lower-cost provider for my colonoscopy], and I think I failed."
>
> **— Dr. Paul Hattis, former HPC Commissioner, on the difficulty of finding the price of health services**

PREMIUMS FOR CONSUMERS AND EMPLOYERS

Nationwide increases

Across the U.S., commercial insurance premiums have risen substantially in recent years. As shown in Figure 1.2.5, the average annual premium for individual coverage increased from $5,429 in 2011 to $6,435 in 2016, and the average premium for family coverage increased from $15,073 to $18,142. These increases substantially outpaced wage growth and overall inflation. Nevertheless, there is evidence that premiums would have increased even more had it not been for various cost-control efforts, including the ACA.[44]

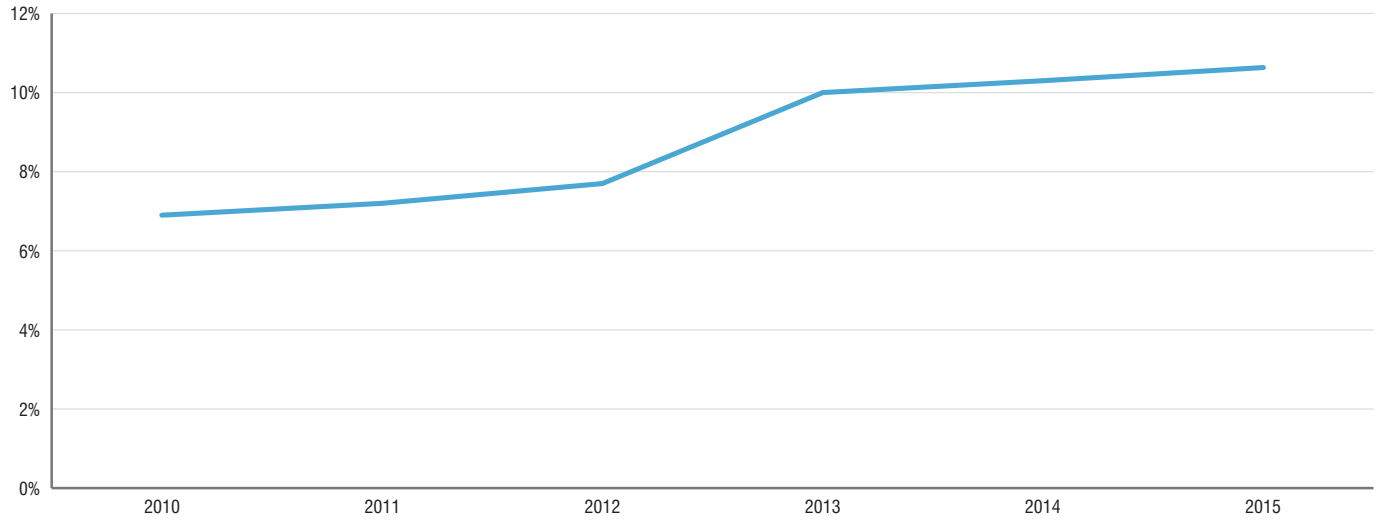
Rising premiums in Massachusetts

The story of rising premiums is similar in Massachusetts. In 2003, the median individual premium was $3,720; in 2014, it was $6,528 (a 75% increase).[45] In 2003, the median family premium was $9,828; in 2014, it was $17,748 (an 81% increase).[46]

Most of the 62 plans offering 2017 coverage through the Massachusetts Health Connector (i.e., not employer-based or self-insured plans) had small premium increases or decreases, according to estimates.[47] But about one-quarter of individuals will pay premiums at least 15% higher than 2016 levels. This increase is smaller than the nationwide increase in premiums for marketplace plans.[48]

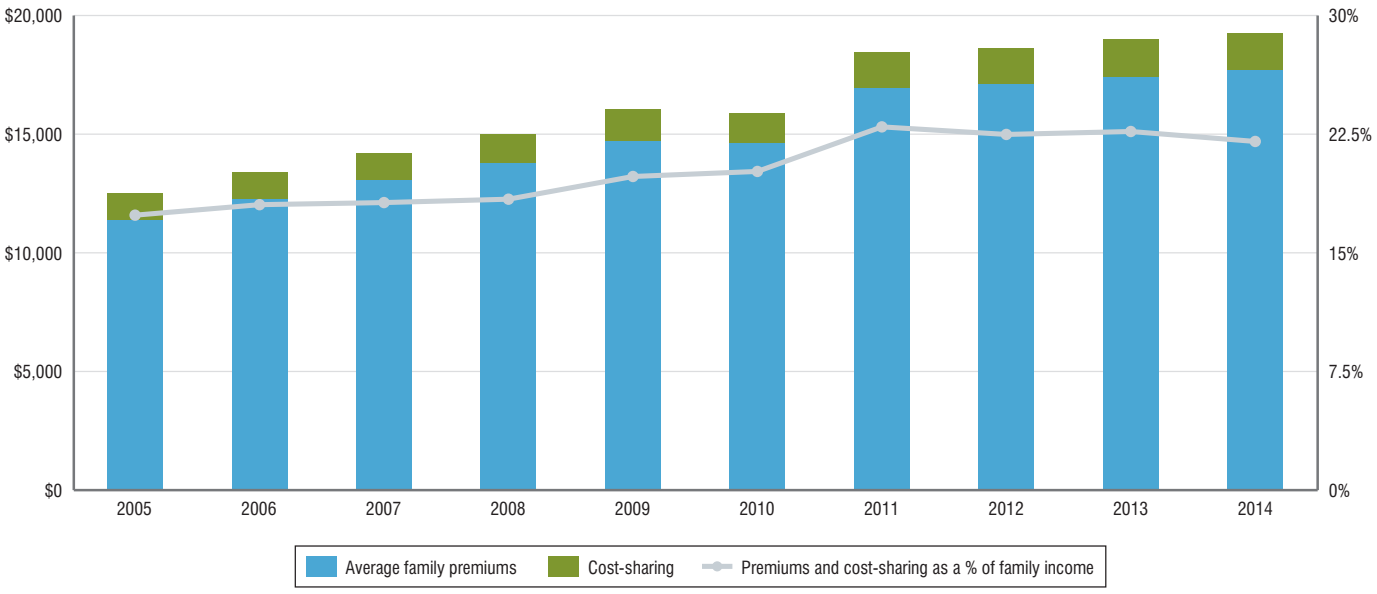
Many Massachusetts insurers have endured recent operating losses. In the first quarter of 2016, Blue Cross Blue Shield, Harvard Pilgrim Health Care, Tufts Health Plan, and Fallon Health each cited rising prescription drug costs, higher use of medical services, and taxes and fees connected to the ACA as driving losses.[49] Indeed, growth in pharmaceutical spending was one of the top areas of concern for insurers at the 2016 HPC Cost Trends Hearings.[50] In an attempt to curb costs and provide value for consumers, established insurers are tweaking their insurance products. A newcomer to the Massachusetts insurance market, Minuteman Health, has struggled since launching in 2013 with the promise of low-premium

Figure 1.2.3. Patient cost-sharing as percentage of total medical claims (commercial)



Source (2010–2012): HPC. (2014, July). Massachusetts commercial medical care spending: findings from the All-Payer Claims Database. Retrieved April 14, 2016, from p. 9 of mass.gov/anf/docs/hpc/apcd-almanac-chartbook.pdf
Source (2013–2015): CHIA annual performance of the Massachusetts health care system reports. Retrieved from chiamass.gov

Figure 1.2.4. Family premiums, cost-sharing, and family income (Massachusetts)



Note 1: Dollars are not inflation-adjusted.
Note 2: Cost-sharing amounts are approximate from 2005 to 2011.
Source: HPC. (2015). 2015 Cost Trends Report. Retrieved April 14, 2016, from p. 11 of http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

insurance;[51] membership has fallen short of projections, and expenses have been higher than expected.[52]

PREMIUMS VERSUS GROWTH IN EARNINGS

Background

From 2007 to 2016, the average hourly earnings of a private-sector employee in the U.S. increased 23.2%,[53] slower than growth in premiums.

Although Massachusetts' premiums are high, they are among the most affordable in the U.S. as measured as a share of income.[54] However, for households with incomes below the Massachusetts median, the Commonwealth's relatively high cost of insurance can be a major burden.[55]

U.S. and Massachusetts trend, 2001–2016

Nationally, employee contributions to premiums for family plans increased more quickly than inflation and wage raises from 2001 to 2016, though the disparity was less dramatic toward the end of that period. (See Figure 1.2.6.)

As a share of income, only the District of Columbia paid less in premium contributions and deductibles than Massachusetts.[56]

AVERAGE MONTHLY PREMIUMS FOR INDIVIDUAL AND FAMILY PLANS

Background

For a variety of economic and health industry reasons, Massachusetts' commercial premiums are higher than the U.S. average.[57] First, Massachusetts has one of the nation's highest per capita incomes, which allows many families to choose more expensive and generous health plans. Second, relative to other states, the Commonwealth has a high concentration of physicians and other health professionals, which makes accessing providers easier, leading to increased use of health services and, in turn, increased premiums.[58]

Despite Massachusetts' high commercial premiums, state premium growth (including cost-sharing) was lower than growth at the national level, from 2012 to 2015.[59]

One way insurance companies are seeking to manage plan premiums is through limited provider networks. Limited-network plans offer members access to smaller networks of lower-cost providers in exchange for lower premiums.[60] In 2015, about 3% of the commercially insured in Massachusetts were enrolled in a limited-network plan, up slightly from 2014.

A study of Massachusetts state employees receiving insurance through the Group Insurance Commission found that, from 2009 to 2012, enrollees in limited-network plans spent almost 40% less on medical care than enrollees in other plans.[61] This reduction reflects the lower prices of services within these plans as well as lower utilization by enrollees. While spending on primary care rose, spending on specialists and hospital care (including the emergency department) decreased. The study did not collect sufficient data to evaluate the effects of limited network plans on health status.[62]

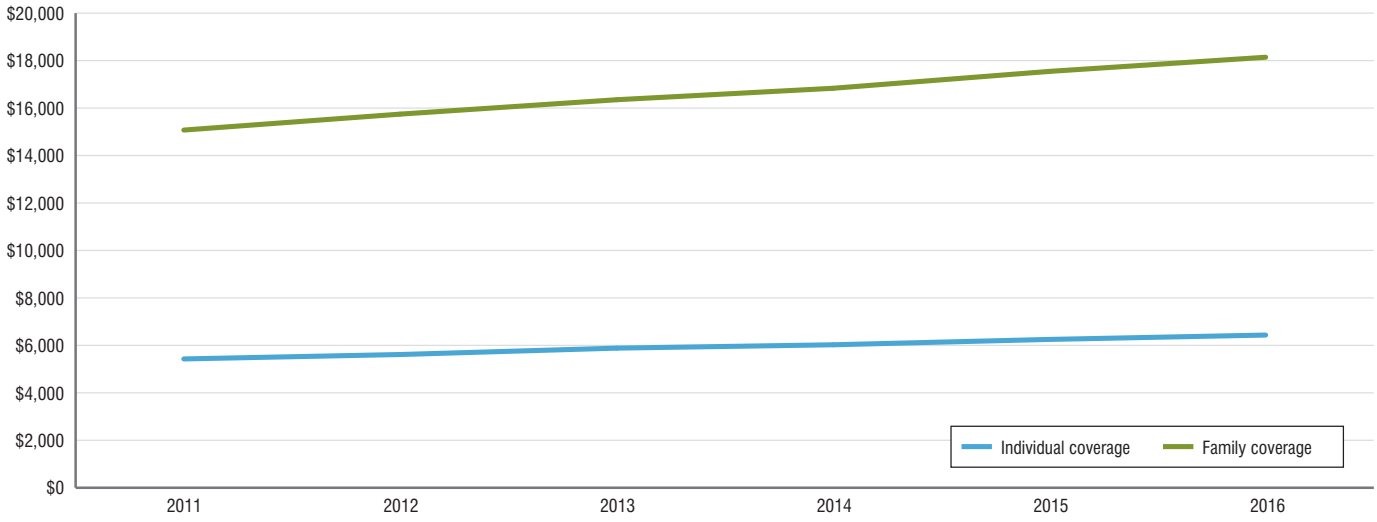
Unsurprisingly, when consumers choose a health plan, premium levels are crucial. Indeed, surveys have found that cost and access to primary care are the top concerns among individuals selecting a plan.[63]

Massachusetts trend, 2010–2015

From 2011 to 2015, average monthly premiums for Massachusetts fully-insured, employer-sponsored plans increased 5.5%, as shown in Figure 1.2.7.

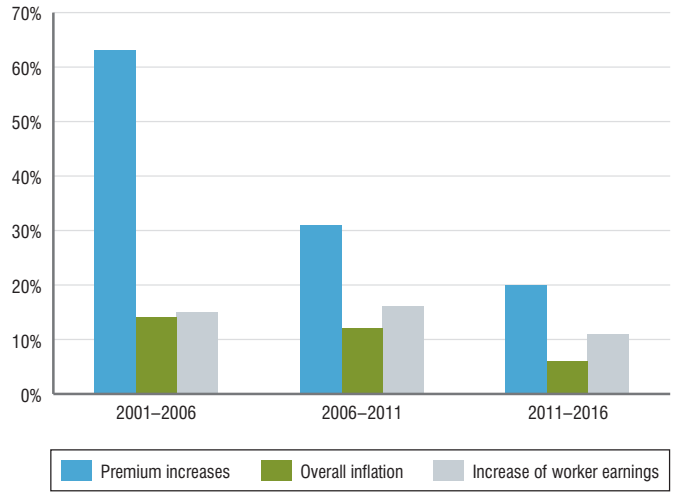
As shown in Figure 1.2.8, the average annual U.S. family premium increased 24.9% from 2010 to 2015, while the average individual premium rose 20.7%. Massachusetts premiums are slightly higher than U.S. premiums.

Figure 1.2.5. Average annual insurance premiums (U.S.)



Source: Kaiser Family Foundation. (2016, September). Employer health benefits 2016 annual survey. Retrieved September 28, 2016, from kff.org/report-section/ehbs–2016-section-one-cost-of-health-insurance

Figure 1.2.6. Increases in employee contributions to premiums for family plans compared to increases in inflation and income growth (U.S., ESI)



Source: Employer Health Benefit Survey 2016. (2016, September). Retrieved September 28, 2016, from p. 3 of http://files.kff.org/attachment/2016-Employer-Health-Benefits-Survey-Release-Slides

Table 1.2.1. Median Copayments (Massachusetts, ESI)

	2009	2010	2011	2012
Physician office visit	$20	$20	$20	$20
Emergency department	$75	$100	$100	$100
Inpatient hospitalization	$250	$300	$250	$250
Outpatient mental health	$20	$20	$20	$20
Tier 1 drugs	$10	$15	$15	$15
Tier 2 drugs	$25	$30	$30	$30
Tier 3 drugs	$45	$30	$50	$50

Source: Center for Survey Research, University of Massachusetts Boston. The 2014 Massachusetts Employer Health Insurance Survey: chart book. Retrieved September 27, 2016, from p. 37 of archives.lib.state.ma.us/bitstream/handle/2452/216847/ocn549563629-2014-chart_book.pdf?sequence=6&isAllowed=y

EMPLOYEE SHARE OF INDIVIDUAL AND FAMILY PLAN PREMIUMS

Background

In 2015, the national average percentage of premium costs that people with employer-based insurance paid was 21% for individual plans and 27% for family plans.[64] However, employees at lower-wage establishments paid more in premiums for individual and family plans than did those working for higher wages.[65]

Among employers, premiums for small businesses have risen particularly sharply in recent years.[66] For example, at the 2016 HPC Cost Trends Hearings, the owner of Berkshire County-based paper company Onyx Specialty Papers Inc. testified that her company's premiums had increased about 70% since 2009.[67]

In Massachusetts and nationwide, small firms tend to require larger employee contributions to cover dependents than larger firms. In 2014, 72% of Massachusetts small firms, but only half of large firms, required employees to contribute more than 25% of the full premium for family coverage.[68]

Massachusetts trend, 2010–2015

As premiums have increased, employees have taken on a greater share of their insurance costs, even as employers spend more on health benefits. As shown in Figure 1.2.9, employees with individual plans paid 22% of premiums in 2010; in 2015, employees paid 24%. As shown in Figure 1.2.10, premiums for employees with family plans rose 30.3%. Employers spent more on premiums as well.

"All of these very, very expensive capital inputs into the health care system, which come out in premiums, there is no policy aimed at optimizing that."

— Thomas Concannon, Senior Policy Researcher, RAND Corporation, on new technologies such as nuclear medicine

MEDICAL LOSS RATIO REBATES TO CONSUMERS

Background

Insurers use the monies from premiums for members' health care; administrative costs, including overhead, salaries, and marketing; and profit. Under Massachusetts law, commercial insurers in the individual and small group markets are required to spend at least 88% of premiums on medical care, while fully-insured, large group plans must spend at least 85% on medical care. There is no such requirement for self-insured plans. Insurers who fail to meet these thresholds must disburse Medical Loss Ratio (MLR) rebates to their customers.[69] Self-insured plans, which cover 61% of people in the Commonwealth with employer-based insurance,[70] are not affected by either federal or state MLR regulations.

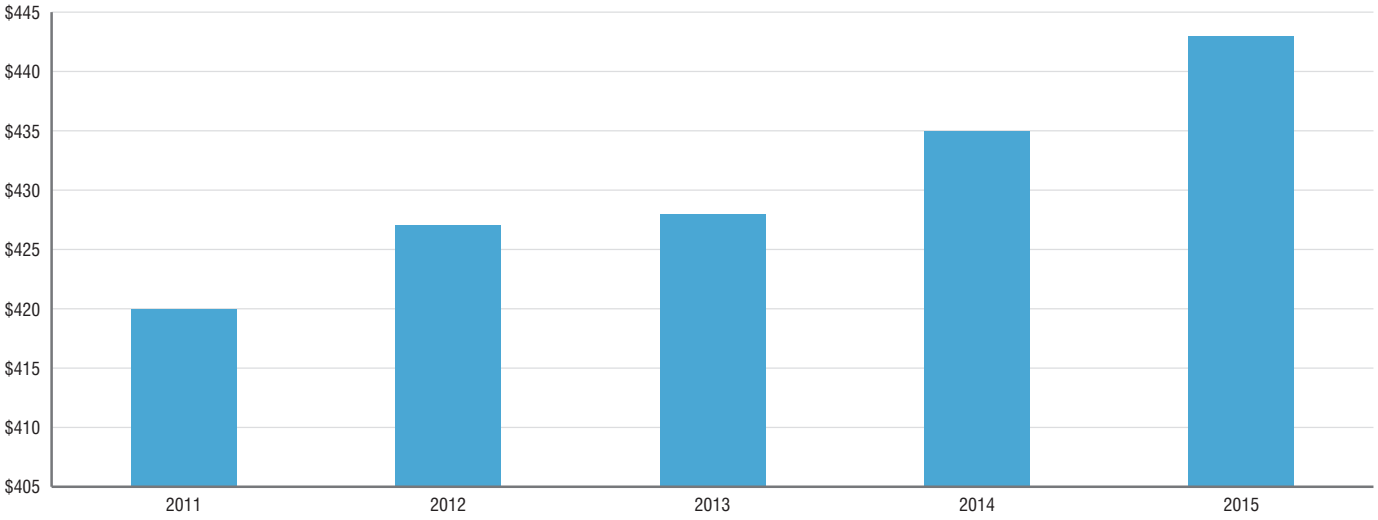
Massachusetts trend, 2012–2015

For consumers in the individual market, total MLR rebates declined from 2012 to 2014, as shown in Figure 1.2.11.

As shown in Figure 1.2.12, MLR rebates for the small and large group markets decreased substantially, from about $34.3 million in 2012 to about $160,000 in 2015.

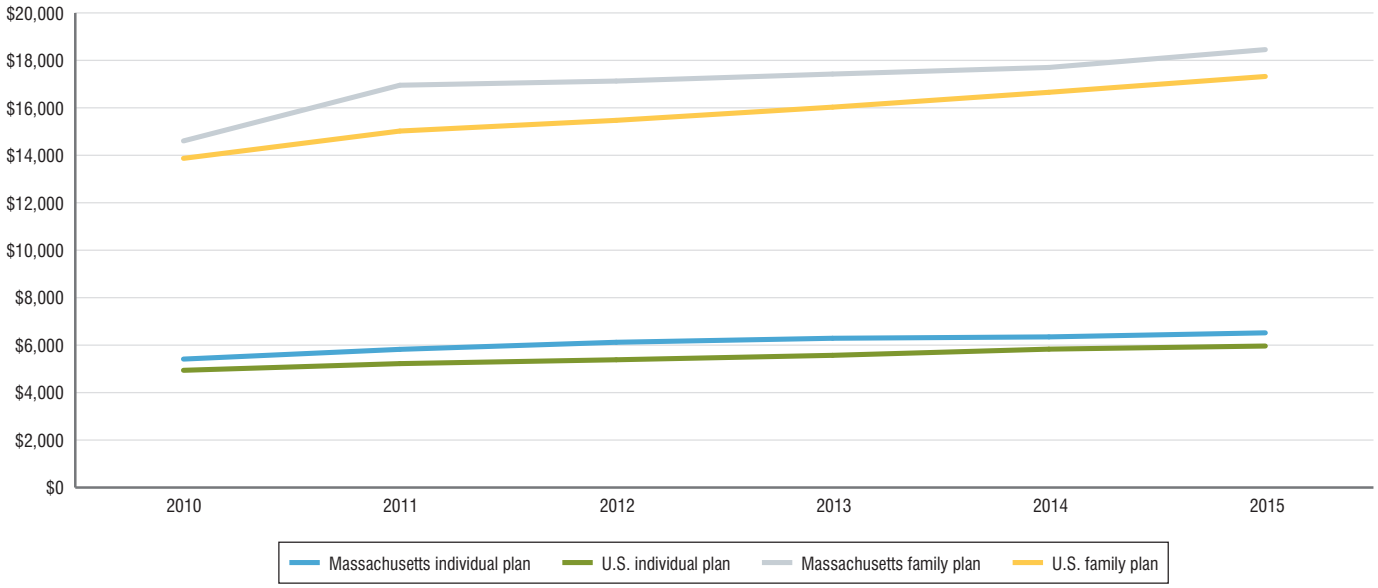
In 2015, Massachusetts commercial insurers spent 89% of premiums on medical care and retained the rest for administration and other expenses.[71]

Figure 1.2.7. Average monthly premiums (Massachusetts, fully-insured ESI)



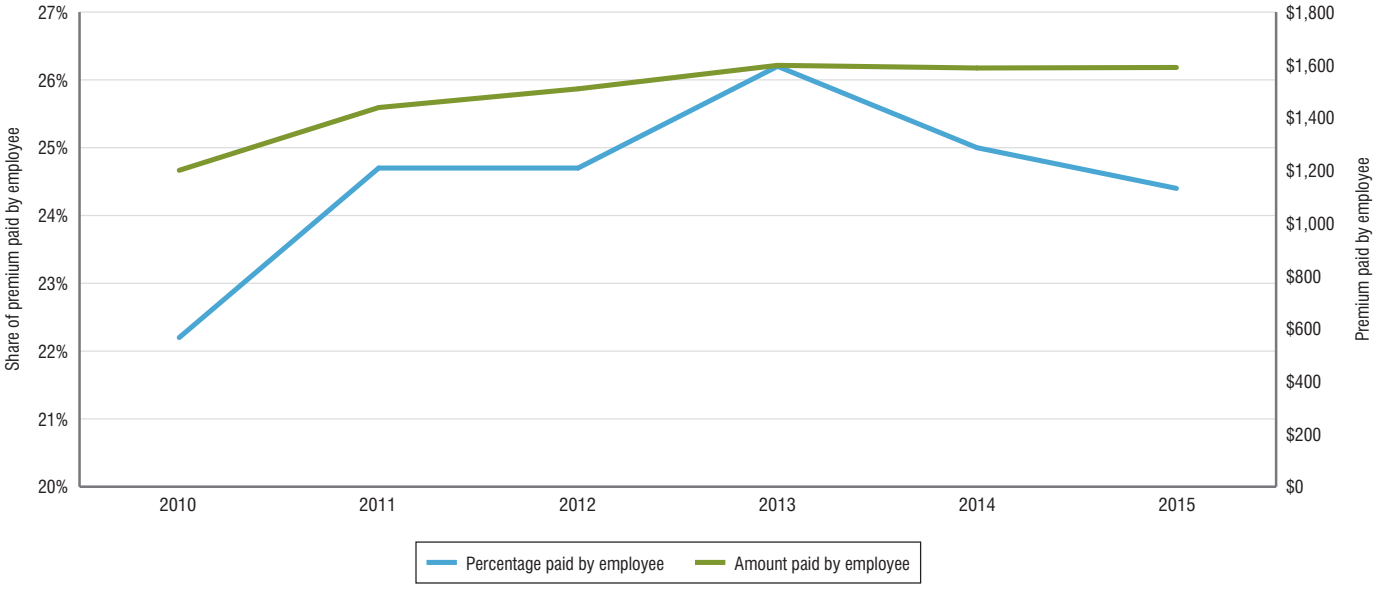
Note: Data from 2012 to 2014 includes medical loss ratio (MLR) reimbursements to patients (about $2 PMPM).
Source: CHIA annual performance of the Massachusetts health care system reports

Figure 1.2.8. Average annual premiums (employee and employer contributions)



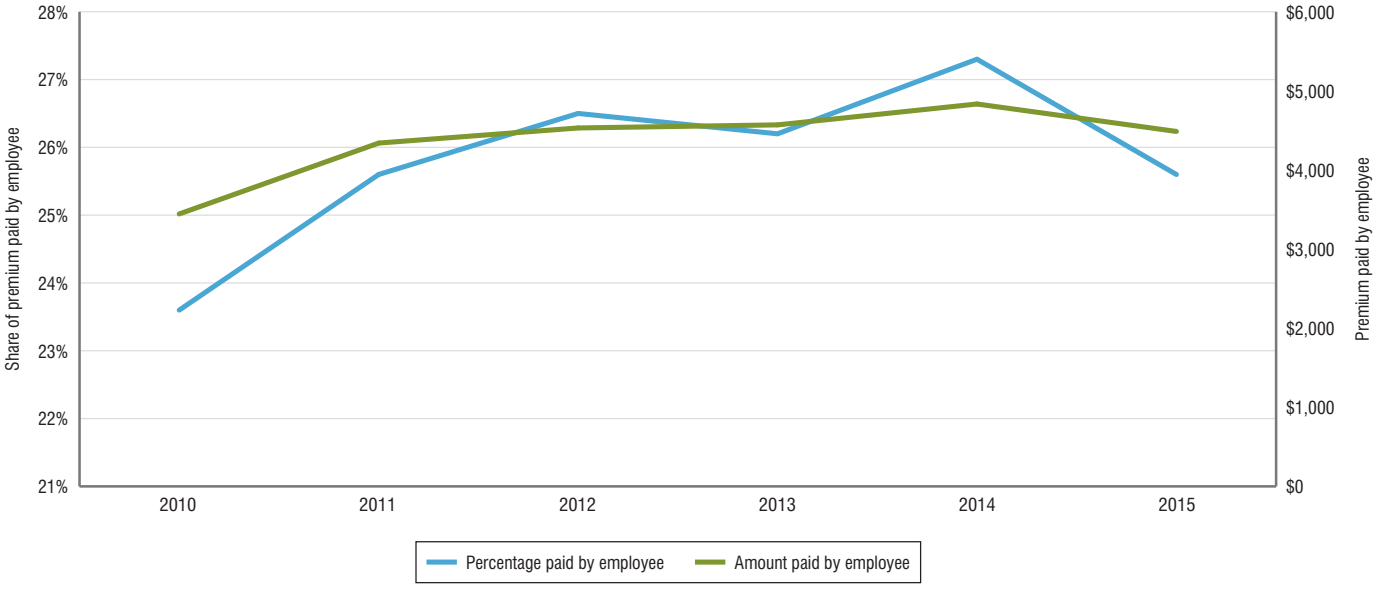
Source: Agency for Healthcare Research and Quality. (2016). Medical Expenditure Panel Survey. Retrieved December 7, 2016, from https://meps.ahrq.gov/mepsweb/data_stats/state_tables.jsp?regionid=18&year=-1

Figure 1.2.9. Share of premiums and total premiums paid by employee (Massachusetts, ESI individual plans)



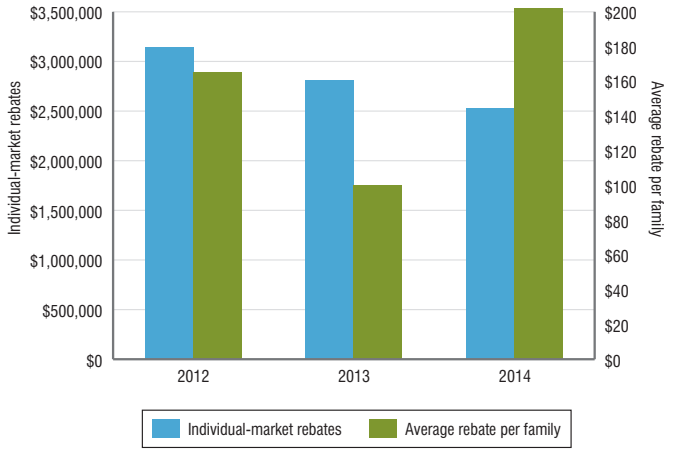
Source: Agency for Healthcare Research and Quality. (2016). Medical Expenditure Panel Survey. Retrieved December 7, 2016, from https://meps.ahrq.gov/mepsweb/data_stats/state_tables.jsp?regionid=18&year=-1

Figure 1.2.10. Share of premiums and total premiums paid by employee (employer-sponsored family plans)



Source: Agency for Healthcare Research and Quality. (2016). Medical Expenditure Panel Survey. Retrieved December 7, 2016, from https://meps.ahrq.gov/mepsweb/data_stats/state_tables.jsp?regionid=18&year=-1

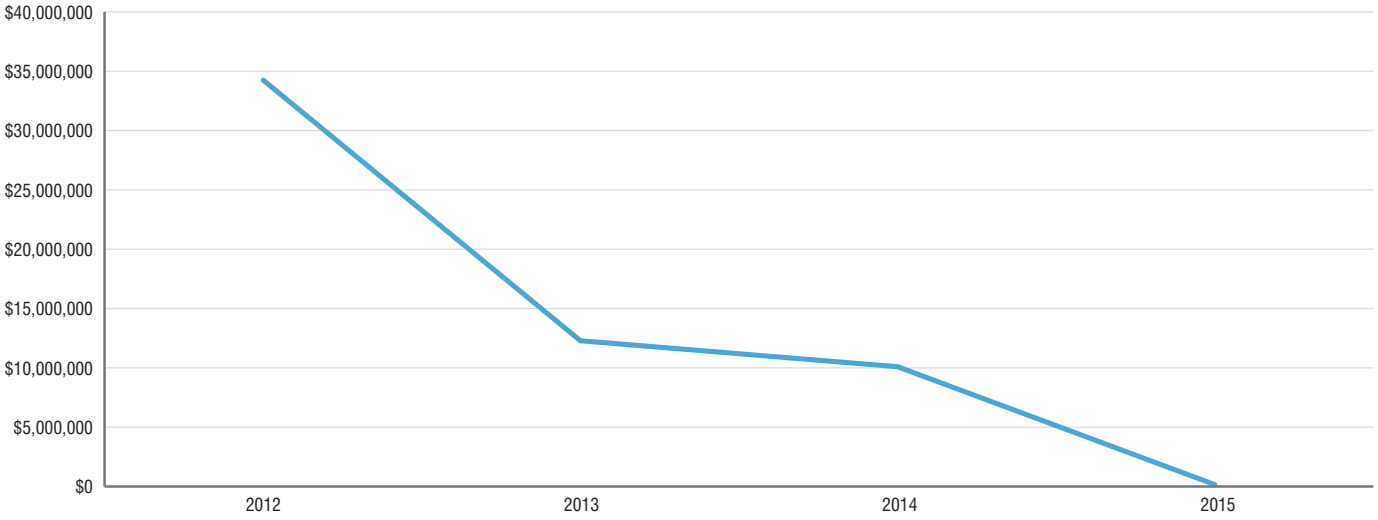
Figure 1.2.11. Individual-market MLR rebates (Massachusetts)



Note: The individual market includes plans where the policy is issued to an individual covering the individual and his or her dependents.
Source: Kaiser Family Foundation. (2016). Medical loss ratio (MLR) rebates in the individual market for consumers and families. Retrieved October 13, 2016, from kff.org/health-reform/state-indicator/mlr-rebates-individual-market

---

Figure 1.2.12. MLR rebates for small-group and large-group markets (Massachusetts)



Source: Centers for Medicare & Medicaid Services. Medical loss ratio data and system resources. Retrieved November 2, 2016, from cms.gov/CCIIO/Resources/Data-Resources/mlr.html

Section 1.3:
Health Care Costs Borne by the Commonwealth

A NOTE ABOUT THE DATA

This section contains statistical measures regarding elements of total health care expenditures (THCE), MassHealth enrollment and spending, the Group Insurance Commission (GIC), the Health Safety Net (HSN), and Medicare.

OSA used several secondary data sources to present a longitudinal perspective, including:

- CHIA, especially the annual performance of the Massachusetts health care system reports
- Other state government sources, including the Executive Office of Administration and Finance, the Executive Office of Health and Human Services (EOHHS), GIC, and HSN
- The Massachusetts Medicaid Policy Institute
- The Center for Health Law and Economics
- CMS

OVERVIEW

Increasing government health spending

Public insurance programs, such as Medicare and MassHealth, are crucial sources of health care coverage for people with low incomes, people with disabilities, and adults older than 65. In 2015, 38.3% of Massachusetts residents—more than 2.5 million people—were covered by a public insurance program.[1] These and other health spending initiatives account for a large share of the Commonwealth's budget. Indeed, from FY 2004 to FY 2014, spending on MassHealth,[2] the GIC, and other health coverage grew 1.9% per year, resulting in $2.8 billion growth in annual spending over the period.[3] From 2014 to 2015, spending among public insurers (predominantly Medicare[4] and MassHealth) increased 3.8%.[5]

As these programs grew, other health-related initiatives shrunk or grew at a slower rate. Spending on mental health declined by 1.9% a year, while public health spending increased 0.5% a year.[6] The public-health increase was smaller than the growth of inflation, did not keep pace with increases in labor and materials costs, and resulted in staff reductions and service eliminations among programs.

Increased health spending threatens to "crowd out" other governmental investment that advances population health. Analyzing data from 2000 to 2009, Bradley, et al., found that states with a higher ratio of social service spending to health spending[7] had significantly better outcomes on seven health outcomes measures: adult obesity; asthma; days with activity limitations; mentally unhealthy days; and mortality rates for heart attack, lung cancer, and type 2 diabetes.[8] These results highlight the importance of addressing social determinants of health.[9] The analysis found that Massachusetts, compared to other states, spent a smaller share of its GDP on social services and a larger share on health spending. (The analysis did not account for premium subsidies provided through the Massachusetts Health Connector.)[10]

Variations in total medical expenses

Per-capita medical spending varies across Massachusetts, thanks to differences in consumer incomes, intensity of health needs, and regional price disparities.

According to a report by the AGO, among the commercially insured in 2014, spending was higher in wealthier communities than in lower-income communities (even after adjusting for health status, since wealthier communities are generally healthier).[11] In the wealthiest areas, about half of commercial members fell into the highest spending quintile; in the lowest-income communities, only 3.2% of members were in the highest spending quintile. To explain the disparity, the report cited higher relative prices in wealthier communities, along with social obstacles more prevalent in lower-income communities, including language barriers and lack of transportation.[12]

As shown in Figure 1.3.1, towns with the highest commercial total medical expenses (TME) are south and southeast of Boston, particularly on the Cape and Islands, and in some suburbs west of Boston. Towns with low commercial TME are generally in western/central Massachusetts. Because this analysis measures TME by city/town, nuances within large cities (such as Boston) are not reflected.

TOTAL HEALTH CARE EXPENDITURES

Background

Chapter 224 requires HPC to set a target growth rate— known as the cost growth benchmark—for Massachusetts' per-person medical spending each year.[13] From 2013 to 2017, this benchmark was 3.6%.[14] In 2018, the benchmark will be 3.1%.[15] The growth rate measures change in THCE, which is composed of three parts:[16]

- Medical expenses paid by all private and public payers to all providers
- Cost-sharing payments (deductibles, copayments, and coinsurance) made by patients
- The net cost of private insurance (NCPHI), which includes administrative expenses and operating margins for commercial insurers

Nationally, the most recent data is from 2015, when THCE increased 5.8% to $3.2 trillion. (The per-capita increase was 5.0%).[17]

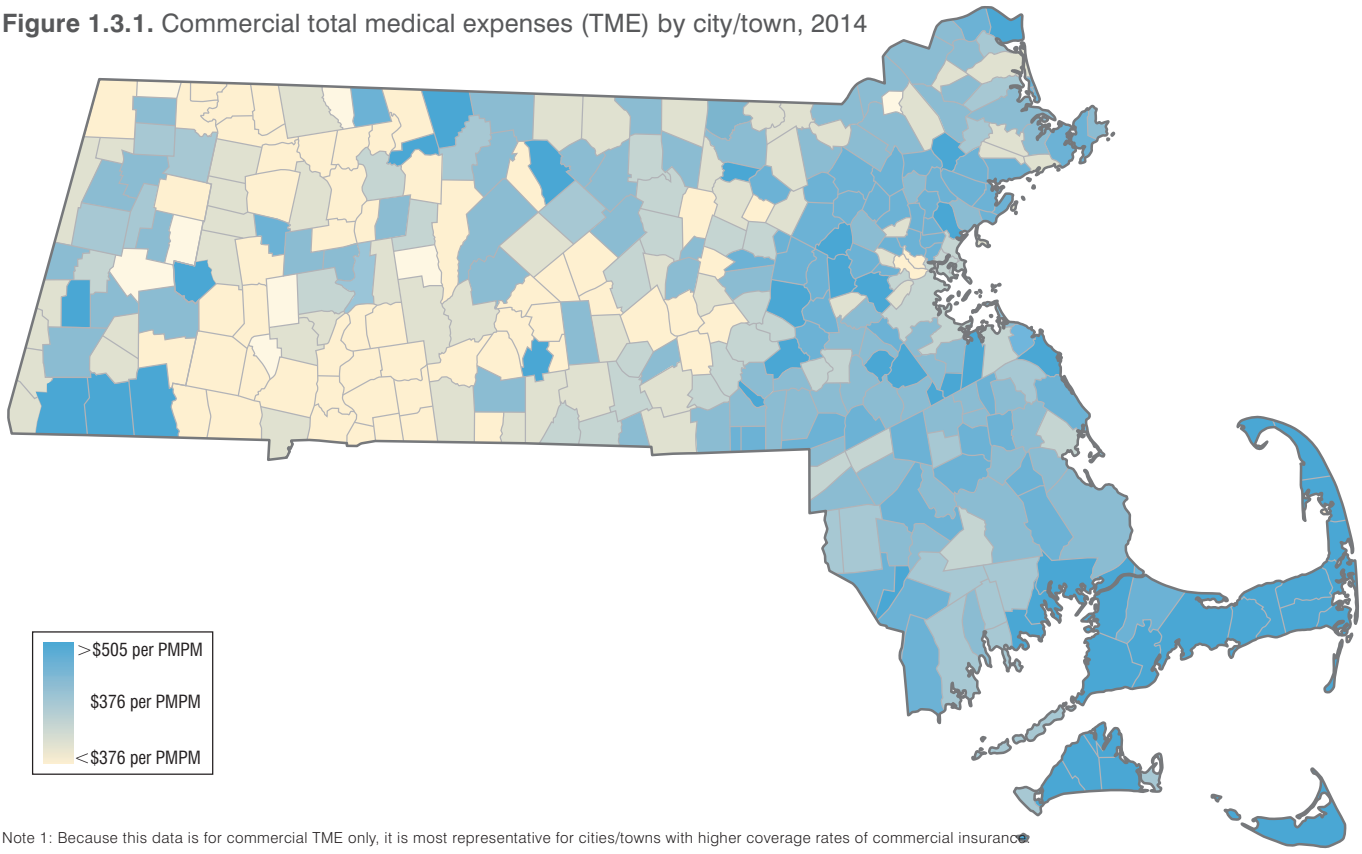
Hospital care represents a growing share of commercial THCE: in 2014, hospital spending accounted for 18% of THCE growth; in 2015, it accounted for 41%.[18] Much of this utilization has been shown to be unnecessary: in 2015, the Commonwealth Fund ranked Massachusetts 31st in the U.S. in avoidable hospital use.[19]

In recent years, prescription drug spending has been a leading driver of THCE growth in Massachusetts and nationally. In the Commonwealth,

- Prescription drug spending increased by double-digits in 2014 and 2015[20] and accounted for 36% of THCE growth.[21]
- Prescription drug spending grew 8.8% per commercial enrollee in 2015, compared to 11.6% per enrollee nationally in 2014. (These figures do not account for rebates and other discounts).[22]
- Spending growth was concentrated in a few drug categories—non-HIV antivirals, anti-arthritics, insulin, and drugs for neurological disorders and oncology—which accounted for 83% of growth in 2014.[23]

In 2014, generic drugs accounted for a larger share of claims, but a smaller share of drug spending, compared to 2012. Therefore, increased use of ge-

Figure 1.3.1. Commercial total medical expenses (TME) by city/town, 2014



Note 1: Because this data is for commercial TME only, it is most representative for cities/towns with higher coverage rates of commercial insurance.
Note 2: TME unadjusted for health status.
Source: CHIA. Variation in Massachusetts commercial total medical expenses by town and region. (2015). Retrieved December 18, 2015, from chiamass.gov/assets/docs/r/pubs/15/Total-Medical-Expenses-Brief-2015.pdf

nerics has not offset increased spending from branded drugs.[24]

Specialty drugs—which are high-cost medications used to treat complex, chronic conditions—accounted for more than one-third of pharmacy spending but only 1% of the number of prescriptions, according to one national pharmacy benefit manager.[25] To help control cost growth among specialty drugs, the AGO made policy recommendations including:

- Requiring reporting on drug rebates to make drugs' net cost more transparent.
- Promoting the availability of cheaper generic and biosimilar drugs (which may require cooperation by the U.S. Food and Drug Administration).
- Providing favorable formulary placement for lower-cost, equally effective drugs.[26]

Massachusetts trend, 2011–2015

Figure 1.3.2 shows the dollar-value, per-capita THCE by payer type in Massachusetts from 2011 through 2015, the most recent year of data available.

- THCE grew 4.1% in 2015,[27] down from 4.8% in 2014.[28] Growth in both years exceeded the cost growth benchmark.
- Overall, THCE increased 14.9%. The increase was 15.6% among public insurance programs and 15.3% among commercial insurance. The net cost of private insurance (the cost of administrating commercial health plans) grew 3.1%.

Figure 1.3.3 shows the composition of THCE by payer type from 2011 to 2015. The breakdown by payer type was stable, with public insurance programs accounting for around 60% of expenditures.

TOTAL MEDICAL EXPENSES

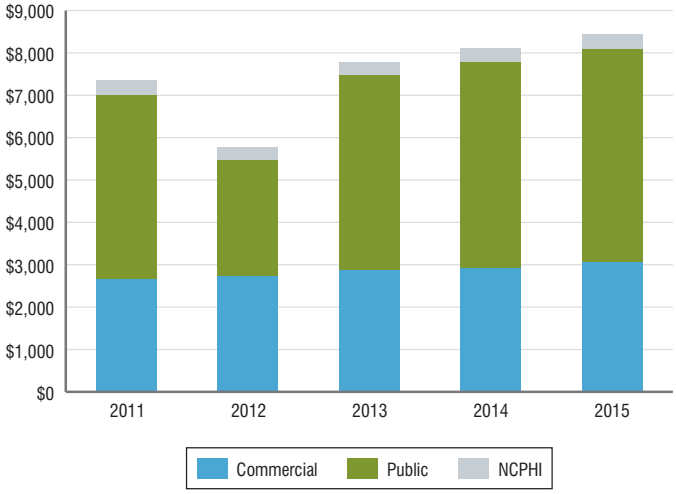
Background

One component of THCE is TME, which is composed of the sum paid to providers by both private and public payers, patient cost-sharing expenditures, and provider performance payments. TME is measured by PMPM.[29]

Nationally, there was a large increase in medical spending in 2014–2015 after a five-year run of slower growth. This increase was due to expansion of health coverage (Medicaid and commercial) under the ACA and a rapid increase in retail prescription drug spending in 2014 and 2015 (12.2% and 9.0%, respectively).[30,31]

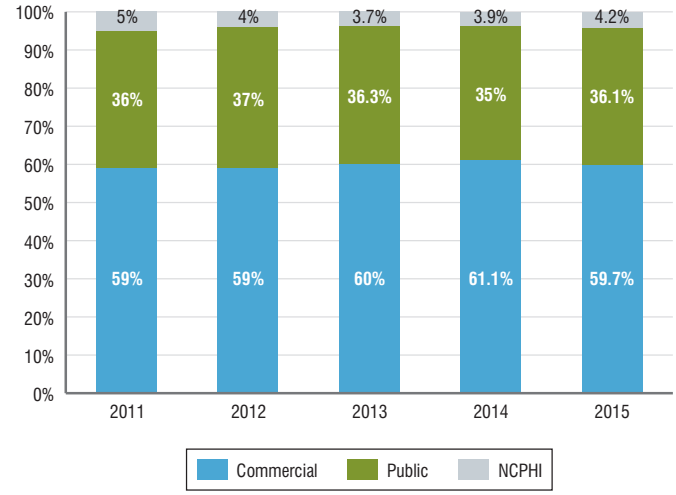
In Massachusetts in 2015, growth in the use of medical services was flat. Increased medical prices continued to be the major driver of spending increases.[32]

Figure 1.3.2. Per capita THCE by payer type (Massachusetts)



Source: CHIA annual performance of the Massachusetts health care system reports

Figure 1.3.3. Composition of per capita THCE by payer type (Massachusetts)



Source: CHIA annual performance of the Massachusetts health care system reports

Massachusetts trend, 2011–2015

As shown in Figure 1.3.5, commercial TME rose from $414 in 2011 to $442 in 2015, an increase of 6.8%. Growth was largest in the pharmacy and hospital outpatient categories. The largest component of TME was payments to physicians, followed by hospital outpatient care.

In 2015, the most recent year of data available, hospital inpatient and physician services TME growth was modest (2.2% and 1.9%, respectively).[33] Cost control among major practices facilitated a moderation in physician spending; among the 10 largest physician groups, Lahey Health, Mount Auburn Cambridge Independent Practice Association, and Steward Network Services had TME growth below the 3.6% benchmark.[34]

In 2015, commercial TME PMPM grew 2.7%, down from 3.7% the year before.[35] Claims on self-insured plans increased only 2.1%.[36]

BUDGET OF THE MASS. EXECUTIVE OFFICE OF HEALTH AND HUMAN SERVICES (EOHHS)

Background

Under the General Appropriations Act (GAA), the Commonwealth's fiscal year 2017 budget is $39,249,262. The largest portion of the budget, $21,024,779, was allocated to EOHHS.[37] In FY 2011, EOHHS spending was 52.2% of the budget; in FY 2017, it is 53.6%.

The EOHHS budget funds the following departments and programs:

- *Office of the Secretary of Health and Human Services:* MassHealth, the Children's Behavioral Health Initiative, and Medicare Part D.
- *Department of Elder Affairs:* MassHealth senior care and nursing home care, elder protective services, and councils on aging.
- *Department of Developmental Services:* community residential services, day and work programs, and autism programs.
- *Department of Children and Families (DCF):* foster care and adoption, social workers, and investigations.
- *Department of Veterans' Services:* veterans' benefits (such as disability payments), homelessness programs, and veterans' cemeteries and memorials.
- *Other programs:* the departments of public health, mental health, and transitional assistance; commissions for the blind, deaf and hard of hearing, and rehabilitation; soldiers' homes; and the Office for Refugees and Immigrants.

Massachusetts trend, 2011–2016

As shown in Figure 1.3.6, EOHHS spending climbed from $15,367,179 in FY 2011 to $21,024,779 in FY 2017, an increase of 36.8%. Growth was largest in the "other programs" category (105%) and the Office of the Secretary of Health and Human Services (43.7%), which includes MassHealth spending. Spending on DCF decreased substantially.

MASSHEALTH ENROLLMENT

Background

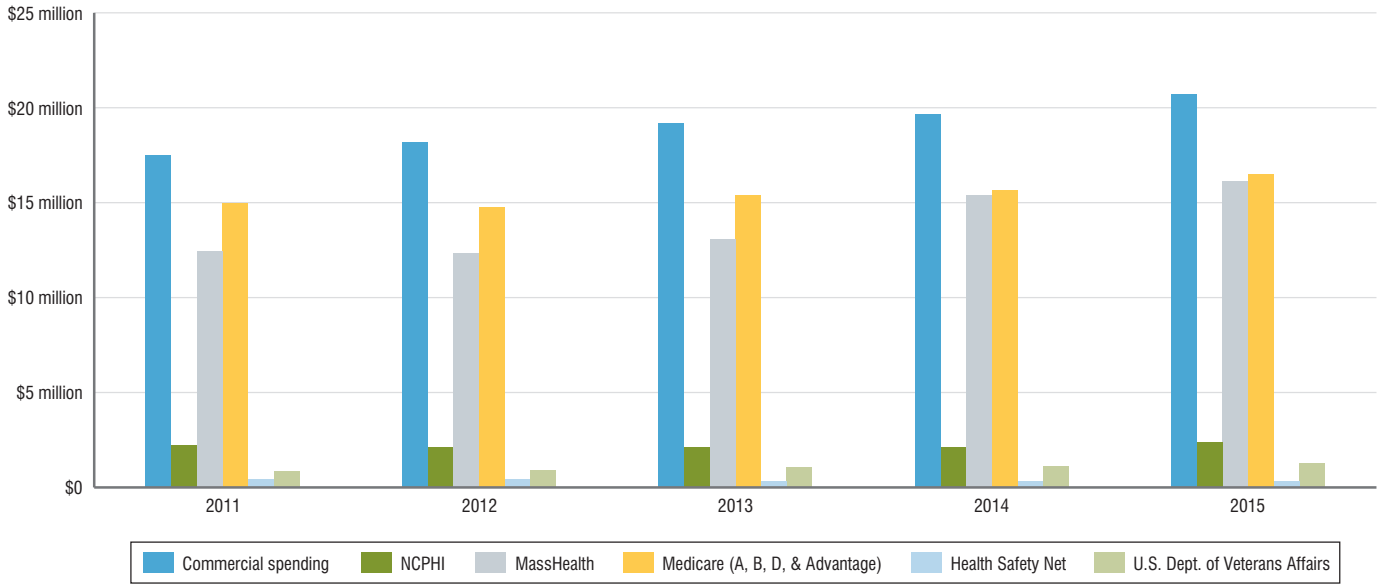
As of September 2016, about 1.3 million Massachusetts residents used MassHealth for their primary coverage. Another 577,000 residents received partial or secondary coverage from MassHealth (along with Medicare or another form of insurance), marking a 6% increase from the year before.[38]

From March 2015 to March 2016, MassHealth enrollment fell by 3% (40,000 members) as the agency recertified eligibility status among people granted temporary coverage following the 2013 failure of the Health Connector.[39] MassHealth enrollment was steady from March 2016 to September 2016.[40]

In 2015, MassHealth covered 1 in 4 Massachusetts residents, including 17% of Whites, 43% of African Americans, and 61% of Latinos.[41]

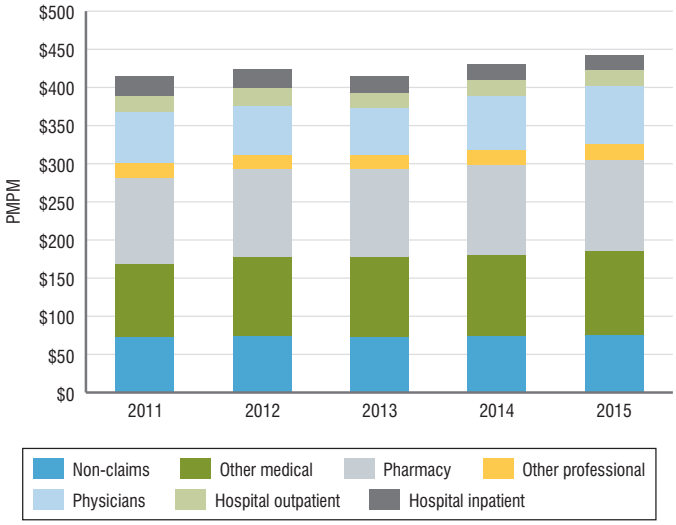
In 2016, the Baker and Obama administrations agreed on a new Medicaid waiver under which the Commonwealth will overhaul

Figure 1.3.4. Selected components of THCE (Massachusetts)



Source: CHIA annual performance of the Massachusetts health care system reports

Figure 1.3.5. TME by expenditure type (Massachusetts, commercial insurance)



Source: CHIA annual performance of the Massachusetts health care system reports

MassHealth care delivery by moving the program's payment model from fee-for-service to capitation and accountable care. The new model tracks provider quality performance and pays providers or provider/payer organizations a lump sum per patient per month.[42] Administration officials hope this shift will promote well-coordinated care and minimize waste and avoidable hospital visits.[43]

As of December 2016, six organizations (Boston Children's Hospital, Boston Medical Center, Partners HealthCare, Steward Health Care System, University of Massachusetts Memorial Health Care, and a new network of community health centers called Community Care Cooperative) launched pilot programs to care for 160,000 MassHealth members.[44]

Massachusetts trend, 1995–2016

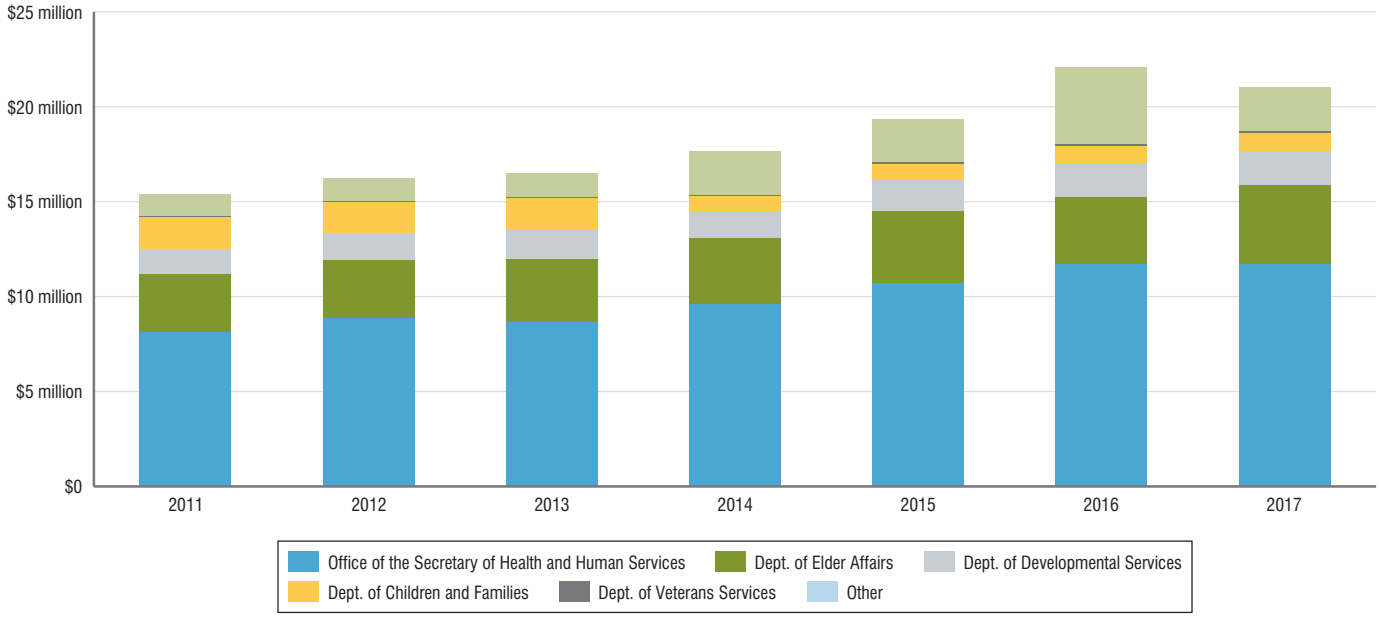
From 2011 to 2016 (the most recent full year with available data), MassHealth enrollment grew 38%, from about 1.3 million to about 1.9 million, as shown in Figure 1.3.7.

MASSHEALTH SPENDING

Background

In 2016, the state announced plans to redesign MassHealth under its Section 1115 waiver agreement with the federal government. Under the overhauled program, six insurers—covering about 48% of MassHealth enrollees—were contracted with the state to manage care for MassHealth patients.[45] The plan would keep insurers in a similar care management role. Under the state's plan, doctor and hospital systems could establish accountable care organizations (ACOs) and contract directly with MassHealth.[46] This redesign of MassHealth is scheduled to begin in late 2017.[47] The agreement will provide $1.8 billion in new payments over five years[48] to help the state transition to accountable care.[49]

Figure 1.3.6. Massachusetts EOHHS budget, by department (fiscal year)



Source: Executive Office of Administration and Finance. State budget. Retrieved October 26, 2016, from mass.gov/anf/budget-taxes-and-procurement/state-budget

Insurers covering MassHealth enrollees face two major financial challenges. First, their per-patient budget is lower than that of commercial health plans.[50] Second, compared to the commercial population, MassHealth enrollees generally have more intensive health needs.[51] In October 2016, the largest MassHealth insurer in Massachusetts, Neighborhood Health Plan (NHP), announced it had temporarily stopped accepting new MassHealth members.[52] NHP, which is owned by Partners HealthCare, lost $241 million from 2014 through June 2016, which the company attributes to increased drug and medical costs and low payments from MassHealth.[53] However, according to the Commonwealth, NHP also has been paying hospitals higher rates than is customary under MassHealth.[54]

In 2015, MassHealth spending on temporary coverage related to the failure of the Health Connector website decreased to $51 million as these beneficiaries transitioned off MassHealth.[55]

Massachusetts trend, 2007–2015

Thanks to a sharp increase in enrollment, MassHealth spending grew by 4.6% in 2015.[56] As shown in Figure 1.3.8, inflation-adjusted spending increased more slowly.

Under the ACA, Massachusetts receives enhanced federal reimbursements (80% to 90% of spending) on newly eligible members.[57] After accounting for reimbursements, from 2010 to 2015, the net cost of MassHealth to the Commonwealth increased 74%, from about $3.5 billion to $6.1 billion.

As shown in Figure 1.3.9, spending is highest on the FFS program. From 2012 to 2015, spending growth was largest for the managed-care organization (MCO) program (70.5%) as MassHealth directed more enrollees to alternative payment methodologies (APMs).

> "Delivery-system reform could be that next giant step ahead, particularly for the MassHealth population—[implementing] alternative payment methodologies."
>
> **— Michael Caljouw, Vice President for State Government and Regulatory Affairs, Blue Cross Blue Shield of Massachusetts**

MASSHEALTH SPENDING AS A PERCENT OF THE STATE BUDGET

Background

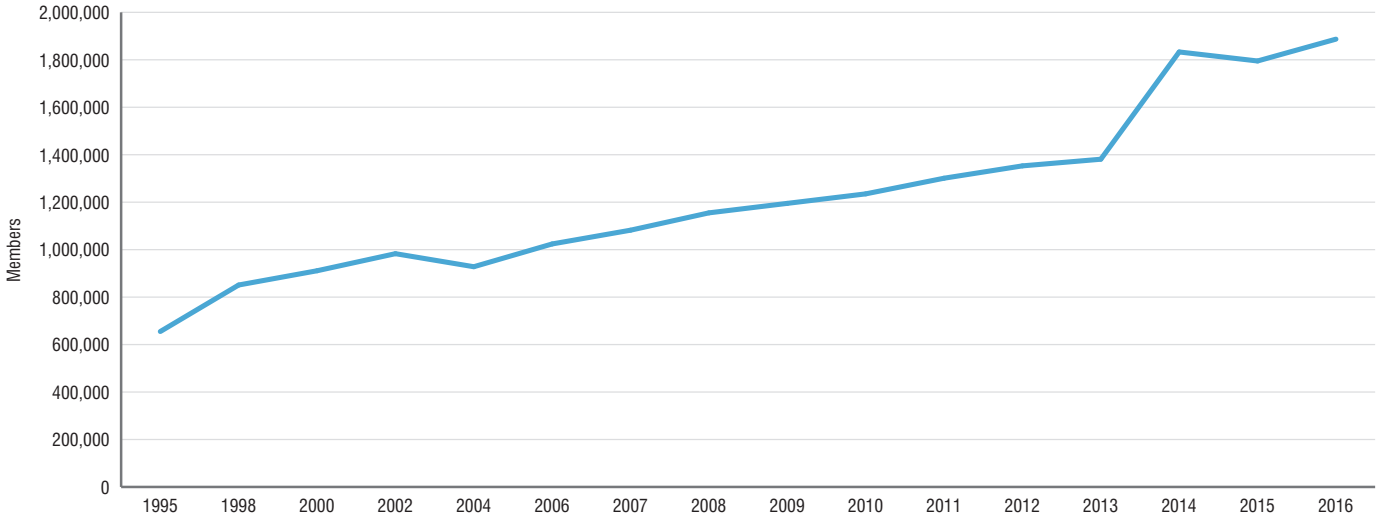
The federal government reimburses Massachusetts for most MassHealth spending.[58] Nearly 50% of the MassHealth FY 2015 spending went to different managed-care organizations for capitation payments, while an additional 25% went to nursing homes and community long-term services and supports.[59]

Thanks to enrollment growth, the Baker Administration is preparing for a $600 million increase in MassHealth spending in fiscal year 2018.[60]

Massachusetts trend, 2007–2015

As shown in Figure 1.3.10, 37% of the state budget went to MassHealth in 2015, up from 31% in 2010. From 2010 to 2015, MassHealth spending increased by about $5 billion, while state spending on other programs rose by about $4 billion.

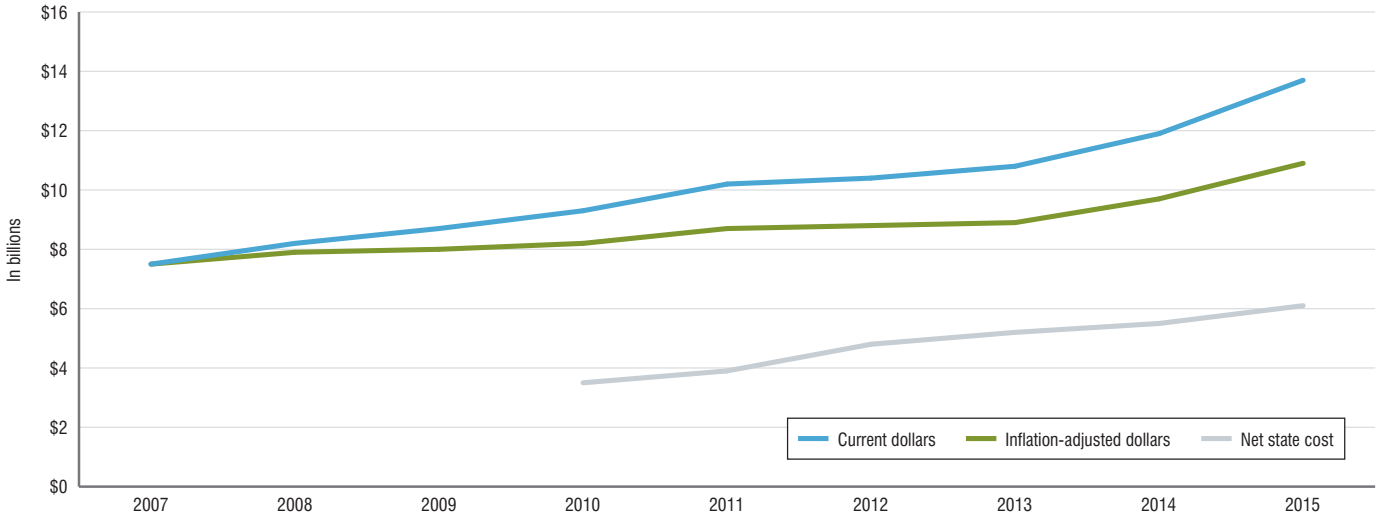
Figure 1.3.7. MassHealth enrollment



Source 1: Massachusetts EOHHS. (2016, June). Section 1115 demonstration project amendment and extension request. Retrieved October 13, 2016, from p. 17 of mass.gov/eohhs/docs/eohhs/cms-waiver/06-15-16-section-1115-demonstration-extension-request.pdf
Source 2: CHIA. (2017, February). Enrollment trends, February 2017 edition. Retrieved October 21, 2017, from chiamass.gov

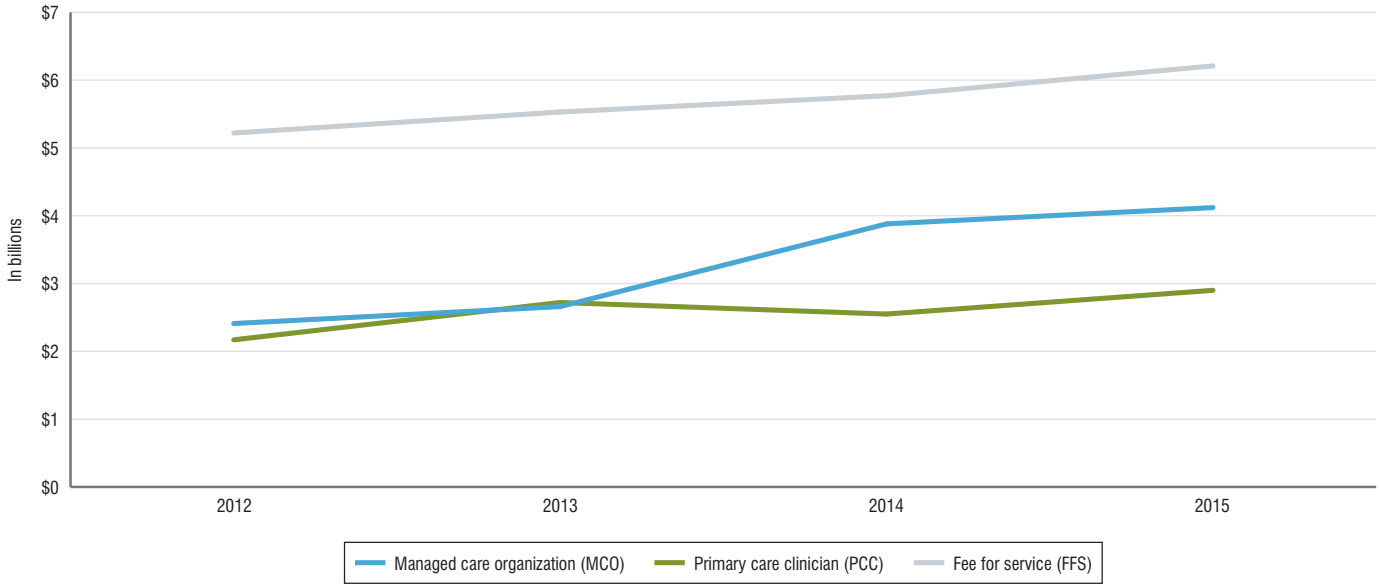
---

Figure 1.3.8. Total MassHealth spending



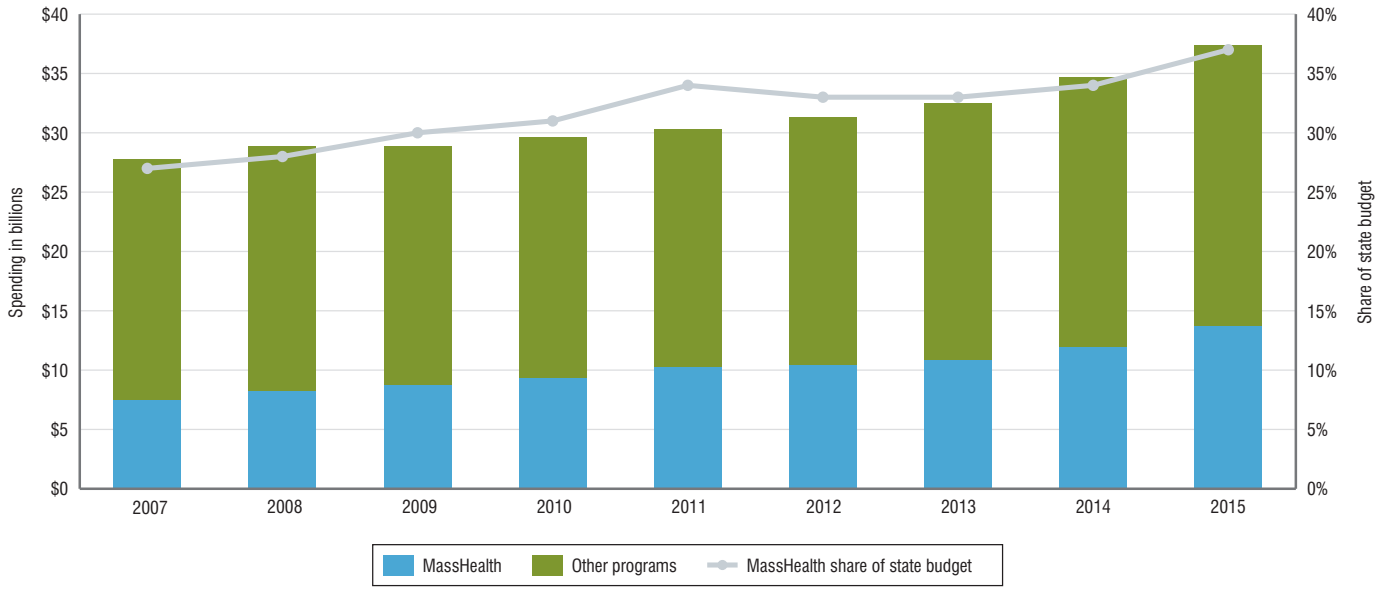
Source 1: Massachusetts Medicaid Policy Institute. (2016, June). MassHealth: the basics. Retrieved October 13, 2016, from p. 18 of bluecrossfoundation.org/sites/default/files/download/publication/MassHealthBasics_Chartpack_FY2015_FINAL_1.pdf
Source 2 (net state cost): Massachusetts EOHHS. (2016, June). Section 1115 demonstration project amendment and extension request. Retrieved October 13, 2016, from p. 12 of mass.gov/eohhs/docs/eohhs/cms-waiver/06-15-16-section-1115-demonstration-extension-request.pdf

Figure 1.3.9. MassHealth spending by program



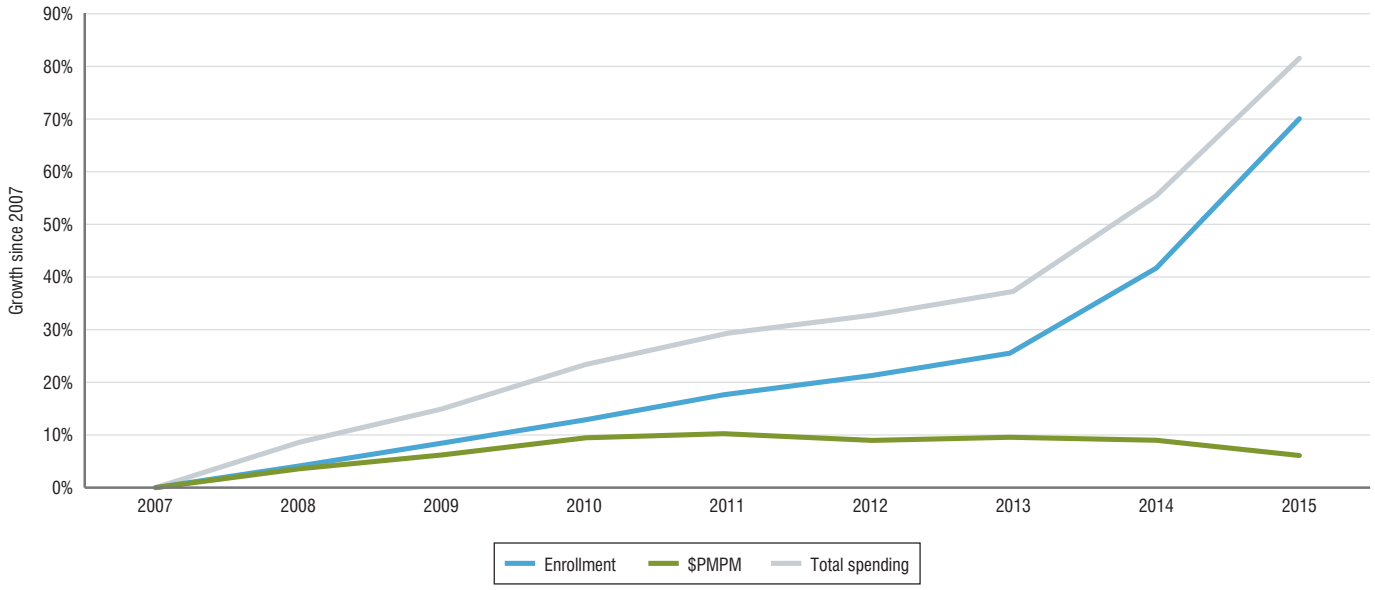
Source: CHIA annual performance of the Massachusetts health care system reports

Figure 1.3.10. MassHealth and other spending as share of state budget (billions)



Source: Center for Health Law and Economics at University of Massachusetts Medical School. (2015, July). MassHealth: the basics. Massachusetts Medicaid Policy Institute, p. 21.

Figure 1.3.11. MassHealth spending by PMPM



Note: Not inflation-adjusted.
Source: Massachusetts Medicaid Policy Institute. (2016, June). MassHealth: the basics. Retrieved October 13, 2016, from p. 26 of bluecrossfoundation.org/sites/default/files/download/publication/MassHealthBasics_Chartpack_FY2015_FINAL_1.pdf

GROWTH IN MASSHEALTH SPENDING PER MEMBER PER MONTH

Background

Since 2007, MassHealth PMPM spending has grown more slowly than inflation. From 2014 to 2015, MassHealth enrollment grew and PMPM spending declined.[61] PMPM spending for members for whom MassHealth was the primary payer declined by 3.1%. PMPM spending declined 2.2% for members of the MCO program and 3.5% for members of PCC program.[62]

Massachusetts trend, 2007–2015

As seen in Figure 1.3.11, MassHealth spending rose slightly more sharply than enrollment from 2007 to 2015, while PMPM spending increased much less.

GROUP INSURANCE COMMISSION (GIC) SPENDING

Background

The GIC administers health insurance and other benefits for more than 430,000 people and is the largest purchaser of commercial health insurance in the Commonwealth.[63] The GIC has leveraged this market clout to push insurers and providers to adopt practices that strive to control costs and improve quality. For example, the GIC was an early adopter of tiered networks, which grade copayments based on provider quality, and has excluded plans whose premiums (in the GIC's view) rose too sharply. The GIC accounts for a major share of the Commonwealth's budget, receiving more than $2 billion a year.[64]

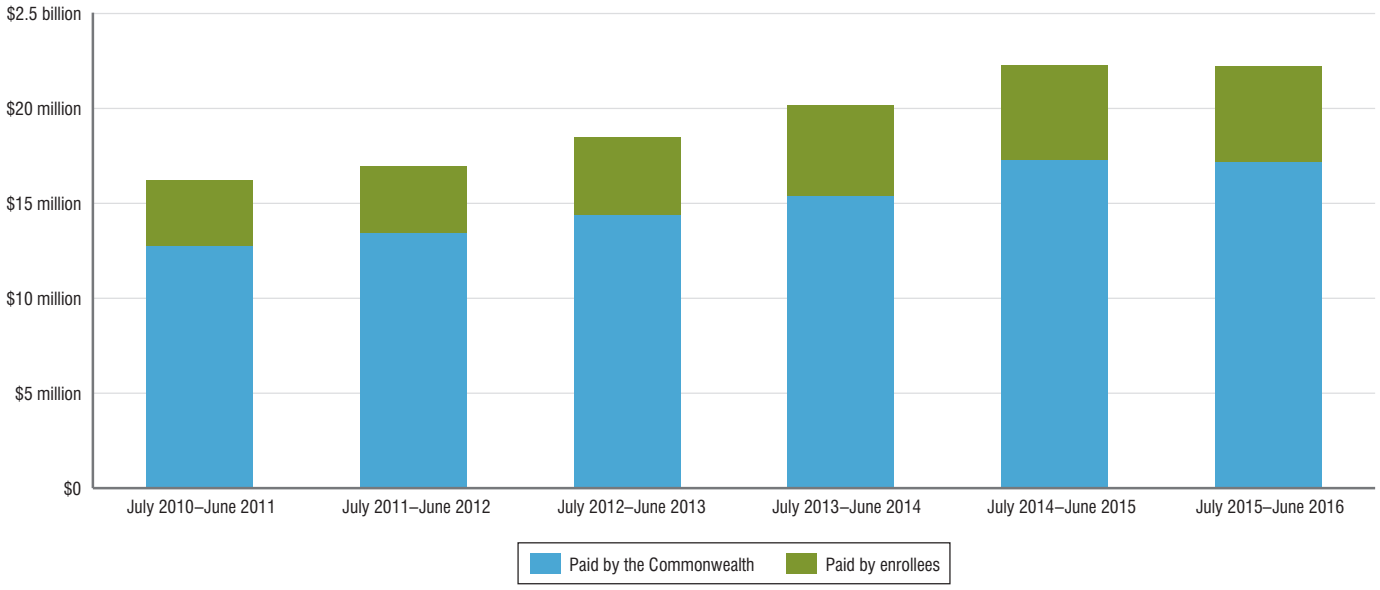
Massachusetts trend, 2007–2015

Figure 1.3.12 shows GIC spending by the Commonwealth and by the GIC's enrollees. From FY 2011 to FY 2015, the Commonwealth's expenditures rose 35.8% while beneficiaries' spending rose 42.3%. Overall, spending—which was close to $2.7 billion in FY 2015—grew 37.2% over this period.

"They can say, 'See, we've solved the problem. Isn't that nice?' ... No, you haven't. ... The $500 the visit charges the employer doesn't go away."

— Dolores Mitchell, former Executive Director, GIC, on having no copayments for preventive care visits

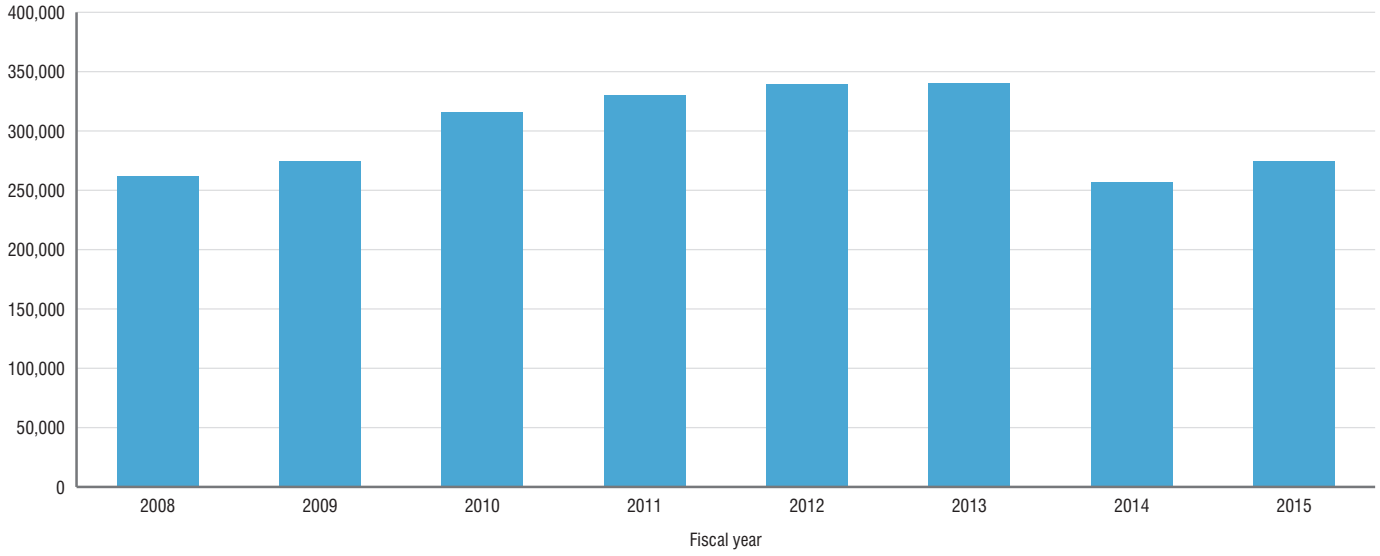
Figure 1.3.12. GIC spending



Source: GIC annual reports. Retrieved from mass.gov/anf/employee-insurance-and-retirement-benefits/annual-reports

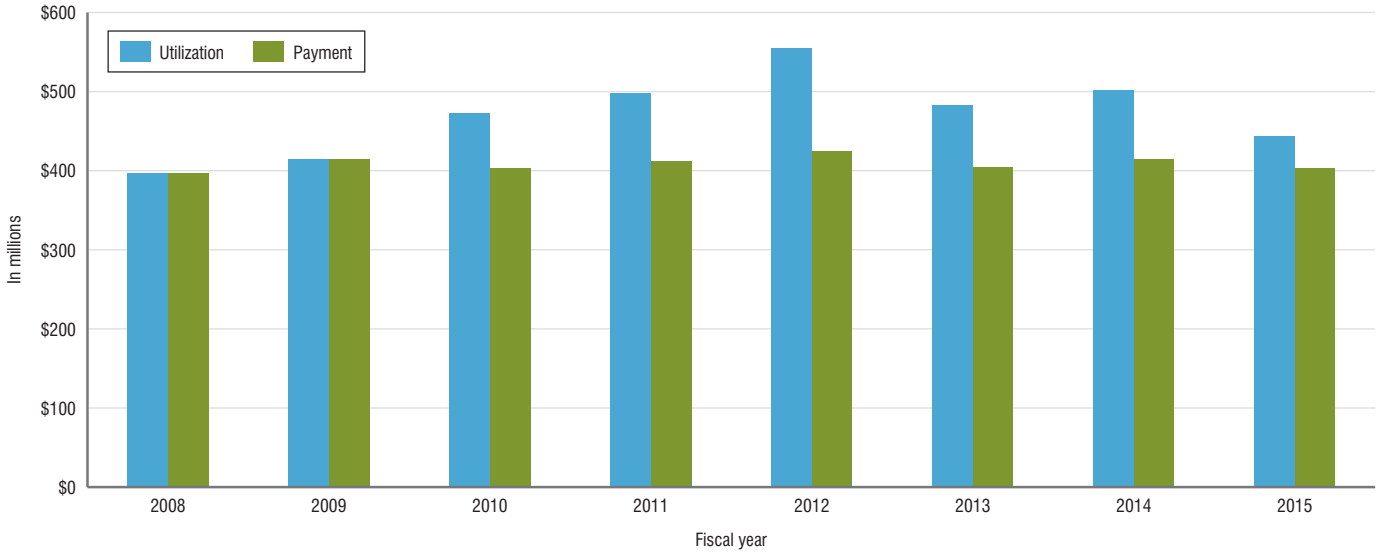
---

Figure 1.3.13. Health Safety Net users



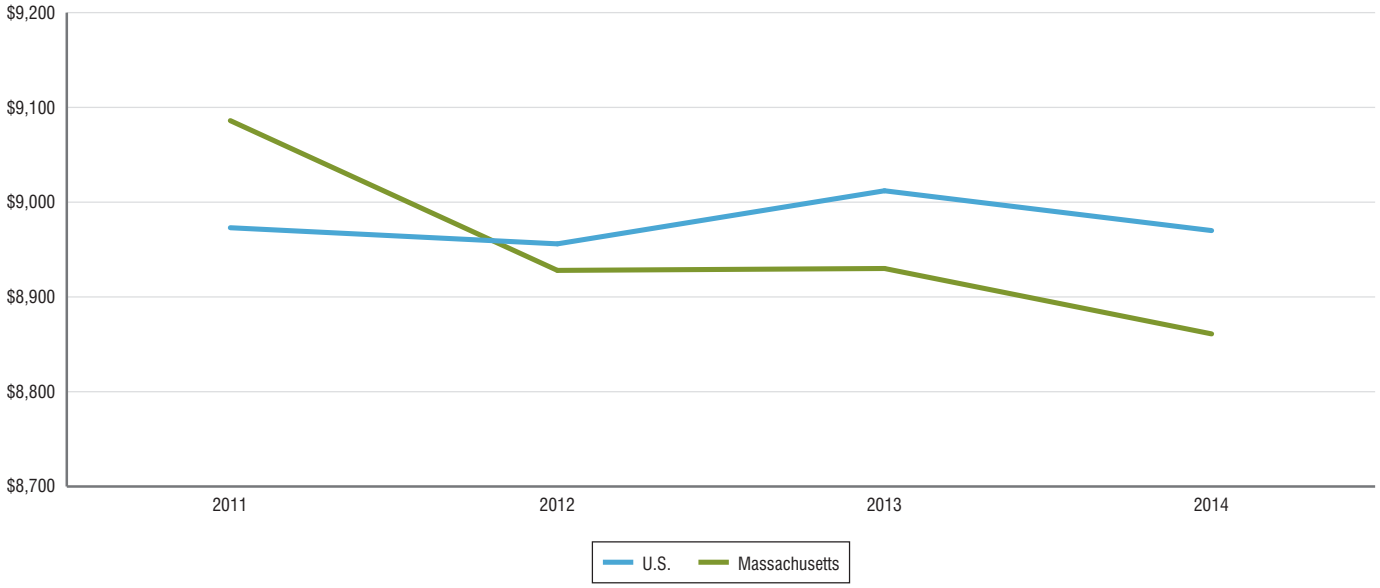
Note: Data for 2015 is estimated.
Source: HSN annual reports. Retrieved from mass.gov/eohhs/consumer/insurance/more-programs/health-safety-net/health-safety-net-reports.html

Figure 1.3.14. Health Safety Net utilization and payments



Source: HSN annual reports. Retrieved from mass.gov/eohhs/consumer/insurance/more-programs/health-safety-net/health-safety-net-reports.html

Figure 1.3.15. Medicare spending per enrollee (Massachusetts and U.S.)



Source: CMS. (2016, January). Geographic variation in standardized Medicare spending. Retrieved October 14, 2016, from cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Dashboard/GeoVar-State/GeoVar_State.html

HEALTH SAFETY NET DEMAND

Background

The HSN pays for certain medically necessary services provided to uninsured or underinsured individuals who received care at a Massachusetts community health center or acute care hospital.[65] People with private insurance who require services not covered by their insurance may be eligible for HSN coverage.

In FY 2015, women accounted for 59% of HSN claims but only 55% of payments, since the care men received was more expensive per patient.[66] From 2011 to 2014, individuals <50% FPL accounted for most HSN demand by a wide margin. Individuals 100–150% FPL incurred the second-most demand. Generally, financial means is inversely proportional to likelihood of using the HSN.[67]

Most claims submitted to the HSN are missing data for patient race/ethnicity. From 2009 to 2014, among claims that did have race/ethnicity data, Whites incurred the most claims, followed by African Americans and then Latinos. However, in FY 2014, African Americans and Latinos had more claims per capita than Whites.[68]

In FY 2015, HSN overall funding was $403 million, broken down as follows:

- An assessment on acute hospital private-sector charges ($165 million)
- A surcharge on payments to hospitals and ambulatory surgical centers by HMOs, insurers, third party administrators, and individuals ($165 million)
- Offset funding for uncompensated care from the Massachusetts Medical Assistance Trust Fund ($70 million)
- An appropriation from the Commonwealth's General Fund ($30 million).[69]

Under the new Medicaid waiver agreement between the Commonwealth and the federal government, the number of safety net hospitals eligible for reimbursement for uncompensated care will rise from 7 to 15.[70]

Massachusetts trend, 2008–2015

As shown in Figure 1.3.13, the number of HSN claims fell 20.4% from 2011 to 2015, from 330,000 to 274,000.

In Figure 1.3.14, demand represents how much providers would have been paid in the absence of a funding shortage. Payment is the amount the HSN disbursed to health centers and hospitals. HSN utilization decreased 21.9% from FY 2011 to FY 2015. But payments declined as well, and there was a funding shortfall in each of these years, ranging from $40 million in FY 2015 to $130 million in FY 2012.

TOTAL MEDICARE SPENDING

Background

In 2016, Medicare covered more than 56 million people in the U.S.[71] Generally, spending on Medicare enrollees in the last year of life accounts for about 25% of Medicare spending on those age 65 or older.[72] As of January 2017, under Medicare's new payment system, providers must opt into one of two programs, as follows:

- The Merit-Based Incentive Payment System requires providers to report outcomes data against a new set of quality and efficiency measures.[73] This could help Medicare emphasize value- and outcomes-based payments.[74]
- The Advanced Alternative Payment Models feature incentive payments connected to APMs.[75]

Medicare has 1,085,065 Massachusetts beneficiaries, including 207,893 enrollees in Medicare Advantage, which is administered by private managed-care plans.[76] In 2013, federal spending on these enrollees totaled $15.2 billion, making up 30% of the Commonwealth's THCE and half of public-program expenditures.[77] In 2015, Medicare spending increased 2% per beneficiary per year, to $16.5 billion.[78]

The Medicare readmission rate in Massachusetts declined from 2011 to 2014, although the Commonwealth still ranked 43rd out of the states in readmissions. (About 18% of Massachusetts Medicare admissions are readmissions.)[79]

Medicare Advantage plans provide beneficiaries with Part A and B benefits. From 2012 to 2013, these plans in Massachusetts reported a 10.8% increase in spending and 4.3% increase in enrollment, while PMPM Medicare Advantage spending increased 6.3%.[80]

In 2014, Massachusetts' per-enrollee Medicare spending compared to the nation's was as follows:

- Inpatient care: 2% lower spending
- Post-acute care: 10% higher
- Hospice care: 17% lower
- Physician/outpatient/tests/imaging: 2% higher
- Durable medical equipment: 26% lower
- Ambulances: 40% higher [81]

Massachusetts trend, 2011–2014

From 2011 to 2014, Massachusetts' per-enrollee Medicare spending, which is slightly lower than the U.S. average, decreased 2.5%, from $9,086 to $8,861. (See Figure 1.3.15.) U.S. per-enrollee spending was almost unchanged.

Summary of Findings

1.1: OVERALL HEALTH EXPENDITURES AND INSURANCE COVERAGE

Health insurance coverage

- Massachusetts had the highest overall insured rate in the U.S., and there has been little change in this rate since 2012.
- The share of people with employer-sponsored insurance (ESI) held steady from 2012 to 2014, then decreased between 2014 and 2015.
- The percentage of people with ESI from self-insured employers increased. Self-insured employers have business incentives to control costs, but their plans are exempt from many regulations that aim to impact cost, quality, and access.
- The percentage of people enrolled in an alternative payment model (APM) plan increased, and this trend is expected to continue with the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) and the MassHealth 1115 Waiver approved by the federal government in 2016. Massachusetts has not yet reached the mandated goal of APMs for 80% of MassHealth enrollees. Caution is needed on setting bundled payment levels since it can institutionalize higher prices unrelated to clinical quality.

Uninsurance

- The uninsured rate decreased in the U.S. and Massachusetts, though most of the Commonwealth's decrease happened in the wake of Chapter 58. Future trends are uncertain since the Republican Party, which opposed the ACA, now controls the presidency and both chambers of Congress. Therefore, federal laws that impact Massachusetts could change.
- Latinos were at especially high risk of uninsurance, at 19.9% nationally and just under 8% in Massachusetts.
- People with incomes <300% of the federal poverty level (FPL) had lower insurance rates, with high deductibles and churning contributing to this gap.

1.2: COST-SHARING AND PREMIUMS

Cost-sharing

- Health care costs represented a high burden relative to income for 1 in 4 privately-insured, working-age adults, although the percentage of insured adults reporting problems paying for medical bills declined slightly from 2006 to 2015.
- Per-member-per-month (PMPM) spending continues to rise.
- Patient health care costs increased, especially due to increasing premiums and deductibles. This was especially for people in the individual and small group market.
- Nationally, health plans are increasing consumers' cost-sharing. The result is that insurers' health expenditures rose 58% from 2004 to 2014, while consumers' costs climbed 77%.
- Families with commercial coverage on average spent more than 20% of income on health care premiums and cost-sharing in 2015.
- In a unique trend, consumers with commercial coverage have spent less on copayments since 2010, largely due to the ACA and Chapter 58 provisions eliminating copays for preventive health visits. Copays increased, however, for people covered on the individual and small group market.

Premiums

- Premium increases slowed considerably compared to previous decades, but still outpaced wage growth and overall inflation. Employees at lower-wage establishments paid more on average for family and individual plan premiums than did those earning higher wages.
- The percentage of premiums paid by employees with ESI increased for individual plans and ended at the same level for family plans (from 2010 to 2015), although total health spending still increased for families and the share of employees using ESI decreased slightly. However, employers also increased expenditures on premiums.
- Medical loss ratio (MLR) rebates decreased dramatically from 2012 to 2014 and likely will continue to do so.

1.3: HEALTH CARE COSTS BORNE BY THE COMMONWEALTH

Overview

- Total health care expenditures (THCE) and total medical expenditures (a subset of THCE) grew at a rate higher than the rate of inflation, nominal GDP, and (in 2014 and 2015) the benchmark set by Chapter 224, although different components grew at different rates.
- Commercial spending was higher in wealthier communities, even after controlling for health status.
- The Executive Office of Health and Human Services' budget grew, and it accounted for most of the state budget.
- From 2011 to 2015 (the most recent full year with available data), MassHealth enrollment grew 38%, from approximately 1.3 million to 1.8 million.
- PMPM spending for MassHealth held fairly steady from 2012 to 2015 despite cost-control efforts. (A slight decrease in 2015 was possibly an artifact of enrollment related to the failure of the Health Connector.) A fuller explanation can be found in the Conclusion. If you wish for that first-reference context to be in the Summary of Findings also, it should read: The new MassHealth 1115 Waiver, which was approved by the federal government in 2016, may have a positive impact on this issue.
- Spending on MassHealth has increased since 2012, representing 37% of the state budget in 2015.
- From FY2011 to FY2015, Commonwealth expenditures on the Group Insurance Commission (GIC) rose 35.8%, while spending by GIC beneficiaries rose 42.3%.
- Health Safety Net (HSN) spending decreased 16.3% from 2011 to 2015. There remained a gap between demand and payments, although the gap shrank from 2011 to 2015. The MassHealth 1115 Waiver approved in 2016 includes some HSN reforms.
- Medicare spending per enrollee in Massachusetts decreased 2.5% to a level slightly below the national average.

Conclusion

Despite some progress, many challenges remain in the effort to control health care costs. Total health expenditures in the Commonwealth grew at a slowing pace for nearly a decade, but the growth rate started to increase again in 2014 and surpassed the benchmark set by Chapter 224 in 2014 and 2015. Although Massachusetts' insured rate was still the highest in the nation, certain subgroups were at much higher risk for uninsurance. Moreover, increasing cost burdens relative to incomes threatened insurance levels, as do the potential for national policy changes. Full implementation of Chapter 224 has not yet occurred, and the Commonwealth's executive and legislative branches continue to propose additional ways to control costs.

OVERALL HEALTH EXPENDITURES AND INSURANCE COVERAGE

For about a decade, there was a reduction in the rate of overall and per capita health expenditure growth, then the growth rate began increasing again in 2014. Key cost drivers include waste, price variation, provider consolidation, and drug prices; however, a direct analysis of these drivers was outside the scope of this report.

There was little change in the insured rate since 2012 in the Commonwealth, which was the highest in the U.S. The employer-based insurance rate held steady from 2012 to 2014 and declined from 2014 to 2015. The percentage of people with ESI from self-insured employers increased. There was also an increase in the percentage of the population enrolled in alternative payment model (APM) plans, a trend expected to continue with the passage of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) and the federal approval of the MassHealth 1115 Waiver in 2016.

The Chapter 224 mandate to cover 80% of MassHealth enrollees in APMs was not reached.

Although uninsurance rates were very low, Latinos were at an especially high risk at 8%, (compared to 19.9% for Latinos nationally).

Moreover, people with incomes <300% of the federal poverty level had lower insurance rates; high deductibles and enrollment churning contributed to this gap.

COST-SHARING AND PREMIUMS

Health care costs represented a high burden relative to income for 1 in 4 privately-insured adults (aged 19 to 64). There was a small decrease from 2006 to 2015 in the number of insured adults reporting problems with paying medical bills, accompanied by an increase in the number of people paying off long-term medical debt. Families paid increasing amounts out-of-pocket for health care, especially due to increasing premiums and deductibles. Although individual copayments also increased, consumer expenditures among the commercially-insured have decreased since 2010, largely due to Chapter 58 and ACA provisions eliminating copays for certain preventive care visits. Growth in premium charges slowed considerably compared to previous decades, but still outpaced wage growth and overall inflation.

HEALTH CARE COSTS BORNE BY THE COMMONWEALTH

Total health care expenditures grew at a rate higher than inflation and, in 2014 and 2015, exceeded the benchmark set by Chapter 224. Expenditure growth was largest in the pharmacy and hospital outpatient categories. Commercial spending was higher in wealthier communities, even after controlling for health status. Amid cost-control efforts, PMPM spending for MassHealth held fairly steady from 2012 to 2015.

Continuing a longer trend, MassHealth spending increased from 2012 to 2015 and represented 37% of the state budget in 2015. From FY2011 to FY2015, Commonwealth expenditures on the Group Insurance Commission (GIC) rose 35.8%. Meanwhile, spending by GIC beneficiaries rose 42.3%, which is illustrative of the growing burden of health costs on individuals and families.

Health Safety Net (HSN) spending decreased from 2011 to 2015; however, demand was greater than HSN funding every year examined. Many of these elements will be impacted by the MassHealth 1115 Waiver.

Endnotes

SECTION 1.1

1 Chapter and subchapter titles are adopted verbatim from the text of Chapter 224.

2 Martin, A., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization Increases. *Health Affairs*. Retrieved December 7, 2016, from http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

3 Organization for Economic Cooperation and Development. (2015, July). Focus on health spending. Retrieved June 21, 2016, from oecd.org/health/health-systems/Focus-Health-Spending-2015.pdf

4 Keehan, S., Poisal, J., Cuckler, G., et al (2016). National health expenditure projections, 2015–25: economy, prices, and aging expected to shape spending and enrollment. *Health Affairs*. Retrieved from content.healthaffairs.org/content/early/2016/07/12/hlthaff.2016.0459.full

5 Goldhill, D. (2009, September). How American health care killed my father. *The Atlantic*. Retrieved March 20, 2017, from theatlantic.com/magazine/archive/2009/09/how-american-health-care-killed-my-father/307617

6 Emanuel, E., Tanden, N., Altman, S., et al (2012). A systemic approach to containing health care spending. *New England Journal of Medicine*, *367*(10), 949–954.

7 Ibid.

8 Antos, J., Pauly, M., & Wilensky, G. (2012). Bending the cost curve through market-based incentives. *New England Journal of Medicine*, *367*(10), 954–958.

9 Berenson, R. (2015). Addressing pricing power in integrated delivery: the limits of antitrust. *Journal of Health Politics, Policy and Law*, *40*(4), 711–744.

10 Ginsburg, P. (2012). Bending the health care cost curve. *New England Journal of Medicine*, *367*(25), 2454.

11 Fisher, E., Wennberg, D., Stukel, T., et al. (2003). The implications of regional variations in Medicare spending. Part 1: the content, quality, and accessibility of care. *Annals of Internal Medicine*, *138*(4), 273–287.

12 Berwick, D., & Hackbarth, A. (2012). Eliminating waste in US health care. *JAMA, 307*(14), 1513–1516.

13 Ibid.

14 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 26 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

15 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 26 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

16 Curfman, G., Shachar, C., & Navathe, A. (2016). Beyond the Dartmouth Atlas - regional variation in private health care spending. *Healthcare (Amsterdam), 4*(3), pp. 132–134.

17 HPC. (2016). Provider price variation stakeholder discussion series summary report. Retrieved October 17, 2016, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-ppv-summary-report.pdf

18 HPC. (2016). Provider price variation stakeholder discussion series summary report. Retrieved October 17, 2016, from p. 1 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-ppv-summary-report.pdf

19 AGO. (2015, September). Examination of health care cost trends and cost drivers. Retrieved October 17, 2016, from p. 2 of mass.gov/ago/docs/healthcare/cctcd5.pdf

20 Ibid.

21 Massachusetts Health & Hospital Association. (2016, September). Report of the Massachusetts health & hospital association price variation workgroup.

22 Ibid.

23 HPC. (2016). Provider price variation stakeholder discussion series summary report. Retrieved October 17, 2016, from p. 18 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-ppv-summary-report.pdf

24 Special Commission on Provider Price Variation. (2017). Special Commission on Provider Price Variation report. Retrieved March 16, 2017, from p. 1 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/ppv-report-final.pdf

25 Ibid.

26 Martin, A., Hartman, M., Benson, J., et al. (2016). National health spending in 2014: faster growth driven by coverage expansion and prescription drug spending. *Health Affairs*, *35*(1), 150–160. Retrieved October 19, 2016, from http://content.healthaffairs.org/content/early/2015/11/25/hlthaff.2015.1194.full.pdf+html

27 Martin, A., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs*. Retrieved December 7, 2016, from: http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

28 Chernew, M. (2015, December 2). Interpreting new data on health care spending growth. Retrieved June 21, 2016, from http://healthaffairs.org/blog/2015/12/02/interpreting-new-data-on-health-care-spending-growth

29 Martin, A., Hartman, M., Benson, J., et al. (2016). National health spending in 2014: faster growth driven by coverage expansion and prescription drug spending. *Health Affairs*, *35*(1), 150–160. Retrieved October 19, 2016, from http://content.healthaffairs.org/content/early/2015/11/25/hlthaff.2015.1194.full.pdf+html

30 Chernew, M. (2015, December 2). Interpreting new data on health care spending growth. Retrieved June 21, 2016, from http://healthaffairs.org/blog/2015/12/02/interpreting-new-data-on-health-care-spending-growth/

31 Ibid.

32 Martin, A., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs*. Retrieved December 7, 2016, from: http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

33 Not inflation-adjusted.

34 Keehan, S., Poisal, J., Cuckler, G., et al (2016). National health expenditure projections, 2015–25: economy, prices, and aging expected to shape spending and enrollment. *Health Affairs, 35*(8), 1522–1531.

35 Ibid.

36 Martin, A., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs*. Retrieved December 7, 2016, from http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

37 "THCE includes health care expenditures for Massachusetts residents from public and private sources, including (i) all categories of medical expenses and all non-claims related payments to providers; (ii) all patient cost-sharing amounts, such as deductibles and co-payments; and (iii) the costs of administering private health insurance (called the Net Cost of Private Health Insurance or NCPHI). It does not include out-of-pocket payments for goods and services not covered by insurance, such as over-the-counter medicines, and also excludes other categories of expenditures such as vision and dental care."
Source: CHIA. Total health care expenditures. Retrieved from http://www.chiamass.gov/total-health-care-expenditures
Source: CHIA performance of the Massachusetts health care system 2015 annual report. Retrieved September 9, 2015, from http://www.chiamass.gov/assets/2015-annual-report/2015-Annual-Report.pdf

38 CHIA. (2016, September). Performance of the Massachusetts health care system 2016 annual report. Retrieved October 18, 2016, from p. 2 chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

39 Ibid.

40 CHIA. (2016, September). Performance of the Massachusetts health care system 2016 annual report. Retrieved October 14, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

41 Martin, A., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs.* Retrieved December 7, 2016, from http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

42 U.S. Census. Table H-8. Median household income by state: 1984 to 2015. Retrieved November 30, 2016, from http://www2.census.gov/programs-surveys/cps/tables/time-series/historical-income-households/h08.xls

43 Collins, S., Radley, D., Gunja, M. et al. (2016, October). The slowdown in employer insurance cost growth: why many workers still feel the pinch. The Commonwealth Fund. Retrieved October 26, 2016, from http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2016/oct/1910_collins_slowdown_employer_ins_cost_growth_ib.pdf

44 Ibid.

45 Smith, J. & Carla, M. (2016, September). Health insurance coverage in the United States: 2014. U.S. Census Bureau, current population reports, P60–253. U.S. Government Printing Office, Washington, DC. Retrieved October 26, 2016, from https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-253.pdf

46 Ibid.

47 Ibid.

48 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

49 Ibid.

50 Ibid.

51 CHIA. Standard statistics (Massachusetts employee median take-up rates tab). Retrieved October 18, 2016, from chiamass.gov/chia-standard-statistics

52 Ibid.

53 Blue Cross Blue Shield Foundation. (2016, April). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update. Retrieved September 27, 2016, from bluecrossfoundation.org/sites/default/files/2015_MHRS%20Webinar%20FINAL.pdf

54 Ibid.

55 CHIA. (2017, February). Enrollment trends, February 2017 edition. Retrieved October 21, 2016, from chiamass.gov

56 Self-Insurance Institute of America, Inc. (2012). Self-insured group health plans. Retrieved October 27, 2016, from siia.org/i4a/pages/Index.cfm?pageID=4546

57 CHIA. (2016, July). Enrollment trends, July 2016 edition. Retrieved October 17, 2016, from chiamass.gov/assets/Uploads/enrollment/enrollment-trends-july-2016.pdf

58 Fronstin, P. (2012, November). Self-insured health plans: state variation and recent trends by firm size, Employee Benefit Research Institute. Retrieved from http://www.ebri.org/pdf/notespdf/EBRI_Notes_11_Nov-12.Slf-Insrd1.pdf

59 Self-Insurance Institute of America, Inc. (2012). Self-insured group health plans. Retrieved October 27, 2016, from siia.org/i4a/pages/Index.cfm?pageID=4546

60 Kaiser Family Foundation. (2016, September). Section ten: plan funding. Retrieved October 24, 2016, from http://kff.org/report-section/ehbs-2016-section-nine-section-ten-plan-funding

61 CHIA. (2016, September). Annual report on the performance of the Massachusetts health care system. Retrieved October 24, 2016, from p. 35 of chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

62 Fronstin, P. Self-insured health plans: state variation and recent trends by firm size, Employee Benefit Research Institute, 4 (2012). Retrieved from http://www.ebri.org/pdf/notespdf/EBRI_Notes_11_Nov-12.Slf-Insrd1.pdf

63 Children's Health Insurance Program

64 Center for Medicare and Medicaid Services. Quality payment program. Retrieved October 26, 2016, from qpp.cms.gov

65 HPC. (2017, February). Annual health care cost trends report, 2016. Retrieved February 21, 2017, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

66 HPC. (2016, January). 2015 Cost Trends Report. Retrieved July 7, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

67 Ibid.

68 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

69 Ibid.

70 AGO. (2015, September). Examination of health care cost trends and cost drivers. Retrieved October 17, 2016, from p. 16 of mass.gov/ago/docs/healthcare/cctcd5.pdf

71 Ibid.

72 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

73 CHIA. (2015, January). The performance of the Massachusetts health care system series: tiered network membership in the Massachusetts market. Retrieved October 17, 2016, from chiamass.gov/assets/Uploads/tnjan2015.pdf

74 AGO. (2015, September). Examination of health care cost trends and cost drivers. Retrieved October 17, 2016, from mass.gov/ago/docs/healthcare/cctcd5.pdf

75 Ibid.

76 Members of the PCC plan, a managed-care program, are matched with a primary care provider. Members of the MCO plan receive care through a managed care plan that participates in the program. Source: Executive Office of Health and Human Services. (2016). Important changes for members of Managed Care Organization and Primary Care Clinician plans. Retrieved October 27, 2016, from mass.gov/eohhs/gov/departments/masshealth/important-changes-for-members-of-mco-and-pcc-plans.html

77 HPC. (2017, February). Annual health care cost trends report, 2016. Retrieved February 15, 2017, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

78 National Center for Health Statistics. (2016, November). Health insurance coverage: early release of estimates from the National Health Interview Survey, January–June 2016. Retrieved December 21, 2016, from cdc.gov/nchs/data/nhis/earlyrelease/insur201611.pdf

79 The Commonwealth Fund. (2016, August). Who are the remaining uninsured and why haven't they signed up for coverage? Retrieved October 24, 2016, from commonwealthfund.org/~/media/files/publications/issue-brief/2016/aug/1894_collins_who_are_remaining_uninsured_tb_rev.pdf

80 Blue Cross Blue Shield of Massachusetts Foundation. (2016, July). Massachusetts residents without health insurance coverage. Retrieved October 24, 2016, from bluecrossfoundation.org/sites/default/files/download/publication/MA_Res_woHealthIns_FINAL.pdf

81 Ibid.

82 Blue Cross Blue Shield Foundation of Massachusetts. (2016, December). Community matters: exploring the link between community characteristics and uninsurance in Massachusetts. Retrieved December 23, 2016, from bluecrossmafoundation.org/sites/default/files/download/publication/CommunityMatters_Dec2016_final.pdf

83 Ibid.

84 National Center for Health Statistics. (2016, November). Health insurance coverage: early release of estimates from the National Health Interview Survey, January–June 2016. Retrieved December 21, 2016, from cdc.gov/nchs/data/nhis/earlyrelease/insur201611.pdf

85 For consistency, the term "Latino" (not "Hispanic") is used throughout this report.

86 The Commonwealth Fund. (2016, August). Who are the remaining uninsured and why haven't they signed up for coverage? Retrieved October 27, 2016, from commonwealthfund.org/~/media/files/publications/issue-brief/2016/aug/1894_collins_who_are_remaining_uninsured_tb_rev.pdf

87 Pew Research Center. (2012, July). Median age for Hispanics is lower than median age for total U.S. population. Retrieved October 27, 2016, from pewresearch.org/daily-number/median-age-for-hispanics-is-lower-than-median-age-for-total-u-s-population

88 Smith, J. & Carla, M., U.S. Census Bureau. (2015, September). Current population reports, P60–253, health insurance coverage in the United States: 2014, U.S. Government Printing Office, Washington, DC, 2015. Retrieved October 26, 2016, from https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-253.pdf

89 Centers for Medicare & Medicaid Services. Health coverage for immigrants. Retrieved November 3, 2016, from healthcare.gov/immigrants/coverage

90 An exception is the Massachusetts Children's Medical Security Plan, which provides preventive and primary care services for uninsured children, regardless of immigration status.
Source: Massachusetts Budget and Policy Center. (2015, March). Children's Medical Security Plan. Retrieved November 3, 2016, from children.massbudget.org/childrens-medical-security-plan

91 AARP, Inc. (2016, March). Do you qualify for Medicare? Retrieved November 3, 2016, from aarp.org/health/medicare-insurance/info-04-2011/medicare-eligibility.html

92 Centers for Medicare & Medicaid Services. (2014, November). Eligibility for non-citizens in Medicaid and CHIP. Retrieved November 3, 2016, from medicaid.gov/medicaid/outreach-and-enrollment/downloads/overview-of-eligibility-for-non-citizens-in-medicaid-and-chip.pdf

93 Economic Policy Institute. (2015, September). New census data show no progress in closing stubborn racial income gaps. Retrieved October 27, 2016, from epi.org/blog/new-census-data-show-no-progress-in-closing-stubborn-racial-income-gaps

94 The Pew Charitable Trusts. (2014, October). A quarter of Latinos are uninsured. Retrieved October 27, 2016, from pewtrusts.org/en/research-and-analysis/blogs/stateline/2014/10/10/a-quarter-of-latinos-are-uninsured

95 Flores, G., Hua, L., Walker, C., et al. (2016). A cross-sectional study of parental awareness of and reasons for lack of health insurance among minority children, and the impact on health, access to care, and unmet needs. *International Journal for Equity in Health, 15*:44.

96 Gyurina, C., Rosinski, J., & Seifert, R. (2015, April). Rising health care costs in Massachusetts: what it means for consumers. Retrieved April 21, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/Rising Health Care Costs in MA and Consumers_final.pdf

97 HPC. (2017, February). Annual health care cost trends report, 2016. Retrieved February 21, 2017, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

98 Sommers, B., Gourevitch, R., Maylone, B., et al. (2016). Insurance churning rates for low-income adults under health reform: lower than expected but still harmful for many. *Health Affairs, 35*(10), 1816–1824.

99 Ibid.

SECTION 1.2

1 Centers for Medicare & Medicaid Services Glossary. Retrieved November 7, 2016, from healthcare.gov/glossary

2 Ibid.

3 Swartz, K. (2010). Cost-sharing: effects on spending and outcomes. Robert Wood Johnson Foundation. Retrieved from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2010/rwjf402103/subassets/rwjf402103_1

4 Federal Reserve. (2016, May). Report on the economic well-being of U.S. households in 2015. Retrieved November 7, 2016, from p. 1 of federalreserve.gov/2015-report-economic-well-being-us-households-201605.pdf

5 Claxton, G., Rae, M., & Panchal, N. (2015). Consumer assets and patient cost sharing. Kaiser Family Foundation. Retrieved June 4, 2015, from http://files.kff.org/attachment/issue-brief-consumer-assets-and-patient-cost-sharing

6 Blue Cross Blue Shield of Massachusetts Foundation, Robert Wood Johnson Foundation & Urban Institute. (2014, March). Health insurance coverage and health care access, use, and affordability in Massachusetts: an update as of fall 2012. Retrieved August 28, 2014, from p. 5 of bluecrossmafoundation.org/sites/default/files/download/publication/MHRS_2012%20Full%20Report.pdf

7 Ibid.

8 Collins, S., Gunja, M., Doty, M., et al. (2015, November). How high is America's health care cost burden? Findings from the Commonwealth Fund health care affordability tracking survey, July–August 2015. *The Commonwealth Fund.* Retrieved October 12, 2016, from p. 2 of http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2015/nov/1844_collins_how_high_is_americas_hlt_care_cost_burden_tb_v1.pdf

9 HPC. (2016). Policy brief on out-of-network billing. Retrieved October 17, 2016, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-ctr-out-of-network.pdf

10 Ibid.

11 Cooper, Z., & Scott Morton, F. (2016). Out-of-network emergency-physician bills—an unwelcome surprise. *New England Journal of Medicine*, *375*(20), 1915–1918.

12 Ibid.

13 Collins, S., Gunja, M., Doty, M., et al. (2015, November). How high is America's health care cost burden? Findings from the Commonwealth fund health care affordability tracking survey, July–August 2015. The Commonwealth Fund, p. 2. Retrieved October 12, 2016, from http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2015/nov/1844_collins_how_high_is_americas_hlt_care_cost_burden_tb_v1.pdf

14 Ibid.

15 Cohen R.A., & Zammitti E.P. (2016). Problems paying medical bills among persons under age 65: Early release of estimates from the National Health Interview Survey, 2011-June 2016. National Center for Health Statistics. Retrieved November 30, 2016, from: http://www.cdc.gov/nchs/nhis/releases.htm.

16 Long, S., & Dimmock, T. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update. Retrieved April 14, 2016, from p. 30 ofhttp://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_FINAL.pdf

17 Ibid.

18 Ibid.

19 Long, S. (2016, April 19). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update webinar. Retrieved April 19, 2016, from bluecrossfoundation.org

20 U.S. Centers for Medicare & Medicaid Services. High deductible health plan (HDHP). Retrieved March 20, 2017, from healthcare.gov/glossary/high-deductible-health-plan

21 Blue Cross Blue Shield of Massachusetts Foundation. (2014, November). Health insurance coverage and health care access and affordability in Massachusetts: affordability still a challenge. Retrieved October 12, 2016, from bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

22 Goldhill, D. (2009, September). How American health care killed my father. *The Atlantic*. Retrieved March 20, 2017, from theatlantic.com/magazine/archive/2009/09/how-american-health-care-killed-my-father/307617

23 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

24 Peterson-Kaiser Health System Tracker. (2016, April). Payments for cost sharing increasing rapidly over time. Retrieved October 12, 2016, from healthsystemtracker.org/insight/payments-for-cost-sharing-increasing-rapidly-over-time

25 Ibid.

26 Ibid.

27 Blue Cross Blue Shield of Massachusetts Foundation. (2014, November). Health insurance coverage and health care access and affordability in Massachusetts: affordability still a challenge. Retrieved October 12, 2016, from bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

28 CHIA. (2016, September). Performance of the Massachusetts health care system 2015 annual report. Retrieved October 17, 2016, from http://www.chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

29 Ibid.

30 Ibid.

31 Ibid.

32 Ibid.

33 Long, S. & Dimmock, T. (2014, November). Health insurance coverage and health care access and affordability in Massachusetts: affordability still a challenge. Blue Cross Blue Shield Foundation of Massachusetts. Retrieved December 3, 2014, from p. 85–86 of bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

34 Ibid.

35 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 23 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

36 Ibid.

37 HPC. (2015). 2015 Cost Trends Report. Retrieved from p. 23 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

38 Ibid.

39 Collins, S., Radley, D., Gunja, M., et al. (2016, October). The slowdown in employer insurance cost growth: why many workers still feel the pinch. The Commonwealth Fund. Retrieved October 26, 2016, from http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2016/oct/1910_collins_slowdown_employer_ins_cost_growth_ib.pdf

40 Peterson-Kaiser Health System Tracker. (2016, April). Payments for cost sharing increasing rapidly over time. Retrieved Oct. 12, 2016 from healthsystemtracker.org/insight/payments-for-cost-sharing-increasing-rapidly-over-time

41 Lantz, P., Evans, W., Mead, H., et al. (2016). Knowledge of and attitudes toward evidence-based guidelines for and against clinical preventive services: results from a national survey. *The Milbank Quarterly, 94*(1), 51–76.

42 Swartz, K. (2010). Cost-sharing: effects on spending and outcomes. Robert Wood Johnson Foundation. Retrieved from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2010/rwjf402103/subassets/rwjf402103_1

43 Ibid.

44 S. R. Collins, D. C. Radley, M. Z. Gunja, and S. Beutel. (2016, October). The slowdown in employer insurance cost growth: why many workers still feel the pinch. The Commonwealth Fund. Retrieved October 26, 2016, from http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2016/oct/1910_collins_slowdown_employer_ins_cost_growth_ib.pdf.

45 Source: Massachusetts Employer Health Insurance Survey, as reported by CHIA

46 Ibid.

47 Freyer, F. (2016, November 1). Insurance turmoil expected as rates climb for some consumers. *Boston Globe*. Retrieved November 2, 2016, from bostonglobe.com/metro/2016/11/01/health-insurance-turmoil-expected-rates-climb-for-some-consumers/tc8jZf237954q9CadowNqO/story.html

48 Ibid.

49 McCluskey, P. (2016, May 13). Mass. health insurers post operating losses. *Boston Globe*. Retrieved June 22, 2016, from https://www.bostonglobe.com/business/2016/05/13/mass-health-insurers-post-operating-losses/5eD8X6brllVYFJAsiHuzkM/story.html

50 Young, C. (2016, October 17). Prescription drug prices singled out by health care industry as cost driver. *State House News Service*. Retrieved October 18, 2016, from wwlp.com/2016/10/17/prescription-drug-prices-singled-out-by-health-care-industry-as-cost-driver

51 McCluskey, P. (2016, January 17). Lower-cost nonprofit insurer is struggling. *Boston Globe*. Retrieved June 22, 2016, from http://www.bostonglobe.com/business/2016/01/17/lower-cost-nonprofit-insurer-struggling/87RUe4zEjXm6UeWs7E6AZI/story.html

52 Ibid.

53 Economic Policy Institute. (2016, October). Nominal wage tracker. Retrieved November 2, 2016, from epi.org/nominal-wage-tracker

54 McDonough, J. (2011, November 7). Does Massachusetts have the nation's highest health insurance premiums? It depends. [Web log post]. Retrieved November 2, 2016, from archive.boston.com/lifestyle/health/health_stew/2011/11/does_massachusetts_have_the_na.html

55 The Commonwealth Fund. (2016, October). The slowdown in employer insurance cost growth: why many workers still feel the pinch. Retrieved October 26, 2016, from commonwealthfund.org/~/media/files/publications/issue-brief/2016/oct/1910_collins_slowdown_employer_ins_cost_growth_ib.pdf

56 Ibid.

57 McDonough, J. (2011, November 7). Does Massachusetts have the nation's highest health insurance premiums? It depends. [Web log post]. Retrieved November 2, 2016, from archive.boston.com/lifestyle/health/health_stew/2011/11/does_massachusetts_have_the_na.html

58 Ibid.

59 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 14 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

60 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

61 Gruber, J., & McKnight, R. (2014). Controlling health care costs through limited network insurance plans: evidence from Massachusetts state employees. *American Economic Journal: Economic Policy, 8*(2): 219–50. National Bureau of Economic Research.

62 Ibid.

63 Norton, M. (2016, November 2). State: Shop around for best health-insurance deals. *State House News Service*. Retrieved November 7, 2016, from lowellsun.com/news/ci_30531403/state-shop-around-best-health-insurance-deals

64 Collins, S., Radley, D., Gunja, M., et al, (2016, October). The slowdown in employer insurance cost growth: why many workers still feel the pinch. The Commonwealth Fund. Retrieved October 26, 2016, from http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2016/oct/1910_collins_slowdown_employer_ins_cost_growth_ib.pdf

65 Carroll, W. and Crimmel, B. Comparing health insurance coverage and costs for employees in lower-wage versus higher-wage establishments, private sector, 2012. Statistical brief #436. April 2014. Agency for Healthcare Research and Quality, Rockville, MD. Retrieved March 29, 2017, from http://www.meps.ahrq.gov/mepsweb/data_files/publications/st436/stat436.shtml

66 Kalter, L. (2016, Oct. 18). Health care hikes hurting. *Boston Herald*. Retrieved October 18, 2016, from bostonherald.com/business/business_markets/2016/10/health_care_hikes_hurting

67 Ibid.

68 HPC. (2017, February). Annual health care cost trends report, 2016. Retrieved February 21, 2017, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

69 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

70 Kaiser Family Foundation. (2016, September). Section ten: plan funding. Retrieved October 24, 2016, from http://kff.org/report-section/ehbs-2016-section-nine-section-ten-plan-funding

71 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

SECTION 1.3

1 Blue Cross Blue Shield of Massachusetts Foundation. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update. Retrieved November 3, 2016, from bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_

FINAL.pdf

2 MassHealth is the agency that manages the Children's Health Insurance Program and Medicaid, which administrates health coverage for low-income residents in Massachusetts.

3 HPC (2014). Cost trends report. Retrieved July 2, 2015, from p. 10 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/2014-cost-trends-report.pdf

4 The Commonwealth pays for some of the Medicare program, but the vast majority of the cost is covered by the federal government, which administers Medicare.

5 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

6 HPC (2014). Cost trends report. Retrieved July 2, 2015, from p. 10 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/2014-cost-trends-report.pdf

7 Calculated as the sum of social service and public health spending divided by the sum of Medicare and Medicaid spending.

8 Bradley, E., Canavan, M., Rogan, E., et al. (2016). Variation in health outcomes: the role of spending on social services, public health, and health care, 2000–09. *Health Affairs*, *35*(5), 760–768.

9 Examples of social determinants include the availability of safe housing, nutritious food, educational and vocational opportunity, affordable health services, and reliable transportation. Other examples include exposure to discrimination, violence, and concentrated poverty.
Source: Healthy People 2020. (2016, November). Social determinants of health. Retrieved November 3, 2016, from healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health

10 Bradley, E., Canavan, M., Rogan, E., et al. (2016). Variation in health outcomes: the role of spending on social services, public health, and health care, 2000–09. *Health Affairs*, *35*(5), 760–768.

11 AGO. (2016, October). Examination of health care cost trends and cost drivers. Retrieved October 18, 2016, from mass.gov/ago/docs/healthcare/cc-market-101316.pdf

12 Ibid.

13 M.G.L. c. 12C, Section 1.

14 HPC. Health Policy Commission. Retrieved October 19, 2016, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission

15 McCluskey, P. (2017, March 29). Mass. sets tougher target for health spending despite not meeting current goal. *Boston Globe*. Retrieved March 29, 2017, from bostonglobe.com/business/2017/03/29/state-sets-tougher-target-for-health-care-spending/6jcraXmeWMndbBVC6ehJKM/story.html

16 HPC. Health Policy Commission. Retrieved October 19, 2016, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission

17 Martin, A.B., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs*. Retrieved December 7, 2016, from: http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

18 HPC. (2017, February). Annual health care cost trends report, 2016. Retrieved February 15, 2017, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

19 Ibid.

20 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

21 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 11 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

22 AGO. (2016, October). Examination of health care cost trends and cost drivers. Retrieved October 25, 2016, from mass.gov/ago/docs/healthcare/cc-pharma-100716.pdf

23 HPC. 2015 cost trends report. Retrieved October 25, 2016, from p. 34 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

24 HPC. (2017, February). Annual health care cost trends report, 2016. Retrieved February 21, 2017, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf

25 AGO. (2016, October). Examination of health care cost trends and cost drivers. Retrieved October 25, 2016, from p. 2 mass.gov/ago/docs/healthcare/cc-pharma-100716.pdf

26 Ibid.

27 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

28 CHIA. (2015, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from mahp.com/unify-files/2015AnnualCHIAReport.pdf

29 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

30 Martin, A., Hartman, M., Benson, J., et al. (2016). National health spending in 2014: faster growth driven by coverage expansion and prescription drug spending. *Health Affairs*, *35*(1), 150–160. Retrieved October 19, 2016, from http://content.healthaffairs.org/content/early/2015/11/25/hlthaff.2015.1194.full.pdf+html

31 Martin, A., Hartman, M., Washington, B., et al. (2016, December 2). National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs*. Retrieved December 7, 2016, from http://content.healthaffairs.org/content/early/2016/11/22/hlthaff.2016.1330.full.pdf+html

32 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 15 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

33 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

34 Ibid.

35 Ibid.

36 Ibid.

37 Commonwealth of Massachusetts. All government areas - summary. Retrieved October 19, 2016, from mass.gov/bb/gaa/fy2017/app_17/ga_17/hdefault.htm

38 CHIA. (2017, February). Enrollment trends, February 2017 edition. Retrieved October 21, 2017, from chiamass.gov

39 CHIA. (2016, July). Enrollment trends, July 2016 edition. Retrieved October 17, 2016, from chiamass.gov/assets/Uploads/enrollment/enrollment-trends-july-2016.pdf

40 CHIA. (2017, February). Enrollment trends, February 2017 edition. Retrieved October 21, 2017, from chiamass.gov

41 Kaiser Family Foundation. (2016). Medicaid coverage rates for the nonelderly by race/ethnicity. Retrieved November 2, 2016, from kff.org/medicaid/state-indicator/rate-by-raceethnicity-3/?currentTimeframe=0&sortModel=%7B"colId":"Location","sort":"asc"%7D

42 McCluskey, P. (2016, April 15). Massive change coming to state health care for poor. *Boston Globe*. Retrieved November 7, 2016, from bostonglobe.com/business/2016/11/04/massive-change-coming-state-health-care-for-poor/XX1EaYofaYv0pVhbCXiZMN/story.html

43 Ibid.

44 McCluskey, P. (2016, Nov. 29). Six networks to test MassHealth's new system. *Boston Globe*. Retrieved November 30, 2016, from bostonglobe.com/business/2016/11/29/six-health-care-networks-test-masshealth-new-accountable-care-system/J0XdI8bCuRF55BuGzrC64K/story.html

45 McCluskey, P. (2016, Oct. 30). No easy fixes for MassHealth insurers. *Boston Globe*. Retrieved October 26, 2016, from bostonglobe.com/business/2016/10/30/easy-fixes-for-masshealth-insurers/tU8PI0eDSmwqLIorCEzRuI/story.html

46 Massachusetts EOHHS. (2016, June). Section 1115 demonstration project amendment and

extension request. Retrieved October 13, 2016, from p. 17 mass.gov/eohhs/docs/eohhs/cms-waiver/06-15-16-section-1115-demonstration-extension-request.pdf

47 Ibid.

48 A share of which are contingent on the Commonwealth meeting certain performance benchmarks.

49 McCluskey, P. (2016, April 15). Massive change coming to state health care for poor. *Boston Globe*. Retrieved November 7, 2016, from bostonglobe.com/business/2016/11/04/massive-change-coming-state-health-care-for-poor/XX1EaYofaYv0pVhbCXiZMN/story.html

50 McCluskey, P. (2016, Oct. 30). No easy fixes for MassHealth insurers. *Boston Globe*. Retrieved October 26, 2016, from bostonglobe.com/business/2016/10/30/easy-fixes-for-masshealth-insurers/tU8Pl0eDSmwqLIorCEzRuI/story.html

51 Ibid.

52 McCluskey, P. (2016, April 15). Neighborhood Health Plan stops taking MassHealth members. *Boston Globe*. Retrieved October 26, 2016, from bostonglobe.com/business/2016/10/26/neighborhood-health-plan-stops-taking-masshealth-members/u3eicAzKNA2DtpU8gAwvcK/story.html

53 Ibid.

54 Bartlett, J. (2016, Oct. 27). Handcuffed by reimbursement rates, Neighborhood freezes Medicaid enrollment. *Boston Business Journal*. Retrieved November 7, 2016, from bizjournals.com/boston/news/2016/10/27/handcuffed-by-reimbursement-rates-neighborhood.html

55 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

56 Ibid.

57 Norton, M., & Murphy, M. (2017, January 12). MassHealth enrollment surges, adding to pressure on state budget. State House News Service. Retrieved January 12, 2017, from lowellsun.com/breakingnews/ci_30721455/masshealth-enrollment-surges-adding-pressure-state-budget

58 Massachusetts Medicaid Policy Institute. (2016, June). MassHealth: the basics. Retrieved October 14, 2016, from bluecrossmafoundation.org/sites/default/files/download/publication/MassHealthBasics_Chartpack_FY2015_FINAL_1.pdf

59 Ibid.

60 Norton, M., & Murphy, M. (2017, January 12). MassHealth enrollment surges, adding to pressure on state budget. *State House News Service*. Retrieved January 12, 2017, from lowellsun.com/breakingnews/ci_30721455/masshealth-enrollment-surges-adding-pressure-state-budget

61 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

62 Ibid.

63 McCluskey, P. (2016, February 6). Mass. health care reform pioneer Dolores Mitchell retires. *Boston Globe*. Retrieved October 26, 2016, from bostonglobe.com/business/2016/02/05/control-health-costs-and-quality-dolores-mitchell-challenged-status-quo/8nMF5KVCQ4rFEhJA2smACO/story.html

64 Ibid.

65 Massachusetts EOHHS. Health Safety Net: for patients. Retrieved September 30, 2014, from mass.gov/eohhs/consumer/insurance/more-programs/health-safety-net/for-patients.html

66 Data provided by HSN to OSA.

67 Ibid.

68 Ibid.

69 HSN. (2015). Health Safety Net annual report: fiscal year 2015. Retrieved Oct. 26, 2016 from mass.gov/eohhs/docs/masshealth/hsn/hsn-fy2015-ar.pdf

70 MassHealth. (2016, November). MassHealth 1115 waiver approval - factsheet. Retrieved December 6, 2016, from mass.gov/eohhs/docs/eohhs/healthcare-reform/masshealth-innovations/ma-1115-waiver-factsheet.pdf

71 CMS. Medicare enrollment dashboard. (2017, February). Retrieved November 3, 2016, from https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Dashboard/Medicare-Enrollment/Enrollment%20Dashboard.html

72 Kaiser Family Foundation. (2016, July). Medicare spending at the end of life: a snapshot of beneficiaries who died in 2014 and the cost of their care. Retrieved November 3, 2016, from kff.org/medicare/issue-brief/medicare-spending-at-the-end-of-life

73 CMS. Quality payment program. Retrieved Oct. 26, 2016 from qpp.cms.gov

74 Ibid.

75 Ibid.

76 CHIA. (2017, February). Enrollment trends, February 2017 edition. Retrieved October 21, 2017, from chiamass.gov

77 CHIA. (2014, September). Annual report on the performance of the Massachusetts health care system - supplement 8: Medicare expenditures for Massachusetts beneficiaries. Retrieved on March 16, 2015, from p. 2 of chiamass.gov/assets/docs/r/pubs/14/chia-annual-report-2014-supplement-08-medicare.pdf

78 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved October 19, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

79 HPC. (2016, October). Slide deck: annual health care cost trends hearing. Retrieved October 25, 2016, from p. 21 of mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/annual-cost-trends-hearing/2016/cth16-presentation.pdf

80 CHIA. (2014, September). Annual report on the performance of the Massachusetts health care system, supplement 8: Medicare expenditures for Massachusetts beneficiaries. Retrieved March 16, 2015, from p. 2 of chiamass.gov/assets/docs/r/pubs/14/chia-annual-report-2014-supplement-08-medicare.pdf

81 CMS. (2016, January). Geographic variation in standardized Medicare spending. Retrieved October 26, 2016, from cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Dashboard/GeoVar-State/GeoVar_State.html

CHAPTER 2

Access to Health Care Services and Quality of Care for Children, Older Adults, Low-Income Individuals, and People with Disabilities

Section 2.i:
Introduction

Massachusetts had the nation's highest rate of health insurance coverage at 95.7% in 2014,[1] while an estimated 97.5% of residents were insured the following year.[2] However, near-universal coverage has not necessarily translated into access. While insurance is usually a necessary first step to obtaining health care, other barriers remain, including the presence or absence of health services near one's home, shortages of health care professionals, language barriers, cost of care, insurance type, and other systemic factors such as the disparate application of laws.

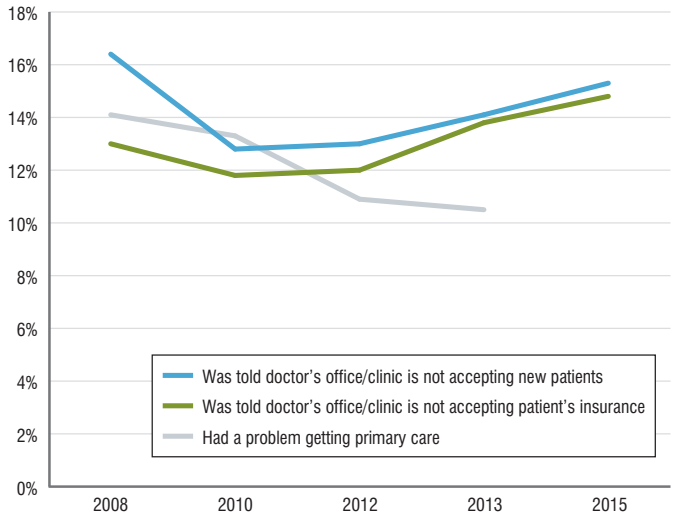
According to the Massachusetts Health Reform Survey (MHRS) of adults aged 19 to 64, even though Massachusetts has a small percentage of uninsured people, many still experience problems accessing care. (See Figure 2.i.1.)

Healthy People 2020, an initiative by the federal government seeking to improve the health of all Americans, defines access as, "...the timely use of personal health services to achieve the best health outcomes."[3] The initiative recognizes three steps to access:

- Entering the health care system,
- Obtaining the right services at the right location, and
- Establishing and maintaining contact with a trusted provider with whom the patient can communicate.[4]

Optimally, once patients engage a provider, they will receive high-quality care. The Agency for Healthcare Research and Quality defines quality health care as, "doing the right thing, at the right time, for the right person, and having the best possible result."[5]

Figure 2.i.1. Problems obtaining care (Massachusetts adults aged 19-64)



Note: No data was available in 2015 for the "had a problem getting primary care" measure.
Source: MHRS

The National Committee for Quality Assurance (NCQA), a not-for-profit organization working to improve health care quality, has developed a set of quality measures that serves as a key mechanism for measuring performance and outcomes and for analyzing data trends.[6] Further, the NCQA "seal of approval" for accredited plans or entities is a widely recognized symbol of quality given only after annual performance reports and a rigorous review covering more than 40 performance areas.[7]

A NOTE ABOUT THE DATA

In this section, the Office of the State Auditor (OSA) presents its longitudinal statistical analyses of NCQA quality measures,[8] including pediatric vaccinations, child development, well-care visits, access to mental health and specialist care, and lead screenings. The analyses were conducted using claims data from MassHealth[9] and the Massachusetts All Payer Claims Database (APCD),[10] which tracks commercial insurance claims. The Office of the State Auditor (OSA) used both quantitative and qualitative components to conduct the analysis.

Quantitative data sources for the longitudinal analysis include:

- For commercial insurance, OSA used data from the top insurers in Massachusetts (Blue Cross Blue Shield, Harvard Pilgrim Health Care, and Tufts Health Plan), which account for 63.2% of market share[11] and are considered representative of the commercial population.
- Results for the MassHealth and commercial/private populations are often presented separately in this report and should be interpreted as representative of their cohorts only and not of the entire population.
- Several measures draw heavily on the MassHealth Managed Care HEDIS (Healthcare Effectiveness Data and Information Set)[12] 2013 Report, which presents statistics on the quality of care provided by the six health plans serving the MassHealth managed care population.

Because some measures (e.g., pediatric immunizations and colorectal cancer screening) require a look back at claims preceding 2011, screening rates among the commercial population are underestimated due to the limitations of APCD release 5.0, which lacks data from these years. For these measures, odds ratios and prevalence figures should be interpreted with particular caution because they may not reflect prevalence increases due to the lack of retrospective data points.

This report also presents qualitative data through quotes conveying the opinions of various stakeholders in the Commonwealth. These data were collected using in-depth, semi-structured interviews and do not reflect any endorsement by OSA.

OSA also uses NCQA's quality measures for tracking the impact of Chapter 224 on population health. Given the differing levels of difficulty in specifying, validating, and collecting adequate data, most measures are not concentrated on outcomes and typically focus on actions taken by health care professionals, such as the administration of screenings.[13] Although there is a strong argument for including patient-experience data in quality measures,[14] a scarcity of standardized measures exist in this area, so OSA has omitted them.

UNMET NEED FOR CARE

Background

Many people cannot access needed health services because of inability to pay and other obstacles. In 2015, 16.9% of Massachusetts residents—about 1,150,000 people[15]—reported having an unmet need for medical care[16] because they could not afford it.[17] Adults aged 19 to 64 reported the highest rate of having an unmet need for care (21.1%), while lower rates were reported for older adults (14.1%) and children (6.7%).[18]

Further, a 2015 nationwide patient survey showed that, in the prior two years, 15% of insured adults needed health care but could not get it; 58% of these patients said they could not afford the care, and 35% said they could not find a provider who would take their insurance.[19]

"Once you have a Medicaid card, what people find out is Medicaid is a pretty good insurance card. It gets you care just about anywhere and minimal [out-of-pocket costs], especially in Massachusetts."

— DR. PAUL HATTIS, TUFTS UNIVERSITY SCHOOL OF MEDICINE

Many providers do not accept MassHealth, and MassHealth enrollees are more likely than the privately insured to have unmet care needs.[20] Indeed, 25.7% of MassHealth enrollees have an unmet need for care, compared to 16.6% of those with employer-sponsored insurance (ESI).[21] However, Medicaid enrollees nationwide feel more favorably about their plans than those with commercial insurance: 75% of Medicaid enrollees are satisfied with how the health system is working, compared to 69% of those with ESI and 65% of those with an individual-market plan.[22,23] Regarding cost, deductibles that constitute a substantial share of income seem to impair access to care, as follows:

- Nationally, about 40% of privately insured adults with deductibles constituting at least 5% of their income cited cost as the reason for not seeking care when sick or not getting preventive screenings, recommended follow-up tests, or needed specialist care, according to a 2014 survey.[24]
- In contrast, only 23% of privately insured adults with deductibles smaller than 5% of their income reported the same.
- In Massachusetts, 12.9% of non-elderly adults reported going without needed prescription drugs because of cost.[25]

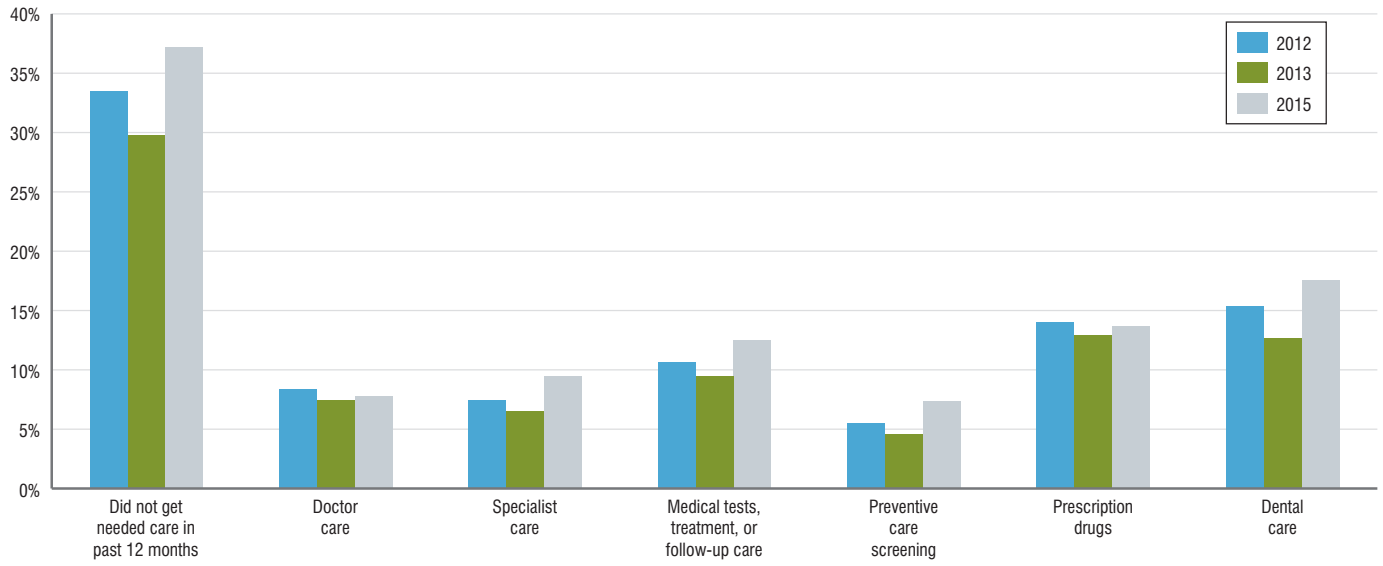
"[There's] a wide swath of people who aren't poor enough for Medicaid, and they're not poor enough to get significant [premium] subsidies. ... They're being chased into higher-deductible plans. I worry about the affordability for them."

— DR. PAUL HATTIS

Massachusetts trend, 2012–2015

In 2015, 37.2% of insured Massachusetts adults aged 19 to 64 had an unmet need for health care, up from 33.5% in 2012. (See Figure 2.i.2.) Unmet needs increased in the categories for specialist care; medical tests, treatment, or follow-up care; preventive care; and dental care.

Figure 2.i.2. Unmet need for health care (Massachusetts full-year insured adults aged 19–64)



Source: MHRS

PHYSICIAN SHORTAGES

Massachusetts faces a physician shortage despite having more physicians per capita than many other states. A large share do not care for patients full-time and engage in other pursuits (including research, teaching, and administration).[26] In addition, significant shortages exist in neurology, gastroenterology, internal medicine, and family medicine, according to a 2013 report by the Massachusetts Medical Society (MMS).[27] (The MMS report is based on surveys of physicians that historically have very low response rates, so it should not be considered authoritative.[28])

Localized physician shortages are impacting the Springfield and Pittsfield regions, in particular. Because of these shortages, many patients lack access to timely appointments and care. Patients who cannot travel, and those enrolled in MassHealth (in which many providers decline to participate), have even greater difficulty getting care when they need it. Indeed, 27.8% of adults with public coverage (MassHealth or Medicare) in 2015 had trouble getting an appointment with a general doctor as soon as they needed one.[29] Moreover, some providers (particularly behavioral health clinicians) reject insurance altogether and only accept out-of-pocket payment.

Efforts to address these shortages are underway. Chapter 224, following the lead of the Patient Protection and Affordable Care Act of 2010 (ACA), sought to broaden the availability of providers by changing "primary care physician" references to "primary care provider" (PCP) in several governing statutes. A PCP was defined as "a health care professional qualified to provide general medical care for common health care problems, who supervises, coordinates, prescribes or otherwise provides or proposes health care services, initiates referrals for specialist care and maintains continuity of care within the scope of practices."[30] In short, the law expanded the scope of practice for nurse practitioners (NPs) and physician assistants (PAs), and the physician-supervision requirements of NPs and PAs were reduced.[31] (NPs who write prescriptions still must be supervised by a physician.[32])

In the years following the Massachusetts health care reform law (Chapter 58 of the Acts of 2006), the share of Massachusetts residents who had a problem receiving primary care declined, and fewer non-elderly adults were told that a doctor's office is not accepting new patients. Specifically, 10.5% of residents reported problems with access to primary care in 2013, down from 14.1% in 2008. The Commonwealth now outperforms the nation on the issue of access: the 10.5% compares favorably to the 15% of American adults who reported in 2015 being unable to access needed care in the past two years, primarily due to cost.[33]

USUAL SOURCE OF CARE

Establishing a usual source of care for people with chronic conditions can help prevent acute episodes that require costly intervention, such as surgery or ED visits. In 2010, 86% of U.S. health care spending was on patients with a chronic condition,[34] so managing chronic disease and co-morbidities is essential to controlling costs. Preventive care—including glucose monitoring, medication management, and screening—is central to this effort.[35,36]

Massachusetts led the nation in the share of adults who had a usual source of care, according to a 2014 Commonwealth Fund report.[37] Wealthier Massachusetts residents are more likely to have a usual source of care than low-income residents: 93.6% of people > 400% of the federal poverty level (FPL), compared to only 86% with family income < 300% of FPL. In addition, women nationwide are more likely than men to have a regular clinician to visit when they are sick or need medical advice (81% vs. 68%).[38]

As shown in Table 2.i.3, the percentage of Massachusetts adults aged 19 to 64 with a usual source of care has ranged from 85.3% in 2006 to 87.5% in 2013.[39] Even though this increase is not statistically significant, Massachusetts has higher access to care than the nation overall; for example, only 74% of U.S. adults in 2015 reported having a relationship with a regular doctor or health care professional who provides for most of their health care needs.[40]

The annual well-care visit gives patients an opportunity to receive preventive care, discuss chronic conditions and new health issues, and build rapport with a provider. However, the importance of well-care visits should be kept in perspective: There is no consensus among experts that a yearly physical is necessary, as follows:

- A 2012 systematic review and meta-analysis by the Cochrane Collaboration found that "general health checks did not reduce morbidity or mortality, neither overall nor for cardiovascular or cancer causes, although they increased the number of new diagnoses."[41] Therefore, while well-care visits can support the management of chronic disease and the monitoring of patients in poor health, increasing the prevalence of the yearly physical may not be an effective means of improving population health.
- On the other hand, targeted preventive-care interventions can have a large positive impact; patients of an urban, mobile preventive-health clinic, which served a high share of uninsured people in Massachusetts, enjoyed a substantially reduced risk of heart attack and stroke from 2010 to 2012.[42]

In 2014, about 83.4% of Massachusetts adults aged 19 to 64 visited a general (primary care) doctor in the past year (see Figure 2.i.3). In 2014 and 2015, adults aged 19 to 64 were less likely to visit a general doctor than children and older adults (see Figure 2.i.4).

As provisions of Chapter 224 are implemented and the health industry moves to adopt a team-based approach to primary care, practice patterns are expected to evolve, with more people seeing an NP, PA, or other mid-level provider.

In 2014, people in low-income Massachusetts households (earning less than $25,000 per year) were more likely to have a checkup in the past year than their wealthier peers.[43] Additionally, women were more likely to have a checkup (82%) than men (74.6%),[44] possibly because women seek obstetrics and gynecology care and are more likely to take children to see their providers.[45] Nationally, men are less likely to be insured, to have seen a health care provider in the past two years, and to seek screening services or discuss sexual health with their provider.[46]

OSA's analysis of MHRS data found that, perhaps in response to industry efforts to diversify primary care settings, Massachusetts adults aged 19 to 64 are changing where they seek care when sick,[47] as follows:

- When sick, fewer adults chose to seek care in their doctor's office: 68.9% in 2015, compared to 71.8% in 2012.
- Many more sick adults visited urgent care centers (3.4% in 2015, up 162% from 2012).
- A higher share of sick adults visited the ED (4.7% in 2015, up 23.7% from the 2012 level).

Finally, a substantial share of consumers are dissatisfied with the choice of providers available to them. According to the 2013 MHRS, 64.4% of adults aged 19 to 64 (including only 56.9% of those with family income < 300% FPL) rated their health plan as having a very good or excellent choice of providers.[48]

EMPLOYER-SPONSORED INSURANCE

Background

Both the ACA and the Massachusetts health care reform law compel employers with at least 50 full-time employees to offer health insurance or pay a penalty.[49] Critics have argued that these mandates will lead to fewer employers offering insurance benefits, although there seems to be little to no evidence of this to date, beyond anecdotal accounts.[50]

Although a high share of Massachusetts workers have the option to enroll in ESI, some decline coverage because they cannot afford the premiums, believe they do not need health care, or can obtain insurance that costs less or provides more benefits through a family member or the individual marketplace.

In 2011, 740,000 full-time Massachusetts employees were not covered by ESI; in 2015, 859,000 were not covered by ESI.[51]

Massachusetts trend, 2005–2014

According to the CHIA employer survey, the share of Massachusetts workers eligible for ESI has fluctuated in the last decade, as shown in Figure 2.i.5. The share of eligible workers reached its peak (81%) in 2007, perhaps due to implementation of the Massachusetts health care reform law. The share dipped to 65% in 2011—perhaps because of slow economic growth and labor trends—before rebounding to 77% in 2014.

AFTER-HOURS CARE AND TELEMEDICINE

Background

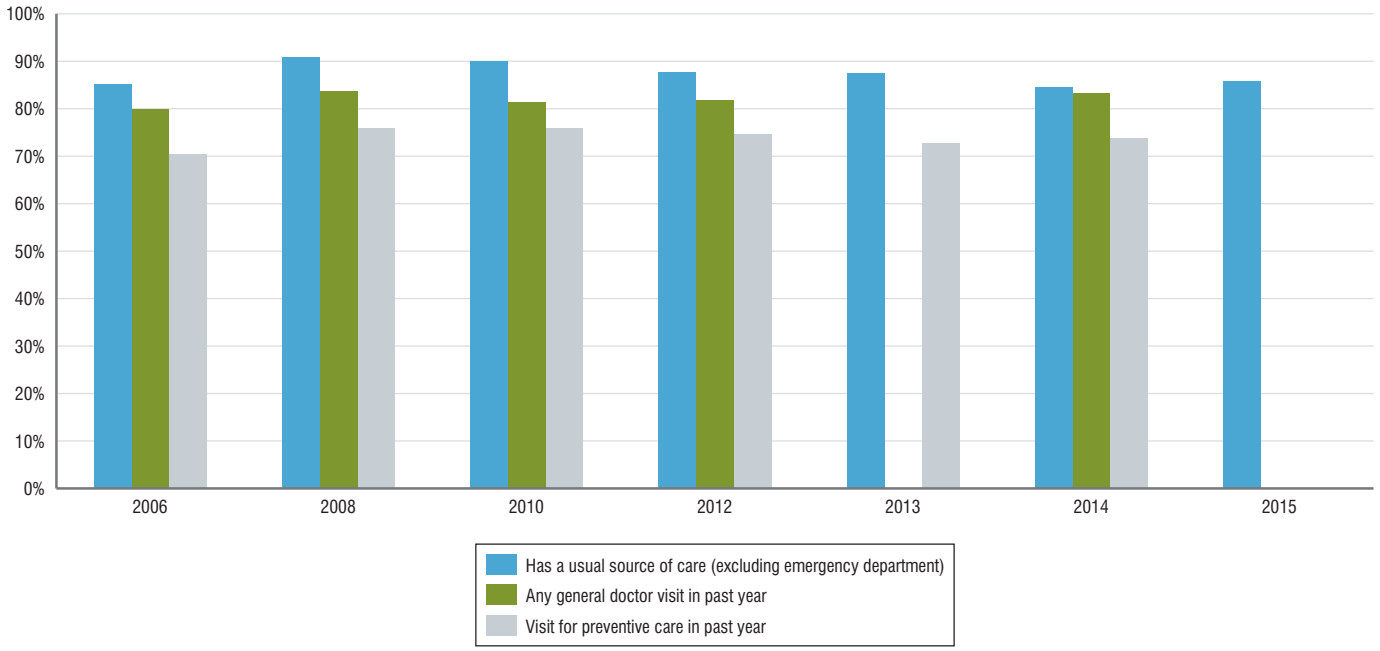
The 2012 MHRS survey defines "after-hours care" as care given when a patient's primary care clinic/doctor's office is closed. After-hours care is particularly important to consumers because it provides an affordable and efficient setting for addressing urgent health matters that may not be emergencies. If affordable after-hours care is available, insurers may see a reduction in expensive ED use.

The demand for after-hours care presents an opportunity for the use of telemedicine, defined as medical consultation and triage performed remotely over video. Telemedicine can improve access to primary care during off hours and for people with mobility issues,[52] which can help divert patients from costly ED visits. However, telemedicine presents regulatory and clinical challenges for practices and payers across the nation;[53] for example, Massachusetts providers who practice telemedicine must be licensed to practice in the Commonwealth and carry out telemedicine care consistent with applicable regulations (including those concerning liability and hospital credentialing).[54]

In Massachusetts, some providers are using telemedicine to conduct dermatology exams and primary care visits,[55] yet it may have the most potential in medical disciplines that do not require a physical exam, such as mental health. Beyond the Commonwealth, a meta-analysis of 380 studies found no difference in effectiveness between tele-psychiatry and "in-person" psychiatric assessments.[56] There is also some evidence that treatment for depression using telemedicine does not increase the burden on mental health providers.[57]

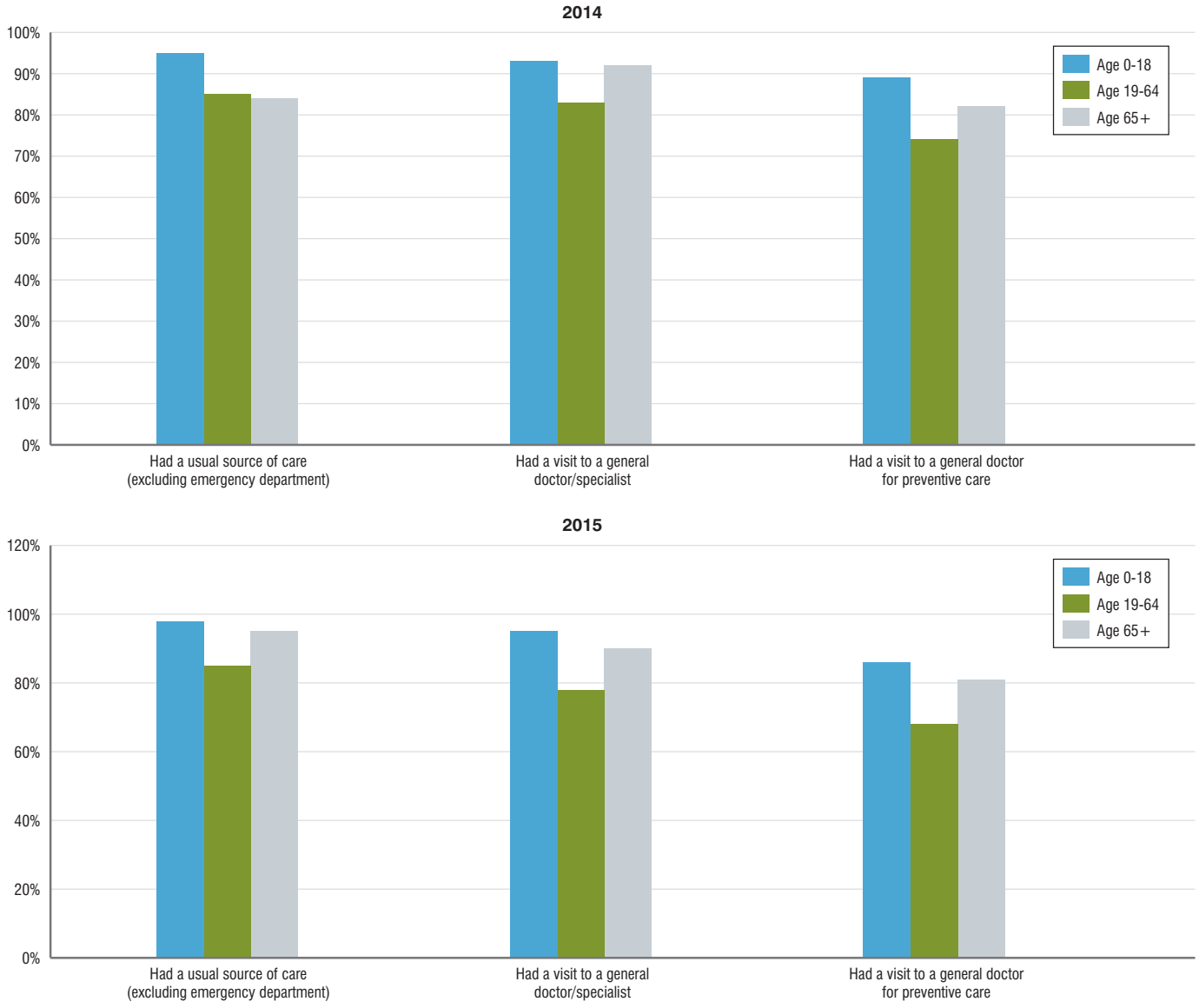
In the Commonwealth, adoption of telemedicine has been slow, although UnitedHealthcare now covers video chats with providers,[58] and Baystate

Figure 2.i.3. Health care access and use in the past year, 2006–2015 (Massachusetts adults aged 19–64)



Note: No data exists for "any general doctor visit in past year" in 2013 and 2015 or for "visit for preventive care" in 2015.
Source: MHRS

Figure 2.i.4. Health care access and use, by age (Massachusetts)



Source: Massachusetts Health Insurance Survey

Franklin Medical Center in Greenfield and Baystate Mary Lane Hospital in Ware have been praised for using telemedicine to connect patients recovering from strokes with a remote neurologist.[59]

Massachusetts trend, 2010–2013

According to the 2013 MHRS, 21.9% of adults aged 19 to 64 needed after-hours care in the previous year. Of these, 62% (about 600,000 people[60]) visited the ED, as shown in Figure 2.i.6. In addition, more adults are visiting urgent care centers for after-hours care: 12% in 2013, up from 8% in 2010.

HOSPITAL USAGE: EMERGENCY DEPARTMENT

Background

EDs are generally the most expensive setting for acute care. The average cost of an ED visit was $1,423 in 2013, according to the national Medical Expenditure Panel Survey.[61] ED usage trends include the following:

- In Massachusetts:
  - 3,062,912 ED visits were recorded in 2013, down 2.3% from 2012.[62] Medicaid and Medicare ED discharges increased each year from 2009 to 2012.[63]
  - Mental health and substance abuse ED visits increased 23.7% from 2010 to 2014.[64]
- Nationwide, 33% of adults said they visited the ED in the past two years (2013 to 2015).[65]

The ED is often not the optimal setting for care. In 2014, about 42% of ED visits in Massachusetts were non-emergencies or treatable in a primary care setting.[66] According to national patient survey data, 40% of ED visits were for treatment of a major health problem, while 23% were for treatment of a minor problem.[67]

ED visits for non-emergency conditions are widely perceived as evidence that a patient is not sufficiently connected to convenient primary care. For example, Latinos, who represent about 10% of the Commonwealth's population and have a higher uninsurance rate than the overall population, account for 15% of ED discharges.[68]

Another contributor to ED usage is preventable oral health conditions, according to the Health Policy Commission. Young adults are most likely to use the ED for such conditions.[69] MassHealth pays for a disproportionately large share (48.8%) of ED visits connected with preventable oral health conditions.[70] Regions with particularly high oral-health-related ED visits included Fall River, which had 10.1 to 13.1 oral visits per 1,000 people, and the New Bedford and Berkshires regions, with 8.4 to 10 visits per 1,000 people.[71]

Chapter 224 encourages institutions to offer acute care in settings that are less costly, such as acute/urgent care clinics, retail clinics, ambulatory centers, community health centers, and open-late practices. Unfortunately, anecdotal evidence suggests these alternatives are often impractical or unavailable. At the 2015 Health Policy Commission Cost Trends Hearings, Dr. Timothy Ferris of Massachusetts General Hospital (MGH) lamented that when patients call him on MGH's doctor hotline, he often has little choice but to refer them to a nearby ED. However, Partners HealthCare announced plans in 2015 to open as many as a dozen urgent care clinics by the end of 2018,[72],[73] and Beth Israel Deaconess Medical Center and Steward Health Care System are players in the urgent care market, too.

Massachusetts trend, 2006–2015

As shown in Figure 2.i.7, the share of Massachusetts adults (aged 19 to 64) who visited the ED declined slightly from 2010 (32.2%) to 2015 (31.5%). This trend was noted among groups with ESI (23.7% down to 19.6%) as well as public insurance, largely MassHealth and Medicare, (52.3% down to 48%).

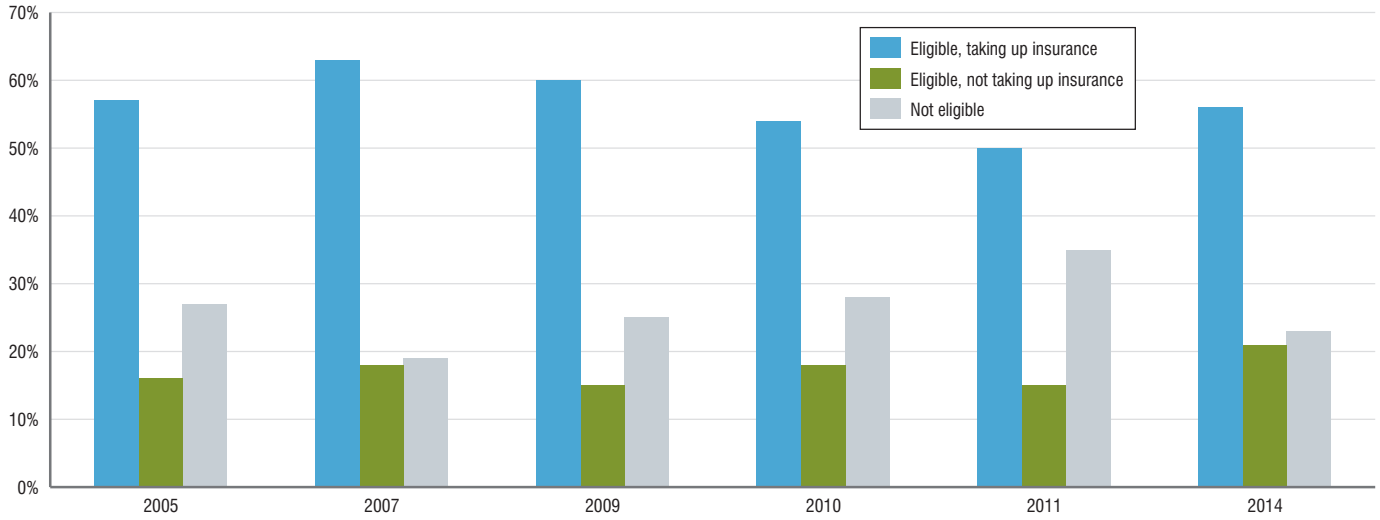
HOSPITAL USAGE: INPATIENT ADMISSIONS

By some important measures, Massachusetts has higher hospital utilization than the national average, as follows:

- Per capita, Massachusetts has more inpatient days in the hospital than 32 states, more inpatient admissions than 35 states, and more ED visits than 28 states.[74]
- Hospitalizations are especially high in the New Bedford and Fall River regions, where patients were most likely to be admitted to the hospital at least four times (in 2014).[75]
- Massachusetts exceeds national rates of potentially preventable hospitalizations for three measures: chronic obstructive pulmonary disease, congestive heart failure, and asthma in younger adults.[76] Rates are particularly high in Hampden County and particularly low in Worcester County.[77]

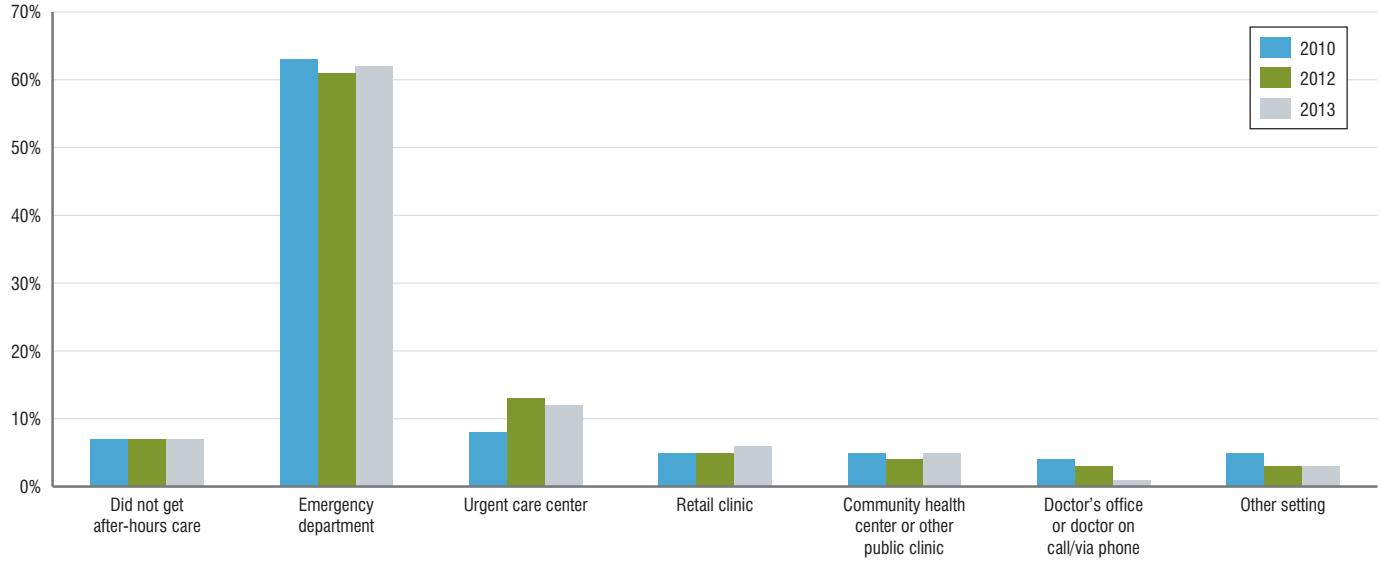
Readmissions account for a large share of avoidable hospital use. Patients are at highest risk of readmission two to seven days after they are discharged, and 7% of patients (those with high needs) account for 58% of readmissions.[78] Patients with substance abuse or mental health problems have particularly high risk of readmission.[79] On a positive note, the unplanned 30-day readmission rate in Massachusetts declined from 16.1% in fiscal year (FY) 2011 to 15.8% in FY 2015.[80]

Figure 2.i.5. Estimated eligibility for ESI (Massachusetts workers)



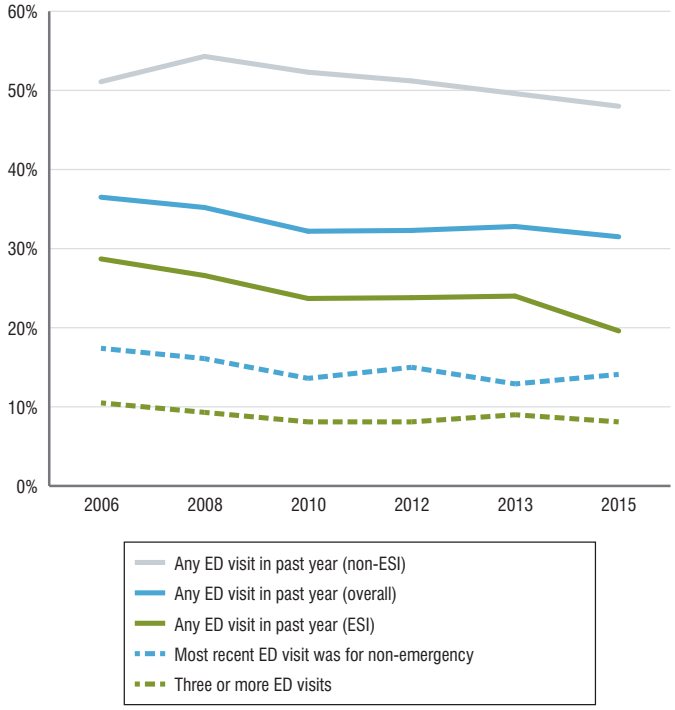
Note: Among those employed at worksites offering insurance
Source: CHIA Standard Statistics (Massachusetts Employee Median Take-Up Rates tab), accessed 5/2/16
http://www.chiamass.gov/assets/docs/r/pubs/14/2014-employer-survey-databook.xlsx

Figure 2.i.6. Setting of after-hours care among those who needed it (adults aged 19–64)



Source: MHRS

Figure 2.i.7. ED use in past year (Massachusetts adults aged 19–64)



Source: MHRS

Section 2.1: Children

A NOTE ABOUT THE DATA

In this section, OSA presents its longitudinal statistical analyses of quality measures constructed from guidelines from NCQA, a not-for-profit organization working to improve health care quality. Quality measures include pediatric vaccinations, child development, well-care visits, access to mental health and specialist care, and lead screening. Claims data—including MassHealth and the APCD, which tracks commercial insurance claims—were used to perform the analyses. For commercial insurance, OSA used data from the top insurers in Massachusetts (Blue Cross Blue Shield, Harvard Pilgrim Health Care, and Tufts Health plan), which account for 63.2% of market share[1] and are considered representative of the commercial population.

Several measures in this section draw heavily on the MassHealth Managed Care HEDIS (Healthcare Effectiveness Data and Information Set)[2] 2013 Report, which presents statistics on the quality of care provided by the six health plans serving the MassHealth managed care population.

OVERVIEW

Pediatric health care is essential: some developmental issues are most easily corrected when a person is young, and poor nutrition in the first 1,000 days of life can have lifelong health impacts.[3] According to the 2010 Census, children compose 20.6% of the Massachusetts population (about 1,350,000 people) and 23.1% of the national population.[4]

Relative to other states, Massachusetts children have good access to healthcare. Only 3% of children in Massachusetts were uninsured in 2007–2008 and again in 2011–2012, the lowest rate in the nation, according to a report from the Commonwealth Fund. As with adults, a combination of expanded Medicaid coverage, employer and individual mandates, and subsidies on individual market coverage contributed to increases in coverage. In 2011–2012, 79% of Massachusetts children had a medical and dental preventive care visit, tied for the second best rate in the U.S.[5] The Commonwealth also provides young children with recommended vaccines at no charge.[6]

Despite these positive trends, some children still face barriers to obtaining coverage. Parents with low literacy can be confused by insurance enrollment procedures, while others, upon discovering they are ineligible for MassHealth or other subsidized coverage, may wrongly assume their children are also ineligible and not seek coverage for them. Additionally, non-parental guardians of children may have limited options to obtain insurance for children in their charge.[7]

Immigrants living here without authorization, including children, are not eligible for MassHealth or commercial insurance. The state's Children's Medical Security Plan, which provides restricted coverage for uninsured children not eligible for MassHealth, regardless of immigration status, has helped fill this gap.[8]

> "We particularly are focusing on immigrant communities and non-English speaking communities, where the disparities are the worst, the needs are the most."
>
> **— BRIAN ROSMAN, DIRECTOR OF POLICY AND GOVERNMENT RELATIONS, HEALTH CARE FOR ALL, ON ENROLLMENT OUTREACH**

Aside from access to coverage, the Commonwealth's performance is poorer than the national average on other important measures regarding children, such as asthma and special needs. In 2010, the Commonwealth had 179 hospital admissions per 100,000 children for asthma treatment, the sixth highest in the U.S.[9] Additionally, according to 2006–2007 data, 37.8% of children with asthma missed school or daycare in the past year because of the condition.[10] Asthma is the leading cause of school absenteeism in the U.S.[11]

Regarding children with special health care needs (CSHCN), 18.3% of children in Massachusetts have been diagnosed with such needs, compared to 15.1% of the nation overall, according to the 2009–2010 National Survey of Children with Special Health Care Needs. It is difficult to determine whether this disparity is due to actual prevalence or to tighter screening and more sensitive diagnoses. Special needs grow more prevalent as children age and are more common among boys. Families of CSHCN are more likely to have high out-of-pocket costs for their children's care, with 25.7% of such families in Massachusetts paying at least $1,000 per year.[12]

As is true nationally, disparities among population groups mean that some children—by virtue of their ethnicity or their parents' income—are likely to have better health and access to health care than others. Indeed, children living in poverty is a major issue in Massachusetts. Because so many children live in poverty, a disproportionate share of minors (40%, including 72% of children in poor families) are covered by MassHealth.[13]

Children in low-income homes are more likely to suffer from poor nutrition. The advocacy group Feeding America published data showing that, in 2011, 16.5% of children in Massachusetts lived in households with food insecurity (including 20.7% and 18.5% of children in Hampden and Suffolk counties, respectively).[14]

Many children, particularly those living in urban areas, endure environmental factors that increase their risk of asthma and other conditions. Some targeted interventions have successfully mitigated the impact of these conditions. For example, Boston Children's Hospital Community Asthma Initiative was able to achieve a 41% reduction in missed school days and an 85% decrease in hospitalizations thanks to medication education and efforts to eliminate asthma-attack triggers.[15] Asthma-related morbidity and hospitalizations impose a significant cost on the Commonwealth. Indeed, on an average day in Massachusetts in 2005, asthma was associated with 102 ED visits and 25 hospitalizations.[16]

PEDIATRIC PRIMARY CARE

The American Academy of Pediatrics' (AAP) Bright Futures Guidelines, recognized in the ACA as the blueprint for well-child care, recommends visits at: 2 to 5 days, 1 month, 2 months, 4 months, 6 months, 9 months, 12 months, 15 months, 18 months, 24 months, 30 months, 3 years, and annually thereafter.[17]

Adherence to these recommendations improved nationwide from 1996 to 2008, though Latino children, children in families with lower incomes, and children whose parents were not college-educated were less likely to have the number of recommended visits.[18] In Massachusetts, despite near-universal coverage across race/ethnicities, Latino and African American children are less likely to have an annual preventive care visit;[19] the reasons include parents/guardians not having time to take them to the doctor,[20] parents/guardians not knowing their insurance covers yearly well-child visits, lack of transportation, lack of open appointments at local practices, and a struggle to find providers who accept their insurance (particularly MassHealth).

Children with dental coverage face similar obstacles to receiving annual care. Additionally, many Massachusetts families lack dental coverage (only 73.4% of adults have dental insurance[21])—perhaps because consumers view dental coverage, which is usually sold separately from medical coverage, as less important than health insurance. Still, lower-cost dental clinics accept out-of-pocket payment, and this helps to reduce the access gap. It is important that children regularly receive dental care because examination of the mouth can indicate general health status and reveal signs of disease, including congenital, developmental, musculoskeletal, neoplastic, and salivary disorders.[22]

Pediatricians connect children to medical specialists, but many lack adequate resources and training to meet minors' varied behavioral health needs. The Massachusetts Child Psychiatry Access Project, established in 2004, has addressed this gap by delivering specialized care-coordination support and child psychiatry consultations to more than 95% of pediatric primary-care providers in Massachusetts.[23] The project served 6,695 children in 2015 (45% of whom were covered by public insurance such as MassHealth).[24]

Unfortunately, pediatric mental-health access in the Commonwealth is trending in the wrong direction. In 2007, about two-thirds of children who had emotional, developmental, or behavioral problems requiring treatment or counseling received treatment from a mental health professional in the preceding year. But in 2011–12, a slightly smaller share (64.9%) received care, including only 38.4% of African Americans and 45.5% of Latinos who needed care. Given that about 13% to 20% of American children experience a mental disorder each year, this is an urgent concern.[25]

"With mental health and substance abuse, [patient privacy] is an even more serious issue. ... Sometimes families don't want it known to schools that their child was in a psychiatric hospital. And the school nurse doesn't know."

— DAVID MATTEODO

WELL VISITS IN THE FIRST 15 MONTHS OF LIFE

Statistical methods explained

- *Group comparison (prevalence):* A statistical method, the Chow test, was used for the group comparison chart in Figure 2.1.1. The group comparison chart, many of which are used throughout this report, compares the prevalence of the two groups (commercial and MassHealth). Here, the group comparison chart shows the prevalence of children who had at least six well-care visits in the first 15 months of life.
- *Odds ratio:* Another statistical measure used throughout this report, the odds ratio (marked by a red line on the bar charts below), shows probability compared to the reference year, 2012, (which has a probability of 1.00). For example, in 2014, MassHealth members were 19% more likely to make at least six well-care visits in the first 15 months of life than in 2012.

Background

This HEDIS measure indicates the percentage of children who turned 15 months during the measure year and had six or more well-child visits in their lives to-date. The AAP recommends that children have at least six well-child visits before their first birthday and two more in the following three months.[26]

Massachusetts trend, 2011–2015

As displayed in Figure 2.1.1, in 2015, 98.2% of children aged 15-months with commercial insurance had six or more well-care visits, compared with 55.6% of those covered by MassHealth. Children with commercial insurance who turned 15-months in 2015 were 10% less likely to have made at least six well-care visits than those who turned 15-months in 2012. Those with MassHealth coverage were 7% more likely to have at least six visits in 2015 than in 2012.

Between 2011 and 2015, children with commercial insurance were significantly more likely than children with MassHealth to have received at least six well visits. (The average rate over the 5-year period was 98.3% for commercial and 55.2% for MassHealth.) The gap between these two groups did not change significantly from 2011-2015.

WELL VISITS AMONG CHILDREN AGED 3–6

Background

This measure shows the share of children aged three to six who received an annual well-child visit during the measure year, as recommended by the AAP.[29] The percentage of 3–6-year-olds with a well visit in the last year increased substantially from 2006 to 2014, perhaps because of Massachusetts health care reform.

Massachusetts trend, 2010–2015

As displayed in Figure 2.1.2, in 2015, 89.9% of children aged 3–6 with commercial insurance had a well-care visit, versus only 69.7% of those with MassHealth coverage. All children were more likely to have a well-care visit in 2015 than in 2012; those with commercial insurance were 10% more likely, and those with MassHealth coverage were 18% more likely.

Between 2010 and 2015, children with commercial insurance were significantly more likely than children with MassHealth to have a well visit (average rate over the 6-year period: 89.2% for commercial; 68.3% for MassHealth). The gap between these two groups did not change significantly from 2010 to 2015.

In 2014, of enrollees in the five leading commercial insurers, there was little variation between medical groups in well-care visit rates among children aged 3 to 6.[30]

ADOLESCENT WELL-CARE VISITS

Background

Though early-childhood well visits are essential to monitor child development, adolescent well visits also play a major role in pediatric health. According to the Bright Futures guidelines, well-care visits for adolescents are crucial as providers and parents monitor puberty, emotional well-being, and engagement in potentially risky behaviors (including substance use and sexual contact).[32]

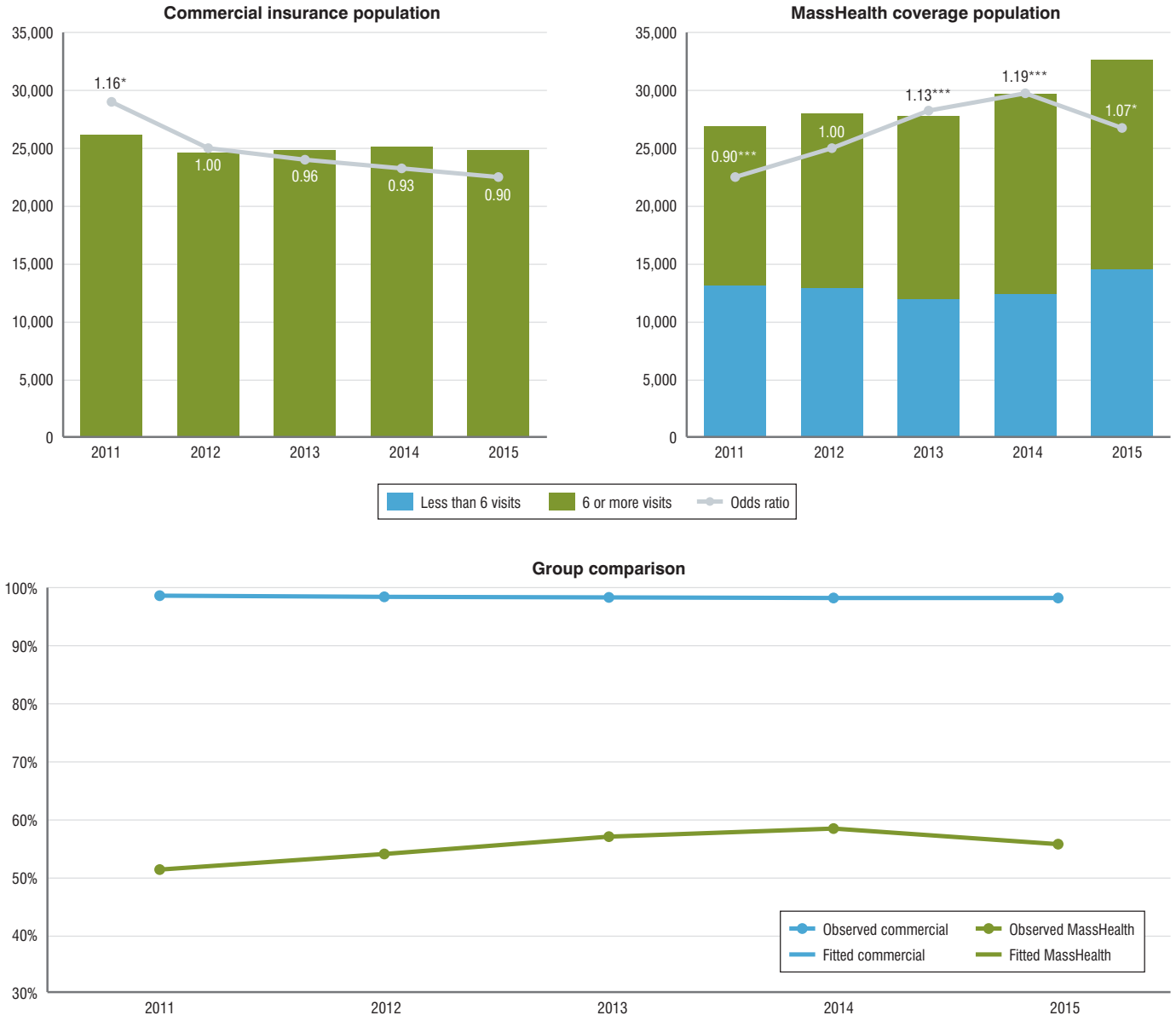
In 2012, a substantially higher share of privately insured Massachusetts adolescents received a well-care visit than adolescents covered by MassHealth. Possible reasons for this include parents of MassHealth adolescents having less time or resources to visit the doctor and providers not accepting MassHealth patients due to low reimbursement rates.

Massachusetts trend, 2010–2015

As displayed in Figure 2.1.3, in 2015, 70.2% of adolescents (aged 12 to 21) with commercial insurance had a well-care visit, versus 55.4% of those with MassHealth coverage. Adolescents were more likely to have had a well-care visit in 2015 than in 2012; those with commercial insurance were 10% more likely, whereas those with MassHealth coverage were 9% more likely. Increased visit rates among females account for most of the increases in both populations.

Between 2010 and 2015, adolescents with commercial insurance were significantly more likely than those with MassHealth to have a well visit (average rate over the 6-year period: 68.4% for commercial; 54.3% for MassHealth). The gap between these two groups did not change signifi-

Figure 2.1.1. Well child visits in the first 15 months of life (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2011 to 2015.[27] Chow test was used for group comparison.
Source: OSA analysis of APCD (commercial insurance)[28] claims data and MassHealth data.

cantly from 2010-2015.

OSA also analyzed data on the rate of adolescent well-care visits for people with disabilities and found no statistically significant trend.

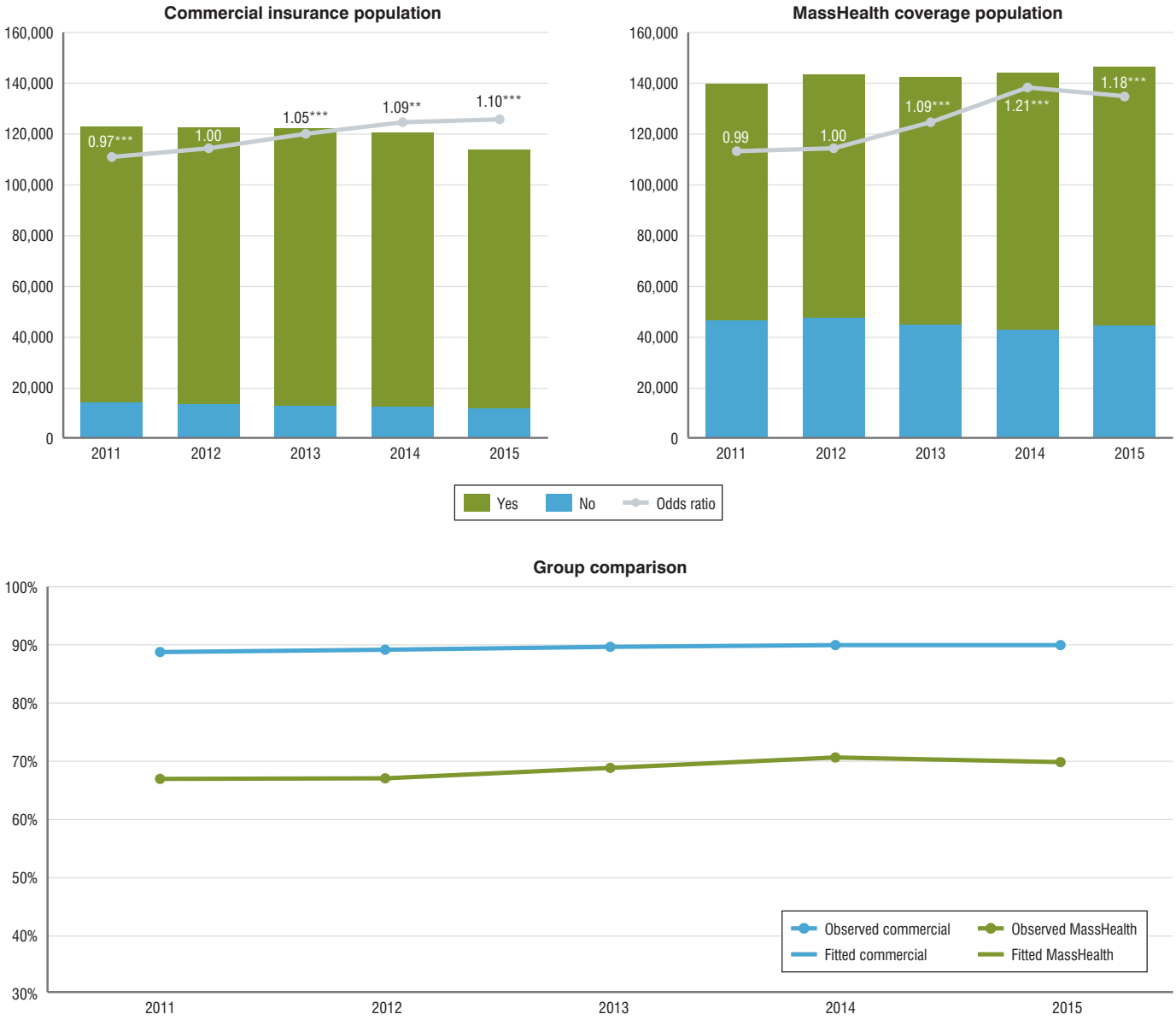
In 2014, among enrollees in the five leading commercial insurers, adolescent well-care visit rates ranged from 50% to 93% across 71 medical groups, suggesting wide variation from the average.[33]

CHILD AND ADOLESCENT ACCESS TO PRIMARY CARE

As displayed in Figure 2.1.4, 97.3% of children and adolescents with commercial coverage accessed primary care recently[35] as of 2015, versus 89.1% with MassHealth coverage. Children and adolescents were more likely to have visited a PCP in the past one or two years in 2015 than in 2012; those with commercial insurance were 12% more likely, and those with MassHealth coverage were 10% more likely. Increased visit rates among 7–19-year-olds account for this increase in both populations.

Between 2011 and 2015, children with commercial insurance were significantly more likely than children with MassHealth to have a PCP visit

Figure 2.1.2. Well-child visits, 3-6 year olds (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2011 to 2015.[31] Chow test was used for group comparison.
Source: OSA analysis of APCD (commercial insurance) claims data and MassHealth data.

(average rate over the 5-year period: 97.2% for commercial; 88.8% for MassHealth). The gap between these two groups did not change significantly from 2011 to 2015.

IMMUNIZATIONS

Background

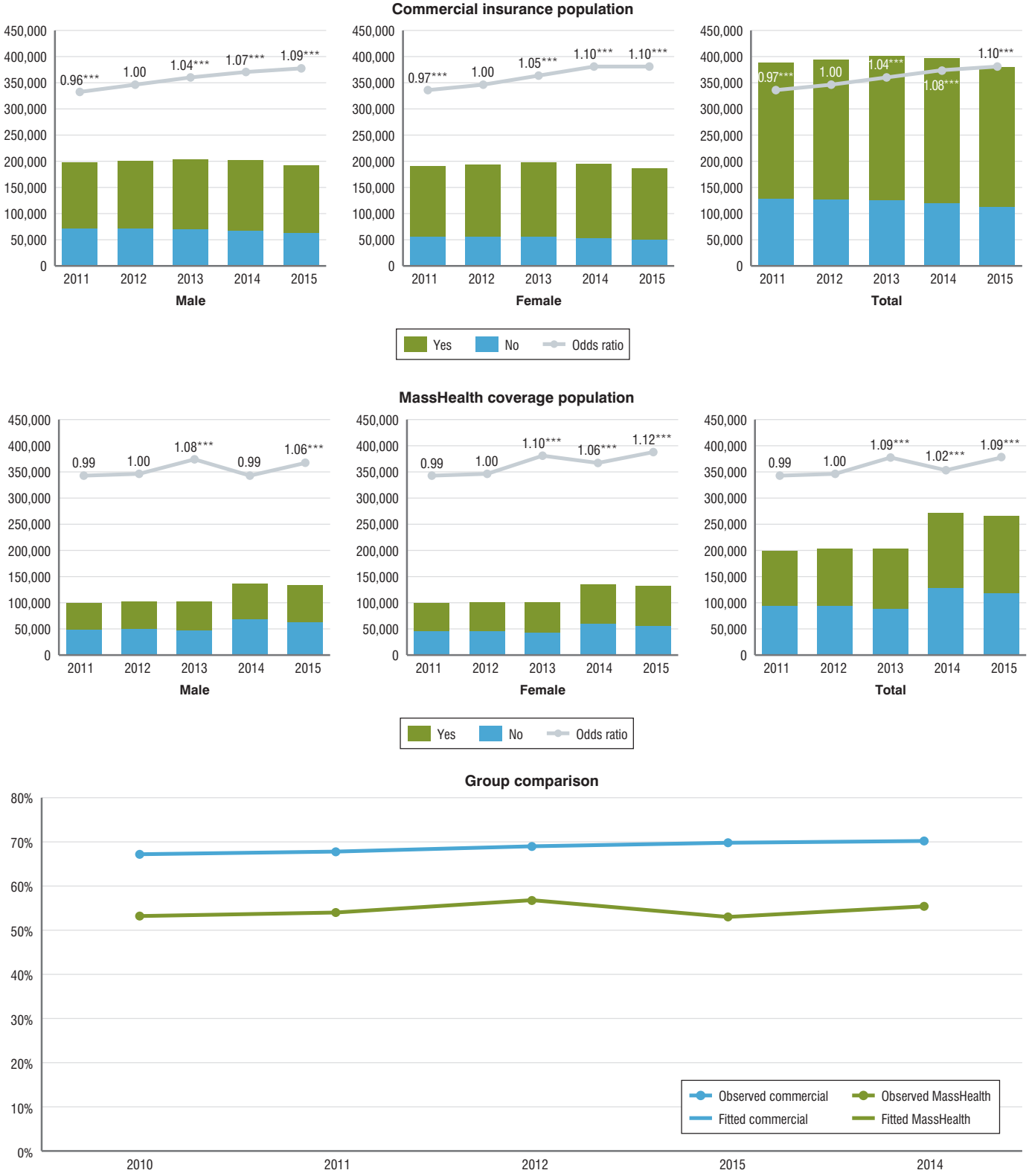
The CDC recommends that younger children and adolescents receive several vaccines to protect against disease.

The meningococcal vaccine helps prevent meningitis, and the Tdap and Td vaccines help prevent tetanus and diphtheria. The CDC recommends that youth aged 14 to 16 receive a tetanus booster vaccination to prevent tetanus disease, commonly known as "lockjaw."[38] Tetanus is serious and can be fatal, but it is rare; only 233 cases were reported in the U.S. from 2001 to 2008.[39] The last reported case in Massachusetts was in 1996.[40]

Nationwide in 2016, the number of reported mumps cases was three times higher than in 2015 and the highest in a decade. This has led public health officials to question the effectiveness of existing vaccine protocol.[41]

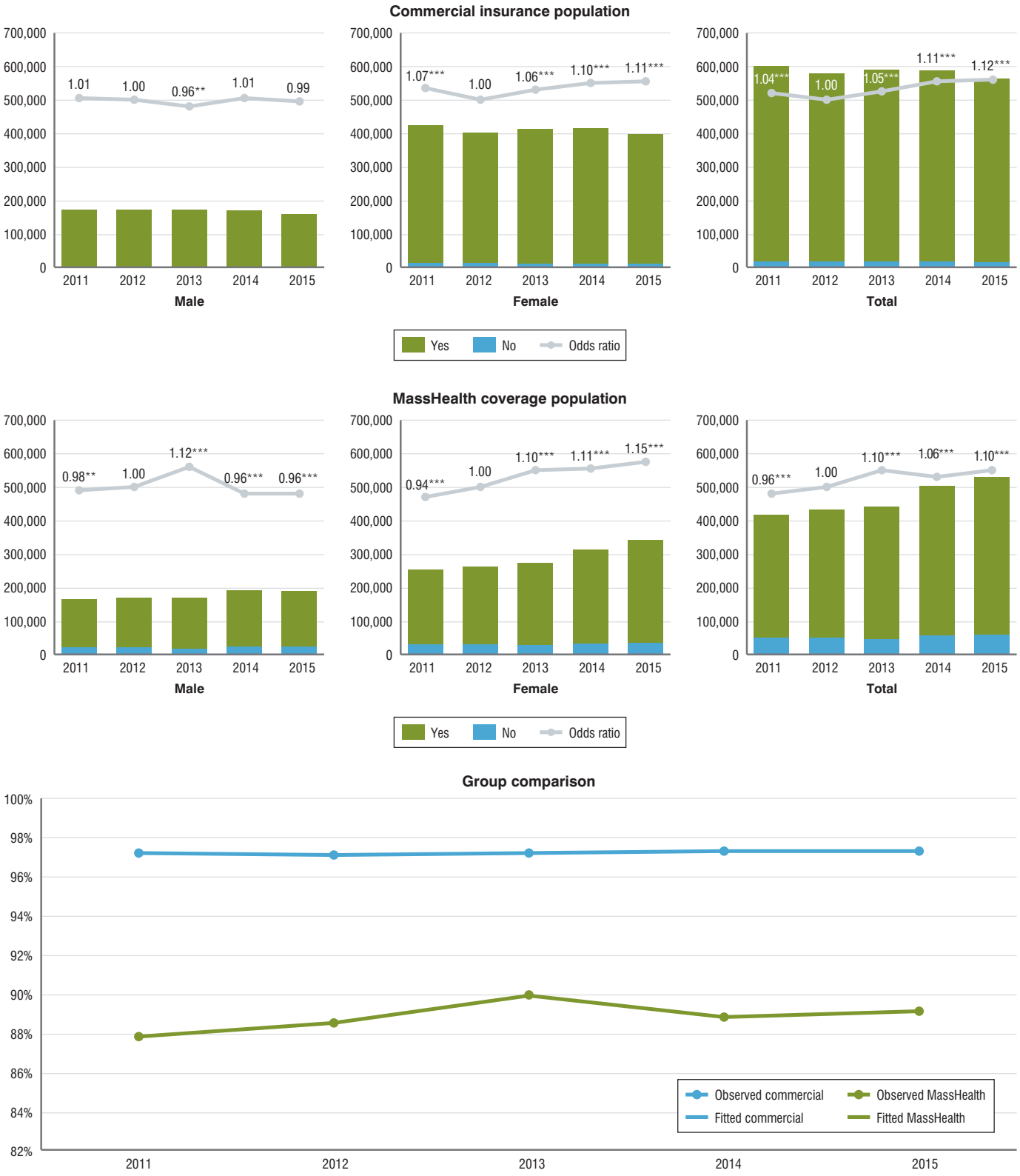
Though fairly rare, meningococcal disease (meningitis) is most common among people aged 16 to 23.[42] The CDC recommends a booster dose at 16 (except for children first vaccinated at ages 13 to 15, who should receive a

Figure 2.1.3. Well-care visits in last year among 12-21 year olds (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2010 to 2015.[34] Chow test was used for group comparison.
Note 3: The MassHealth population had anomalous growth in 2014 due to technical difficulties with the Connector website; thus, trend data is difficult to interpret.
Source: OSA analysis of APCD (commercial insurance) claims data and MassHealth data.

Figure 2.1.4. Access to primary care, 1–19-year-olds (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2011 to 2015.[36] Chow test was used for group comparison.[37]
Source: OSA analysis of APCD (commercial insurance) claims data and MassHealth data.

booster at 16 to 18).[43] In 2010, the state had 8 confirmed cases of meningococcal disease, down from 21 in 2006 and 43 in 2002.[44]

In 2015, 84% of U.S. adults said it was extremely or very important to vaccinate their children, down from 94% in 2001.[45] Despite this trend, Massachusetts pediatric vaccination rates have increased since 2012 (see figures 2.1.5 and 2.1.6), though they may have increased more without the increased vaccine skepticism). Anecdotal accounts suggest that vaccine skepticism may be rising in the Commonwealth.[46]

Massachusetts trend, 2012–2015

As shown in Figure 2.1.5, the HEDIS measure for childhood immunization status captures how well children are immunized according to the Recommended Childhood and Adolescent Immunization Schedule issued by the CDC, AAP, and American Academy of Family Physicians.[47] [48]

As displayed in Figure 2.1.6, in 2015, 32.2% of commercial insurance members had received the meningococcal vaccine between their 11th and 13th birthdays, which is a significant increase from 30.1% in 2012. In 2015, 35.4% of 13-year-olds with commercial insurance had received Tdap/Td vaccine between their 10th and 13th birthdays. However, because the 2012 prevalence of Tdap/Td vaccine was underestimated due to insufficient APCD data, the odds ratios should be interpreted cautiously. MassHealth provides these immunizations without billing for them, so data is not available for the MassHealth population.

LEAD SCREENING

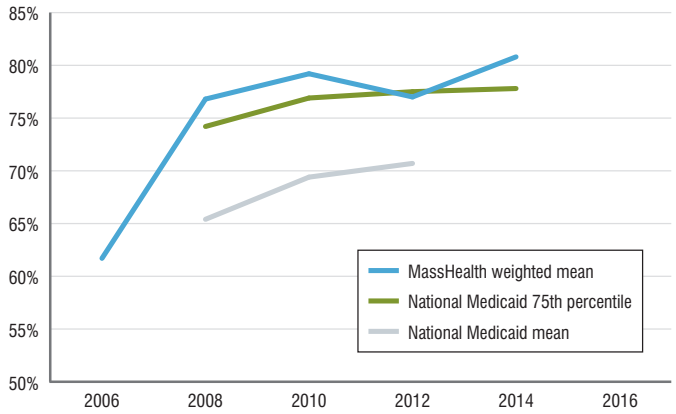
Background

Children under age 6 and those living in older housing have the highest risk of exposure to lead, which can lead to irreversible brain damage, kidney impairment,[50] and lower school performance.[51] Very high levels can cause unconsciousness and seizures.[52]

Massachusetts regulations require all children to be screened for lead levels between the ages of 9 and 12 months and again at ages 2 and 3.[53] An additional test is recommended at age 4 for children in communities with a high share of housing built before 1978, when lead was banned from household paint.[54] Seventy-eight percent of Massachusetts homes were built before 1978.[55]

According to the state Bureau of Environmental Health, high-risk communities for child lead poisoning include many of the state's largest cities: Boston, Brockton, Fall River, Lawrence, Lowell, Lynn, New Bedford, Springfield, and Worcester.[56] Eight of these nine cities are "Gateway Cities,"

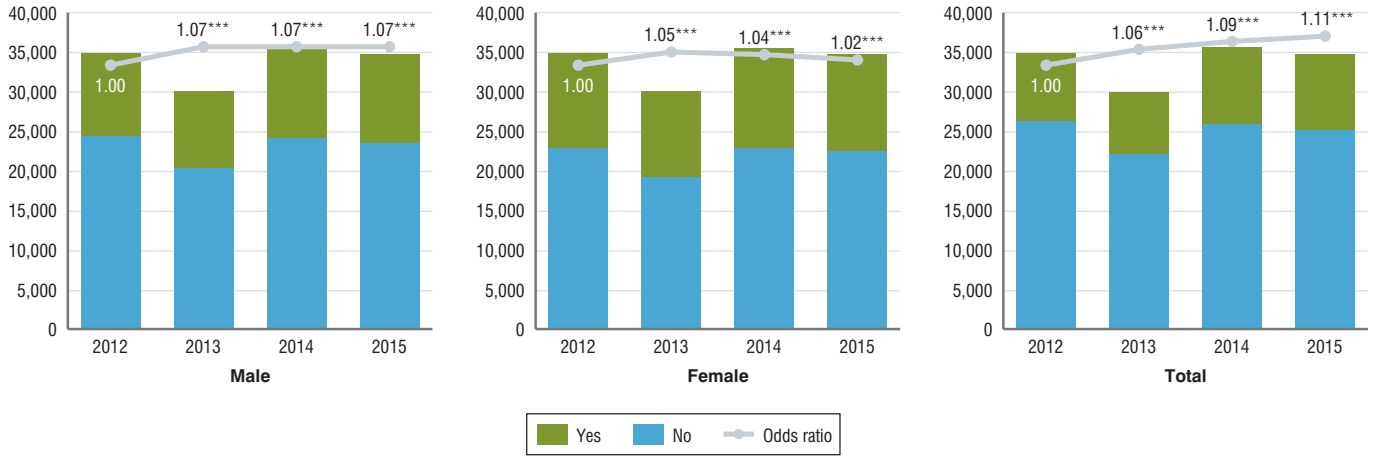
Figure 2.1.5. Childhood immunization, Combination 3 (MassHealth children, managed care population)



Note: Combination 3 measures the percentage of two year olds who have received four Dtap/DTP (diphtheria-tetanus-pertussis), three IPV (injectable polio), one MMR (measles-mumps-rubella), three HiB (H influenza type B), three hepatitis B, one chicken pox vaccine, and four pneumococcal conjugate vaccinations by their second birthday.

Source: University of Massachusetts Medical School Center for Health Policy and Research, MassHealth Managed Care HEDIS final report http://www.mass.gov/eohhs/researcher/insurance/masshealth-reports.html

Figure 2.1.6. Percentage of children in Massachusetts who received recommended dose of meningococcal vaccine and Tdap or Td by 13 (commercial)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression model was used for this longitudinal data from 2012 to 2015.[49]
Source: OSA analysis of APCD (commercial insurance) claims data.

midsized regional hubs that have faced headwinds as the Commonwealth's economy has transitioned away from manufacturing.[57] Economic challenges in these cities may be driving the risk of lead exposure. The remaining city, Boston, also has a significant share of older housing stock and child poverty.

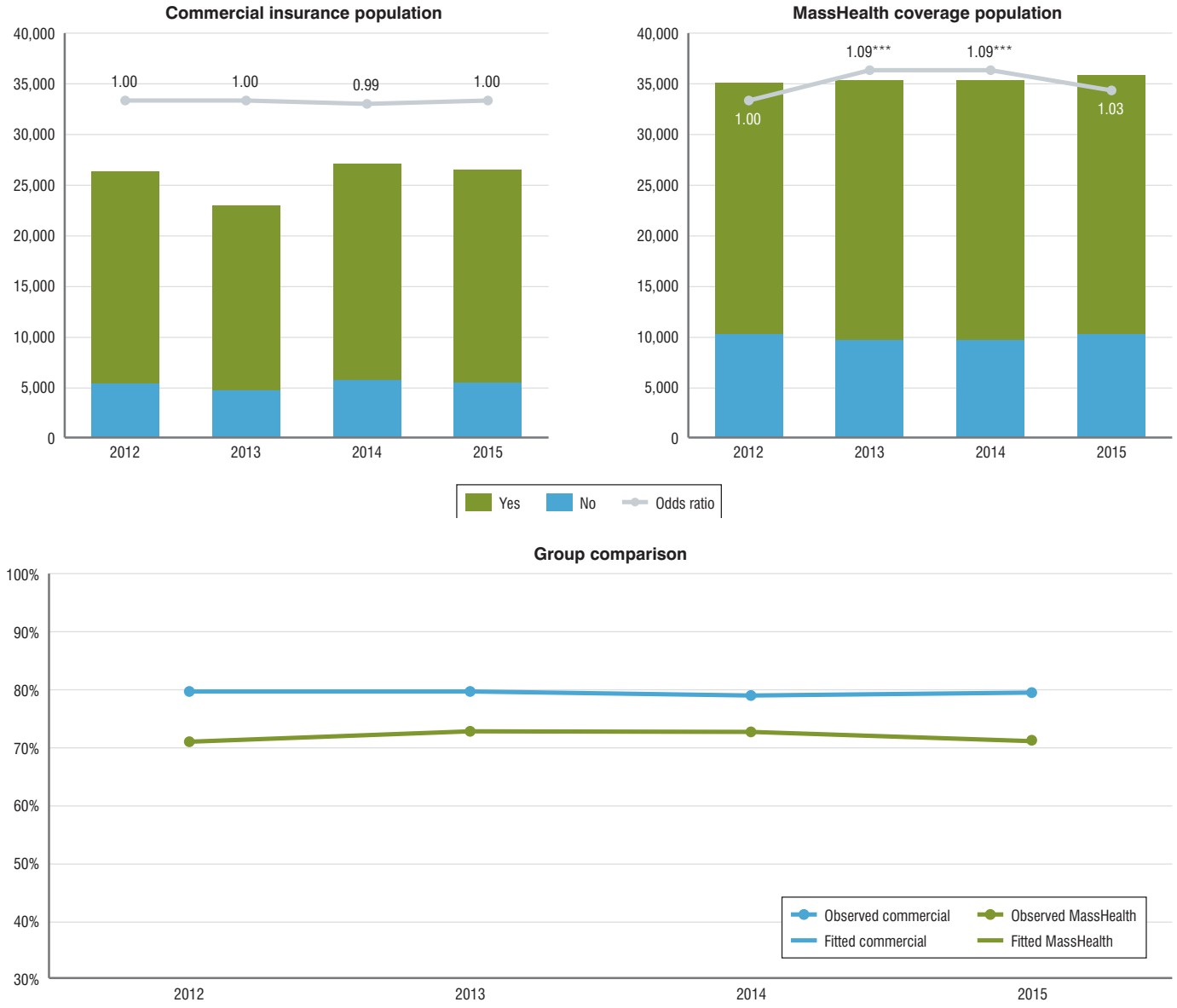
Vulnerable populations can have a dramatically higher risk of elevated blood levels. Refugees, for example, are at very high risk, perhaps because of exposure prior to arriving in the U.S., difficulty accessing health care (including lead screenings), and living in older housing associated with a higher risk of exposure.[58]

Massachusetts trend, 2012–2015

As displayed in Figure 2.1.7, in 2015, 79.4% of 2-year-olds with commercial insurance and 71.5% of those with MassHealth coverage received a lead blood test by their second birthday. The trend test shows that there was no significant change to the test rate for either the commercial or the MassHealth population from 2012 to 2015.

From 2012 to 2015, children with commercial insurance were significantly more likely than those with MassHealth to have been tested (average rate over the period: 79.4% for commercial, 71.9% for MassHealth). The gap between these two did not change significantly from 2012 to 2015.

Figure 2.1.7. Received capillary/venous lead blood test before second birthday (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2012 to 2015.[xi] Chow test was used for group comparison.
Source: OSA analysis of APCD (commercial insurance) claims data and MassHealth data.

Section 2.2:
Older Adults (65+)

A NOTE ABOUT THE DATA

This subchapter includes longitudinal statistical analyses of quality measures constructed from NCQA guidelines. These measures include cancer screening, osteoporosis management, medication therapy for hypertension, obesity rates, and pneumococcal and influenza vaccination. In the health evaluation field, these NCQA measures are widely considered authoritative indicators of improving or worsening population health among older adults, and therefore they are useful for tracking Chapter 224's goals (including improving care quality and access).

Claims data, including MassHealth and APCD (commercial insurance), were used in this subchapter's statistical analyses.

OVERVIEW

The needs of the Baby Boomer generation dominate the health care policy landscape. From 2010 to 2029, about 10,000 Americans every day will turn 65—and thus become eligible for Medicare.[1] In 2011, median annual health care spending for each adult older than 65 was $9,863 (up 11.9% from $8,815 in 2001).[2] If the U.S. wants to control the growth of health care costs, a necessary area of intervention is costs among older adults. (Unless otherwise noted, in this report "older adults," "seniors," and "elderly" refer to people aged 65 and over.)

Long-term services and supports (LTSS) are the range of services that people with chronic conditions or disabilities use to fulfill their daily routine and personal care needs. An estimated 27 million Americans will need LTSS in 2050, the tail end of the "grey boom," according to a 2013 report from the U.S. Senate Commission on Long-Term Care. By comparison, only 12 million Americans needed LTSS in 2010.[3]

Medicare has leveled the playing field so that nearly all seniors have access to adequate health services, but some disparities—between rich and poor, urban and rural, White and people of color, English-speaking and not—persist. For example, while many older adults have friends or family who take them to medical appointments, others rely on public transportation or taxis, and other skip needed care because they can't find transportation.

Many seniors have trouble getting around and need help completing daily tasks. Indeed, 39% of seniors living in the community (that is, not in a nursing facility) use a mobility device, such as a wheelchair, inside or outside the home.[4] Overall, about one in four (25.7%) older adults have serious difficulty walking or climbing stairs.[5] Moreover, many seniors struggle to afford the basic costs of living: 61% of Massachusetts residents older than 65 have trouble paying for food, health care, housing, and transportation,[6] leaving them with limited reserves in the case of a health crisis.

Massachusetts will not escape the stress placed on the eldercare infrastructure, as 41.5% of its residents are 45 or older, compared to 39.4% of all Americans.[7] These costs will impact federal, state, municipal, and household budgets as follows:

- Assuming Medicare endures, the federal government will absorb a large share of eldercare costs. Federal action—including steering Medicare providers toward outcomes-based accountability, exploring the potential for elders to age in place, and expanded coverage for pharmaceutical costs—is essential.
- However, MassHealth, a primary source of financing for long-term care (LTC) (which provides assistance with basic personal care needs), spent $4.57 billion—12% of the entire state budget—on LTC in 2012. (This included spending on persons younger than 65).[8] These costs are growing more quickly than in previous decades and threaten to crowd out other state priorities.[9]
- Moreover, as Commonwealth families scramble to arrange LTSS support for relatives who wish to avoid institutional living, cities and towns are straining to accommodate complex senior needs, and elders are struggling to buy medications and other out-of-pocket necessities.

End-of-life care is an emotionally charged and fiscally significant subject. In 2012, 26% of Medicare spending was on patients who died within a year.[10] With the goal of spending resources wisely and improving quality of life, prominent health care thinkers have advocated re-orienting end-of-life care toward palliative care, patient autonomy, and family communication and away from the heretofore favored fight-until-the-end, exhaust-every-intervention approach. For example, Blue Cross Blue Shield of Massachusetts announced in December 2015 that it will begin covering end-of-life counseling and will expand access to hospice care.[11]

According to a 2016 survey of Massachusetts residents who experienced the death of a loved in the last year, 52% believed their loved one's wishes were "very much" followed by health providers at the end of life, while 15% believed those wishes were followed "a bit" or "not at all."[12] Meanwhile, 21% of respondents rated the care their loved one received as "fair" or "poor." White respondents and those with higher educational attainment were more likely to report that their loved one received satisfactory care and had their wishes followed.[13]

> "Geriatricians, there's not enough of them. Their whole purpose is around managing an elder's totality of care and quality of life. That's what our primary care doctor should be."
>
> **— MARYLOU SUDDERS, SECRETARY, EXECUTIVE OFFICE OF HEALTH AND HUMAN SERVICES**

BREAST CANCER SCREENING

Background

The U.S. Preventive Services Task Force (USPSTF) recommends biennial mammograms for women aged 50 to 74.[14] Assuming that all women have mammograms with the same frequency, a screening rate around 50% would indicate that women this age are being appropriately screened

Breast cancer screening guidelines have been hotly debated; proponents of increased screening argue that early diagnosis can save lives, while opponents maintain that too much screening can cause harm in the form of false positives, needless interventions, and wasted money and time. Recent changes to these guidelines and the surrounding debate have likely confused

many patients and providers. Nevertheless, in recent years, mammography rates have been fairly stable among Massachusetts seniors aged 65 to 74.

Massachusetts trend, 2012–2015

As displayed in Figure 2.2.1, in 2015, 83.4% of women aged 65 to 74 with commercial insurance had a mammogram in the past 27 months, versus 53.5% of those with MassHealth coverage. Women were more likely to have a mammogram in the past 27 months in 2015 than in 2012; women with commercial insurance were 31% more likely, whereas those with MassHealth coverage were 14% more likely.

Between 2012 and 2015, women with commercial insurance were significantly more likely than women with MassHealth to have at least one mammogram in the past 27 months (average rate over the 4-year period: 82.2% for commercial; 49.1% for MassHealth). The gap between these two groups significantly decreased from 2012 to 2015.

COLORECTAL CANCER SCREENING

Background

The USPSTF recommends that people aged 50 to 75 receive annual screenings for colorectal cancer using a high-sensitivity fecal occult blood test, a sigmoidoscopy, or a colonoscopy.[16] The median age for colorectal cancer diagnosis is 68, and the cancer is most frequently diagnosed among people aged 65 to 74.[17] To be considered screened, patients must have had a fecal occult blood test in the past year, a flexible sigmoidoscopy in the past five years, or a colonoscopy in last 10 years.

According to the USPSTF, the rate of serious adverse events from colorectal screening increases with age, and the benefit of early detection of and intervention for colorectal cancer declines after 75. Still, screening can benefit the 76 to 85 cohort, especially those who have not been previously screened, are healthy enough to undergo treatment if cancer is detected, and do not have comorbid conditions that would significantly limit life expectancy. The USPSTF does not recommend screening in adults aged 86 and older.[18]

A 2010 review of 83 studies (most of which were conducted in the US) concluded that among the elderly, the most frequently cited facilitator to colon-cancer screening was living with a partner, followed by having a usual source of care and Medicare's coverage of colonoscopies.[19] The most commonly cited barriers were:

- Low educational attainment
- Being African American, Latino, or a woman
- Physician failure to recommend screening [20]

In 2012, 39.1 per 100,000 Massachusetts men and 33.1 per 100,000 Massachusetts women were diagnosed with colorectal cancer (37.1 per 100,000 overall).[21] This was below the national rate (42.4 per 100,000).[22]

Massachusetts trend, 2010–2015

Figure 2.2.2 shows the percentage of members 50 to 75 years of age who had appropriate screenings for colorectal cancer. This measure checked fecal occult blood test in the past year, flexible sigmoidoscopy in the past five years, and colonoscopy in the past ten years. Because screening rates from 2010 to 2015 were underestimated due to insufficient APCD and MassHealth data, the group comparison and odds ratios should be interpreted cautiously. The results show a dramatic increase of screening in the commercial population and a more modest increase among the MassHealth population.

OSTEOPOROSIS MANAGEMENT IN WOMEN WHO HAD A FRACTURE

Background

Nationally, 16% of women over 50 and 4% of men over 50 suffer from osteoporosis.24 This condition causes bones to become so weak and brittle that even minor stresses can cause a fracture.25 Postmenopausal Asian and White women have the highest risk.26 According to a projection by the National Osteoporosis Foundation, 1,420,000 Massachusetts residents 50 and over will have osteoporosis or be at high risk of osteoporosis due to low bone mass in 2030.27

The USPSTF recommends that women aged 65 and older, along with younger women with enhanced risk, be screened with a BMD test for osteoporosis and risk of bone fractures. (It does not recommend that men be screened, citing a lack of evidence to justify the value.[28]) Screening can help providers identify good candidates for medications or other therapies to bolster bone strength.[29] Factors driving low bone-density screening rates can include low patient understanding of the risks, diagnosis, and treatment of osteoporosis.[30]

Amino-bisphosphonate medications can protect against fractures and are associated with an increase in survival and diminished morbidity among people with osteoporosis. However, these drugs also carry a risk of serious adverse outcomes—including osteonecrosis (death of bone tissue) of the jaw, atypical femur fractures, atrial fibrillation (irregular heartbeat), and esophageal cancer[31]—which may deter some patients from using them.[32]

Massachusetts trend, 2012–2015

As displayed in Figure 2.2.3, women with commercial insurance who suffered a fracture in 2015 were 17% more likely to receive osteoporosis management within six months than in 2012. No significant difference for women with MassHealth coverage was found for the same period.

Between 2012 and 2015, there was no significant difference in osteoporosis management for women with MassHealth coverage and those with commercial coverage (average rate over the 4-year period: 11.3% for commercial 8.7% for MassHealth). The gap between these two groups did not change significantly from 2012 to 2015.

TAKING MEDICATION FOR HIGH BLOOD PRESSURE

Background

Hypertension (also known as high blood pressure or HBP) is among the most common medical conditions and can lead to heart attack, stroke, renal failure, and death if not detected early and treated appropriately.[34]

The Eighth Joint National Committee recommends that patients aged 60 and older receive blood pressure medication when their systolic blood pressure (SBP) is ≥150 mm Hg or diastolic blood pressure (DBP) is ≥90 mm Hg; patients should be treated to a goal SBP of <150 mm Hg and goal DBP of <90 mm Hg.[35] Medications including diuretics, beta blockers, and angiotensin-converting enzyme inhibitors stop or slow some bodily functions that cause HBP.[36]

Massachusetts trend, 2011–2013

Figure 2.2.4 presents (1) the share of older adults who had been told they have HBP and, of those, (2) the share taking medication to treat it. Data from 2015 show:

Figure 2.2.1. Received a mammogram in past year, ages 65–74 (commercial, MassHealth, and group comparison)

Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2012 to 2015.[15] Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth claims data.

- Among people aged 65 to 74, 57.2% had ever been told they had HBP, compared to 65.9% of adults over 74.
- The national averages are higher: 64% of men and 69.3% of women aged 65 to 74, and 66.7% of men and 78.5% of women over 74.[37]
- Of those who had been told they had HBP, 92.0% of those aged 65 to 74 were taking medication to treat HBP, while 96.1% of those over 74 were.

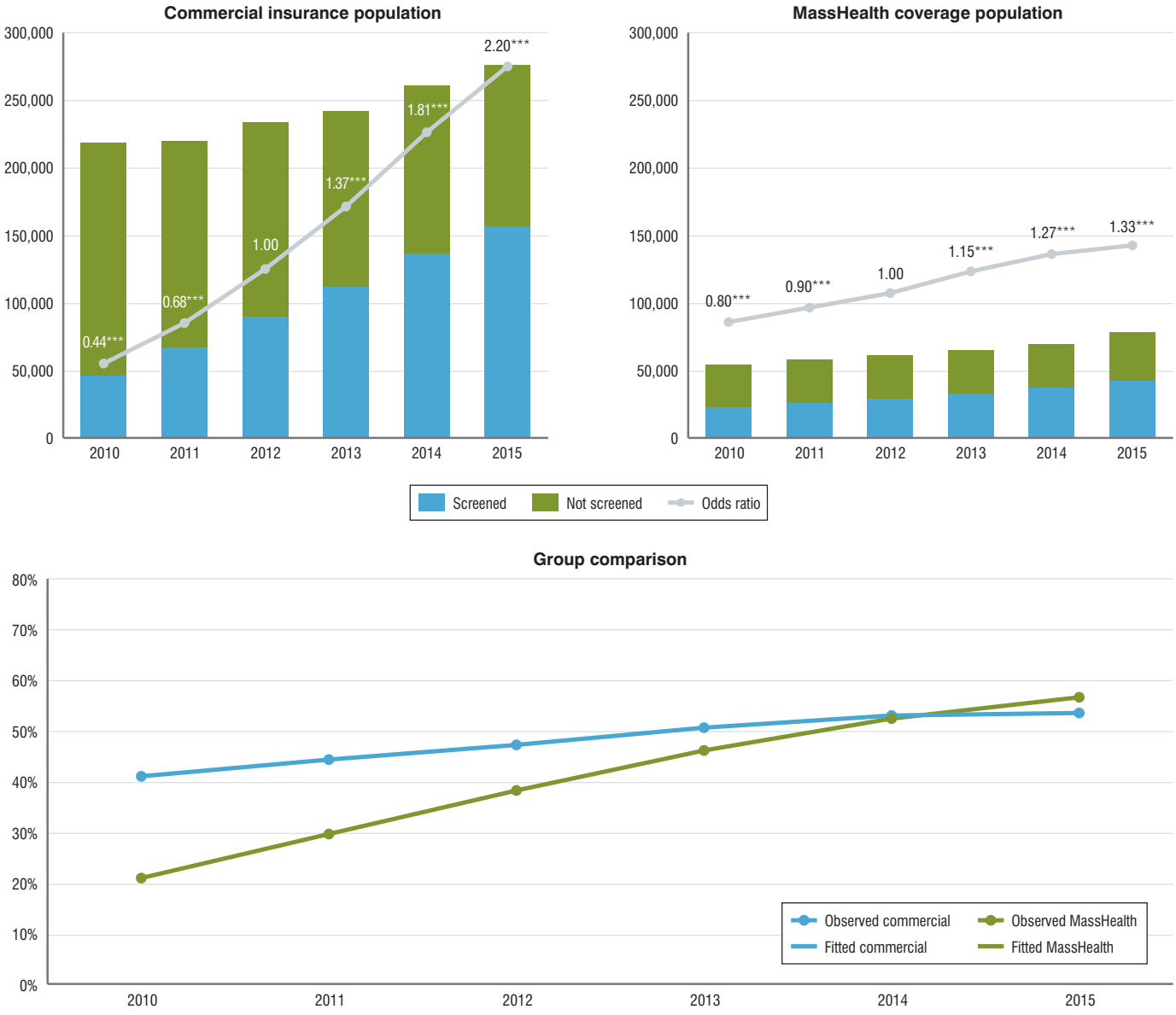
After controlling for year (not shown in figure), adults over 74 were 32.0% more likely than their younger cohort to have been told they had HBP and 49.8% more likely to take medicine for it. From 2011 to 2015, there was no significant increase or decrease in both measures among any age group.

OBESITY AMONG ADULTS AGED 65 YEARS OR OLDER

Background

Obesity, defined as a body mass index (BMI) over 30, is generally understood to increase the risk of mortality and is associated with many adverse health outcomes.[38] Overweight (defined as a BMI greater than 25), increases the risk of some cancers, arterial plaque buildup (which is associated with stroke), and hypertension.[39]

Figure 2.2.2. Appropriate screening for colorectal cancer, ages 65–75 (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2010 to 2015.[23] Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth claims data.

However, one report on obesity presented surprising findings regarding the risk of excess weight.[40] In a 2013 review of 97 studies[41] with a combined sample size of 2.88 million people, researchers found that obesity did increase the risk of mortality, yet overweight was associated with a significantly lower all-cause mortality rate than normal-weight individuals. Possible explanations were that overweight patients receive better medical care, seek care more regularly, and reap the benefits of having higher metabolic reserves. The study suggests that though obesity is generally harmful, the health impact of overweight may be more nuanced.

Massachusetts trend, 2011–2014

Among the elderly, Massachusetts has one of the nation's lowest rates of overweight. As shown in Figure 2.2.5:

- Among Massachusetts adults (in 2015):
  - Aged 65 to 74: 65.3% were overweight, including 26.9% who were obese.
  - Aged 75 and over: 58.9% were overweight, including 22.9% who were obese.

Figure 2.2.3. Women aged 67–85 who had prescription drug therapy or a bone mineral density test to treat osteoporosis within six months of a fracture (commercial, MassHealth, and group comparison)

Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2012 to 2015.[ix] Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth claims data.

- Among U.S. adults (from 2009 to 2012):
  - Aged 65 to 74: 76.9% were overweight, including 36.4% who were obese.
  - Aged 75 and over: 70.4% were overweight, including 27.4% who were obese.[42]

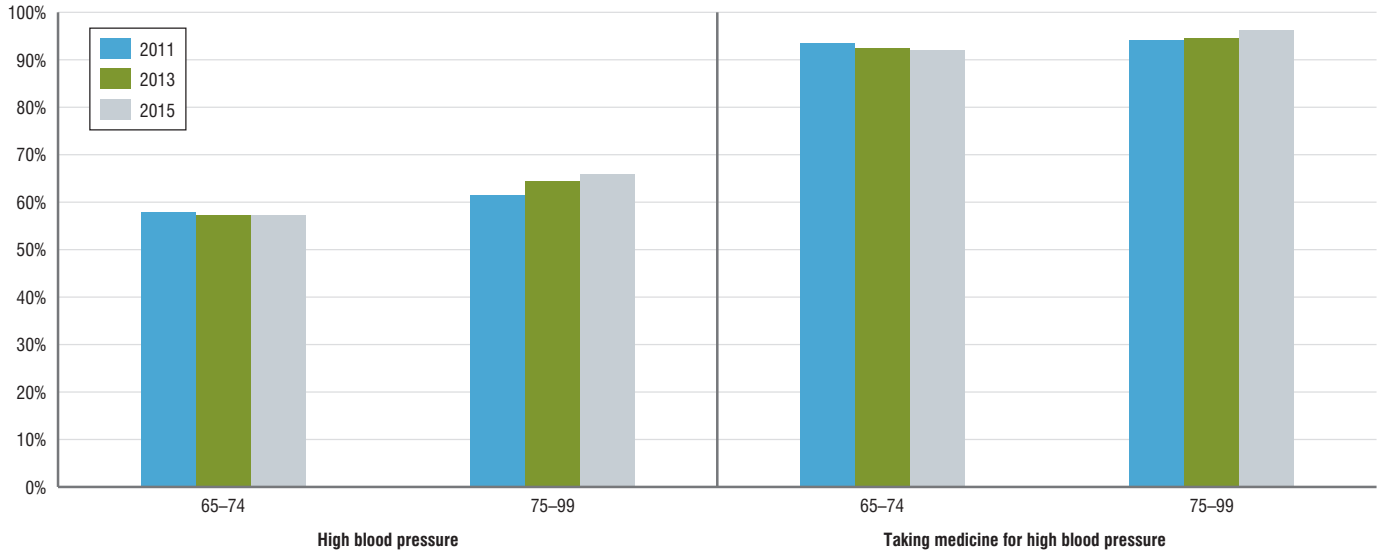
After controlling for year (not shown in figure), seniors aged 65 to 74 were 52.9% more likely to be overweight and 71.2% more likely to be obese than those aged over 74. From 2011 to 2015, there was no significant increase or decrease in overweight and obesity among any age group.

FLU VACCINATIONS FOR ADULTS AGED 65 AND OLDER

Background

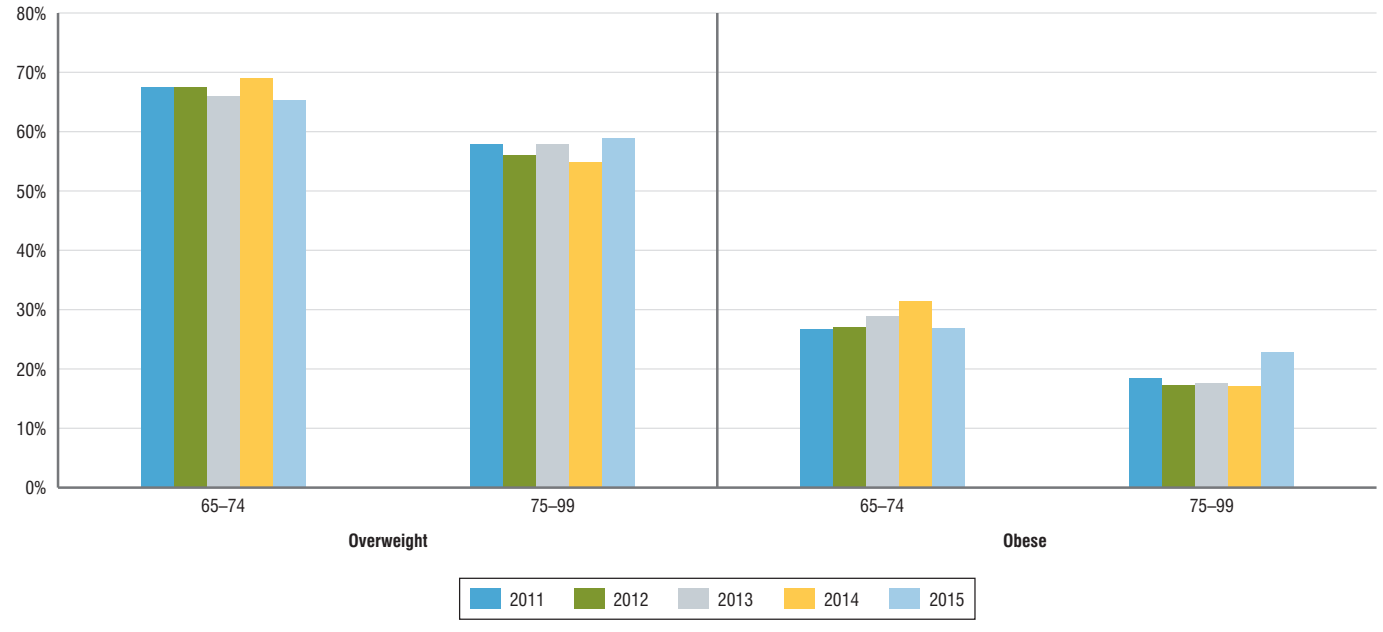
The CDC estimates that from the 1976–77 influenza season to the 2006–2007 season, annual flu-related deaths ranged from 3,000 to 49,000 people, with mortality fluctuating widely from year to year.[43] Generally, about 90% of U.S. influenza deaths occur among older adults.[44] In fact, while the overall influenza mortality rate in 2013 was 1.2 per 100,000 people, it was 1.6 among people aged 65 to 74, 5.2 among people aged 75 to 84, and 26.4 among those 85 and older.[45] In 2013, Massachusetts had an (age-adjusted)

Figure 2.2.4. High blood pressure and blood pressure medication therapy (adults aged 65 and older)



Statistically significant difference from 2011: *$p<.05$, **$p<.01$, ***$p<.001$.
Note: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 2.2.5. Overweight and obesity (adults aged 65 and older)



Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

influenza and pneumonia death rate[46] of 18 per 100,000, which is 13.2% above the national rate.[47]

Though its effectiveness varies each year, the flu vaccine is the best medical intervention available for preventing influenza and making the illness milder for people who do get sick.[48] It is particularly important that medically vulnerable populations—including older adults and children—are vaccinated.

Massachusetts trend, 2011–2014

Figure 2.2.6 presents the share of older adults who had a flu shot in the last year: 58.7% of those aged 65 to 74, compared to 64.0% of adults over 74 (in 2015).

After controlling for year (not shown in figure), adults over 74 were 31.3% more likely to have had a flu shot than the younger group. From 2011 to 2015, there was a significant decrease in the flu shot rate among both age groups.

PNEUMOCOCCAL VACCINATION FOR OLDER ADULTS

Background

The CDC recommends that all older adults receive the PPSV pneumonia vaccine.[49] There were 53,282 pneumonia-related deaths in the U.S. in 2013, a rate of 16.9 deaths per 100,000 people.[50]

Massachusetts trend, 2011–2015

Figure 2.2.7 presents the percentage of older adults who received a pneumonia vaccination: 66.1% of those aged 65 to 74, compared to 82.4% of adults over 74 (in 2015).

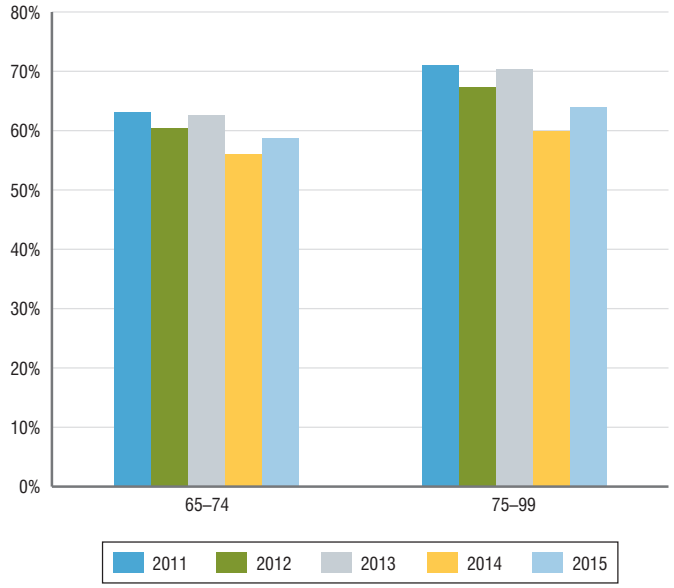
After controlling for year (not shown in figure), adults over 74 were 90.6% more likely to have a pneumonia vaccination than those aged 65 to 74. From 2011 to 2015, there was a significant increase in pneumonia vaccination among adults over 74. There was no significant increase or decrease among the younger group.

Section 2.3: Low-Income Individuals

OVERVIEW

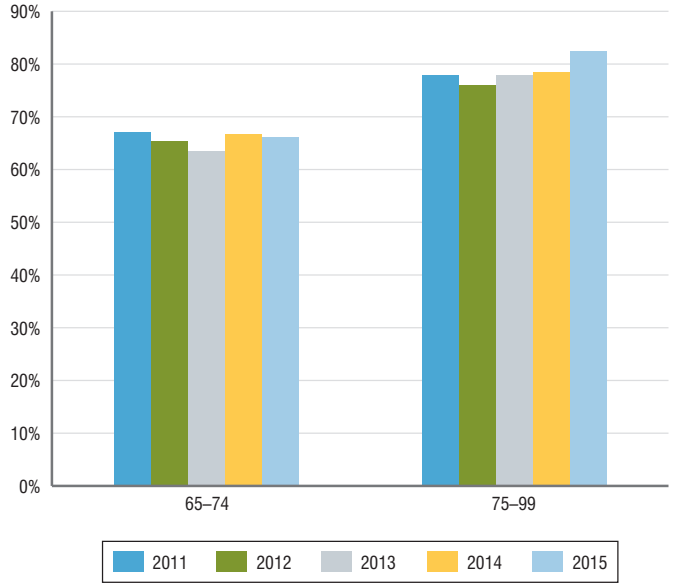
Poverty is a major social factor that determines health outcomes.[1] Low-income adults generally have worse health outcomes than their wealthier counterparts. Low-income families are more likely to be uninsured, to forgo or delay needed care due to cost, and to live in social and physical environments that increase their risk of adverse health outcomes. These social determinants—including quality of housing, availability of places to exercise and buy healthy food, neighborhood stability, and educational attainment—help explain the higher rates of obesity, chronic disease, tobacco use, and substance abuse among people with low incomes.

Figure 2.2.6. Received flu shot in past year, adults aged 65 and over



Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 2.2.7. Received pneumonia vaccination in lifetime, adults aged 65 and over



Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

"There are lots of social issues that get translated into higher health costs: poor housing, poor food, personal safety. ... If we took a holistic view and work on those issues, we're going to lower health costs dramatically."

— BRIAN ROSMAN

These challenges are compounded by the difficulty of accessing adequate health services. Because MassHealth reimburses at a lower rate than Medicare and commercial insurance, some providers hesitate to treat people covered by the program.[2] Moreover, even relatively modest out-of-pocket costs can put many treatments beyond low-income patients' reach. Faced with these barriers, low-income patients are less likely to have a regular PCP and more likely to visit the ED for non-emergency episodes.[3] Cumulatively, these challenges result in a health care system that works much differently for the low-income than for the affluent.

"I really challenge this notion that our system is affordable, especially for people whose family income is below the median [and who] don't qualify for Medicaid—and that's a wide swath of people."

— DR. PAUL HATTIS

The ACA created a minimum-eligibility level for Medicaid of 138% FPL[4] for Americans under age 65, but states must opt into this expansion of eligibility.[5] As of October 2016, Massachusetts, 30 other states, and the District of Columbia had expanded Medicaid.[6]

The Massachusetts Medicaid program, MassHealth, covers about 1.8 million residents. MassHealth income-eligibility limits vary based on family size, disability status, pregnancy status, immigration status, and coverage type (limited or standard).[7] Several MassHealth programs have higher income-eligibility limits than the minimum set by federal law.[8]

Figures showing MassHealth data in this section should be interpreted with caution due to the failure of the Massachusetts Health Connector, which led to the Commonwealth providing temporary, no-cost MassHealth coverage for more than 300,000 residents in 2014 and 2015.[9] This influx may have changed the demographic composition of MassHealth members, thus distorting statistical outcomes.

A NOTE ABOUT THE DATA

This section includes longitudinal statistical analyses of quality measures constructed from NCQA guidelines. Claims data, including MassHealth and APCD, were used in the analyses. Quality measures include unmet need for care, usual source of care, how cost can limit access to care, screening for cancer and other disease, prenatal and postpartum care, chronic disease management, and overweight/obesity.

UNMET NEEDS FOR CARE AMONG PEOPLE WITH LOW INCOMES

In 2012, 90.1% of nonelderly adults with low incomes (family income <300% FPL) reported having health insurance coverage, up significantly from 75.7% in 2006.[10] The percentage of low-income adults with a usual source of care also increased, as did the share of adults who had a PCP visit and a preventive-care visit within the year.

However, not every measure of access is improving. Figures 2.3.1 and 2.3.2 show various service categories that MassHealth and other insurance products are required to cover in Massachusetts. Numerous barriers make it difficult for people with low incomes to access these covered benefits, including:

- The increasing number of health plans with high deductibles, which can discourage price-sensitive consumers from seeking care.
- Copayments and coinsurance, which, even if very small, discourage patient utilization.
- A scarcity of local providers accepting MassHealth patients. Indeed, 25.1% of MassHealth enrollees had trouble finding a provider taking new patients, versus just 6.5% of those with ESI.[11]
- Language barriers and a lack of paid sick leave, which can discourage the use of primary care settings.[12]

PROVIDER ACCEPTANCE OF MASSHEALTH

Background

Nationally, low-income adults are less likely to have a usual source of care, including 32.9% of adults below the poverty line, 29.4% of adults at 100–199% FPL and 19.3% of adults 200–399% FPL.[13]

Across the country, 71% of specialists accepted new Medicaid patients in 2009 and 2010, compared to only 65% of PCPs, about the same as a decade earlier.[14] Even if Medicaid enrollees can find a PCP, they still face additional challenges. PCPs were less likely to recommend preventive services—including breast exams and Pap tests—to women covered by Medicaid than to women covered by private insurance, according to national data from 2006 to 2010.[15] Specifically, an estimated 26.4% of visits by women with Medicaid included at least one recommended preventive service, versus 31.3% of visits by privately insured women.

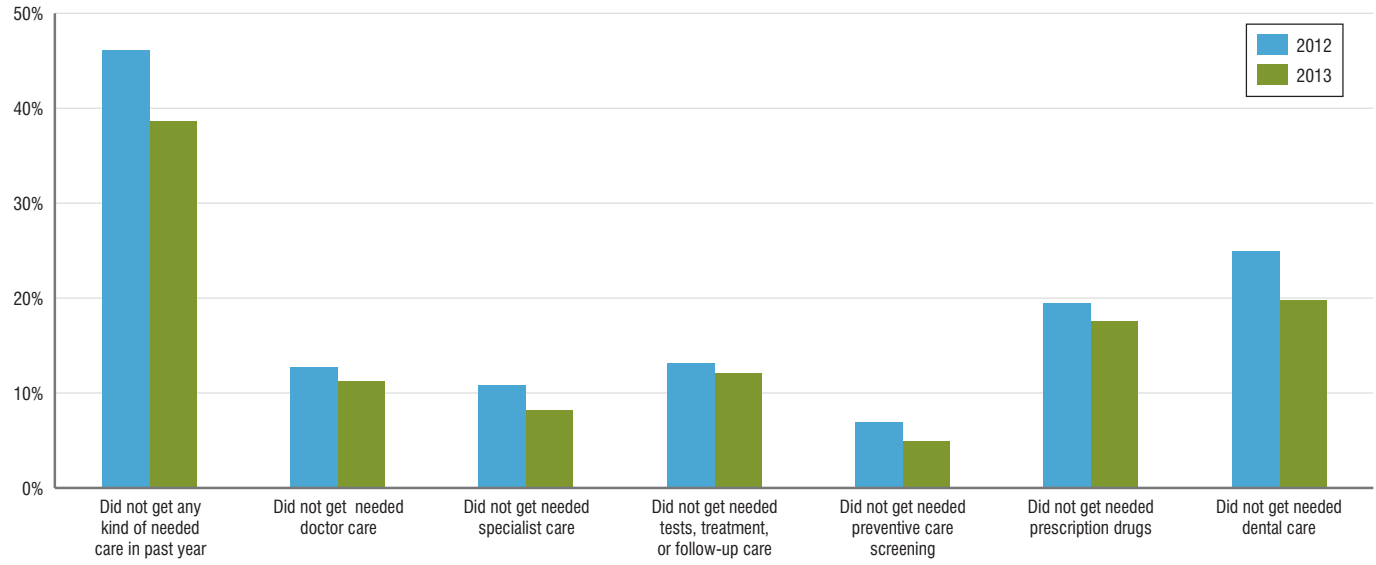
In December 2014, the U.S. Office of Inspector General released a report assessing the availability and timelines of appointments for enrollees in Medicaid managed-care programs.[16] From a random sample of 1,800 providers and specialists, more than half of providers could not offer appointments to enrollees:

> "35 percent of providers could not be found at the location listed by the plan, and another 8 percent were at the location but said that they were not participating in the plan. An additional 8 percent were not accepting new patients. Among the providers who offered appointments, the median wait time was 2 weeks. However, over a quarter had wait times of more than 1 month, and 10 percent had wait times longer than 2 months. Finally, primary care providers were less likely to offer an appointment than specialists; however, specialists tended to have longer wait times."[17]

Massachusetts trend, 2007–2013

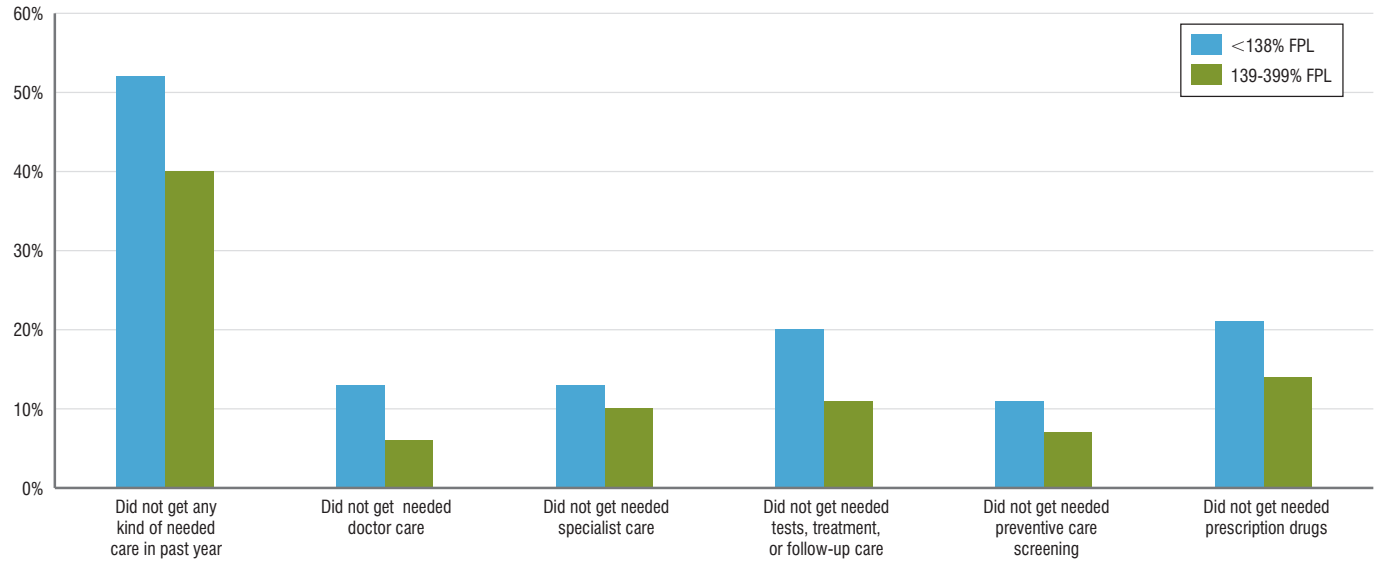
The percentage of pediatricians accepting MassHealth decreased slightly from 89% in 2011 to 83% in 2013, as shown in Figure 2.3.3.[18] Acceptance

Figure 2.3.1. Unmet need for care (Massachusetts adults <300% FPL aged 19–64) [2012 and 2013]



Source: MHRS data

Figure 2.3.2. Unmet need for care, 2015 (Massachusetts adults <400% FPL aged 19–64) [2015]



Note: The 2015 MHRS uses different income categories than the 2012 and 2013 MHRS surveys, so these years cannot be directly compared.
Source: MHRS data

of MassHealth among cardiologists declined, while acceptance rose in other disciplines.

PREVENTIVE CARE VISITS IN THE PAST YEAR

Background

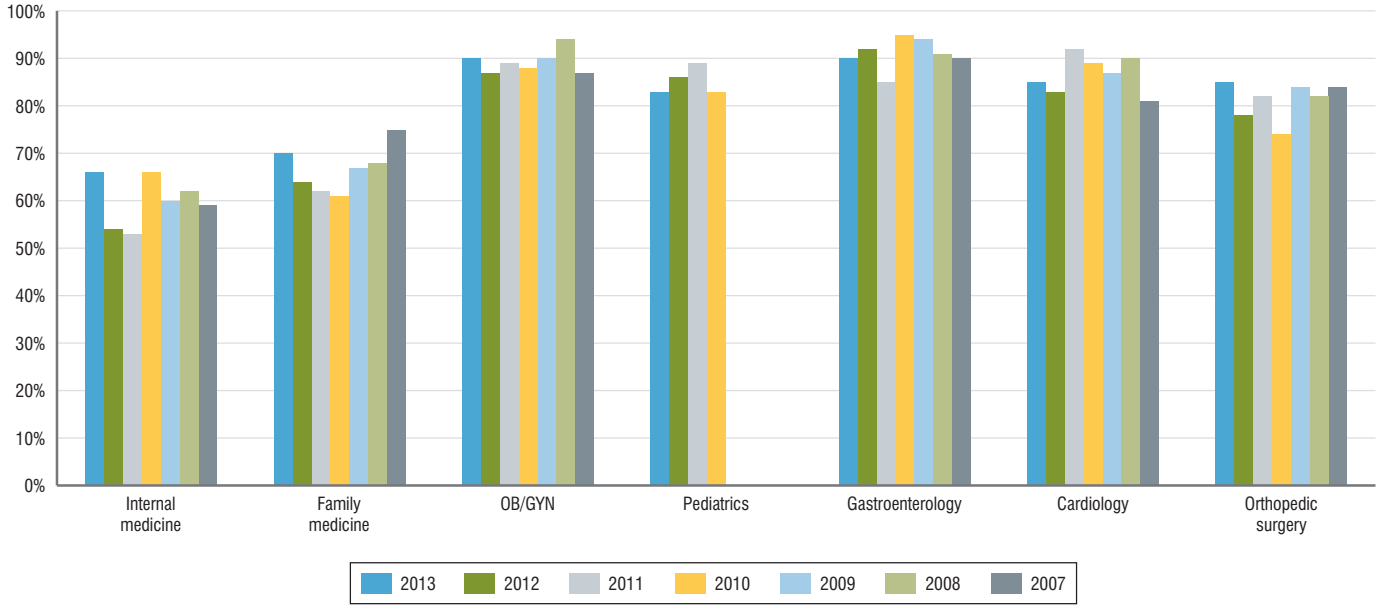
Preventive care visits—ranging from mammograms and vaccinations to well-care visits—are an important tool for monitoring health and managing chronic disease. Additionally, preventive care is generally cost-efficient because it is provided in a primary-care setting, not in EDs and other more expensive settings.

In the Commonwealth, low-income people with health insurance are less likely to have seen a PCP or specialist in the past year, less likely to have a usual source of care (whether or not they visited that source), and less likely to have made a preventive care visit in the past year than their higher-income peers.[19]

Massachusetts trend, 2006–2015

Among adults aged 19 to 64 <300% FPL, the share with a usual source of care decreased from 84.1% in 2010 to 83.3% in 2015, as shown in Figure 2.3.4.

Figure 2.3.3. MassHealth acceptance by provider type



Note: Pediatrics data from 2007-2009 not available.
Source: 2013 Massachusetts Medical Society Patient Access To Care Study. (2013, July). Retrieved July 29, 2016 from http://www.telegram.com/assets/pdf/WT17910716.PDF

ANY DENTAL VISIT IN PAST YEAR

Background

Dental care is the most common unaddressed health care need among Massachusetts adults. In 2012, 24.9% of low-income nonelderly adults reported an unmet dental care need,[20] while adults <300% FPL are less likely to see a dentist annually than other adults.

Only 35% of members of the Massachusetts Dental Society, which represents most dentists in the state, accepted MassHealth in 2013,[21] a fact the society's president attributed to MassHealth's low reimbursement rates.[22]

A commonly cited rule of thumb is that one should visit the dentist every six months. But a review of the literature by the Cochrane Oral Health Group found "no evidence to support or refute the practice of encouraging patients to attend for dental check-ups at six-monthly intervals" due to a lack of relevant quality research.[23] Therefore, it is not clear that patients should see the dentist twice a year, and patients who do so may be restricting overall appointment availability.

Massachusetts trend, 2006–2013

As shown in Figure 2.3.5, the percentage of low-income adults that reported seeing a dentist within the year increased after 2006, when the Massachusetts health care reform law expanded MassHealth's dental-benefit eligibility. Unfortunately, these benefits were nearly eliminated for adults in 2010 and only partially restored,[24] leaving tremendous unmet need.[25]

ANY HOSPITAL STAY IN THE PAST YEAR

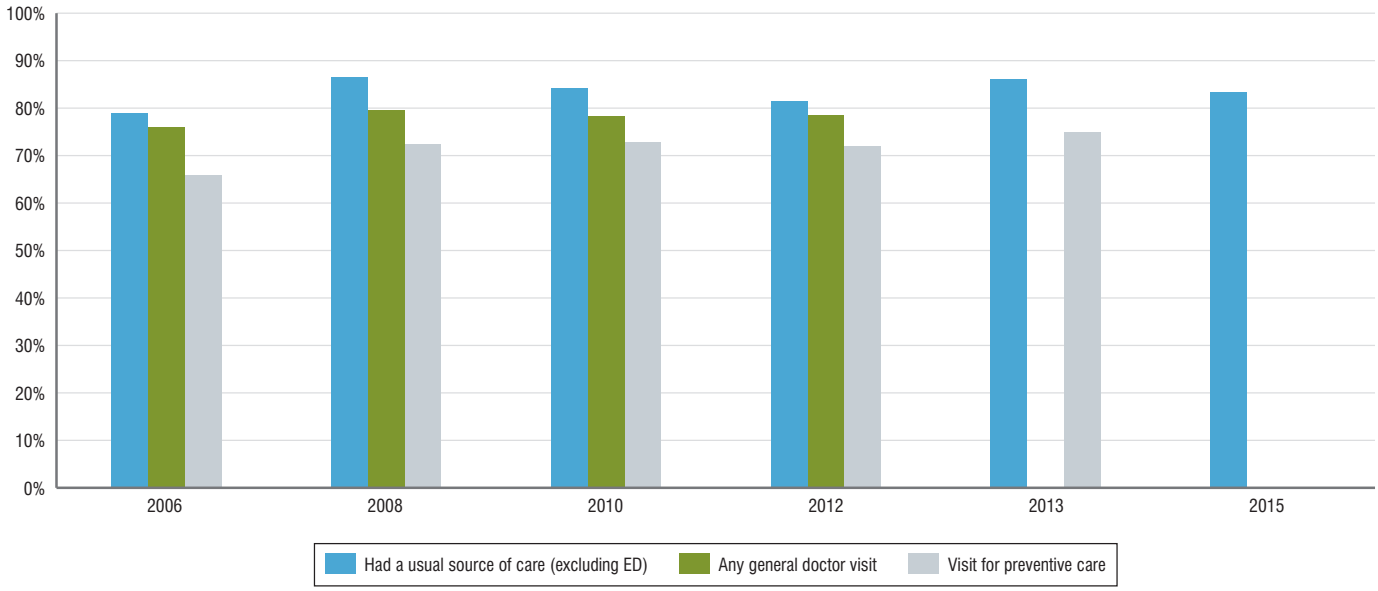
Background

Nationally, patients with low income are twice as likely as those with high SES to require urgent ED visits and four times as likely to require readmission.[26] Potential reasons for this disparity based on SES include:

- Patients with low SES believe that hospitals offer better access and technical quality than ambulatory care.[27]
- People with low incomes may be less likely to have a regular non-hospital source of care and less likely to adhere to medication and preventive care recommendations due to cost considerations or lower health or language literacy.
- Low-income Massachusetts families (<300% FPL) are less likely to have a usual source of health care than their wealthier peers,[28] which could leave them with few options besides visiting the ED.
- In Massachusetts, the poorer one is, the less likely one is to be in good health;[29] therefore, those with low SES are more likely to have episodes that cause them to seek ED care.

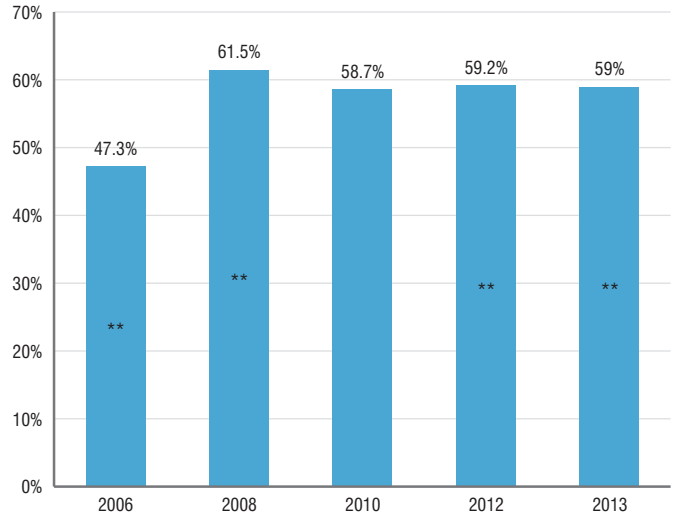
Mirroring this trend, patients in Massachusetts covered by Medicaid (who have lower relative incomes) had a higher readmission rate (16.9%) in 2015 than those with commercial coverage (10.5%).[30] According to Dr. Amy Boutwell of Newton-Wellesley Hospital, the Commonwealth's surfeit of hospital beds makes readmission a popular choice for providers whose patients are experiencing post-discharge problems.[31]

Figure 2.3.4. Access to health care in past year (Massachusetts adults <300% FPL aged 19–64)



Note 1: Some 2013 and 2015 data not available due to changes in survey methodology.
Note 2: In 2014, 300% FPL was $71,550 for a family of four.
Source: MHRS data

Figure 2.3.5. Dental visit in past year (Massachusetts adults <300% FPL)



Note 1: These are regression-adjusted estimates, significantly different from the value in 2006 at the $^{**}p<.01$ level, two-tailed test.
Note 2: This question was deleted from the survey in 2015, so no later data is available.
Source: MHRS data

Massachusetts trend, 2006–2013

As displayed in Figure 2.3.6, the share of adults with any hospital stay in the past year (excluding for birth) significantly decreased from 2012 to 2013. Further, 11.7% of low-income adults had a non-birth-related hospital stay in 2013, higher than the 8.7% of adults overall.

THREE OR MORE ED VISITS IN THE PAST YEAR

Frequent visits to the ED indicate that a patient is not receiving needed care in more appropriate clinical settings, such as primary care clinics. A lack of ongoing care (such as chronic disease management or substance abuse services) can trigger acute and costly episodes for which patients seek immediate medical attention.

> "[People] shouldn't be going to the emergency room for things that should be done in their regular doctor's office or in a clinic."
>
> **— JON HURST, PRESIDENT, RETAILERS ASSOCIATION OF MASSACHUSETTS, MEMBER OF HEALTH POLICY COMMISSION ADVISORY COUNCIL**

As displayed in Figure 2.3.7, the share of lower-income adults in Massachusetts that made at least three ED visits in the past year declined from 2010 to 2015.

PROBLEMS PAYING MEDICAL BILLS

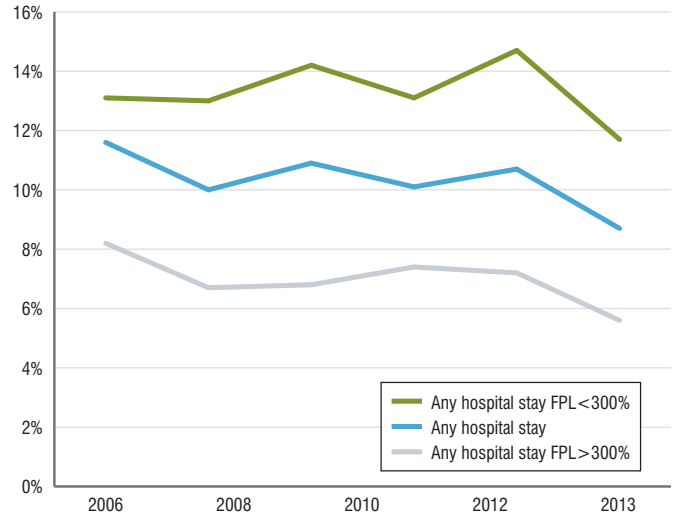
Background

Contextualizing the problem of lingering medical bills, the Federal Reserve found in 2013 that only 48% percent of Americans could cover an emergency $400 expense without selling something or borrowing money.[32] Moreover, while the number of low-income adults reporting problems paying medical bills decreased slightly from 2010 to 2015, the share paying bills over time held steady.[33]

A 2014 report by the Consumer Financial Protection Bureau highlighted a particularly vexing issue for families with lower literacy, be it financial, medical, linguistic, and/or legal:

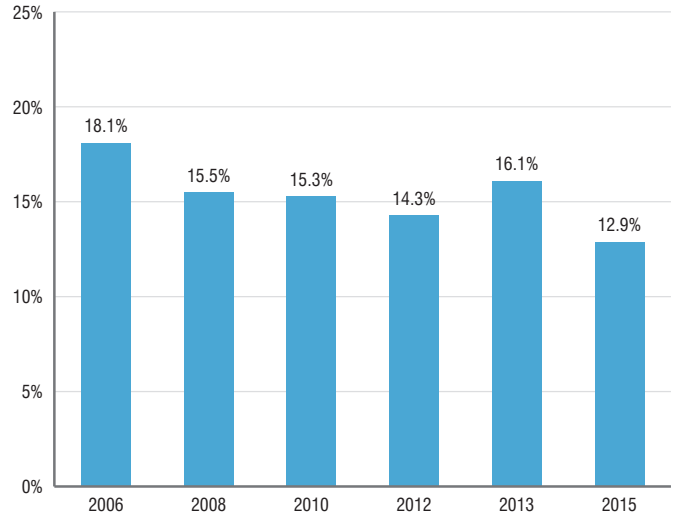
> "The complexity of medical billing and the third-party reimbursement processes faced by most patients and their families is a potential source of confusion or misunderstanding between patient, medical provider, and insurer. That complexity could lead some consumers to be unaware of when, to whom, or for what amount they owe a medical bill or even whether payment was the responsibility of the consumer rather than an insurance company."[34]

Figure 2.3.6. Hospital visit in past year (Massachusetts adults aged 19–64)



Note: Visits for birth excluded.
Source: MHRS data

Figure 2.3.7. Three or more ED visits in past year (adults 19-64 <300% FPL)



Source: MHRS data

Massachusetts trend, 2006–2013

As shown in Figure 2.3.8, more than a quarter of low-income adults in the Commonwealth had problems paying medical bills over the past year in 2012. The next year, people with family incomes 300%–399% FPL were most likely to have medical debt over $1,000, perhaps because this group, while wealthier than others, is not covered by MassHealth and other lower-cost public programs.

> "Many of our clients who have medical debt … had comprehensive health insurance at the time, but their services [weren't] covered for any number of reasons … [like] cost sharing, deductibles, or coinsurance."
>
> **— MATT SELIG, EXECUTIVE DIRECTOR, HEALTH LAW ADVOCATES**

NEEDED TO SEE A DOCTOR BUT COULD NOT DUE TO COST IN THE PAST YEAR

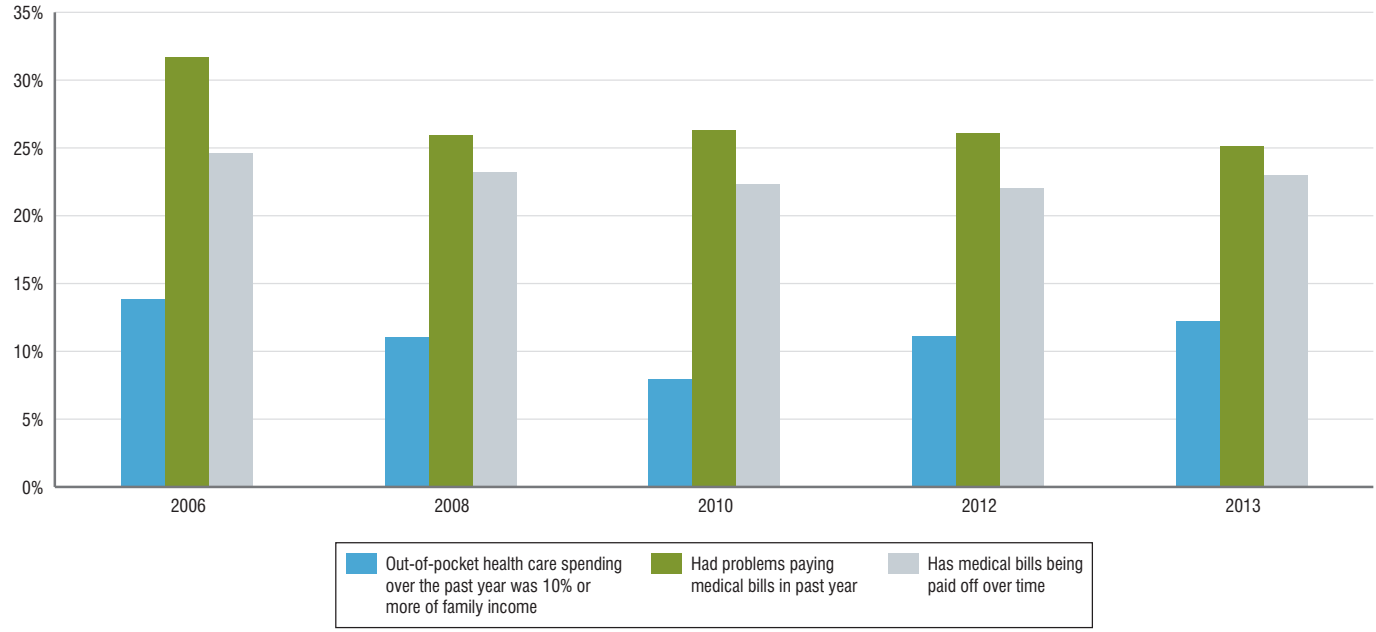
Figure 2.3.10 shows the relationship between health care access and income level, as follows:

- Massachusetts adults with lower household incomes are significantly less likely to report having a personal health care provider.
- However, among people with household income less than $25,000, the share who reported having a personal provider increased significantly from 2011 to 2015. There was no significant change among other income groups.
- In addition, adults with lower household incomes were significantly more likely to skip a doctor visit because of cost, and there was no significant change over time within each income group.

Figure 2.3.11 shows the relationship between health care access and education level, as follows:

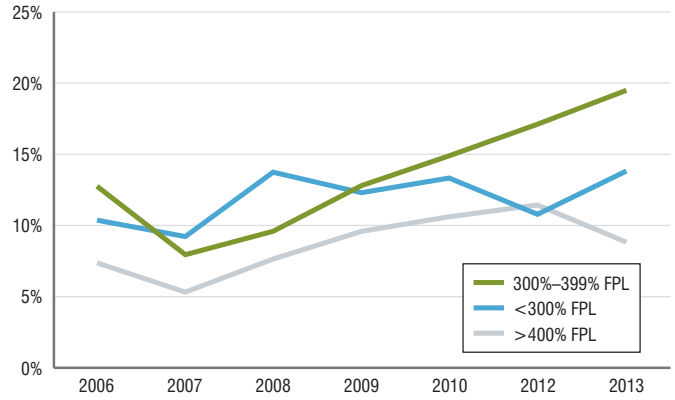
- More highly educated adults were significantly more likely to have a personal health care provider and less likely to be unable to see doctor due to cost.
- Among those who skipped a doctor visit due to cost, there was no significant difference between adults with a high school education and those

Figure 2.3.8. Problems with health care affordability (Massachusetts adults <300% FPL aged 19–64)



Note: These survey questions were discontinued, so data after 2013 is not available.
Source: MHRS data

Figure 2.3.9. Has medical debt by income level, Massachusetts



Note: Data not available for 2011.
Source: MHRS data

with 1 to 3 years of college.

- There was no significant change among any education group between 2011 and 2015, except for a significant decrease in skipping a doctor visit due to cost among adults with at least 4 years of college.

BREAST CANCER SCREENING

USPSTF recommends that women aged 50 to 74 receive a mammogram every two years.[35] Survey data collected by DPH indicates that low-income women receive mammograms at a lower rate than women with higher incomes, although the gap between the lowest- and highest-income individuals is smaller than it was 10 years ago.[36] Among the MassHealth managed-care population, breast cancer screening rates increased from 2009 to 2015, as shown in Figure 2.3.12.

CERVICAL CANCER SCREENING

Background

The USPSTF recommends that women aged 21 to 65 receive a Pap smear to screen for cervical cancer every three years and that women aged 30 to 65 receive a Pap smear and HPV testing every five years.[37]

A screening rate of 34% would suggest women covered by MassHealth are receiving Pap smears with the recommended frequency, and the actual screening rate is greater than 50%. However, it cannot be assumed that women are generally receiving adequate screening, because some women may be screened more often than others. Pelvic examinations are no longer recommended, because they are inaccurate in asymptomatic women and can lead to harm that exceeds clinical benefits.[38]

Massachusetts trend, 2010–2015

As displayed in Figure 2.3.13, among women aged 24 to 64 with MassHealth coverage, 53.5% had a screening that met the guidelines in 2015, a decrease from 57.0% in 2012. These women also were 5% less likely to be up-to-date with recommended screenings[39] in 2015 than in 2012. In the trend test (not

shown in the figure), there was a significant decrease in screening from 2010 to 2015.

COLORECTAL CANCER SCREENING

Background

The USPSTF recommends annual colorectal cancer screenings for adults aged 50 to 75, using a high-sensitivity fecal occult blood test, a sigmoidoscopy, or a colonoscopy.[41] According to a 2011 report, the top reason why older adults do not receive colon screenings is fear of either a worrisome finding or the procedure itself.[42]

Massachusetts trend, 2010–2015

Figure 2.3.14 shows the percentage of members aged 50 to 75 years who had an appropriate screening for colorectal cancer: either a fecal occult blood test in the past year, flexible sigmoidoscopy in the past five years, or colonoscopy in the past 10 years. The screening rates from 2010 to 2015 were underestimated due to insufficient MassHealth data; therefore odds ratios should be interpreted cautiously.

DIABETES CONTROL

Approximately 10.2% of Massachusetts residents live with diabetes,[44] and its prevalence is increasing. To prevent complications, it is important that people with diabetes monitor and control their vital signs, including blood pressure and hemoglobin/blood glucose levels as measured by the HbA1c test.

As shown in Figure 2.3.15, only 29.6% of adults aged 18 to 75 with diabetes in the MassHealth managed-care population had poor HbA1c control in 2015, down significantly from 45.2% in 2006.

> "We're supporting a proposal that would eliminate copays and deductibles for preventive care. We know people avoid [preventive care] because of the copays and deductibles, and that doesn't make sense for the overall cost of the system."
>
> — BRIAN ROSMAN

USE OF INAPPROPRIATE IMAGING FOR LOW-BACK PAIN

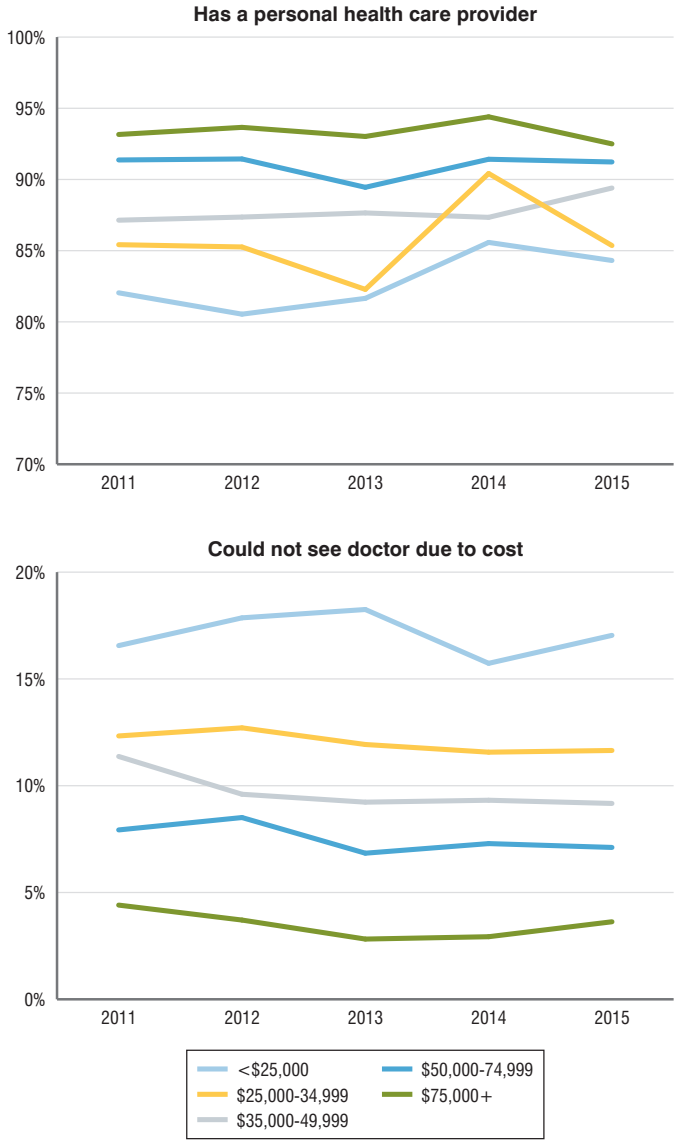
Background

According to the NCQA, many patients with simple low-back pain undergo excessive imaging that can lead to needless worry and overtreatment.[46] Imaging conducted in the 28 days following diagnosis is unlikely to improve patient care,[47] so lower imaging numbers are desirable on this measure.

Massachusetts trend, 2011–2015

On the measure of avoiding the use of inappropriate imaging for low-back pain, Massachusetts providers performed in the 90th percentile among the five leading commercial insurers nationwide in 2014. Generally, providers avoid inappropriate imaging, though there is variation among practices.[48]

Figure 2.3.10. Has a personal health care provider and could not see a doctor due to cost (Massachusetts adults)

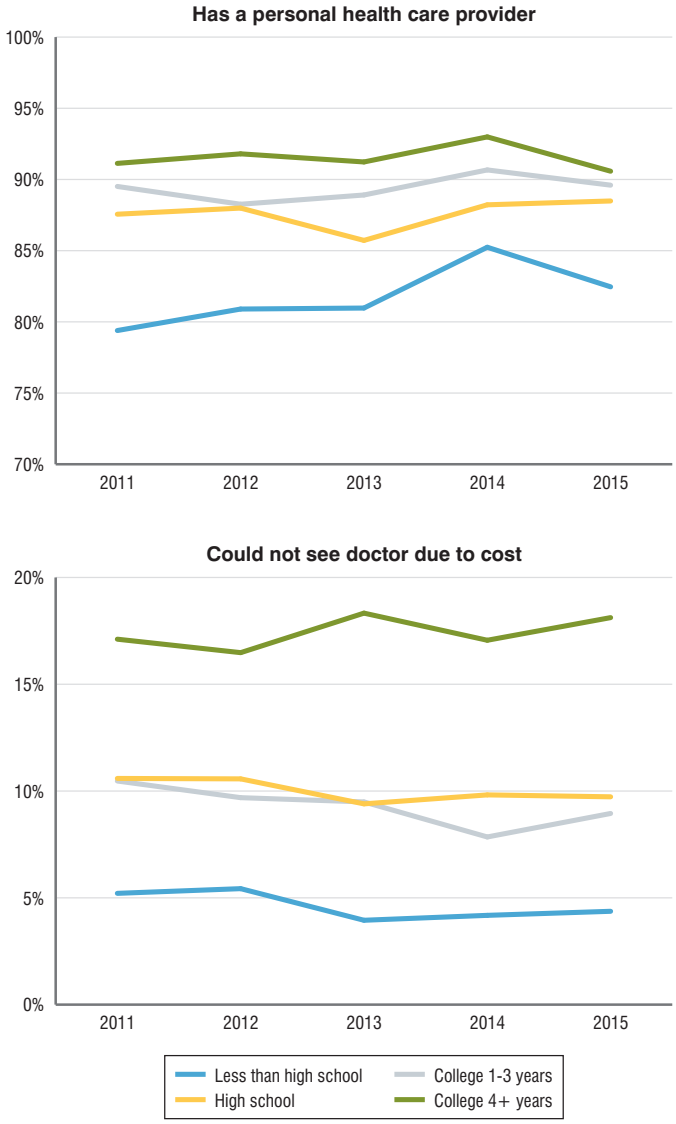


Note 1: Reflects household income (regardless of number of people in the household).
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

As displayed in Figure 2.3.16, 20.8% of people with commercial insurance used imaging studies for low back pain in the 28 days following diagnosis, versus 22.1% of those with MassHealth coverage (2015). Neither commercial nor MassHealth members had a significant difference in the use of such imaging from 2011 to 2015.

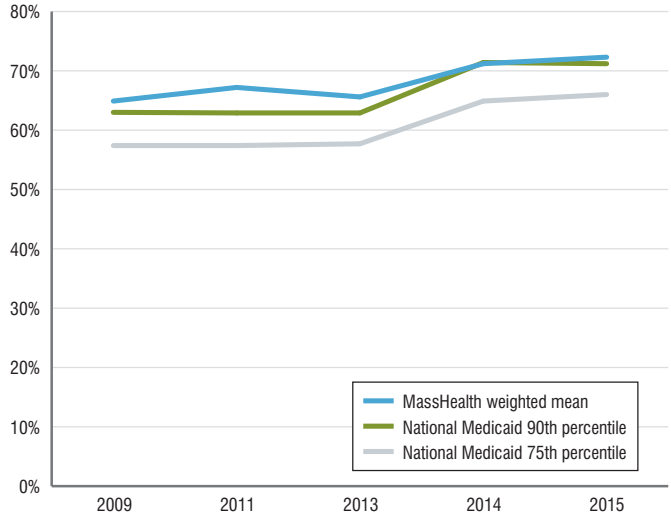
Between 2011 and 2015, members with commercial insurance were significantly more likely than those with MassHealth to have imaging within 28 days of diagnosis (average rate over the 5-year period: 79.2% for

Figure 2.3.11. Has a personal health care provider and could not see a doctor due to cost by education level (Massachusetts adults)



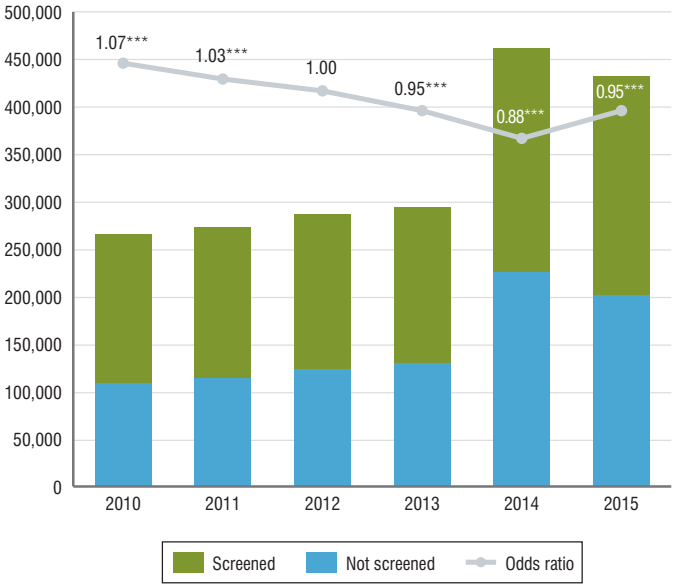
Note 1: Reflects household income (regardless of number of people in the household).
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 2.3.12. Breast cancer screening (MassHealth managed-care population)



Note: The HEDIS data presented in this report measures only MassHealth members enrolled in managed-care organizations' plans. From 2006 to 2015, the share of members enrolled in such plans ranged from to 56% to 64% (with the exception of 2014, an anomalous year impacted by the Health Connector failure). While HEDIS data is not representative of overall MassHealth trends, it is among the best available reported MassHealth data.
Source: MassHealth managed care HEDIS reports

Figure 2.3.13. Cervical cancer screening, women aged 21–64 (MassHealth)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2010 to 2015.[40]
Note 3: The MassHealth population grew dramatically in 2014 as a stopgap response to technical difficulties with the Connector website, thus affecting the percentage of those screened.
Source: OSA analysis of MassHealth data

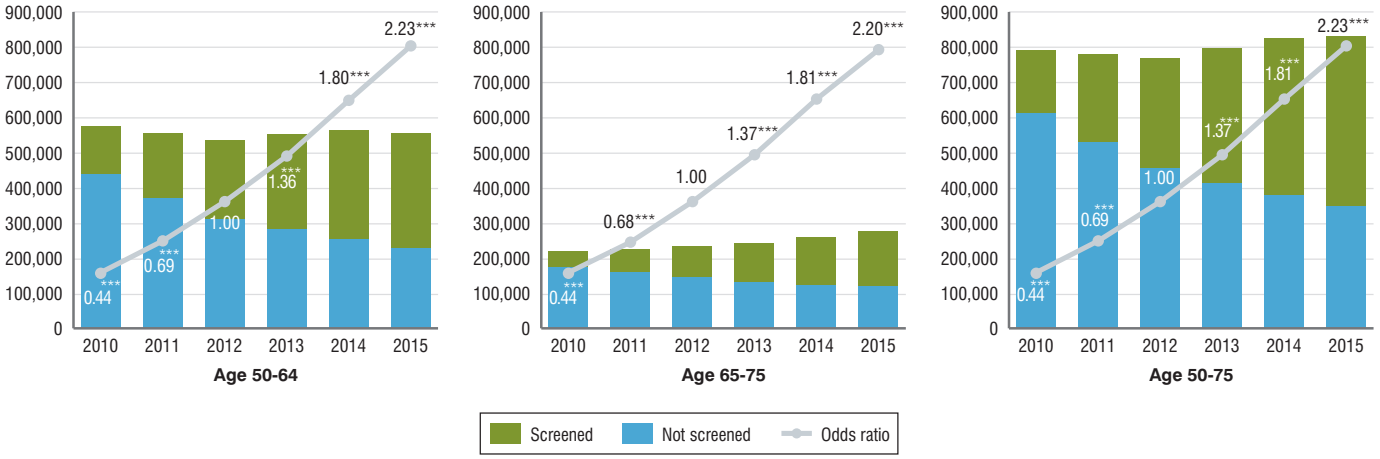
commercial; 77.7% for MassHealth). The gap between these two groups did not change significantly from 2011 to 2015.

TIMELINESS OF PRENATAL CARE

Background

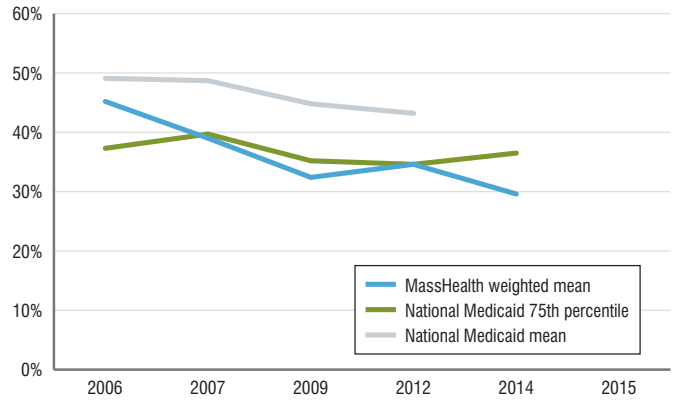
Timeliness of prenatal care is a HEDIS measure that captures the percentage of live births where the mother received prenatal care in the first trimester or within 42 days of enrollment in MassHealth. Health visits early in pregnancy, especially in the first trimester, help ensure a safe and healthy

Figure 2.3.14. Received appropriate colorectal cancer screening, aged 50–75 (MassHealth)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2010 to 2015.[43]
Source: OSA analysis of MassHealth data

Figure 2.3.15. Poor hemoglobin/blood sugar control[45] among diabetics (MassHealth managed-care population, aged 18–75)



Note: Figure reflects MassHealth managed-care population only (60% of members in 2014).
Source: University of Massachusetts Medical School Center for Health Policy and Research. MassHealth managed care HEDIS final report 2014. Retrieved from http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2014.pdf

delivery by promoting healthy choices, identifying potential health risks, and addressing any other problems.[50]

Massachusetts trend, 2007–2013

As shown in Figure 2.3.17, managed care patients with MassHealth outperformed the national Medicaid 75th percentile in 2013. This suggests these patients are receiving timely prenatal care with much greater consistency than the average Medicaid managed care patient.

FREQUENCY OF PRENATAL VISITS

Background

This measure, frequency of prenatal visits, reports the share of deliveries by MassHealth beneficiaries that received at least 81% of the approximately 14 prenatal visits recommended (that is, every 4 weeks for the first 28 weeks of pregnancy, every 2 to 3 weeks for the next 7 weeks, then weekly until delivery).[51] Infants of mothers who do not receive prenatal care are three times more likely to have a low birth weight and five times more likely to die than those born to mothers who get prenatal care.[52]

Massachusetts trend, 2007–2013

As shown in Figure 2.3.18, MassHealth performed between the national Medicaid mean and the 75th percentile on this measure from 2009 to 2013.

Figure 2.3.16. No imaging performed in 28 days following diagnosis of low back pain (commercial, MassHealth, and group comparison)

Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2011 to 2015.[49] Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth claims data.

NEONATAL CARE (POSTPARTUM VISIT)

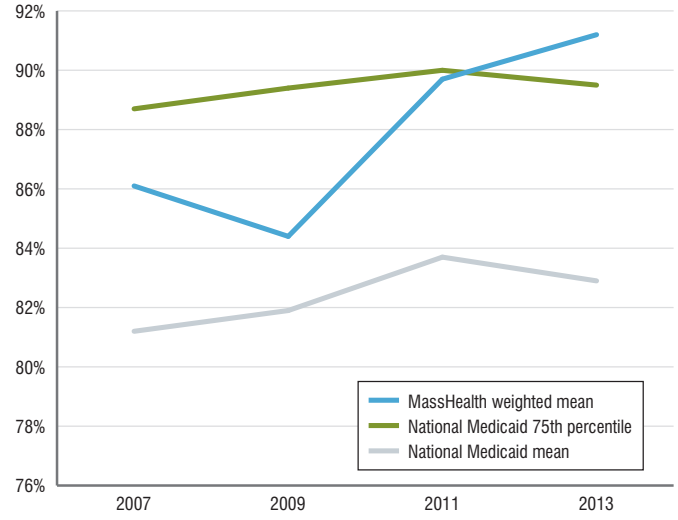
Background

The postpartum-visit measure reports the percentage of deliveries by MassHealth members that were followed by a postpartum visit 21 to 56 days after delivery. A postpartum visit provides an opportunity to address important care matters, including interconception care, pregnancy complications, postpartum depression screening, chronic conditions, and breastfeeding guidance.[53]

Massachusetts trend, 2007–2014

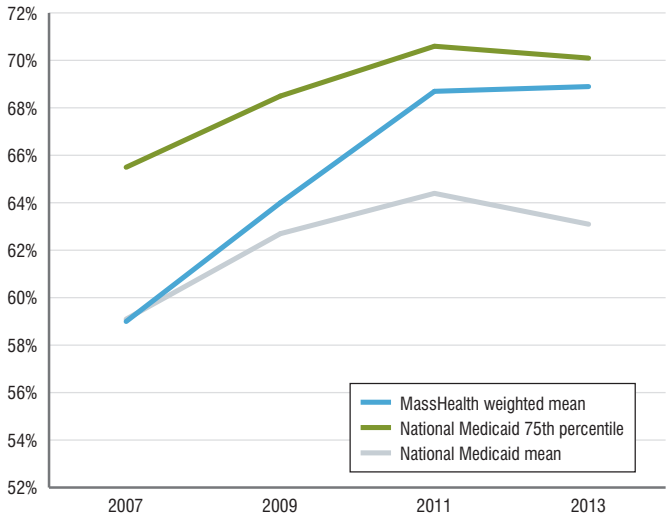
As shown in Figure 2.3.19, MassHealth pulled ahead of the national Medicaid 75th percentile for postpartum visit rate in 2014. However, caution should be taken in interpreting these numbers, because the MassHealth population temporarily increased in 2014 due to technical difficulties with Health Connector enrollment.

Figure 2.3.17. Received timely prenatal care (MassHealth managed-care population)



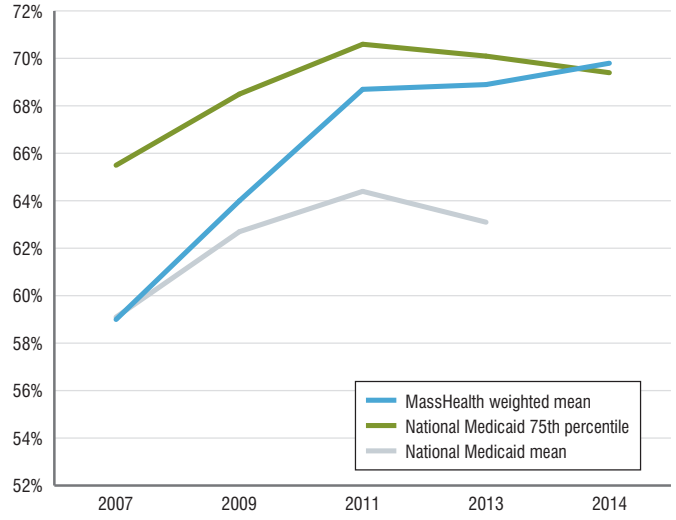
Note: Figure reflects MassHealth managed-care population only (60% of members in 2014).
Source: MassHealth managed care HEDIS 2013 report. (2014). Retrieved December 8, 2015, from p. 45
http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

Figure 2.3.18. Made at least 81% of expected prenatal visits (MassHealth managed-care population)



Note: Figure reflects MassHealth managed-care population only (60% of members in 2014).
Source: MassHealth managed care HEDIS® 2013 report. (2014). Retrieved December 8, 2015 from p. 47
http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

Figure 2.3.19. Made a postpartum visit (MassHealth managed-care population)



Note: Figure reflects MassHealth managed-care population only (60% of members in 2014).
Source: MassHealth Managed Care HEDIS 2013 Report. Retrieved August 14, 2014, from p. 56
http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

Section 2.4:
People with Disabilities

OVERVIEW

OSA's most significant finding regarding the health of people with disabilities (PWDs) is that a severe of lack of data exists. The available data on adults were insufficient to perform a longitudinal analysis, and data on children (from the National Survey of Children with Special Health Care Needs) were available for only a limited number of years. Action is needed to collect more meaningful data on this important and complex topic and to move forward with corresponding policy and practice.

The definition of "disability" depends on context. Two commonly accepted definitions are as follows:

- MassHealth defines a disability as a mental or physical condition that severely limits a person's ability to work or to do certain activties for at least 12 months.[1] Adults with disabilities are eligible for MassHealth coverage if their income is <138% FPL ($22,108 a year for a family of two in 2016).[2]
- Federal laws define a person with a disability as "any person who has a physical or mental impairment that substantially limits one or more major life activities; has a record of such impairment; or is regarded as having such an impairment."[3]

ADULTS

In Massachusetts, 34% of adults aged 65 and older reported having a disability in 2013. (Adults in this age group represent 15% of the total population.) Among adults aged 18 to 64, 9% reported a disability.[4]

PWD encounter persistent barriers throughout the health system, including buildings and equipment unfit for their needs, medical professionals untrained to care for them, a lack of respect, and inadequate communication accommodations (e.g., failure to provide Braille).[5] Out-of-pocket costs are another major barrier to care, especially since many PWD are unemployed or underemployed. People with mobility problems can have difficulty traveling to appointments. People with complex care needs spanning multiple medical disciplines can find the lack of care coordination particularly damaging. Even when good health care is accessible, a lack of community supports can push adults with disabilities into institutional living.

Given these barriers, it is not surprising that people with disabilities are at higher risk of poor health than the overall population. While 3.4% percent of people without disabilities are in fair or poor health, the percentages are much higher for people reporting difficulty seeing or hearing (30.6%), movement difficulties (37.9%), emotional difficulties (51.8%), and cognitive difficulties (63.8%).[6] In addition, non-elderly PWD are more likely than those without disabilities to be obese, to smoke, and to be physically inactive.[7]

These health problems can make it difficult for PWD to maintain steady employment and can contribute to their societal marginalization. PWD are far less likely to have a job (46% employment rate among 18- to 64-year-olds) than those without disabilities (84%).[8] Moreover, PWD experience high levels of poverty: 27% among those with severe disabilities and 12% among those with non-severe disabilities, compared to just 9% among people without a disability.[9]

Medicare and Medicaid cover a disproportionate share of children and adults with disabilities, and these programs are particularly important to people with chronic disabilities seeking LTC services. MassHealth covers a variety of LTC services, including facility-based care, day and residential programs, community services, and home-based care. More recently, MassHealth has focused on ways to provide community care, as opposed to institutional care.[10] Conversely, Medicare and private insurance coverage of LTC is much more limited.[11]

Among Massachusetts adults aged 21 and over with an activities-of-daily-living disability and income <250% FPL ($40,050 for a family of two in 2016), 67.4% received Medicaid or some other government assistance with health insurance in 2011 and 2012; this was the second-highest rate in the nation.[12]

Several Massachusetts initiatives aim to improve care for adults with disabilities, including:

- One Care, which provides the full set of services under both MassHealth and Medicare coverage and connects patients with a personal care coordinator to facilitate cooperation among providers;[13]
- Managed-care plans providing MassHealth coverage, which have an opportunity to focus on care coordination and wellness; and
- The Patient-Centered Medical Home program, which certifies providers as capable of directing care for patients with complex care needs.

Age is a major risk factor for having a disability. An estimated 49.8% of people over age 74 had been diagnosed with a disability in 2015, compared to 6% of people aged 18 to 34.[14] The National Academy of Health (formerly the Institute of Medicine) observed that the number of people living with disabilities in the U.S. will grow substantially in the next 30 years, primarily because of the aging of the Baby Boomer generation.[15] Overall, females have slightly higher risk of being diagnosed with a disability (12.7%) than males (12.5%), according to 2015 data.[16]

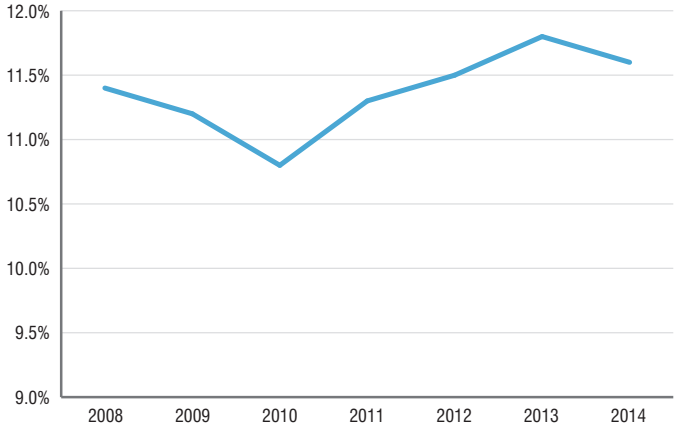
The share of Massachusetts residents with a disability who live in the community has remained stable since 2006, as shown in Figure 2.4.1.

Nationally and within Massachusetts, many people with disabilities do not receive the support they need for various reasons. First, and perhaps most significantly, is inadequate transportation.[17] Payers and providers may help fill this void as alternative-payment methodologies come to provide more options for transportation, but, in the meantime, PWD will continue to face transportation challenges alleviated only somewhat by public transit. A second major barrier to efficient care is poor care coordination. [18] Finally, because people with disabilities are more likely to be low-income and less likely to be able to work,[19] they may not be able to afford services and treatments not covered by insurance.

CHILDREN

Children with disabilities have a unique set of care needs and survey measures, including development-related screening measures. The 2005/2006 and 2009/2010 National Surveys of Children with Special Health Needs (NSCSN) represent the most recent national data available regarding children with disabilities (as of publication; updated NSCSN data are expected in 2017)

Figure 2.4.1. Estimated civilian non-institutionalized population with a disability (Massachusetts)



Source: U.S. Census Bureau. 2014 American community survey 1-year estimates. Retrieved April 28, 2016, from http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S1810&prodType=table

Summary of Findings

2.i: ACCESS TO HEALTH CARE SERVICES AND QUALITY OF CARE

Based on data from MHRS

- Among insured adults aged 19 to 64 in Massachusetts, 37.2% reported an unmet need in 2015, which was the highest rate since 2012.
- Around 85% had a usual source of care in 2015, essentially the same rate as in 2012. Moreover, wealthier Massachusetts residents were more likely to have a usual source of care than those with low incomes.
- Data on urgent care centers were very limited but indicated an increase in the use of after-hours care from 2010 to 2013.
- The share of adults who visited the ED declined slightly from 2010 (32.2%) to 2015 (31.5%). In 2014, about 42% of ED visits in Massachusetts were non-emergencies or treatable in a primary care setting.

Based on data from CHIA

- In 2014, 77% of Massachusetts workers were eligible for employer-sponsored insurance (ESI), up from 65% in 2011, but a greater proportion were not enrolling in it. In 2017 Governor Baker proposed re-instating an employer penalty for not offering ESI, since the similar ACA provision had not yet been implemented.
- In 2014, Massachusetts had more inpatient admissions per 1,000 population than 35 states. The Commonwealth also exceeded national rates of potentially preventable hospitalizations for three measures: chronic obstructive pulmonary disease, congestive heart failure, and asthma in younger adults. However, the unplanned 30-day readmission rate in Massachusetts declined from FY 2011 (16.1%) to FY 2015 (15.8%).

2.1: CHILDREN

Based on data from the Commonwealth Fund

- As of 2012, Massachusetts had the highest health insurance rate for children in the U.S.

Based on data from APCD and MassHealth

- In 2015, 98% of children covered by commercial insurance and 56% of those with MassHealth had at least 6 well visits in first 15 months of life; among children covered by MassHealth, the likelihood of their having at least 6 visits increased 7% from 2012 to 2015.
- On the measure of receiving a well visit, the gap between those with commercial coverage versus MassHealth coverage was smaller for children aged 3 to 6 (89% vs. 68%, respectively) and smaller still for those aged 12 to 21 (70% vs. 55%, respectively); both age groupings had an increased likelihood of receiving a well visit in 2015 compared to 2012, although the gaps between those with commercial coverage and MassHealth did not change significantly.
- In 2015, 97% of children and adolescents with commercial coverage and 89% with MassHealth accessed primary care recently. Children and adolescents were more likely to have visited a PCP in the past 1 or 2 years in 2015 than in 2012, although increased visit rates among 7–19-year-olds accounted for this increase in both groups.
- Limited data suggest increasing immunization rates since 2012 for several childhood vaccines, though trending vaccine skepticism among parents may suppress additional potential improvement.
- From 2012 to 2015, 79% of 2-year-olds covered by commercial insurance and 72% of those with MassHealth received a blood lead test. No significant change in trend was measured.

2.2: OLDER ADULTS (65+)

Based on data from APCD and MassHealth

- Among women aged 65 years and older, 82% of those with commercial insurance and 50% of those with MassHealth had at least one mammogram in the past 27 months between 2012 and 2015. The gap between these two groups significantly decreased and both groups saw significant improvement during this period.
- Limited data suggested an increase in the percentage of MassHealth and commercially covered adults, aged 65 to 75, with appropriate colorectal cancer screening from 2012 to 2015. Both groups had a rate of approximately 55% in 2015.
- Fewer than 15% of women aged 67 to 85 received osteoporosis management within six months of a fracture in 2015. There was no significant difference between those with commercial coverage and those with MassHealth.

Based on data from BRFSS

- In 2015, 57% of adults aged 65 to 74 and 66% of those aged 75 and older had ever been told they had high blood pressure (HBP), but over 90% of all seniors told they have HBP were taking medication for HBP. Neither of these rates changed significantly from 2012 to 2015.
- In 2015, 65% of adults aged 65 to 74 and 59% of those aged 75 and older were overweight, including 27% and 23%, respectively, who were obese. Nevertheless, Massachusetts has one of the lowest overweight/obesity rates among older adults in the U.S. There was no significant increase or decrease in the percentages from 2011 to 2015.
- In 2015, 59% of adults aged 65 to 74 and 64% of those aged 75 and older had a flu shot; a significant decrease since 2011 for both groups.
- In 2015, 66% of adults aged 65 to 74 received a vaccine for pneumonia, representing no significant change since 2011. Among adults aged 75 and older, 82.4% received the vaccine, a significant increase since 2011.

2.3: LOW-INCOME INDIVIDUALS

Based on data from the Massachusetts Medical Society

- Provider acceptance of MassHealth increased from 2012 to 2013 for internal medicine, family medicine, and some specialties, but decreased among pediatricians and cardiologists.

Based on data from MHRS

- Among adults aged 19 to 64, 52% of those with incomes <138% FPL and 40% earning <300% FPL did not get any kind of needed care in 2015.
- Among adults aged 19 to 64, the share earning <300% FPL with a usual source of care decreased from 84.1% in 2010 to 83% in 2015.
- Among adults aged 19 to 64, the percentage earning <300% FPL with one dental visit in the past year increased starting in 2006 when the Massachusetts health care reform law expanded MassHealth dental-benefit eligibility for adults. Unfortunately, these benefits were nearly eliminated in 2010 and then partially restored, leaving unmet need.
- Among those earning <300% FPL, the share with any hospital stay in the past year (excluding for childbirth) significantly decreased from 12% in 2012 to 9% in 2013.
- Among adults aged 19 to 64, the percentage earning <300% FPL with three or more ED visits decreased from 14% in 2012 to 13% in 2015.
- Between 2012 and 2013, there were slightly fewer adults with incomes <300% FPL reporting problems paying medical bills, but this group also saw an increase in the percentage with medical debt. As of 2013, those at 300%–399% FPL were most likely to have medical debt over $1,000, perhaps because this group, while wealthier than others, was not covered by MassHealth or other lower-cost public programs.

Based on data from BRFSS

- No significant change was measured from 2012 to 2015 in the percentage of households with <$50,000 income that reported not seeing a doctor because of cost.

Based on data from MassHealth (including HEDIS)

- Among the MassHealth managed-care population, breast cancer screening rates increased from 2012 to 2015.
- Among women aged 24 to 64 with MassHealth coverage, 54% had cervical cancer screening that met the guidelines in 2015, a significant decrease from 57% in 2012.
- Among MassHealth-covered adults aged 50 to 75 years, limited data suggested an increasing trend from 2012 to 2015 in the percentage who received appropriate colorectal cancer screening.
- Among adults aged 18 to 75 with diabetes in the MassHealth managed-care population, only 30% had poor HbA1c control in 2014, down significantly from 45% in 2006.
- Among adults with MassHealth, no significant change was measured from 2011 to 2015 in the percentage (i.e., 22%) who, appropriately, did not receive imaging for low-back pain 28 days post diagnosis.
- Very limited data indicated MassHealth managed-care patients received timely prenatal care with greater consistency than the average Medicaid managed-care patient in 2013.

2.4: PEOPLE WITH DISABILITIES

- The share of Massachusetts residents with a disability who live in the community has remained stable since 2006, (11.6% in 2014).
- The data were insufficient to calculate a single trend for children with disabilities.

Conclusion

For these measures of different patient populations, there were some areas of improvement and some negative trends. Overall, Massachusetts maintained broad access to care but continued to grapple with high levels of readmissions and avoidable ED visits, as well as serious disparities. Access to pediatric primary care improved, though children and adolescents with commercial insurance still attended primary care visits more often than those enrolled in MassHealth.

Adults aged 65 and older received sufficient cancer screening, yet significant room for improvement remains in preventive care.

Among people with low incomes, cancer screening rates generally improved, but access to care remained inconsistent.

For people with disabilities, the data were insufficient to calculate a single trend, though it is clear this population faced substantial barriers to achieving satisfactory health outcomes.

Massachusetts sustained its high level of access to healthcare, but there is room for improvement. The Commonwealth outperformed the nation on important measures, such as access to care and having a usual source of care (among adults aged 19 to 64). An increased share of Massachusetts workers became eligible for employer-sponsored insurance, but a greater proportion are not enrolling in it, possibly because more people chose coverage through the individual market or obtained it through a family member.

Massachusetts' hospital utilization statistics point to troublesome trends. For example, the Commonwealth had more inpatient admissions per 1,000 population than 35 states, and 42% of ED visits in Massachusetts were non-emergencies or treatable by primary care (2014 data). Additionally, although the unplanned 30-day readmission rate declined, the Commonwealth's preventable readmission rate was higher than the national average for three important conditions: chronic obstructive pulmonary disease, congestive heart failure, and asthma in younger adults. Policymakers have expressed optimism that urgent care clinics can help divert patients from EDs so primary-care-treatable conditions can be tended to before they require readmission. Use of urgent care centers increased from 2012 to 2015, but it is unclear whether these clinics contributed to cost-savings as desired or drove new demand for health services.

CHILDREN

The Commonwealth assured a high level of access to care for children, though those covered by MassHealth continued to face disparities. Massachusetts children had the highest insurance rate in the U.S. From 2012 to 2015, primary care utilization was steady or increased among children of various age groups. Among infants in the first 15 months of life, children aged 3 to 6, and adolescents aged 12 to 21, those with commercial insurance made more primary care visits than those with MassHealth coverage (though this gap narrowed as children aged and was smallest among adolescents). Possible factors contributing to lower rates among MassHealth enrollees include some parents/guardians being unaware that their children were entitled to these visits, parents/guardians not having time to take them to the doctor, inadequate transportation, lack of open appointments at local practices, and a struggle to find providers who accept MassHealth.

From 2012 to 2015, 79% of 2-year-olds covered by commercial insurance and 72% of those with MassHealth received a blood lead test, and this rate was stable with no significant change. Still, this testing disparity is concerning because MassHealth-enrolled children may have a higher risk of lead exposure due to environmental and social factors.

Growing vaccine skepticism among parents is a troubling trend for both children and population health, although limited data suggested an increase in some childhood vaccination rates.

OLDER ADULTS (65+)

Cancer screening rates improved among older adults in both the commercial and MassHealth populations. However, significant room for improvement remains on preventive measures, especially osteoporosis care and vaccinations for pneumonia and influenza. Among older women with either commercial insurance or MassHealth, the share who had a mammogram in the past 27 months increased significantly from 2012 to 2015. Though the mammogram rate is much higher among the commercial population, both groups may have received screening biannually, as is recommended.

Limited data indicated the share of adults with both MassHealth and commercial coverage that received appropriate colorectal screening increased from 2011 to 2015. By and large, women aged 67 to 85 did not receive the recommended course of care after breaking a bone: only about 1 in 9 had prescription drug therapy or a bone mineral density test to treat osteoporosis within 6 months of a fracture. In contrast, over 90% of seniors who were told they have high blood pressure (HBP) were taking medication for HBP.

Massachusetts had one of the lowest obesity rates in the U.S., as 27% of adults aged 65 to 74 and 23% of those aged 75 and older were obese in 2015. Finally, findings regarding vaccinations were mixed: In 2015, 59% of adults aged 65 to 74 and 64% of those 75 and older had a flu shot, which represents a significant decrease since 2011 for both groups. At the same time, 66% of adults aged 65 to 74 received a vaccine for pneumonia, representing no significant changes since 2011, while 82.4% of adults 75 and older received the vaccine, a significant increase since 2011.

LOW-INCOME INDIVIDUALS

Among people with low incomes, cancer screening rates generally improved, but the trend was negative for a number of health care access issues. Among the MassHealth population, cancer screening rates generally improved. For example, limited data showed a significant increase in the share of adults in line with colorectal screening guidelines. Among the MassHealth managed-care population, breast cancer screening rates increased from 2009 to 2015. However, the share of women aged 24 to 64 with MassHealth coverage in line with cervical screening guidelines decreased significantly.

On the matter of health care access, the Commonwealth failed to make

progress on some important measures among people with low incomes. Indeed, among adults aged 19 to 64 earning <300% FPL, the share having a usual source of health care decreased. Additionally, the share with a dental visit in the past year was almost unchanged, and a large portion, especially those earning <138% FPL, skipped some kind of needed care in 2015.

Of all income groups, people at 300% to 399% FPL were most likely to have medical debt over $1,000, perhaps because, while wealthier than others, this group was not covered by MassHealth or other lower-cost public programs. Very limited data suggested MassHealth managed-care patients received timely prenatal care with greater consistency than the average U.S. Medicaid managed care patient in 2013. Other areas of improvement include a decreased share of adults (aged 19 to 64 years, <300% FPL) with three or more ED visits and an improved trend of diabetes control among those enrolled in MassHealth managed-care plans.

PEOPLE WITH DISABILITIES

There is a critical lack of data regarding the health of people with disabilities. What little data is available on adults with disabilities were insufficient to perform a longitudinal analysis and data on children with disabilities (from the National Survey of Children with Special Health Care Needs) were available fo only a limited number of years. Action is needed to collect more meaningful data on this important and complex topic to inform policy and practice.

Endnotes

INTRODUCTION

1 Long, S., & Dimmock, T. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 Update. Retrieved April 28, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_FINAL.pdf

2 Long, S., Skopec, L., Shelto, A. et al. (2016). Massachusetts health reform at ten years: great progress, but coverage gaps remain. *Health Affairs, 35*(9), 1633–1637.

3 United States Department of Health and Human Services. Access to health services. Retrieved August 26, 2014, from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicId=1

4 Ibid.

5 Agency for Healthcare Research and Quality. (2008, August). Module 6: the way forward—promoting quality improvement in the states. Retrieved October 6, 2016, from archive.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/diabguide/diabqguidemod6.html

6 Salzer, M., Nixon, C., Schut, L. et al. Validating quality indicators: quality as relationship between structure, process, and outcome. *Evaluation Review. 1997; 21*(3), 292–309.

7 National Committee for Quality Assurance. *About NCQA.* Retrieved from http://www.ncqa.org/AboutNCQA.aspx

8 NCQA (2015). HEDIS 2015 technical specifications volume 2.

9 MassHealth is the agency that manages Medicaid, which serves low-income residents, and the Children's Health Insurance Program in Massachusetts.

10 APCD is the state-managed database of public and private health claims in Massachusetts. It is a crucial tool for tracking health trends in the Commonwealth.

11 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved November 8, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

12 HEDIS is a specified set of standardized health measures developed by NCQA and used by more than 90% of the nation's health plans.

13 Selecting process measures for clinical quality measurement. Retrieved March 3, 2014, from the Agency for Healthcare Research and Quality website: http://www.qualitymeasures.ahrq.gov/tutorial/ProcessMeasure.aspx

14 Salzer, M., Nixon, C., Schut, L. et al. Validating quality indicators: quality as relationship between structure, process, and outcome. *Evaluation Review. 1997; 21*(3), 292–309.

15 Population estimates, July 1, 2015, (V2015) (n.d.). Retrieved June 13, 2016, from https://www.census.gov/quickfacts/table/PST045215/25

16 Defined as an unmet need for doctor care, specialist care, mental health care or counseling, or a prescription drug because of cost.

17 Skopec, L., Long, S., Sherr, S., et al. (2015, December). Findings from the 2015 Massachusetts health insurance survey. Retrieved June 13, 2016, from http://www.chiamass.gov/assets/docs/r/survey/mhis-2015/2015-MHIS.pdf

18 Ibid.

19 National Public Radio, the Robert Wood Johnson Foundation, & the Harvard T.H. Chan School of Public Health (2016, February). Patients' perspectives on health care in the United States: A look at seven states & the nation. Retrieved February 29, 2016, from NPR's website: http://www.npr.org/assets/img/2016/02/26/PatientPerspectives.pdf

20 Blue Cross Blue Shield of Massachusetts Foundation. (n.d.). Access to care in Massachusetts: Comparing public coverage with employer-sponsored insurance. Retrieved February 9, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/Comparing_Access_summary_RELEASE_0.pdf

21 Ibid.

22 Riffkin, R. (2015, November 6). Americans with government health plans most satisfied. Retrieved June 13, 2016, from http://www.gallup.com/poll/186527/americans-government-health-plans-satisfied.aspx

23 This subjective judgment may reflect higher expectations among the commercially insured.

24 Collins, S., Rasmussen, P., Doty, M. et al. (2014). Too high a price: out-of-pocket health care costs in the United States, p. 4. *Issue brief (Commonwealth Fund)*. Retrieved June 4, 2015, from http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2014/nov/1784_collins_too_high_a_price_out_of_pocket_tb_v2.pdf

25 Long, S., & Dimmock, T. (2014, November). *Health insurance coverage and health care access and affordability in Massachusetts: affordability challenge*. Retrieved February 9, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

26 Long, S., Skopec, L., Shelto, A. et al. (2016). Massachusetts health reform at ten years: great progress, but coverage gaps remain. *Health Affairs, 35*(9), 1633–1637.

27 Massachusetts Medical Society (2013, September). *2013 MMS Physician Workforce Study*. Retrieved November 3, 2015, from http://www.massmed.org/workforce2013

28 J. McDonough, personal communication, June 7, 2016.

29 Long, S., & Dimmock, T. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update, p. 24. Retrieved October 11, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_FINAL.pdf

30 MGL ch.6D §1; *also see*, MGL Ch. 32A §2, Ch. 111 §1, §25N1/2, Ch. 118E §8, Ch. 176A §8A, §8U, Ch. 176B §1, Ch. 176G §1, Ch. 176O §1, Ch. 176S §1, which contain substantially similar language.

31 Blue Cross Blue Shield of Massachusetts Foundation. (2012, September). Summary of Chapter 224 of the Acts of 2012. Retrieved November 3, 2015, from http://bluecrossmafoundation.org/sites/default/files/download/publication/Ch224_summary_FINAL.pdf

32 263 CMR: Board of Registration of Physician Assistants, Massachusetts Court System § 5 (2014).

33 Patients' perspectives on health care in the United States, a look at seven states & the nation, p. 15. (2016, February). Retrieved March 3, 2016, from http://www.npr.org/assets/img/2016/02/26/PatientPerspectives.pdf

34 Centers for Disease Control and Prevention (2015). *Chronic Disease Overview*. Retrieved October 30, 2015, from http://www.cdc.gov/chronicdisease/overview/

35 U.S. Preventive Services Task Force (2016, June). USPSTF A and B Recommendations. Retrieved August 24, 2016 from http://www.uspreventiveservicestaskforce.org/Page/Name/uspstf-a-and-b-recommendations/#dag

36 Wang, J., Shih, Y., Qin, Y. et al. (2015, July–August). Trends in Medicare Part D medication therapy management eligibility criteria. *Am Health Drug Benefits, 8*(5), 247–255.

37 Health System Data Center. (2015). Retrieved March 15, 2016, from the Commonwealth Fund website: http://datacenter.commonwealthfund.org/#ind=1/sc=1

38 Kurani, N., Ranji, U., Salganicoff, A. et al. (2015). Health care coverage and access for men. 2013–2015. *JAMA*, *313*(24), 2414–2414.

39 Data from MHRS, as reported in Long, S. & Dimmock, T. (2014, November). Health insurance coverage and health care access and affordability in Massachusetts: affordability still a challenge, p. 27. Blue Cross Blue Shield Foundation of Massachusetts. Retrieved November 3, 2015, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

40 Patients' perspectives on health care in the United States: A look at seven states & the nation. (2016, February). Retrieved February 29, 2016, from http://www.npr.org/assets/img/2016/02/26/PatientPerspectives.pdf

41 Krogsbøll, L., Jørgensen, K., Larsen, C. et al (2012). General health checks in adults for reducing morbidity and mortality from disease: Cochrane systematic review and meta-analysis. *BMJ*, *345*, e7191.

42 Song, Z., Hill, C., Bennet, J. et al (2013). Mobile clinic in Massachusetts associated with cost savings from lowering blood pressure and emergency department use. *Health Affairs*, *32*(1), 36–44.

43 Massachusetts Department of Public Health. (2015, August). A profile of health among Massachusetts adults, 2014: results from the behavioral risk factor surveillance system, p. 13. Retrieved March 15, 2016, from http://www.mass.gov/eohhs/docs/dph/behavioral-risk/report-2014.pdf

44 Ibid.

45 W. Everett, personal communication, June 6, 2016.

46 Kurani, N., Ranji, U., Salganicoff, A. et al (2015). Health care coverage and access for men, 2013-2015. *JAMA*, *313*(24), 2414.

47 Source: OSA analysis of MHRS data.

48 Long, S., & Dimmock, T. (2014, November). Health insurance coverage and health care access and affordability in Massachusetts: affordability is still a challenge, p. 40. Retrieved June 14, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

49 Employer responsibility under the Affordable Care Act. (2015, October 2). Retrieved June 15, 2016, from Henry J. Kaiser Family Foundation website: http://kff.org/infographic/employer-responsibility-under-the-affordable-care-act/

50 Ibid.

51 Norton, M., & Murphy, M. (2017, January 12). MassHealth enrollment surges, adding to pressure on state budget. *State House News Service*. Retrieved January 12, 2017, from lowellsun.com/breakingnews/ci_30721455/masshealth-enrollment-surges-adding-pressure-state-budget

52 Brignell, M., Wootton, R., & Gray, L. (2007). The application of telemedicine to geriatric medicine. *Age Ageing*, *36*, 369–374.

53 Kahn, J. (2015). Virtual visits—Confronting the challenges of telemedicine. *New England Journal of Medicine*, *372(18)*, 1684–85.

54 Leehan, G., Sossong, S., Lacktman, N. (2015, March 5). Telemedicine in Massachusetts: what providers need to know. *Health Law Reporter.* Retrieved July 30, 2015, from healthlawreporter.bbablogs.org/2015/03/05/telemedicine-in-massachusetts-what-providers-need-to-know/

55 W. Everett, personal communication, June 6, 2016.

56 Hyler, S., Gangure, D., & Batchelder, S. (2005). Can telepsychiatry replace in-person psychiatric assessments? A review and meta-analysis of comparison studies. *CNS Spectrums*, *10(05)*, 403–415. Retrieved July 30, 2015, from ncbi.nlm.nih.gov/pubmed/15858458

57 Fortney, J., Maciejewski, M., Tripathi, S., et al. (2011). A budget impact analysis of telemedicine-based collaborative care for depression. *Medical Care*, *49(9)*, 872–80.

58 Subbaraman, N. (2015, May 1). UnitedHealthcare now covers a doctor visit via video chat. *BetaBoston*. Retrieved July 30, 2015, from betaboston.com.

59 Mckiernan, K. (2015, May 9). Baystate Health lauded for use of telemedicine. *The Greenfield Recorder*. Retrieved July 30, 2015, from recorder.com.

60 Population estimates, July 1, 2015, (V2015). (n.d.). Retrieved June 15, 2016, from https://www.census.gov/quickfacts/table/PST045215/25

61 Agency for Healthcare Research and Quality. (n.d.). Emergency room services—mean and median expenses per person with expense and distribution of expenses by source of payment: United States, 2013. Medical Expenditure Panel Survey Household Component Data. Retrieved August 11, 2016, from https://meps.ahrq.gov/mepsweb/data_stats/tables_compendia_hh_interactive.jsp?_SERVICE=MEPSSocket0&_PROGRAM=MEPSPGM.TC.SAS&File=HCFY2013&Table=HCFY2013_PLEXP_E&VAR1=AGE&VAR2=SEX&VAR3=RACETH-5C&VAR4=INSURCOV&VAR5=POVCAT13&VAR6=REGION&VAR7=HEALTH&VARO1=4+17+44

62 Acute care hospital utilization trends in Massachusetts FY2009–2012. (n.d.). Retrieved February 9, 2016, from http://www.chiamass.gov/assets/docs/r/pubs/14/utilization-statewide.pdf

63 Center for Health Information and Analysis. (n.d.). Acute care hospital utilization trends in Massachusetts FY2009–2012. Retrieved February 9, 2016, from http://www.chiamass.gov/assets/docs/r/pubs/14/utilization-statewide.pdf

64 Commonwealth of Massachusetts Health Policy Commission. (n.d.). 2015 Cost Trends Report. Retrieved July 8, 2016, from www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

65 Patients' perspectives on health care in the United States: a look at seven states & the nation. (2016, February). Retrieved February 29, 2016, from http://www.npr.org/assets/img/2016/02/26/PatientPerspectives.pdf

66 Commonwealth of Massachusetts Health Policy Commission. (n.d.). 2015 Cost Trends Report. Retrieved July 8, 2016, from www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

67 Patients' perspectives on health care in the United States: a look at seven states & the nation. (2016, February). Retrieved February 29, 2016, from npr.org/assets/img/2016/02/26/PatientPerspectives.pdf

68 Acute care hospital utilization trends in Massachusetts FY2009–2012. (n.d.). Retrieved February 9, 2016, from http://www.chiamass.gov/assets/docs/r/pubs/14/utilization-statewide.pdf

69 ED utilization for preventable oral health care conditions in MA (2016, April 6). Retrieved August 9, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/public-meetings/committee-meetings/20160401-public-presentation-dental-findings.pdf

70 Ibid.

71 Ibid.

72 McCluskey, P. (2015, August 13). Partners HealthCare to launch urgent care facilities. *Boston Globe*. Retrieved October 30, 2015, from http://www.bostonglobe.com

73 As of October 2016, Partners had opened three locations in cities/towns bordering Boston. Partners plans to open eight more by the end of 2017. Source: Partners Urgent Care. (2016). Partners urgent care in the greater Boston area. Retrieved October 6, 2016, from partnersurgentcare.org/locations

74 Commonwealth of Massachusetts Health Policy Commission. (n.d.). 2015 Cost Trends Report, p. 57. Retrieved from www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

75 Ibid.

76 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

77 Ibid.

78 CHIA. (2016, December). Hospital-wide adult all-payer readmissions in Massachusetts: SFY 2011-2015. Retrieved December 19, 2016, from chiamass.gov/assets/docs/r/pubs/16/Readmissions-Report-2016-12.pdf

79 Kowalczyk, L. (2016, October 11). A revolving door at Mass. hospitals. *Boston Globe*. Retrieved October 11, 2016, from www.bostonglobe.com

80 CHIA. (2016, December) Hospital-wide adult all-payer readmissions in Massachusetts: SFY 2011-2015. Retrieved December 19, 2016, from chiamass.gov/assets/docs/r/pubs/16/Readmissions-Report-2016-12.pdf

SECTION 2.1

1 CHIA. (2016, September). Performance of the Massachusetts health care system annual report. Retrieved November 8, 2016, from chiamass.gov/assets/2016-annual-report/2016-Annual-Report-rev-1.pdf

2 HEDIS is a specified set of standardized health measures developed by NCQA and used by more than 90% of the nation's health plans.

3 Kattula D., Sarkar R., Velusamy V., et al. (2014). The first 1000 days of life: prenatal and postnatal risk factors for morbidity and growth in a birth cohort in southern India. *BMJ Open 4:*7 e005404 DOI: 10.1136/bmjopen-2014-005404; and http://thousanddays.org/the-issue/why-1000-days

4 Massachusetts quick facts from the U.S. census bureau. (2015, December 1). Retrieved December 3, 2015, from http://quickfacts.census.gov/qfd/states/25000.html

5 Health systems data center - The Commonwealth Fund. (2015). Retrieved December 3, 2015, from http://datacenter.commonwealthfund.org/#ind=1/sc=1

6 Massachusetts Department of Public Health. (2010, April 1). Health of Massachusetts 2010, p. 97. Retrieved December 2, 2015, from http://www.mass.gov/eohhs/docs/dph/commissioner/health-mass.pdf

7 McMorrow, S., Kenney, G., & Coyer, C. (2012). Addressing barriers to health insurance coverage among children: new estimates for the nation, California, New York, and Texas. The Urban Institute.

8 Children's medical security plan. (2015). Retrieved December 3, 2015, from http://www.mass.gov/eohhs/consumer/insurance/more-programs/childrens-medical-security-plan.html

9 Health System Data Center. (2015). Retrieved December 3, 2015, from the Commonwealth Fund website: http://datacenter.commonwealthfund.org/#ind=1/sc=1

10 Massachusetts Department of Public Health. (April 2010). Burden of asthma in Massachusetts, p. 60–61.

11 Massachusetts Department of Public Health. (May 2009). Strategic plan for asthma in Massachusetts 2009–2014, p. 41. Retrieved September 30, 2014, from http://www.mass.gov/eohhs/docs/dph/com-health/asthma/state-plan.pdf

12 CSHCN profiles. (2012). Retrieved December 3, 2015, from http://childhealthdata.org/browse/snapshots/cshcn-profiles?rpt=9&geo=23

13 University of Massachusetts Medical School, Center for Health Law and Economics. (2014, April 1). MassHealth: the basics. Facts, trends, and national context, p. 7. Retrieved December 3, 2015, from http://webcache.googleusercontent.com/search?q=cache:XTs62O3nqtEJ:bluecrossmafoundation.org/sites/default/files/download/publication/PPT%20National%20comparisons%20chartpack%20june%202012_0.pptx &cd=1&hl=en&ct=clnk&gl=us

14 Chilton, M., Black, M., Berkowitz, C., et al (2009). Food insecurity and risk of poor health among U.S.-born children of immigrants. *American Journal of Public Health*, *99*(3), 556–562.

15 Woods, E., Bhaumik, U., Sommer, S., et al. (2012, March). Community asthma initiative: evaluation of a quality improvement program for comprehensive asthma care. *Pediatrics 129*(3), 465–472.

16 Massachusetts Department of Public Health. (2009, May). Addressing asthma in Massachusetts. Retrieved October 11, 2016, from mass.gov/eohhs/docs/dph/com-health/asthma/burden-doc-plan.pdf

17 Well-child care: a check-up for success. (2015). Retrieved December 3, 2015, from https://www.healthychildren.org/English/family-life/health-management/Pages/Well-Child-Care-A-Check-Up-for-Success.aspx

18 Abdus, S., & Selden, T. (2013). Adherence with recommended well-child visits has grown, but large gaps persist among various socioeconomic groups. *Health Affairs*, *32*(3), 508–515.

19 Ray K., Chari A., Engberg J., et al (2015, August). Opportunity costs of ambulatory medical care in the United States. *American Journal of Managed Care*, *21*(8), 67–74.

20 Ibid.

21 Long, S. & Dimmock, T. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update. Retrieved April 19, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_FINAL.pdf

22 National Institute of Dental and Craniofacial Research. (2014, March). Chapter 5: linkages with general health. Retrieved October 11, 2016, from nidcr.nih.gov/DataStatistics/SurgeonGeneral/sgr/chap5.htm

23 Straus, J., & Sarvet, B. (2014). Behavioral health care for children: the Massachusetts child psychiatry access project. *Health Affairs*, *33*(12), 2153–2161. Retrieved December 3, 2015, from http://content.healthaffairs.org/content/33/12/2153.full.html

24 Holt, W., & Lyman, D. (2016, April). Massachusetts Child Psychiatry Access Project strategic planning report. Retrieved October 11, 2016, from https://www.mcpap.com/Docs/MCPAP%20Strategic%20Planning%204-20-16.pdf

25 Perou, R., Bitsko, R., Blumberg, S., et al (2013). Mental health surveillance among children—United States, 2005–2011. *MMWR Surveill Summ*, *62*(Suppl 2), 1–35. Retrieved December 3, 2015, from http://www.cdc.gov/mmwr/preview/mmwrhtml/su6202a1.htm

26 University of Massachusetts Medical School Center for Health Policy and Research (2006, October). MassHealth managed care HEDIS® 2006 final report, p. 24. Retrieved January 7, 2015, from http://www.mass.gov/eohhs/docs/masshealth/research/hedis-2006.pdf

27 Age: 15-months-old during the measurement year. Continuous enrollment: 31 days to 15 months of age. Calculate 31 days of age by adding 31 days to the child's date of birth. Calculate the 15-month birthday as the child's first birthday plus 90 days. Allowable gap: No more than 45 days during the continuous enrollment period. Anchor date: day the child turns 15-months-old. OSA did not look specifically to see if a visit was with a PCP. The queries reviewed only the procedure code billed.

28 For commercial insurance, OSA used data from the top insurers in Massachusetts (Blue Cross Blue Shield, Harvard Pilgrim Health Care, and Tufts Health plan), which account for 63.2% of market share and are considered representative of the commercial population.

29 University of Massachusetts Medical School Center for Health Policy and Research. (2006, October). MassHealth managed care HEDIS® 2006 final report, p. 24. Retrieved January 7, 2015, from http://www.mass.gov/eohhs/docs/masshealth/research/hedis-2006.pdf

30 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

31 Aged 3–6 years as of December 31 of the measurement year. Continuous enrollment: The measurement year. Allowable gap: No more than 45 days during the measurement year. Anchor date: December 31 of the measurement year. OSA did not look specifically to see if a visit was with a PCP. The queries reviewed only the procedure code billed.

32 Bright Futures. (n.d.). Guidelines for health supervision of infants, children, and adolescents: Adolescence—11 to 21 years, p. 517. Retrieved December 3, 2015, from https://brightfutures.aap.org/Bright Futures Documents/18-Adolescence.pdf

33 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

34 Aged 12–21 years as of December 31 of the measurement year. Continuous enrollment: The measurement year. Allowable gap: no more than 45 days during the measurement year. Anchor date: December 31 of the measurement year. OSA did not look specifically to see if a visit was with a PCP. The queries reviewed only the procedure code billed.

35 Among those aged 1 to 6, a visit in the calendar year. Among those aged 7 to 19, a visit in the calendar year or preceding calendar year.

36 Age: 15 months during the measurement year. Continuous enrollment: 31 days to 15 months of age. Calculate 31 days of age by adding 31 days to the child's date of birth. Calculate the 15-month birthday as the child's first birthday plus 90 days. Allowable gap: No more than 45 days during the continuous enrollment period. Anchor date: Day the child turns 15 months old. OSA did not look specifically to see if a visit was with a PCP. The queries reviewed only the procedure code billed.

37 Age: 12 months to 19 years as of December 31 of the measurement year; report three age stratifications: 1–6 years, 7–11 years, 12–19 years. Continuous enrollment: For 1–6 years: measurement year; for 7–11 years, 12–19 years: the measurement year and the year prior to the measurement year. Allowable gap: For 1-6 years: no more than 45 days during the measurement year; for 7–11 years, 12–19 years: no more than 45 days during each year of continuous enrollment. Anchor date: December 31 of the measurement year. OSA did not look specifically to see if a visit was with a PCP. The queries reviewed only the procedure code billed.

38 CDC data. Retrieved June 1, 2016, from http://www.cdc.gov/vaccines/vpd-vac/tetanus/who-vacc.htm

39 CDC. Tetanus surveillance—United States, 2001-2008. *MMWR. 2011; 60*(12), 365–69. Retrieved June 1, 2016, from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6012a1.htm.

40 Ibid.

41 Smith, R. (2016, December 23). Mumps cases spike, raising questions about need for vaccine boosters. *Kaiser Health News*.

42 Meningococcal vaccines for preteens and teens. (2015, December 2). Retrieved December 3, 2015, from http://www.cdc.gov/vaccines/who/teens/vaccines/mening.html

43 Meningococcal vaccine. (n.d.). Retrieved December 3, 2015, from http://www.vaccines.gov/diseases/meningitis/

44 Cases of confirmed invasive meningococcal disease (N. meningitidis) in Massachusetts, 2002-2010. (2011, August 8). Retrieved December 3, 2015, from http://www.mass.gov/eohhs/docs/dph/cdc/meningitis/data-invasive-state-totals.pdf

45 Newport, F. (2016, March). In U.S., percentage saying vaccines are vital dips slightly. Retrieved October 11, 2016, from gallup.com/poll/181844/percentage-saying-vaccines-vital-dips-slightly.aspx

46 Brown, K. (2013, October). Rising number of western Mass. vaccine skeptics a quandary for doctors. Retrieved October 11, 2016, from legacy.wbur.org/2013/10/07/western-mass-vaccine-skeptics

47 The immunization rates reported by Medicaid under the HEDIS guidelines are often much lower than state and national immunization rates reported through other sources, such as the National Immunization Survey (NIS). This difference is likely due to the HEDIS requirement of continued eligibility for 12 months, and differences in the number and timing of doses.

48 University of Massachusetts Medical School Center for Health Policy and Research (2006, October). MassHealth Managed Care HEDIS® 2006 final report, p. 20. Retrieved January 7, 2015, from http://www.mass.gov/eohhs/docs/masshealth/research/hedis-2006.pdf

49 Age: Adolescents who turn age 13 years during the measurement year. Continuous enrollment: 12 months prior to the member's 13th birthday. Allowable gap: No more than 45 days during the measurement year. Anchor date: Enrolled on the member's 13th birthday.

50 Lead poisoning. (2014, June 10). Retrieved December 3, 2015, from http://www.mayoclinic.org/diseases-conditions/lead-poisoning/basics/definition/con-20035487

51 Evans, et al. (2015). The impact of low-level lead toxicity on school performance among children in the Chicago Public Schools: a population-based retrospective cohort study. *Environmental Health 14*:21.

52 Lead poisoning. (2014, June 10). Retrieved December 3, 2015, from http://www.mayoclinic.org/diseases-conditions/lead-poisoning/basics/definition/con-20035487

53 Massachusetts Department of Public Health. (2015, October). Screening and Prevalence Statistics 2014, Calendar Year Data. Retrieved from https://web.archive.org/web/20160315123433/http://www.mass.gov/eohhs/docs/dph/environmental/lead/stats/lead-annual-report-cy14.pdf

54 Ibid.

55 Knorr, R. (n.d.). Preventing childhood lead poisoning in Massachusetts. Retrieved December 3, 2015, from https://www.cityofboston.gov/images_documents/Robert%20Knorr,%20Preventing%20Childhood%20Lead%20Posioning%20in%20MA_tcm3-48543.pdf

56 Ibid.

57 MassINC. (2015). About the Gateway Cities. Retrieved October 11, 2016, from massinc.org/our-work/policy-center/gateway-cities/about-the-gateway-cities

58 Eisenberg, K., van Wijngaarden, E., Fisher, S., et al (2011). Blood lead levels of refugee children resettled in Massachusetts, 2000 to 2007. American Journal of Public Health, 101(1), 48. Retrieved October 11, 2016, from http://www.ncbi.nlm.nih.gov/pubmed/21088268

59 Age: Children who turn age 2 during the measurement year. Continuous enrollment: 12 months prior to the child's second birthday. Allowable gap: No more than one gap in enrollment of up to 45 days during the 12 months prior to the child's second birthday. Anchor date: Enrolled on the child's second birthday.

SECTION 2.2

1 Baby boomers retire. (2010, December 28). Retrieved December 8, 2015, from the Pew Research Center website: http://www.pewresearch.org/daily-number/baby-boomers-retire

2 Mirel, L., & Carper, K. (2014). Trends in health care expenditures for the elderly, age 65 and over: 2001, 2006, and 2011. Retrieved December 8, 2015, from the Agency for Healthcare Research and Quality website: http://meps.ahrq.gov/mepsweb/data_files/publications/st429/stat429.pdf

3 Manatt Health Solutions. (2015, December 2). MassHealth matters II: long-term services & supports (LTSS) [PowerPoint slides]. Retrieved December 8, 2015, from the Blue Cross Blue Shield of Massachusetts website: http://bluecrossfoundation.org/sites/default/files/download/publication/Manatt_MMPI_ChartPack_FINAL_v05.pdf

4 Garfield, R., Young, K., Musumeci, M., et al. (2015, September 1). Serving low-income seniors where they live: Medicaid's role in providing community-based long-term services and supports. Retrieved January 5, 2016, from http://files.kff.org/attachment/issue-brief-serving-low-income-seniors-where-they-live-medicaids-role-in-providing-community-based-long-term-services-and-supports

5 He, W., & Larsen, L. (2014). Older Americans with a disability: 2008–2012. U.S. Census Bureau, American Community Survey Reports, p. 2. Washington, D.C.: U.S. Government Printing Office. Retrieved June 20, 2016, from http://www.census.gov/content/dam/Census/library/publications/2014/acs/acs-29.pdf

6 Mutchler, J., Li, Y., Xu, P. (2016, September). Living below the line: economic insecurity and older Americans insecurity in the states 2016. Center for Social and Demographic Research on Aging Publications. Retrieved October 5, 2016, from http://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1012&context=demographyofaging

7 Howden, L., & Meyer, J. (2011, May 1). Age and sex composition: 2010. Retrieved December 8, 2015, from http://www.census.gov/prod/cen2010/briefs/c2010br-03.pdf

8 Manatt Health Solutions. (2015, December 2). MassHealth matters II: long-term services & supports (LTSS) [PowerPoint slides]. Retrieved December 8, 2015, from the Blue Cross Blue Shield of Massachusetts website: http://bluecrossfoundation.org/sites/default/files/download/publication/Manatt_MMPI_ChartPack_FINAL_v05.pdf

9 Anthony S., Nevitt K., Raphael C. (2016, May). Massachusetts long-term services and supports: Achieving a new vision for MassHealth. Retrieved May 30, 2016, from the Blue Cross Blue Shield of Massachusetts website: http://bluecrossfoundation.org/sites/default/files/download/publication/MassHealth_LTSS_report_FINAL%205.11.16.pdf

10 Hogan, C., Lunney, J., Gabel, J., et al. (2001). Medicare beneficiaries' costs of care in the last year of life. *Health Affairs*, *20*(4), 188–195. Retrieved December 8, 2015, from http://medpac.gov/documents/contractor-reports/spending-in-the-last-year-of-life-and-the-impact-of-hospice-on-medicare-outlays-rev.pdf

11 McCluskey, P. (2015, December 27). Blue cross expands benefits for end-of-life care. *Boston Globe*. Retrieved January 4, 2016, from http://www.highbeam.com/doc/1P2-39118865.html?

12 Freyer, F. (2016, May 12). When you die, will your wishes be known? *Boston Globe*. Retrieved November 8, 2016, from bostonglobe.com/metro/2016/05/11/wishes-for-end-life-care-often-ignored-survey-finds/Pna4jQN3V1MqxYKTJWLFaP/story.html

13 Freyer, F. (2016, May 12). When you die, will your wishes be known? *Boston Globe*. Retrieved November 8, 2016, from bostonglobe.com/metro/2016/05/11/wishes-for-end-life-care-often-ignored-survey-finds/Pna4jQN3V1MqxYKTJWLFaP/story.html

14 Final recommendation statement: breast cancer screening. Retrieved May 18, 2016, from U.S. Preventive Services Task Force website: http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/breast-cancer-screening1

15 Age: Women aged 65 to 74 years as of December 31 of the measurement year. Continuous enrollment: October 1 of two years prior to the measurement year through December 31 of the measurement year. Allowable gap: No more than 45 days for each full calendar year of continuous enrollment. No gaps in enrollment are allowed from October 1 of two years prior to the measurement year through December 31 of two years prior to the measurement year. Anchor date: December 31 of the measurement year.

16 Colorectal cancer screening guidelines. (2014, February 26). Retrieved December 8, 2015, from the Centers for Disease Control and Prevention's http://www.cdc.gov/cancer/colorectal/basic_info/screening/guidelines.htm

17 SEER stat fact sheets: colon and rectum cancer. (2012). Retrieved December 8, 2015, from http://seer.cancer.gov/statfacts/html/colorect.html

18 *Draft recommendation statement: colorectal cancer: screening.* (2015, October). Retrieved May 21, 2016, from U.S. Preventive Services Task Force's website: http://www.uspreventiveservicestaskforce.org/Page/Document/draft-recommendation-statement38/colorectal-cancer-screening2

19 Guessous, I., Dash, C., Lapin, P., et al. (2010). Colorectal cancer screening barriers and facilitators in older persons. National Colorectal Cancer Roundtable Screening Among the 65 Plus Task Group. *Preventive Medicine*, *50*(1), 3–10. Retrieved December 3, 2015, from http://www.sciencedirect.com/science/article/pii/S0091743509006355

20 Ibid.

21 Rates are age-adjusted to the 2000 U.S. Standard Population.

Data brief: cancer incidence in Massachusetts, 2009–2013, preliminary data. (2015, November 1). Retrieved December 8, 2015, from Commonwealth of Massachusetts Department of Public Health's website: http://www.mass.gov/eohhs/docs/dph/cancer/state/mcr-statewide-preliminary-data-brief-09-13.pdf

22 Age-adjusted. SEER stat fact sheets: colon and rectum cancer. (2012). Retrieved December 8, 2015, from National Cancer Institute's website: http://seer.cancer.gov/statfacts/html/colorect.html

23 Appropriate screening is either an annual fecal occult blood test, flexible sigmoidoscopy every five years, or colonoscopy every 10 years. Age: 65 to 75 years as of December 31 of the measurement year. Continuous enrollment: The measurement year and the year prior to the measurement year. Allowable gap: No more than 45 days during each year of continuous enrollment. Anchor date: December 31 of the measurement year.

24 Osteoporosis. (2015, September 29). Retrieved December 8, 2015, from http://www.cdc.gov/nchs/fastats/osteoporosis.htm

25 Osteoporosis. (2014, December 13). Retrieved December 8, 2015, from http://www.mayoclinic.org/diseases-conditions/osteoporosis/basics/definition/con-20019924

26 Ibid.

27 National Osteoporosis Foundation. (2014). Osteoporosis and low bone density in the United States. Retrieved December 8, 2015, from https://web.archive.org/web/20150414121756/http://nof.org/files/nof/public/content/file/2833/upload/923.pdf

28 USPSTF provides this recommendation for screening frequency: "Because of limitations in the precision of testing, a minimum of 2 years may be needed to reliably measure a change in BMD; however, longer intervals may be necessary to improve fracture risk prediction. A prospective study of 4,124 women aged 65 years or older found that neither repeated BMD measurement nor the change in BMD after 8 years was more predictive of subsequent fracture risk than the original measurement." Source: U.S. Preventive Services Task Force. (2014, October). *Final recommendation statement: osteoporosis: screening.* Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/osteoporosis-screening

29 U.S. Preventive Services Task Force. (2014, October). *Final recommendation statement: osteoporosis: screening.* Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/osteoporosis-screening

30 Warriner, A., Outman, R., Feldstein, A., et al. (2014). Effect of self-referral on bone mineral density testing and osteoporosis treatment. *Medical Care*, *52*(8), 743–750.

31 McClung, M., Harris, S., Miller, P., et al. (2013). Bisphosphonate therapy for osteoporosis: benefits, risks, and drug holiday. *American Journal of Medicine*, *126*(1), 13–20. Retrieved December 2, 2015, from http://www.sciencedirect.com/science/article/pii/S0002934312005876

32 Kennel, K., & Drake, M. (2009). Adverse effects of bisphosphonates: implications for osteoporosis management. *Mayo Clinic Proceedings*, *84*(7), 632–638.

33 Intake period: A 12-month window that begins July 1 of the year prior to the measurement year and ends June 30 of the measurement year. The intake period is used to capture the first fracture. IESD: Index Episode Start Date. The earliest date of service for any encounter during the intake period with a diagnosis of fracture. Negative diagnosis history: a period of 60 days prior to the IESD when the member had no diagnosis of fracture. Active prescription is considered active if the "days supply" indicated on the date the member filled the prescription is at least as many days as there are between that date and the relevant service date. Age: Women 67 to 85 years as of December 31 of the measurement year. Continuous enrollment: 12 months before the IESD through 180 days after the IESD. Allowable gap: No more than 45 days during the continuous enrollment period. Anchor date: IESD.

34 James P., Oparil S., Carter B., et al. (2014). Evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA, 311*(5), 507–520. Retrieved December 2, 2015, from jama.jamanetwork.com/article.aspx?articleid=1791497

35 Ibid.

36 How is high blood pressure treated? (2015, September 10). Retrieved December 8, 2015, from National Heart, Lung, and Blood Institute's (NHLIBI) website: http://www.nhlbi.nih.gov/health/health-topics/topics/hbp/treatment

37 High blood pressure facts. (2015, February 19). Retrieved May 26, 2016, from the CDC website: http://www.cdc.gov/bloodpressure/facts.htm

38 The health effects of overweight and obesity. (2015, June 5). Retrieved December 8, 2015, from the CDC website: http://www.cdc.gov/healthyweight/effects/

39 What are the health risks of overweight and obesity? (2012, July 13). Retrieved December 8, 2015, from NHLIBI's website: http://www.nhlbi.nih.gov/health/health-topics/topics/obe/risks

40 Flegal, K., Kit, B., Orpana, H., et al. (2013). Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and meta-analysis. *JAMA*, *309*(1), 71–82. Retrieved December 2, 2015, from http://jama.jamanetwork.com/article.aspx?articleid=1555137#ref-jrv120009-118

41 Thirty-eight of these studies were conducted in the U.S.

42 National Center for Health Statistics, U.S. (2015). Health, United States, 2014: with special feature on adults aged 55–64. Retrieved December 2, 2015, pp. 231–2 from http://www.cdc.gov/nchs/data/hus/hus14.pdf

43 Estimating seasonal influenza-associated deaths in the United States: CDC study confirms variability of flu. (2015, March 18). Retrieved December 8, 2015, from the CDC website: http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm

44 Ibid.

45 Xu, J., Murphy, S., Kochanek, K., et al. (2016, February 16). Deaths: final data for 2013, p. 45. Retrieved June 16, 2016, from the CDC website: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

46 Data that separates pneumonia and influenza mortality is not available.

47 Xu, J., Murphy, S., Kochanek, K., et al. (2013). Deaths: final data for 2013, p. 61. Retrieved December 8, 2015, from http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

48 Key facts about seasonal flu vaccine. (2015). Retrieved December 8, 2015, from the CDC website: http://www.cdc.gov/flu/protect/keyfacts.htm

49 Pneumococcal vaccination: who needs it? (2015, June 19). Retrieved December 8, 2015, from the CDC website: http://www.cdc.gov/vaccines/vpd-vac/pneumo/vacc-in-short.htm

50 FastStats: pneumonia. (2015, July 17). Retrieved December 8, 2015, from the CDC website: http://www.cdc.gov/nchs/fastats/pneumonia.htm

SECTION 2.3

1 National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. (2014). Social determinants of health: definitions. Retrieved January 12, 2016, from http://www.cdc.gov/nchhstp/socialdeterminants/definitions.html

2 2013 MMS patient access to care study. (2013, July). Retrieved July 29, 2016, from http://www.telegram.com/assets/pdf/WT17910716.PDF

3 Long, S., & Dimmock, T. (2014, November). Health insurance coverage and health care access and affordability in Massachusetts: affordability still a challenge. (pp. 55–56). Retrieved May 31, 2016, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

4 In 2016, 138% FPL was $33,534 for a family of four. Source: U.S. Department of Health and Human Services. (2016, January). Poverty guidelines. Retrieved October 6, 2016, from aspe.hhs.gov/poverty-guidelines

5 CMS. (n.d.). Medicaid eligibility. Retrieved February 28, 2014, from http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Eligibility/Eligibility.html

6 Status of state action on the Medicaid expansion decision. (2016, January 12). Retrieved January 25, 2016, from the Henry J. Kaiser Family Foundation website: http://kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act

7 MassHealth standard. Retrieved May 30, 2016, from the Massachusetts Health and Human Services website: http://www.mass.gov/eohhs/consumer/insurance/masshealth-coverage-types/masshealth-standard.html#Income standards

8 The Blue Cross Blue Shield Foundation of Massachusetts. (2016, June). MassHealth: the basics. Retrieved October 6, 2016, from bluecrossfoundation.org/sites/default/files/download/publication/MassHealthBasics_Chartpack_FY2015_FINAL_1.pdf

9 McDonough, J. (2016, April). Behind the Massachusetts health connector's rehab. *CommonWealth Magazine*. Retrieved October 6, 2016, from http://commonwealthmagazine.org/health-care/behind-the-massachusetts-health-connectors-rehab

10 Blue Cross Blue Shield of Massachusetts Foundation, Robert Wood Johnson Foundation & Urban Institute. (2014, March). Health insurance coverage and health care access, use, and affordability in Massachusetts: an update as of Fall 2012. Retrieved August 28, 2014, from p. 6 of http://bluecrossmafoundation.org/sites/default/files/download/publication/MHRS_2012%20Full%20Report.pdf

11 Access to care in Massachusetts: comparing public coverage with employer-sponsored insurance. (2014). Retrieved December 8, 2015, from the Blue Cross Blue Shield of Massachusetts website: http://bluecrossfoundation.org/sites/default/files/download/publication/Comparing_Access_summary_RELEASE_0.pdf

12 Quality and access: preventable hospitalizations in low-income communities. (2013). Retrieved December 8, 2015, from p. 2 of http://www.mass.gov/anf/docs/hpc/cost-trends-july-2014-section-c.pdf

13 No usual source of health care among adults aged 18–64, by selected characteristics: United States, average annual, selected years 1993–1994 through 2012–2013. (2014). (Table 68, p. 1). Retrieved January 6, 2016, from http://www.cdc.gov/nchs/data/hus/2014/068.pdf

14 Hing, E., & Schappert, S. (2012, September). Generalist and specialty physicians: supply and access, 2009–2010. Retrieved March 17, 2016, from www.cdc.gov/nchs/data/databriefs/db105.pdf

15 McMorrow, S., Long, S., & Fogel, A. (2015). Primary care providers ordered fewer preventive services for women with Medicaid than for women with private coverage. *Health Affairs*, *34*(6), 1001–1009.

16 Department of Health and Human Services Office of Inspector General. (2014, December). Access to care: provider availability in Medicaid managed care. Retrieved May 30, 2016, from p. 9 of http://oig.hhs.gov/oei/reports/oei-02-13-00670.pdf

17 Ibid.

18 2013 MMS patient access to care study. (2013, July). Retrieved July 29, 2016, from http://www.telegram.com/assets/pdf/WT17910716.PDF

19 Long, S., & Dimmock, T. (2014, November 1). Health care access and affordability in Massachusetts: affordability still a challenge. Retrieved December 8, 2015, from p. 56 of http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

20 Long, S., & Dimmock, T. (2014, November 1). Health care access and affordability in Massachusetts: affordability still a challenge. Retrieved December 8, 2015, from http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

21 Caputo, I. (2013, July 30). Dental care hard to find for low income Mass. residents. Retrieved January 8, 2016, from http://wgbhnews.org/post/dental-care-hard-find-low-income-mass-residents

22 Ibid.

23 Riley, P., Worthington, H., Clarkson, J., et al. (2013). Recall intervals for oral health in primary care patients. Issue 12. Retrieved December 2, 2015, from p. 16 of researchgate.net/profile/Philip_Riley2/publication/259387771_Recall_intervals_for_oral_health_in_primary_care_patients/links/547f0cc60cf2c1e3d2dc3aa6.pdf

24 WGBH News. (2013, July 29). MassHealth leaves many adults without dental care. Retrieved May 30, 2016, from http://news.wgbh.org/post/masshealth-leaves-many-adults-without-dental-care

25 Massachusetts Department of Public Health, Office of Oral Health. (2009, November). The status of oraldisease in Massachusetts: a great unmet need. Retrieved from http://www.mass.gov/eohhs/docs/dph/com-health/oral-health-burden.pdf

26 Kangovi, S., Barg, F., Carter, T., et al. (2013). Understanding why patients of low socioeconomic status prefer hospitals over ambulatory care. *Health Affairs*, *32*(7), 1196–1203. Retrieved December 2, 2015, from http://content.healthaffairs.org/content/32/7/1196.long

27 Ibid.

28 Long, S., & Dimmock, T. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update. Retrieved August 22, 2016, from p. 30 of http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

29 Massachusetts Department of Public Health. (2016, September). A profile of health among Massachusetts adults, 2015. Retrieved October 6, 2015, from p. 7 of mass.gov/eohhs/docs/dph/behavioral-risk/report-2015.pdf

30 Center for Health Information and Analysis. (2016, December). Hospital-wide adult all-payer readmissions in Massachusetts: SFY 2011-2015. Retrieved Jan. 23, 2017, from chiamass.gov/assets/docs/r/pubs/16/Readmissions-Report-2016-12.pdf

31 Kowalczyk, L. (2016, October 11). A revolving door at Mass. hospitals. *Boston Globe*. Retrieved October 11, 2016, from bostonglobe.com

32 Board of Governors of the Federal Reserve System. (2014, July 1). Report on the economic well-being of U.S. households in 2013. Retrieved December 8, 2015, from p. 3 of http://www.federalreserve.gov/econresdata/2013-report-economic-well-being-us-households-201407.pdf

33 Long, S., & Dimmock, T. (2016, March). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update. Retrieved August 22, 2016, from p. 30 of http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

34 Consumer Financial Protection Bureau. (2014, December). Consumer credit reports: a study of medical and non-medical collections. Retrieved December 8, 2015, from p. 15 of http://files.consumerfinance.gov/f/201412_cfpb_reports_consumer-credit-medical-and-non-medical-collections.pdf

35 U.S. Preventive Services Task Force. (n.d.) Final recommendation statement: breast cancer screening. Retrieved May 18, 2016, from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/breast-cancer-screening1

36 Data from Massachusetts Department of Public Health, MassCHIP, Behavioral Risk Factor Surveillance System, 2000–2010. Retrieved August 21, 2014.

37 U.S. Preventive Services Task Force. (2015, July). *Final update summary: cervical cancer screening*. Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/cervical-cancer-screening

38 Morgan, D., Dhruva, S., Wright, S., et al. (2015, December). Update on medical practices that should be questioned in 2015. *JAMA Internal Medicine, 175*(12), 1960–1964.

39 Women aged 24 to 64 who had cervical cytology performed within 3 years or women aged 30 to 64 who had cervical cytology/human papillomavirus co-testing performed within 5 years.

40 Age: Women 24 to 64 years as of December 31 of the measurement year. Continuous enrollment: The measurement year and the two years prior to the measurement year. Allowable gap: no more than 45 days during each year of continuous enrollment. Anchor date: December 31 of the measurement year.

41 Colorectal cancer screening guidelines. (2014, February 26). Retrieved December 8, 2015, from http://www.cdc.gov/cancer/colorectal/basic_info/screening/guidelines.htm

42 Rabin, R. (2011, January 20). Why people aren't screened for colon cancer. Retrieved December 8, 2015, from http://well.blogs.nytimes.com/2011/01/20/why-people-arent-screened-for-colon-cancer

43 Age: 50 to 75 years as of December 31 of the measurement year. Continuous enrollment: The measurement year and the year prior to the measurement year. Allowable gap: No more than 45 days during each year of continuous enrollment. Anchor date: December 31 of the measurement year.

44 MassHealth managed care HEDIS® 2013 report. (2014). Retrieved December 8, 2015, from p. 46 of http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

45 Hemoglobin/blood sugar levels of 9% or higher.

46 Use of imaging studies for low back pain. (n.d.). Retrieved May 26, 2016, from http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2015-table-of-contents/low-back-pain

47 Ibid.

48 CHIA. (2016, November). Performance of the Massachusetts health care system focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

49 Age: 18 years as of January 1 of the measurement year to 50 years as of December 31 of the measurement year. Intake period: January 1 to December 3 of the measurement year. The intake period is used to identify the first outpatient or ED encounter with a primary diagnosis of low back pain. IESD: Index Episode Start Date. The earliest date of service for an outpatient or ED encounter during the intake period with a principal diagnosis of low back pain. Negative Diagnosis History: A period of 180 days prior to the IESD when the member had no claims/encounters with any diagnosis of low back pain. Continuous enrollment: 180 days (6 months) prior to the IESD through 28 days after the IESD. Allowable gap: No gaps in enrollment during the continuous enrollment period. Anchor date: IESD.

50 MassHealth managed care HEDIS® 2013 report. (2014). Retrieved December 8, 2015, from p. 45 of http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

51 Ibid, 49.

52 Prenatal care fact sheet. (2012, July 12). Retrieved December 8, 2015, from http://womenshealth.gov/publications/our-publications/fact-sheet/prenatal-care.html

53 MassHealth managed care HEDIS® 2013 report. (2014). Retrieved December 8, 2015, from p. 74 of mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

SECTION 2.4

1 Retrieved from Massachusetts Health and Human Services website: http://www.mass.gov/eohhs/consumer/insurance/masshealth-coverage-types/masshealth-commonhealth.html

2 Massachusetts Law Reform Institute. (2016). Federal poverty guidelines. Retrieved June 1, 2016, from http://www.masslegalservices.org/content/federal-poverty-guidelines-2016

3 Disability rights in housing. (n.d.). Retrieved December 29, 2015, from U.S. Department of Housing and Urban Development website: http://portal.hud.gov/hudportal/HUD?src=/program_offices/fair_housing_equal_opp/disabilities/inhousing

4 Executive Office of Health and Human Services. (2014, October). Public payer commission [PowerPoint slide 6]. Retrieved December 22, 2014, from http://www.mass.gov/eohhs/docs/eohhs/public-payer/ppcpres1027214.pdf

5 Iezzoni, L. (2011). Eliminating health and health care disparities among the growing population of people with disabilities. *Health Affairs, 30*(10), 1947–1954.

6 Ibid.

7 Ibid.

8 Ibid.

9 Ibid.

10 Executive Office of Health and Human Services. (2014, October). Public payer commission [PowerPoint slide 11]. Retrieved December 22, 2014, from http://www.mass.gov/eohhs/docs/eohhs/public-payer/ppcpres1027214.pdf

11 U.S. Department of Health and Human Services. (n.d.). Coverage limits of long-term care offered by health insurance. Retrieved from http://longtermcare.gov/costs-how-to-pay/what-is-covered-by-health-disability-insurance/coverage-limits-chart

12 Reinhard, S., Kassner, E., Houser, A., et al. (2014). Raising expectations: a state scorecard on long-term services and supports for older adults, people with physical disabilities, and family caregivers, p. 30. Retrieved August 19, 2016, from the AARP website aarp.org/content/dam/aarp/research/public_policy_institute/ltc/2014/raising-expectations-2014-AARP-ppi-ltc.pdf

13 Massachusetts Executive Office of Health and Human Services. (2016). One Care: MassHealth plus Medicare. Retrieved October 7, 2016, from mass.gov/eohhs/consumer/insurance/one-care

14 U.S. Census Bureau. Disability characteristics: 2015 American community survey 1-year estimates. Retrieved October 11, 2016, at http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S1810&prodType=table

15 Iezzoni, L. (2011). Eliminating health and health care disparities among the growing population of people with disabilities. *Health Affairs, 30*(10), 1947–1954.

16 U.S. Census Bureau. Disability characteristics: 2015 American community survey 1-year estimates. Retrieved October 11, 2016, at http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S1810&prodType=table

17 McDoom, M., Koppelman, E., & Drainoni, M. (2014). Barriers to accessible health care for Medicaid eligible people with disabilities: a comparative analysis. *Journal of Disability Policy Studies, 25*(3), 154–163.

18 de Vries McClintock, H., Barg, F., Katz, S., et al. (2016). Health care experiences and perceptions among people with and without disabilities. *Disability and Health Journal, 9*(1), 74–82.

19 Drainoni, M., Lee-Hood, E., Tobias, C., et al. (2006). Cross-disability experiences of barriers to health-care access consumer perspectives. *Journal of Disability Policy Studies, 17*(2), 101–115.

CHAPTER 3

Access to Health Care Services and Quality of Care Related to Primary Care and Behavioral Health

Section 3.i:
Introduction

This chapter explores two important domains—primary care and behavioral health (which includes mental health and substance use)—and associated issues with health care access and quality of care. This chapter will touch on various topics, including primary care utilization, coordination of care, mental health treatment, management of medications for mental health conditions, substance use disorders, and availability of treatment.

A NOTE ABOUT THE DATA

The Office of the State Auditor (OSA) used several data sources to identify measures to conduct the longitudinal analysis, including:

- Massachusetts Health Reform Survey to measure the use of primary and specialist care
- National and state data from the Substance Abuse and Mental Health Services Administration for measures regarding substance use and behavioral health treatment
- Bureau of Substance Abuse Services data for measures regarding substance-use treatment utilization and access
- Department of Public Health data for measures regarding opioid mortality and recidivism in acute treatment services
- Healthcare Effectiveness Data and Information Set (HEDIS) data, primarily to measure mental health treatment among the MassHealth population

In order to maintain reliable data for behavioral health, the Center for Health Information and Analysis (CHIA)'s Behavioral Health Hospital Data Collection Project[1] will collect inpatient utilization data for 26 Massachusetts behavioral-health hospitals starting in fiscal year 2018. Data will include clinical (diagnosis and procedure codes)[2] and sociodemographics.[3] These data could be used to better understand the opioid epidemic, readmissions and capacity limitations at behavioral-health hospitals, preventable hospitalizations, and population health.[4]

PRIMARY CARE

Primary care providers (PCPs) are general practitioners who confront a broad range of health issues every day. Unlike medical specialists or practitioners who focus on a single kind of intervention, PCPs interface with nine levels of care: prevention, pre-symptomatic detection of disease, early diagnosis, diagnosis of established disease, management of disease, management of disease complications, rehabilitation, terminal care, and counseling.[5]

PCPs also generally serve as patients' gateway to the health care system, so they should be conveniently accessible and focus on patients' short-term and long-term health.[6] The critical role of the PCP is why behavioral-health integration efforts have been concentrated in primary care.[7]

Data regarding quality measures show generally satisfactory performance among Massachusetts PCPs. The statewide average score for providers exceeded the national 90th-percentile score for measures including blood testing and cholesterol screenings for patients with diabetes and cholesterol screenings for patients with cardiovascular conditions.[8] However, the state average fell short of the 90th-percentile for blood pressure and antidepressant medication management.[9]

> "We've been working on developing more community-based supports to keep people out of beds. ... [But because reimbursement rates are so low,] we can't develop a large enough workforce."
>
> **— Daniel Mumbauer, President and CEO, High Point Treatment Center**

BEHAVIORAL HEALTH

Behavioral health, which includes mental health and substance use disorders, is often overlooked by policymakers and the public. Possible reasons include the social stigma of mental illness and substance abuse, inadequate screening by primary care providers,[10] the concentration of behavioral health conditions among low-income residents,[11] and the general unprofitability of behavioral health care.[12]

As observed in other health domains, racial/ethnic disparities have an important role in outcomes and access to appropriate treatment. The World Health Organization describes these disparities as "differences in health which are not only unnecessary and avoidable but, in addition, are considered unfair and unjust."[13] Further, the National Academy of Medicine describes such disparities as differences in service use that are not justified by underlying health conditions or patient preference.[14]

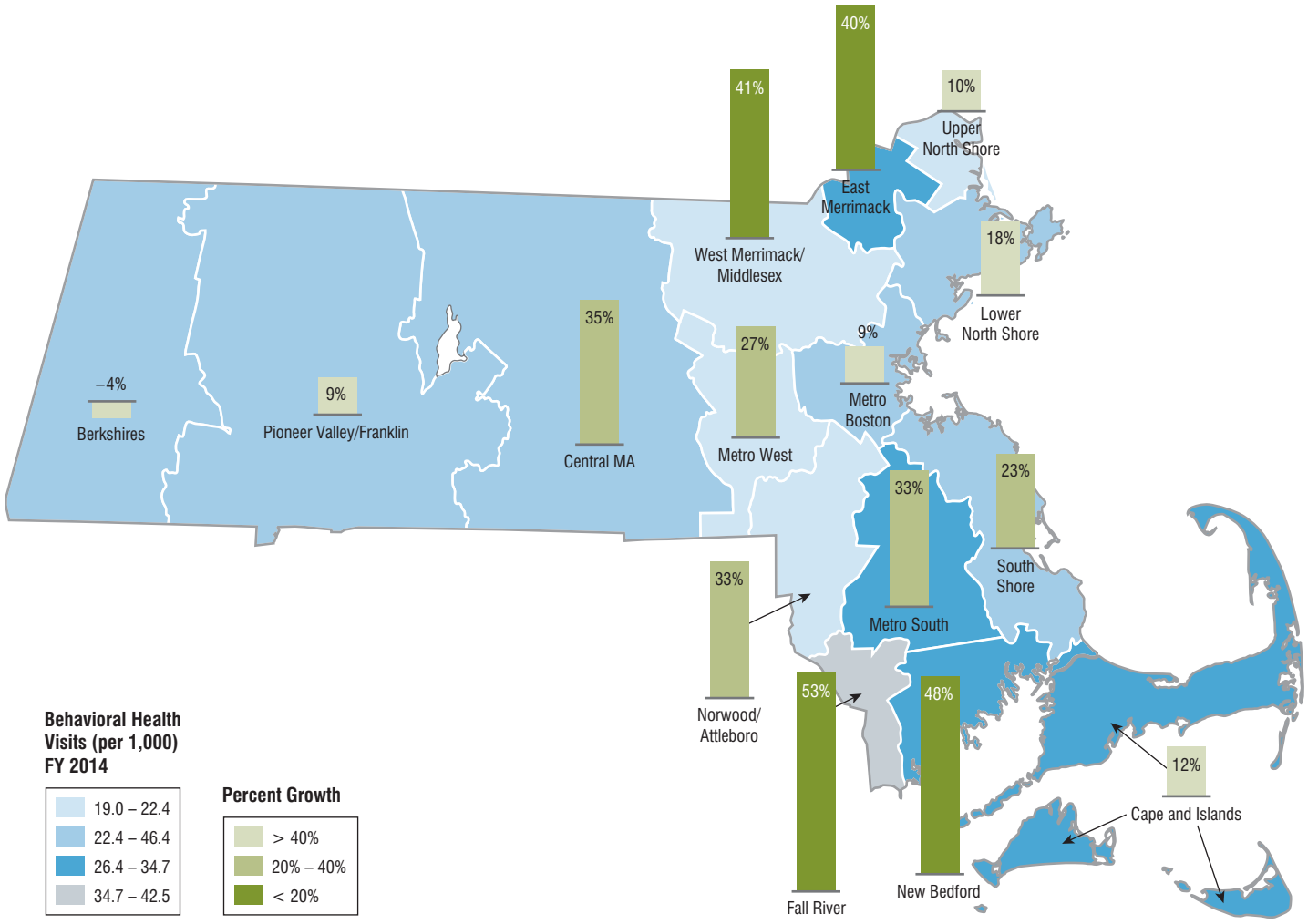
Increased behavioral health-related emergency department (ED) use suggests that patients are struggling to access behavioral health care in primary care or other non-emergency settings. As shown in Figure 3.i.1, the fastest growth in these ED visits is in the Merrimack Valley, parts of Middlesex County, and the Fall River and New Bedford regions.

CHALLENGES TO ACCESS

The capacity for behavioral health care lags behind demand,[15] which creates many potential challenges for patients seeking quality care, providers seeking to provide that care, and all actors seeking to reduce disparities. The issues include:

- **Hospital readmissions:** Hospitalized patients who have a behavioral health condition are 77% more likely to be readmitted than those without such a condition (20.2% vs. 11.4%).[16] This is especially true among MassHealth patients and young adults.[17] These readmissions, particularly those reimbursed by MassHealth, are a financial burden on providers and imply that patients with behavioral health comorbidities are not receiving coordinated behavioral and medical health care.
- **Lack of insurance parity:** Federal rules attempting to ensure insurance benefit parity between behavioral and physical health have

Figure 3.i.1. Behavioral-health-related ED visits per 1,000 residents, 2010-2014



Note: Vertical bars show growth in visits. All conditions are based on primary diagnosis. All rates are adjusted for age and sex.

Source: Commonwealth of Massachusetts Health Policy Commission (2015). 2015 Cost Trends Report, p. 60. Retrieved from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

proven difficult to enforce.[18] In March 2016, the Obama Administration announced new regulations to improve behavioral health coverage parity by Medicaid programs; however, the changes could further increase demand for behavioral health services among the beneficiary population,[19] despite there being an inadequate number of providers to meet current need.[20] Moreover, services are unevenly distributed.

- **Compliance obstacles:** The rules governing behavioral-health medical records pose a compliance challenge for even the most sophisticated providers. Federal and state laws form a complicated regulatory web that safeguards sensitive patient data but also impedes access to medical records amid emergencies and efforts to coordinate care.[21] Additionally, the uneven adoption and interoperability of health information-technology systems have slowed efforts to make sharing behavioral health data easier.[22] Indeed, in 2014, 96% of Massachusetts primary care providers had adopted health information technology, compared to only 55% of behavioral health providers.[23]

- **Quality measurement:** Similarly, quality measures for behavioral health also lag. As Pincus and colleagues wrote, "the concept of quality measurement does not appear to have penetrated very far into mental health and substance abuse care."[24] They noted that only 10% of behavioral health measures are endorsed by the National Quality Forum, performance on four HEDIS behavioral health measures among commercial plans averaged 48% in 2014, and average quality for these HEDIS measures declined over the past decade among commercial and Medicare plans.[25]

- **Low reimbursement:** Generally, behavioral health payments from insurers are lower than the cost of providing care. According to a 2015 report by the Massachusetts Attorney General, commercial and MassHealth reimbursements covered only 61% of the cost.[26] As a result,

some hospitals have removed beds designated for mental health or cut psychiatric units. "Hospital administrators concluded long ago that this is a money-losing proposition," Philip W. Johnston, chairman of the board at the Blue Cross Blue Shield of Massachusetts Foundation, told the *Boston Globe*.[27] However, the insurance industry, citing recent losses by some insurers and the state's already high health spending, argues that its rates are adequate and that hospitals should devote more resources to the problem.[28]

- Exacerbating challenges to the financial viability of providing behavioral health care, the patients who seek behavioral health at their local community hospitals are disproportionately those for whom payment rates are generally lower, including elders, people with disabilities or low incomes, and individuals seeking other lower-margin services.[29] Moreover, behavioral health visits (e.g., the boarding of psychiatric patients) can overwhelm ED capacity.[30]

"Ultimately, that person who went into a psychiatric hospital needs coordinated care. Otherwise, they're going to probably, unfortunately, come back [to the hospital]."

— David Matteodo, Executive Director, Massachusetts Association of Behavioral Health Systems

CHALLENGES TO QUALITY

Unfortunately, access to treatment is not enough to ensure quality of care.[31] An important challenge is the lack of culturally relevant services. The promotion of cultural competence has been the cornerstone of service delivery. However, this approach does not include self-evaluation and self-critique from clinicians or professionals, nor does it address the power imbalances in the medical relationship. A more inclusive and comprehensive approach, such as cultural humility, [32] may provide a better framework to increase the quality of care. This approach suggests the inclusion of the attitudes and feelings of professionals and clinicians by learning about their own attitudes and feelings of the diverse groups served, by practicing awareness of responses as barriers to communication, and by recognizing potential for group differences as an important topic for individual exploration. [33]

Diversity in the health care workforce can help ensure that people of all backgrounds feel comfortable seeking care. However, only 7.8% of psychologists, 12.9% of social workers, and 21.4% of psychiatrists were non-white, according to a nationwide study in 2006.[34] Alegria and colleagues further identified that service planning did not address non-white patients' preferences and evidence-based interventions were not readily available for diverse populations.[35]

DIFFERENCES AMONG PAYER SOURCES

Research shows members of public health-insurance programs, including MassHealth, are more likely to access behavioral health treatment than members of commercial insurance. For example, a lower proportion of individuals with commercial insurance received treatment in 2012 (13% for mental health; 1.2% for substance use disorder) than did members of Medicare (21.6% for mental health; 3.4% for substance use) and MassHealth (22.9% for mental health; 4.9% for substance use).[36] Further, mental health utilization was 70% and 80% higher for Medicare and MassHealth than for commercial members. For substance use disorders, Medicare and MassHealth utilization were 2.8 times and 4 times higher than commercial utilization rates, respectively.[37] Because MassHealth and Medicare have lower payment rates, the high share of members of these programs seeking behavioral health care is a financial burden on providers.

One reason for these findings is that MassHealth devotes a significantly higher share of its medical claims spending to behavioral health than commercial insurers. In 2013, the MassHealth Managed Care Organization spent 9.3% of its claims on behavioral health and the MassHealth Primary Care Clinician program spent 12.8%; commercial payers spent only 3.7%.[38]

INTEGRATING PRIMARY CARE AND BEHAVIORAL HEALTH

One aim of Chapter 224 is to support the integration of primary care and behavioral health care in order to improve access and quality and to reduce costs. This pursuit is a logical policy extension of the Mental Health Parity and Addiction Equity Act of 2008, the Patient Protection and Affordable Care Act (ACA),[39] and the Obama Administration's new Medicaid mental health rules,[40] all of which still have had a limited impact to date.[41]

Integrating behavioral health into primary care is a complex undertaking that should be tailored to local needs when possible.[42] Early efforts have struggled to get beyond minimal integration[43] and have had a larger impact on mental health than on substance use.[44,45] Much work is yet to be done, as only 52% of primary care providers (PCPs) in Massachusetts screened patients for behavioral health conditions in 2014.[46]

One major logistical barrier to integration is payment structure. With different diagnosis and billing codes than other areas of health care, behavioral health is viewed as an essentially separate and parallel system of care.[47] Global payments, which provide providers a monthly allowance to care for all of a patient's health needs, may encourage integration.

"We would like to make sure that people understand their rights to grieve denials of [behavioral health] coverage, because the legislature on the federal and state levels have afforded consumers pretty significant protections."

— Matt Selig, Executive Director, Health Law Advocates

Section 3.1:
Primary Care

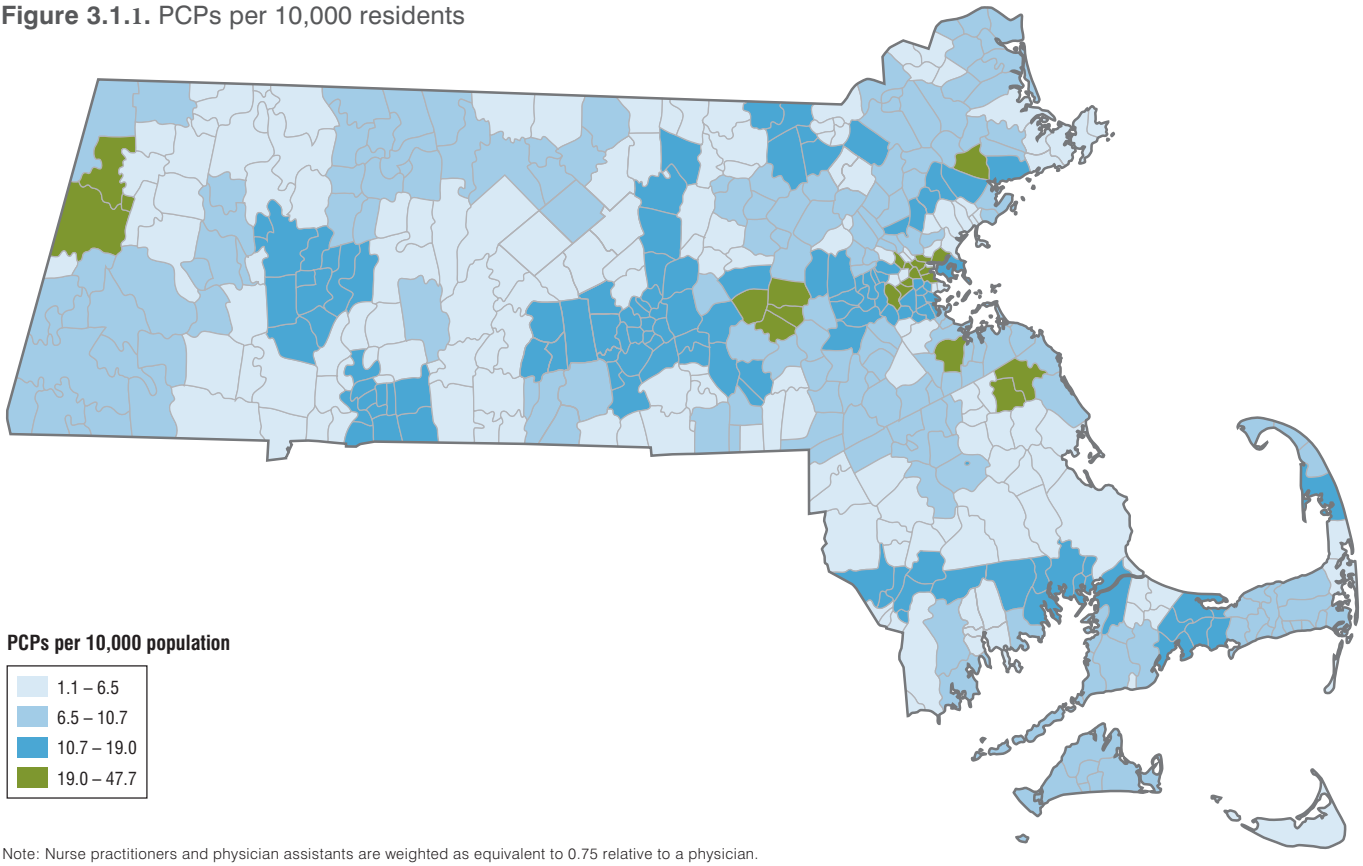
OVERVIEW

PCPs are charged with tending to a broad range of health issues, including screening for physical health, managing chronic disease, providing guidance on healthy living, and sometimes screening for behavioral health. Moreover, PCPs often function as patients' entry point to other areas of health care, including prescription medication and specialist care. Because PCPs are so integral to patient care, efforts to integrate behavioral health care have been concentrated in primary care settings.[1]

In Massachusetts, 96% of the population is insured and therefore entitled to well primary-care visits annually.[2] However, various obstacles prevent many patients from regularly accessing primary care, including:

- People who do not get coverage through their employer (including members of MassHealth) report poorer overall health[3] and are less likely to have a usual source of care[4] than those with employer-sponsored insurance.
- Across the state, there is a 30-fold variation in the number of PCPs per 10,000 residents.[5] Approximately 500,000 residents live in areas federally designated with a PCP shortage (see map below). For example, there are 47.7 PCPs per 100,000 people in Cambridge and 34.1 in Boston, but only 2.1 in Bellingham and 1.6 in South Weymouth.[6]
- Because traditional PCPs work during business hours in appointment-driven practices, finding "off-hours" or on-demand primary care is a challenge.
- Because of limited training and resources, many PCPs struggle to triage and treat patients with behavioral health conditions,[7] particularly those with serious mental illnesses, who tend to miss appointments, have poor diets, and have unstable housing situations.[8]
- Some patients do not realize that they or their children are entitled to well-care visits and other preventive care.[9]
- Other challenges to patient access include transportation limitations,[10] difficulty getting time off work,[11] and uneven cultural competence among PCPs.[12]

Figure 3.1.1. PCPs per 10,000 residents



Note: Nurse practitioners and physician assistants are weighted as equivalent to 0.75 relative to a physician.
Source: Commonwealth of Massachusetts Health Policy Commission (2015). 2015 Cost Trends Report, p. 66. Retrieved March 15, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

"We overpay procedure-oriented specialists. We underpay primary care and behavioral health providers. ... We almost ought to double what we pay primary care, and include in that the integration of behavioral health."

— Dr. Paul Hattis, Former Commissioner, Health Policy Commission

As shown in Figure 3.1.1, the PCP-to-resident ratio generally is lower in rural areas. This is particularly true in parts of Franklin and Hampden Counties in western Massachusetts and Worcester County in the central part of the state.

Experts suggest that PCPs must continue improving their capacity to provide for patients' whole health and to coordinate care among multiple providers.[13] In addition to competitive grant programs for providers, the Health Policy Commission (HPC) has launched two certification programs—accountable care organization (ACO) certification and patient-centered medical home (PCMH) certification—that encourage the provision of high-quality, pay-for-performance care and behavioral-health integration. Nonetheless, the HPC has expressed concern that new certification mandates could put a strain on providers, since the average physician practice[14] already spends 785 hours a year (15.1 hours per week) reporting quality measures.[15]

Policymakers have hypothesized that a greater preponderance of on-demand retail clinics and urgent care centers—which tend to treat conditions that do not warrant a visit to higher-cost EDs—will help reduce health spending. Consumers seem eager to visit such locations, and hospital systems are responding. Steward Health Care System, Beth Israel Deaconess Medical Center, and Lahey Health have established urgent care centers, while Partners HealthCare has opened clinics in Brookline, Newton, and Watertown.[16] However, retail clinics also drive increased health care demand, which can increase spending overall, particularly for low-acuity conditions.[17]

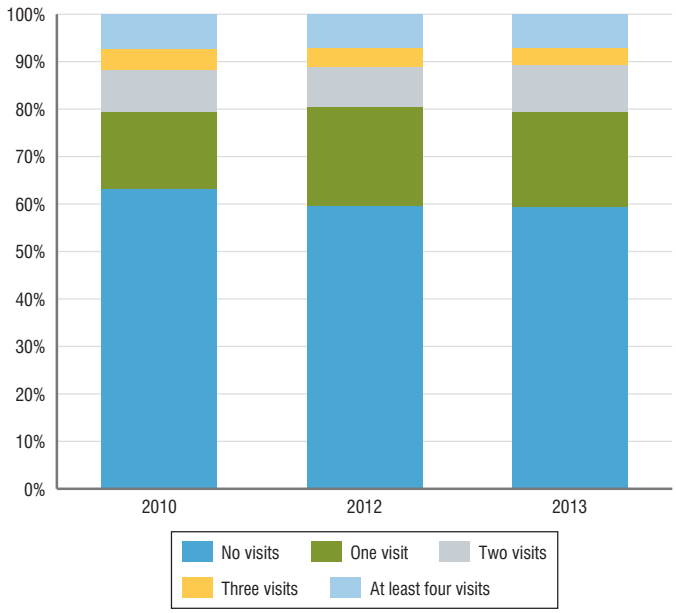
Even as some institutions add new options for getting care, many people cannot do so. Indeed, 10.9% of Massachusetts adults with public coverage went without needed doctor care in 2015 (versus 6% of those with employer-sponsored insurance).[18] Furthermore, those with public coverage were less likely to have received dental care[19] and to report that their most recent ED visit was for a non-emergency.[20]

RECENT VISITS TO NON-PHYSICIAN PCPS

Background

Chapter 224 includes provisions that require public and private payers to match patients with a PCP, which the law provides can be either a physician, physician assistant (PA), or nurse practitioner (NP). Supporters note that PAs and NPs are well qualified to handle most primary care scenarios and that expanding their role can ease PCP shortages. However, critics of this policy argue that physicians are superior to PAs and NPs because physicians receive more training.

Figure 3.1.2. Primary care visits to an NP, PA, or midwife instead of a general doctor (Massachusetts adults 19–64)



Source: OSA analysis of Massachusetts Health Reform Survey (MHRS)

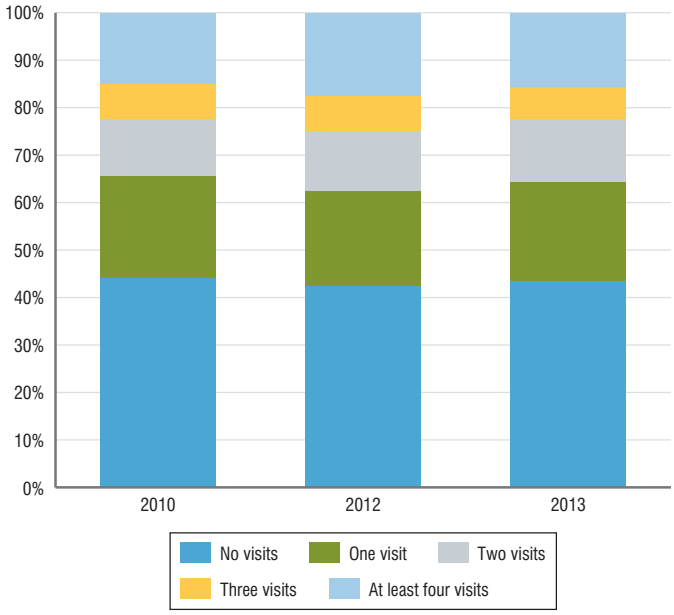
A look at research on the effectiveness of non-physician PCPs includes the following:

- A 2008 systematic review of 11 randomized, controlled trials and 23 observational studies conducted in high-income countries (including the U.S.) found:
  - Moderate-quality evidence that patients were more satisfied with care provided by an NP than by a doctor,
  - Low-quality evidence that quality of care is better for NPs than doctors, and
  - Low-quality evidence that no significant difference in patient health outcomes exists between treatment provided by NPs and by doctors.[21]
  - A study using Wisconsin Longitudinal Study data found that patients of NP and PA PCPs, compared to patients of physician PCPs, displayed no differences in difficulties/delays in care or outcomes and few differences in utilization.[22]

Massachusetts trend, 2010–2013

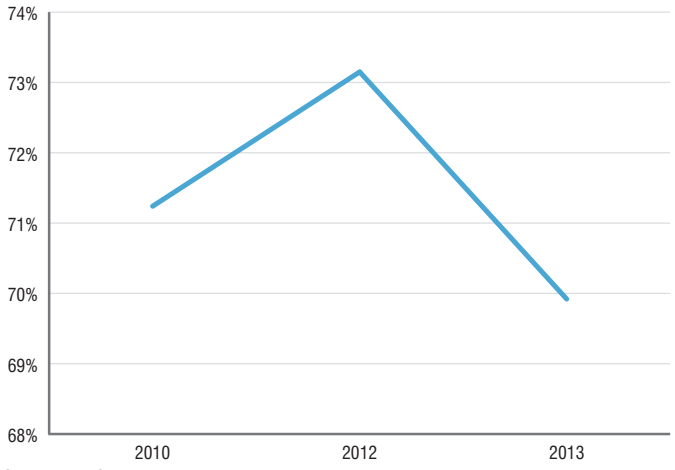
Approximately 40% of adults aged 19 to 64 reported seeing an NP, PA, or midwife rather than a primary care doctor in 2012 and 2013, up from 36.8% in 2010, as shown in Figure 3.1.2.[23] This increase, however, was not statistically significant.

Figure 3.1.3. Specialist visits in the past year (Massachusetts adults 19–64)



Source: MHRS

Figure 3.1.4. Patients who received help from provider's office/clinic to coordinate care with different providers (Massachusetts adults 19–64)



Source: MHRS

SPECIALIST VISITS IN PAST YEAR

Background

A growing share of Americans regularly visit specialty physicians. In 1980, only 33.8% of the population visited a specialist, compared to 46.8% in 2012. African Americans are less likely to see specialists than Whites, particularly those younger than age 65.[24] Adults aged 65 years and older use specialists the most,[25] so specialist utilization likely will increase as the Massachusetts population ages.

Massachusetts trend, 2010–2013

Specialist visits were mostly stable from 2010 to 2013, with a slight increase in the share of Massachusetts adults making two visits and making at least four visits. In 2013, 56.6% of Massachusetts adults saw a specialist, down from 57.5% in 2012 (although this difference is not statistically significant).

COORDINATION OF CARE AMONG PRIMARY CARE PRACTICES

Background

The American health care system is notoriously fragmented, and experts frequently cite care coordination as a way to improve care and reduce costs.[26] Chapter 224 builds on previous efforts to coordinate care as a mechanism to increase access and quality.

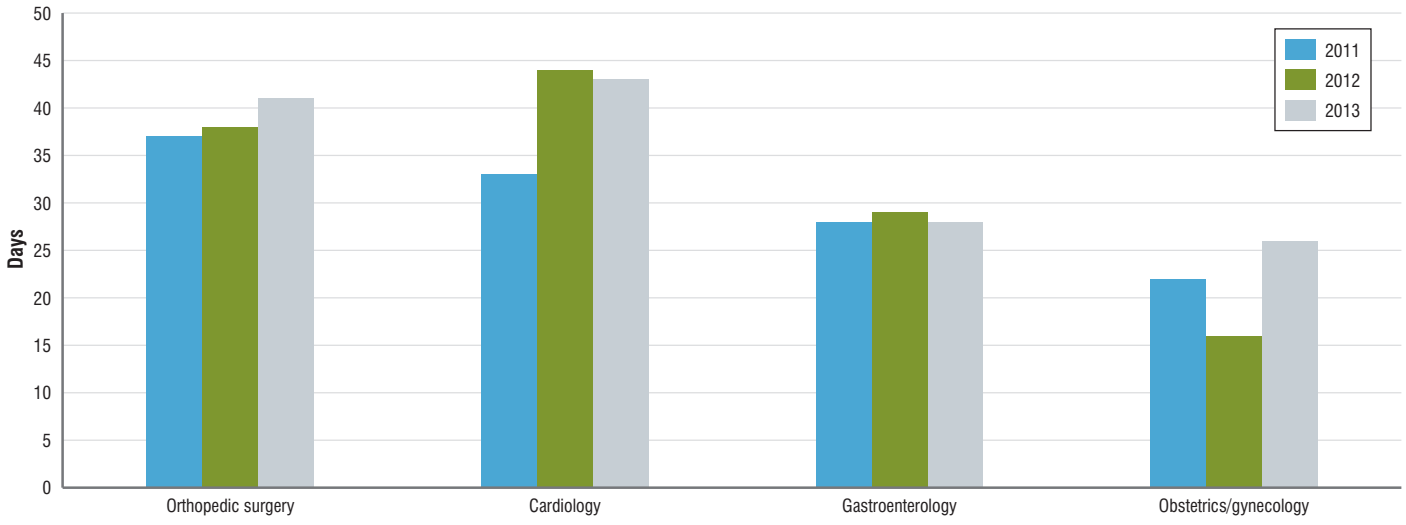
PCMHs aim to streamline comprehensive primary care by emphasizing preventive care, chronic condition management, behavioral health integration, and provider cooperation. The research includes the following:

- A national survey found that children matched to PCMHs, as compared to children without medical homes, had significantly better rates of indicators, including obtaining preventive care, experiencing providers taking a developmental history, having no unmet care needs, and having the human papillomavirus vaccine recommended to them.[27]

- However, children in need of mental health services, including counseling, were less likely to receive such services from a PCMH.[28]
  - Another intervention that integrated a behavioral health provider into well-child visits in a rural setting found an increase in time spent with a physician and a dramatic increase in health topics discussed.[29]
  - Among a mixed children-and-adult population, David et al. found that enrolling chronically ill patients in a PCMH was associated with a 5–8% reduction in ED use.[30]
  - Other studies have found mixed evidence.[31]

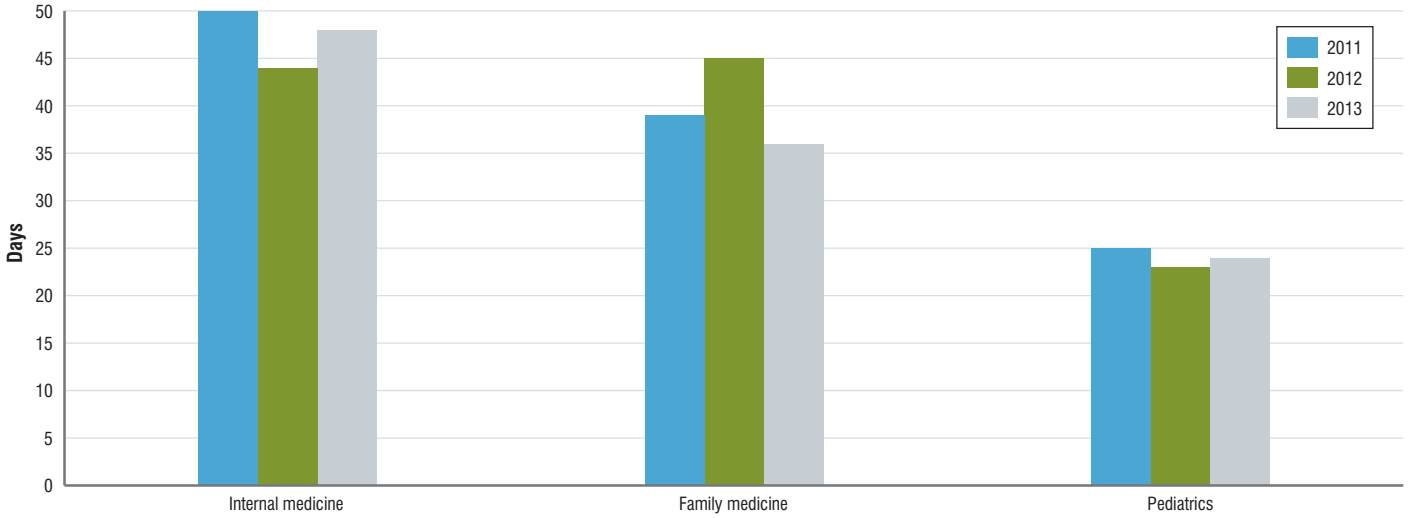
There is some reason to be skeptical of care-coordination initiatives that project cost savings. A $57 million federal program encouraging federally qualified health centers to seek "medical home" accreditation and to coordinate treatment for high-risk Medicare patients failed to cut ED use and overall per-patient spending.[32] Nevertheless, it is possible that these health centers, encouraged by the program to provide for the whole health of their patients, uncovered long-neglected health needs, thus leading to increased spending. Moreover, the annual median investment in each clinic (i.e., $26,000) may not have been large enough to achieve change.[33]

Figure 3.1.5. Average new-patient wait time, specialists



Source: Massachusetts Medical Society, (2013, July). 2013 MMS patient access to care study. Retrieved March 17, 2016, from http://web.archive.org/web/20141127132034/http://www.massmed.org/News-and-Publications/Research-and-Studies/2013-MMS-Patient-Access-to-Care-Study-(pdf)

Figure 3.1.6. Average new-patient wait time, primary care



Source: Massachusetts Medical Society, (2013, July). 2013 MMS patient access to care study. Retrieved March 17, 2016, from http://web.archive.org/web/20141127132034/http://www.massmed.org/News-and-Publications/Research-and-Studies/2013-MMS-Patient-Access-to-Care-Study-(pdf)

Massachusetts trend, 2010–2013

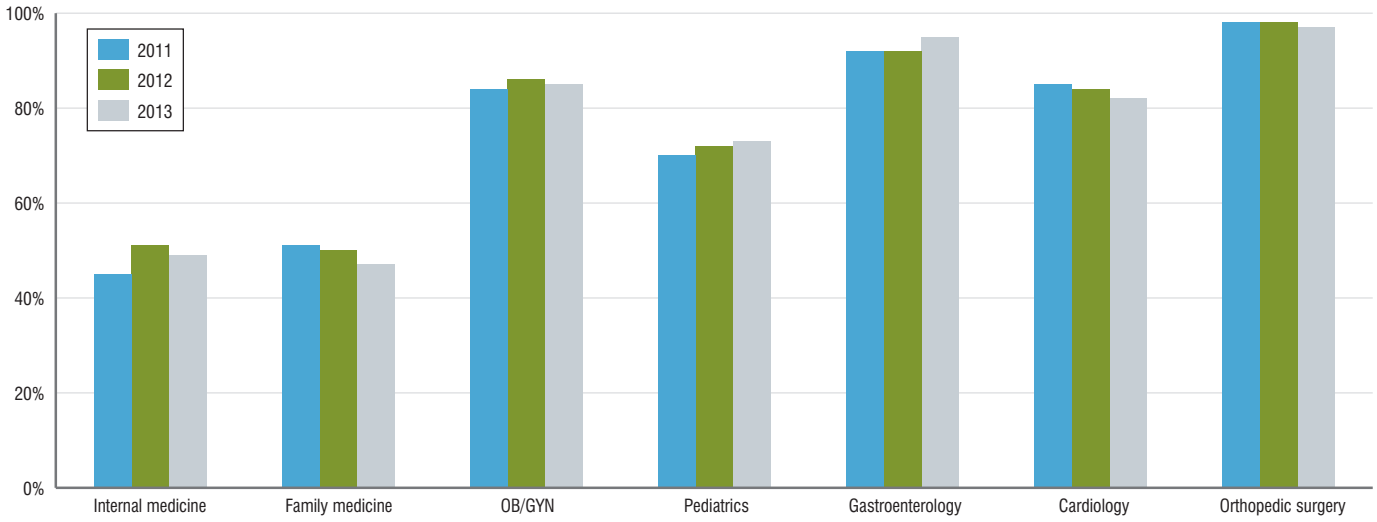
As seen in Figure 3.1.4, the share of patients who received help coordinating care decreased slightly from 2010 to 2013.

PATIENT WAIT TIME FOR PRIMARY AND SPECIALIST CARE

Background

Compared to 14 other U.S. metropolitan areas, Boston had the longest wait times for specialty physician appointments (cardiology, dermatology, obstetrics/gynecology, and orthopedic surgery), according to a 2014 survey of providers.[34] Boston also had the longest wait for primary-care family medicine appointments (66 days), perhaps in part because Massachusetts

Figure 3.1.7. Offices accepting new patients



*Note: No 2007–09 data is available for pediatrics.
Source: Massachusetts Medical Society, (2013, July). 2013 MMS patient access to care study.

expanded health access under the Massachusetts health care reform law (Chapter 58 of the Acts of 2006). Limiting patient wait times can help ensure patients get timely care and avoid unnecessary ED use.

According to the Massachusetts Health Reform Survey, in 2013[35] and 2015,[36] patients with public insurance coverage had more difficulty obtaining specialty care and finding a PCP than patients with commercial insurance. This can be explained in part by the lower rates that Medicare and MassHealth pay providers.

Massachusetts trend, 2011–2013

For several years, the Massachusetts Medical Society conducted annual studies regarding health care wait times in Massachusetts and practitioners' acceptance of Medicare and MassHealth.[37] The surveys examined cardiology, internal medicine, family medicine, gastroenterology, obstetrics/gynecology, orthopedic surgery, and pediatrics. The data were collected by telephone calls to physician offices for the purpose of making an appointment for a new patient.

From 2011 to 2013,[38] wait times for specialists declined slightly (see Figure 3.1.5). Wait times for primary care, which are longer, increased slightly (see Figure 3.1.6). In 2013, among the specialties, wait times were longest for orthopedic surgery (37 days). Among the primary care disciplines, internal medicine had the longest wait (50 days).

PCPS AND SPECIALISTS ACCEPTING NEW PATIENTS

Background

Although the physician supply nationwide is expected to increase slightly from 2013 to 2025, demand will grow more sharply as baby boomers age and consume more health care. If current projections hold, the demand for doctors will exceed supply by between 46,000 and 90,000 physicians in 2025.[39] This shortage of providers could lead physicians to pass over patients with Medicaid and Medicare, which have lower reimbursement rates than private insurance, or to stop accepting new patients altogether. As the availability of physicians drops, medical schools continue to mint far more specialists than doctors interested in primary care; a 2012 study found that only 1 in 5 third-year medical residents planned to pursue general internal medicine.[40] Policymakers and industry figures have been weighing varying incentives to attract more residents to primary care.[41]

Massachusetts trend, 2007–2013

As shown in Figure 3.1.7, approximately half of internal-medicine and family-medicine offices were accepting new patients in both 2013 and 2012. A higher share of offices in three disciplines (orthopedic surgery, cardiology, and family medicine) accepted patients in 2013 than in 2011. A lower share of offices in the other four disciplines (gastroenterology, pediatrics, obstetrics/gynecology, and internal medicine) accepted patients.

> "There's so much money going into these large health systems to support … [behavioral health] integration, and there's very little attention spent working with community-based providers … [who are] the lowest-cost providers in the system."
>
> — Daniel Mumbauer

Section 3.2:

Behavioral Health (Mental Health and Substance Use Disorders)

MENTAL HEALTH

Overview

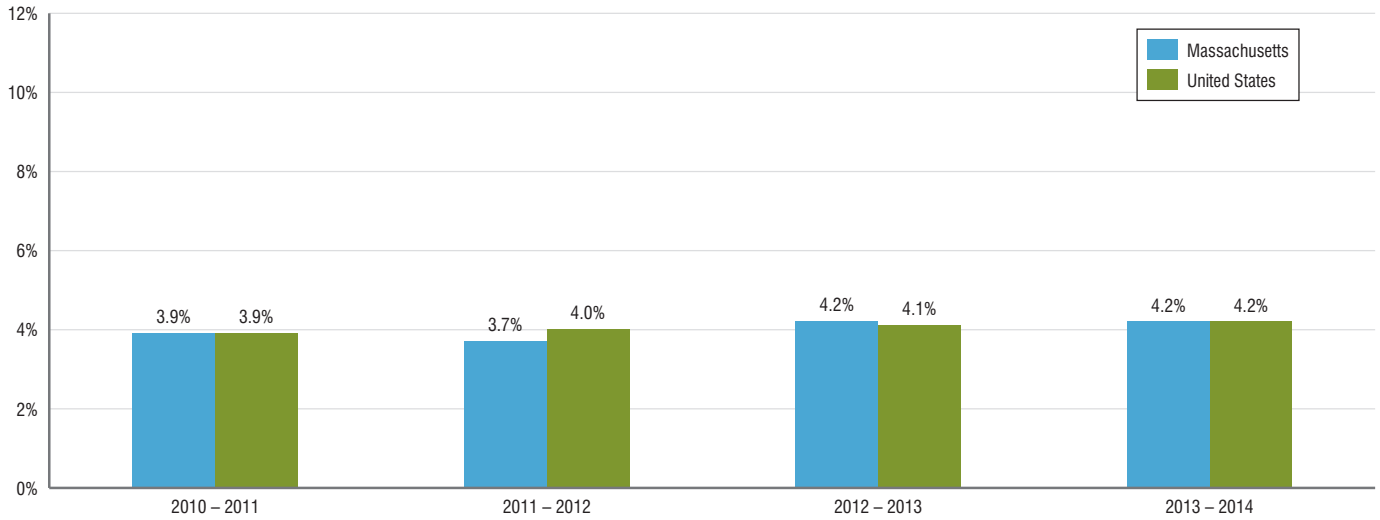
Patients across the nation are facing challenges with access to mental health care due to, among other factors, widespread and unevenly distributed shortages of mental health professionals.[1,2] Even in Massachusetts, which has one of the highest rates of psychiatrists and psychologists per capita,[3] patients have limited options for providers. Access can be particularly challenging for individuals who cannot afford to pay out of pocket, since mental health providers are struggling with inadequate reimbursement rates and difficulty obtaining payment from insurers.[4] Indeed, a survey of Massachusetts mental health clinicians found that low rates is the most common reason those in private practice participate in fewer insurance panels or intentionally take on more clients who pay with cash.[5] Nationally, 44% of surveyed mental health clinicians said they turn away five or more patients in an average month.[6] Recent progress on access has been made, though non-Whites still struggle to access care.[7] It is hoped that as mental health care is further integrated with physical health care, access and quality will improve, although additional policy actions will likely be required.[8,9]

According to the 2013–2014 National Survey on Drug Use and Health, 20.1% of Massachusetts adults suffer from a mental illness[10] and 4.2% suffer from a serious mental illness.[11,12] Further, the Behavioral Risk Factor Surveillance System survey found that 11.3% of Massachusetts residents experienced 15 or more poor mental health days (including problems with stress, depression, and emotions) in the last month.[13] Among those with a physical health condition, the rate of mental illness was 26.6%.[14] For those struggling to obtain treatment, the stakes are high: Individuals with a serious mental illness live, on average, 25 years less than individuals without behavioral health issues in part due to inadequate access to care and the high prevalence of treatable medical conditions, including smoking, obesity, and substance abuse;[15] suicide is also a major contributor to the shortened lifespan.[16]

As shown in Figure 3.2.1, the rates of substance dependence and abuse in Massachusetts are similar to national rates, as is the percentage of people receiving treatment.[17] For serious mental illness, the rate of occurrence in Massachusetts compares similarly to the national rate, although Massachusetts has a higher rate of people receiving treatment.[18] However, Massachusetts spends less on mental health services per capita ($119.62 in fiscal year 2013) than the country overall and less than every other New England state, except Rhode Island.[19]

> "We have more behavioral health resources than virtually any state. But if you looked at us in absolute terms, you'd say we're way underperforming because people can't get the services they need."
>
> —David Cutler, Commissioner, Health Policy Commission

Figure 3.2.1. Prevalence of serious mental illness (Massachusetts and U.S. adults)



Source: Substance Abuse and Mental Health Services Administration. (2015). Behavioral health barometer, Massachusetts, 2015, p. 10. Retrieved June 15, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

Racial/ethnic disparities

As with other health care domains, stark differences in mental illness exist among racial/ethnic groups. For example, one study found that 20% of Latino high school students reported having suicidal thoughts in the past year, compared to 15% of White students.[20] From 2004 to 2012, 29.2% of Latino adults with mental illness received mental health care, compared to 51.5% of Whites. Massachusetts Latinos also have higher rates of diagnosed lifetime depression and self-reported poor mental health than their White counterparts. There also are large disparities in access to treatment among racial/ethnic groups.[21] Notably, recent reductions in the number of public treatment centers for substance use disorders disproportionately impacted African American residents.[22]

Challenges with access to mental health services

One major obstacle to treatment relates to inpatient psychiatric care. In a practice known as "boarding," many patients admitted to the ED for a mental health issue must wait hours—or even days—before they are moved to an appropriate unit.[23] From 2011 to 2016, the number of patients boarding increased 23%, and the amount of time they waited increased 20%.[24]

Patients are likely to have a longer wait on weekends when fewer beds are available. Additionally, many commercial insurers and Medicare do not cover certain kinds of community-based care,[25] so patients with such coverage frequently must wait for an available inpatient bed. Moreover, a shortage in acute inpatient psychiatric beds for children and adolescents often leads to boarding young people.[26]

Another factor that can impact where psychiatric patients receive care is the quality of their insurance and personal finances. According to the vice chairman of emergency medicine at Tufts New England Medical Center, in order for hospitals to find an appropriate facility, they must perform a "wallet biopsy" to determine a patient's financial resources.[27]

Yet another issue is the "payer mix" of psychiatric utilization, which shows why so many mental health providers struggle to make ends meet. MassHealth and Medicare—which pay less than commercial insurance—use about two-thirds of the state's beds (30% and 33%, respectively), compared to a small slice (9%) paid for with commercial insurance.[28] Reacting to this challenging payer mix, many psychiatric providers now accept cash only, restricting service availability to those who can afford to pay out of pocket.

Finally, the number of inpatient beds in public psychiatric facilities in Massachusetts decreased 40% from 2005 to 2014.[29] Overall, the growth rate of individuals seeking acute, inpatient, psychiatric admission is increasing faster than the growth rate of new psychiatric beds.[30] (However, the number of psychiatric beds is rebounding somewhat: Massachusetts had 2,388 public and private psychiatric beds in 2013 and 2,431 in 2014.[31])

Efforts to increase access

The demand for mental health services exceeds supply in many regions of the state. Government efforts to increase access have included the following:

- Chapter 224 established the Community Hospital Acceleration, Revitalization, and Transformation (CHART) Investment Program, which awards grants that promote access to behavioral health and coordination between hospitals and community-based providers.[32] Eleven of the program's 27 awards in Phase I included behavioral health elements,[33] as did 11 of 22 awards in Phase II.[34]
- As a complementary effort, Chapter 224 also established the Health Care Innovation Investment Program (HCII).[35] While not focused exclusively on behavioral health, HCII has three relevant aims:
  - Support innovative delivery and payment models for behavioral health integration (one of eight target areas).
  - Support telemedicine for behavioral health.
  - Improve care for newborns and mothers with opioid exposure. The $11.4 million program will provide funding to 20 awardees, 16 of which include a behavioral health element.

Awardee programs include the integration of primary care and community supports for homeless adults (through the Behavioral Health Network) and the deployment of community health workers for medication monitoring among adults with serious mental illness (via the Lynn Community Health Center).[36]

- Additionally, Governor Charlie Baker's administration is attempting to improve access and provide better value for taxpayers by privatizing government-provided mental health services in a region covering Brockton, Fall River, Taunton, Attleboro, and Cape Cod and the Islands.[37] The Baker Administration is also transferring inmates with mental illness from Bridgewater State Hospital to a separate facility in an effort to provide higher-quality, individualized care.[38]

Elsewhere, developers are planning or building projects that will create more than 500 beds in psychiatric facilities. Major facilities in Dartmouth (120 new beds), on the former Fort Devens property in Ayer and Shirley (104 beds), in Middleborough (72 beds), and in Salem (50 beds) should improve access to care for those with acute mental health needs.[39]

> "I have friends [with health insurance] who earn six-figure incomes [and say] to me, 'I cannot afford my kid's outpatient mental health treatment because those providers [accept cash only].'" — Dr. Paul Hattis

MENTAL HEALTH TREATMENT UTILIZATION

Background

A major factor that can increase one's risk of developing mental health problems is stress, which can be caused by financial problems,[40] as well as racism, low socioeconomic status, inadequate housing conditions, poor nutrition, and job insecurity.[41] All of these conditions may be impacting MassHealth beneficiaries in particular, as shown in Figure 3.2.2.

Web- and mobile-based programs can help public health officials reach discrete subpopulations outside of clinical settings, particularly those less likely to seek care due to the social stigma of mental health conditions. For example, the state Department of Public Health sponsors MassMen.org, a site geared toward middle-aged men, the population group with the highest risk of suicide completion.[42] The website offers mental health screenings; a

directory of nearby suicide prevention organizations; and ManTherapy, a colloquial, brawny simulation of virtual counseling.[43]

Massachusetts trend, 2005–2014

Figure 3.2.2 shows the share of MassHealth managed care members utilizing mental health services. From 2011 to 2014, the share increased slightly for inpatient care and more substantially for any service.

This measure does not include chemical dependency services and does not provide any information about the quality of services utilized. However, many managed care plans with low mental health utilization perform poorly on other HEDIS behavioral health measures,[44] suggesting it is important for patients to have access to these services.

> "The legislature should look at ... insurance practices that seek to micromanage and deny or defer care. ... [We're supporting] a bill to say that medical necessity for mental health should be determined by the treating clinician."
>
> **— David Matteodo**

TREATMENT RESOURCES

According to data from 2014, psychiatric facilities in Massachusetts include the following:[45]

- 43% of psychiatric beds are in freestanding hospitals, 56% are in general hospitals, and 1% are in state facilities.
- 37 beds are available per 100,000 people, based on a state population of 6.6 million residents.
- 73% of psychiatric beds are designated for adults, 17% for older residents, and 10% for children and adolescents.
- Since 2010, bed capacity has grown 5% among freestanding hospitals and 2% among all hospitals, but there has been no growth in beds in general acute hospitals that may provide care for more complex cases.

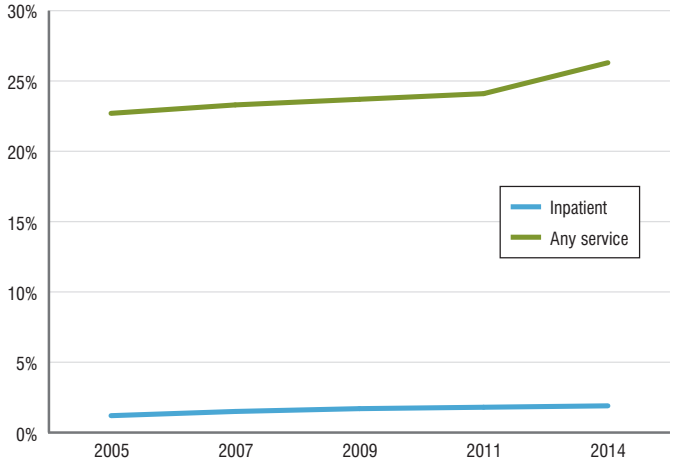
ANTIDEPRESSANT MEDICATION MANAGEMENT

Background

According to Behavioral Risk Factor Surveillance System data from 2013, 19.7% of Massachusetts adults reported they had been told they have a form of depression at least once in their life.[46] Antidepressants can effectively treat depression, but many patients, particularly those with lower socioeconomic status,[47] do not adhere to medication regimens.

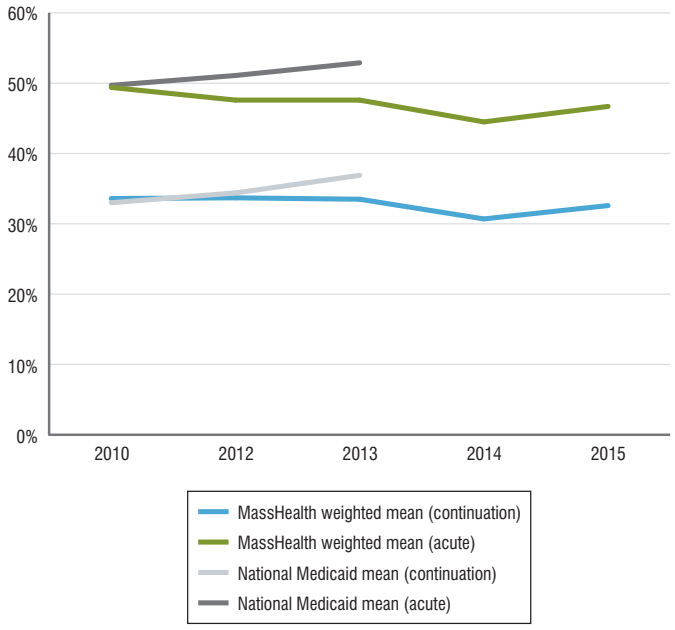
A national study found that primary care practices are less likely to use care management processes (e.g., disease registries, nurse care managers, reminders to patients, and the use of non-physician staff to educate patients) for depression than for asthma, diabetes, and congestive heart failure.[48] This suggests that practices may be better equipped to manage medical conditions than behavioral health conditions, including depression.

Figure 3.2.2. Mental health utilization, MassHealth managed care population (adults)



Note: Means were weighted based on plan membership. Includes MassHealth managed care population only (60% of members in 2014). From 2006 to 2015, the share of members enrolled in such plans ranged from to 56% to 64% (with the exception of 2014, an anomalous year impacted by the Massachusetts Health Connector failure). While HEDIS data are not representative of overall MassHealth trends, it is among the best available reported MassHealth data.
Source: Data from MassHealth Managed Care HEDIS Reports. Retrieved from http://www.mass.gov/eohhs/researcher/insurance/masshealth-annual-reports.html

Figure 3.2.3. Percentage receiving antidepressant medication, MassHealth managed care population (adults diagnosed with depression)



Source: HEDIS 2015 report, p. 26. Retrieved on July 1, 2016, from http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2015.pdf

The underuse of care management may also be partially due to how certain aspects of care are incentivized by performance measures and outcomes-based payments.

Massachusetts trend, 2007–2015

The HEDIS Antidepressant Medication Management metric looks at MassHealth adults in managed care who are diagnosed with depression and prescribed medication. (At the end of 2014, 60% of MassHealth members were enrolled with Managed Care Organizations.[49])

As shown in Figure 3.2.3, the measure shows the percentage of this population that remain on an antidepressant for 84 days (acute treatment phase) and at least 180 days (continuation phase).[50] Most adults enrolled in MassHealth managed care plans who have been diagnosed with depression are not being treated with antidepressants, which can improve daily functioning and well-being and reduce risk of suicide.[51]

FOLLOW-UP CARE FOR CHILDREN PRESCRIBED ADHD MEDICATION

Background

Attention deficit hyperactivity disorder (ADHD) is a brain disorder marked by an ongoing pattern of hyperactivity-impulsivity and/or inattention that interferes with development or functioning.[52] According to a sample of the National Health and Nutrition Examination Survey, 8.7% of children aged 8 to 15 meet DSM-IV criteria for ADHD. Further, the 2011–2012 National Survey of Children's Health showed that 5.4% of children aged 2 to 17 have ADHD and are taking medication for it, while 2.5% currently have ADHD but are not taking medication; in Massachusetts, the figures are slightly higher: 5.7% and 2.7%, respectively.[53]

Low-income children have a much higher risk for ADHD, but the wealthiest children are more likely to receive regular medication treatment.[54] According to the American Academy of Pediatrics (AAP), the optimal treatment for 6- to 11-year olds with ADHD is a stimulant medication combined with parent- and/or teacher-administered behavior therapy designed to teach children to manage their behavior.[55] AAP also recommends this dual approach for adolescents aged 12 to 18 but notes that the quality of evidence for behavior therapy is weaker for this cohort.[56]

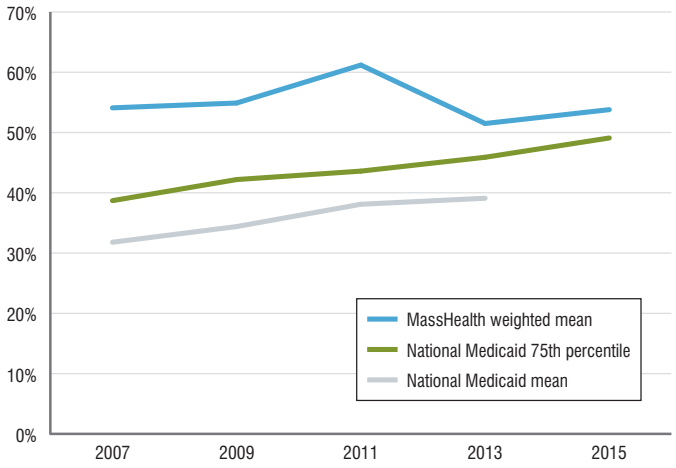
MassHealth requires that all children receive a behavioral health screening during well visits.[57] The state's Children's Behavioral Health Initiative and Massachusetts Child Psychiatry Access Project have provided PCPs with new services and supports to help integrate mental and physical health care.[58]

Massachusetts trend, 2007–2015

The following figures show HEDIS measures related to children enrolled in MassHealth managed care with a recent ADHD medication prescription. Figure 3.2.4 shows children with a visit within 30 days of the start of the medication (initiation). Figure 3.2.5 shows the percentage of children who had at least three follow-up visits within a 10-month period (continuation and maintenance).

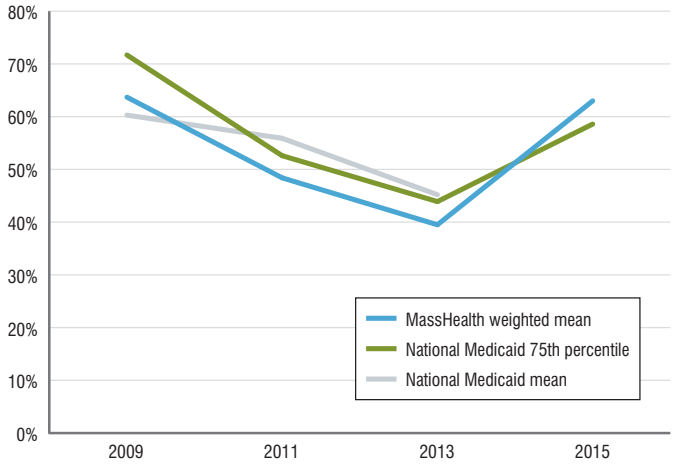
In 2015, MassHealth outperformed the national 75th percentile on these measures.

Figure 3.2.4. Follow-up care for children prescribed ADHD medication (initiation), (MassHealth managed care population)



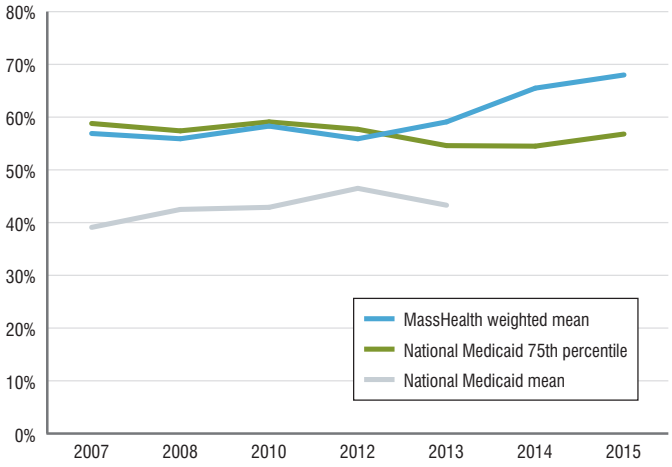
Notes: No data was provided for 2015 National Medicaid mean.
Source: UMASS Medical School (2016, February). MassHealth Managed Care HEDIS® 2015 Report. Retrieved July 1, 2016, from p. 32
http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2015.pdf

Figure 3.2.5. Follow-up care for children prescribed ADHD medication (continuation and maintenance), (MassHealth managed care population)



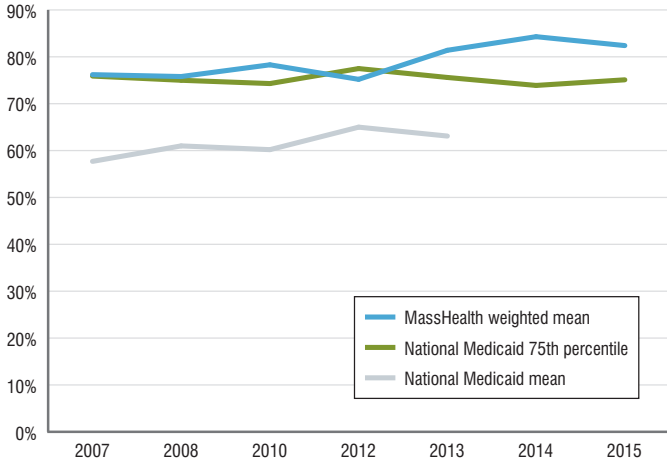
Note: MassHealth managed care population only, (60% of members in 2014).
Source: UMASS Medical School (2016, February). MassHealth Managed Care HEDIS® 2015 Report. Retrieved July 1, 2016, from p. 32
http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2015.pdf

Figure 3.2.6. Follow-up care after hospitalization for mental illness within a week days, (MassHealth managed care population)



Note: Data show MassHealth managed care population only (60% of members in 2014).
Source: UMASS Medical School (2016, February). MassHealth managed care HEDIS® 2015 report, p. 38. Retrieved July 1, 2016, from http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2015.pdf

Figure 3.2.7. Follow-up care after hospitalization for mental illness within 30 days, (MassHealth managed care population)



Note: Data show MassHealth managed care population only (60% of members in 2014).
Source: UMASS Medical School, 40.

FOLLOW-UP CARE WITHIN A MONTH OF HOSPITALIZATION FOR MENTAL ILLNESS

Background

Timely follow-up care after hospitalization can reduce the risk of readmission for certain mental health conditions or time spent with a disability.[59] A critical component of effective follow-up care is the provision of a continuing care plan after discharge. Without a care plan, patients may not be able to inform their next providers of the details of their hospitalization and treatment plans.[60] Care plans should include information on diagnosis, a complete list of medications, and recommendations for follow-up care.

Nationally, patients with private commercial insurance had the highest 30-day follow-up rate at 77% compared to those with Medicare at 56%.[61] Compared to White adults, African American adults were less likely to begin adequate treatment and much less likely to receive follow-up within 30 days of a discharge,[62] while similar racial trends were measured among youth aged 6 to 17.[63]

According to CMS data, Massachusetts providers generally do a satisfactory job providing post-discharge care plans for psychiatric patients, as follows:

- In 2014, a plan was created for 83% of applicable hospitalizations, and 71% had that plan transmitted to the next level of provider upon discharge.[64]
- These rates ranged dramatically among hospitals and were slightly lower than the national average (plans created for 84% of applicable hospitalizations; 78% had plan transmitted),[65] suggesting room for improvement.
- In 2013, a plan was created for 69% of applicable Massachusetts hospitalizations, and 57% had that plan transmitted upon discharge. (Again, these figures were lower than the national averages of 77% and 70%, respectively).[66]

Massachusetts trend, 2007–2015

The Figures 3.2.6 and 3.2.7 show HEDIS measures related to the percentage of MassHealth managed care patients, aged 6 and older, who received follow-up care, in an ambulatory or intermediate treatment setting, 7 and 30 days after being discharged from a hospital following treatment for selected mental health disorders.

In 2015, MassHealth outperformed the national Medicaid 75th percentile on these measures. From 2010 to 2015, the share of MassHealth patients who received a follow-up increased at both the 7-day and 30-day marks.

MASSACHUSETTS DEPARTMENT OF MENTAL HEALTH BUDGET

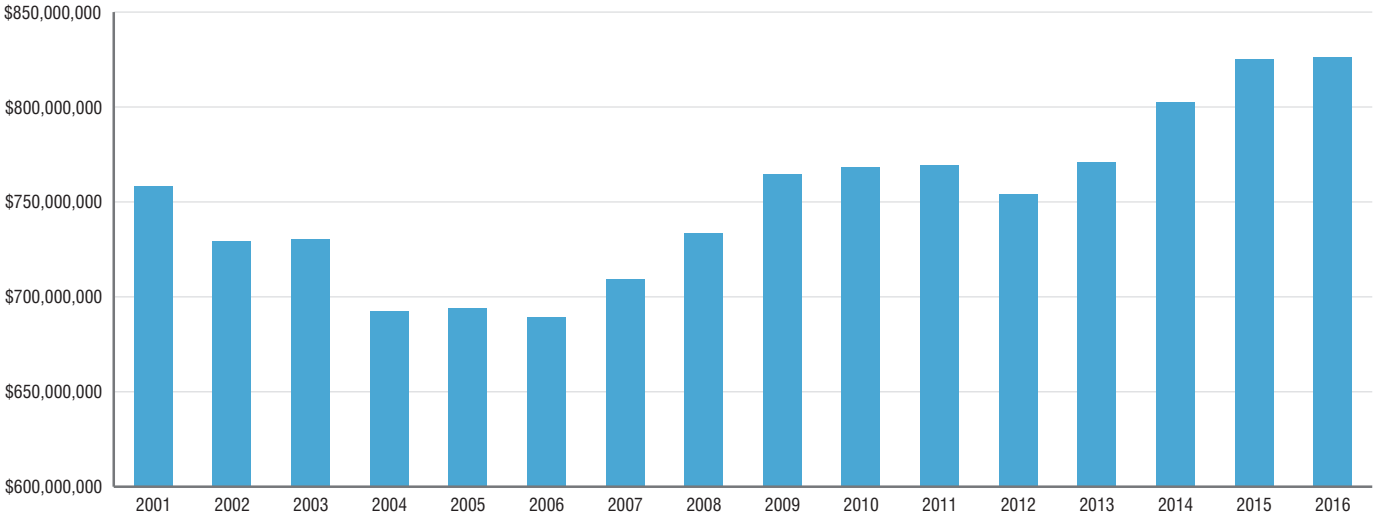
Background

The Commonwealth supports mental health care, in part, through the Massachusetts Department of Mental Health (DMH)'s community mental-health system. The cornerstone and largest part of this system for adults is a program known as Community Based Flexible Supports,[67] which accounts for the largest portion of the DMH's budget each year.[68] MassHealth also devotes considerable resources to behavioral health care. Even a well-funded DMH should not be viewed as a substitute for a coordinated and integrated health care system that addresses behavioral and medical health needs.[69]

Massachusetts trend, 2001–2016

Massachusetts' public spending on mental health shrank 16% from FY2001 to FY2012 (as shown in Figure 3.2.8)[70] but then increased 9.3% from FY2012 to FY2016, for a long-term reduction of 8.2%.[71]

Figure 3.2.8. Department of Mental Health budget by fiscal year



Note: Figures are adjusted for inflation using the Consumer Price Index; based on 2016 dollars.
Source: Massachusetts Budget and Policy Center (2016). Mental health. Retrieved June 30, 2016, from http://massbudget.org/browser/subcat.php?c1=1&c2=12&id=Mental+Health&inflation=cpi&budgets=517b16b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1#comparisons

"With Chapter 258 of the Acts of 2014, incredibly important decisions were made to [improve] access to substance abuse treatment. Largely because of the opiate epidemic ... [the law] removed prior approval for inpatient substance abuse."

— David Matteodo

SUBSTANCE USE DISORDERS

Overview

The opioid epidemic

Opioids are a class of drugs used to treat pain, including post-operative pain and pain caused by chronic conditions like cancer. The class includes prescription drugs like OxyContin, Percocet, Vicodin, and Fentanyl, as well as heroin and morphine. These drugs have a high potential for dependence. According to the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA), "substance use disorders occur when the recurrent use of alcohol and/or drugs causes clinically significant impairment, including health problems, disability, and failure to meet major responsibilities at work, school, or home."[72]

In recent years, increasing use of heroin and non-medical use of prescription opioids have resulted in sharply rising morbidity and mortality. In 2015, the rate of unintentional opioid-related overdose deaths was 25.8 deaths per 100,000 residents, up from 5.6 deaths per 100,000 residents in 2000.[73]

This epidemic has highlighted the limitations of Massachusetts' capacity to prevent and treat substance use disorders (SUDs), as suggested below:

- A recent study examined national access to substance use treatment in the wake of the ACA and found no statistically significant increase, despite Whites and Latinos increasing their access to some treatment.[74]
- Across Massachusetts, only 1 in 10 individuals with substance abuse or dependence receive treatment.[75]
- In 2013 and 2014, 9.7% of Massachusetts adults reported substance abuse or dependence.[76] The rates of SUD were much higher among people with a comorbid physical-health condition: 13.1% among those with two conditions and 14.0% among those three or more conditions.[77]
- Despite the Massachusetts health care reform law of 2006, statewide admissions to addiction treatment services organizations did not increase from 2005 to 2009, suggesting that expanded insurance coverage alone is insufficient to achieve increased treatment utilization rates.[78]
- Because only a small share of those with a SUD perceive that they need treatment, increasing capacity across the treatment spectrum may be insufficient to increase treatment utilization.[79]

Finally, the opioid epidemic is having a grave impact on newborns born to people with SUDs. Newborns exposed to drugs in utero can endure painful withdrawal symptoms for weeks or months. As many as 74.7 per 1,000 babies born in Cape Cod Hospital suffered neonatal abstinence syndrome (NAS), as reported by the hospital in a 2012 study.[80] UMass Memorial reported a more typical rate for the Commonwealth at 18 per 1,000 live births. Nationally, the rate is approximately 3.4 per 1,000 live births.[81] As part of the HCII, HPC has issued a request for up to $3.5 million in proposals to develop integrated delivery models for people affected by NAS.[82]

"Until the [overdose] crisis happened, my gosh, a lot of people wouldn't even call to talk to us. Now everyone wants to talk to us, because the kids in the suburbs are dying from heroin."

— Daniel Mumbauer

Challenges with access to substance-use disorder treatment

Patients in Massachusetts report it is hard to find "step-down" services after they complete acute detoxification programs, and evidence suggests that demand for step-down services does indeed outstrip supply.[83] These services help people with SUDs obtain tools and treatment to help prevent relapse. Because these services are hard to find, some patients find themselves in a vicious cycle, oscillating between acute detoxification, a sudden end of treatment, and relapse. Further, visits to the ED by people with behavioral health conditions (including substance use) grew 24% from 2010 to 2014 (in some regions, growth was more than 50%), despite the fact that most categories of ED use have remained relatively unchanged in recent years. [84] From 2009 to 2012, inpatient discharges for substance abuse increased by 8.7% in Massachusetts,[85] while discharges for mental health and substance abuse made up 7.4% of all inpatient discharges in the state.[86]

Both in acute and step-down treatment settings, providers have expressed a need to better tailor treatment to the large number of young people who are seeking treatment.[87]

Patients face other obstacles to optimal care for a variety of reasons, including:

- The Federal Drug Administration tightly restricts how providers can administer buprenorphine, a medication that helps people quit opiates, thus limiting how many patients can receive this promising treatment.
- Patients cite "fail-first" policies, which restrict insurance coverage for higher levels of care unless a patient has attempted and "failed" at a lower level of care.
- Many providers are insufficiently skilled in cultural competency, or the ability of SUD providers to respect and understand people from diverse backgrounds.[88]
- The applications of medical necessity criteria, which are the standards insurers and providers use to determine the appropriate setting of SUD treatment, vary widely.[89]

Efforts to increase access and limit ED visits

Hospital utilization related to alcohol and drug consumption has increased in recent years. Hospitalizations related to alcohol and substance use rose 10.7% from 2000 to 2011, and ED visits increased 60.7% from 2002 to 2011.[90] Without follow-up care, patients hospitalized for alcohol or substance use are quite likely to be re-hospitalized and consume more expensive care, yet the provision of this follow-up care is inconsistent. Nationally, 40% of patients hospitalized for opioid use from 2010 to 2014 did not receive any follow-up services in the following 30 days.[91] In fact, insurers and PCPs—who could help shepherd treatment—often do not learn of a patient's hospitalization for months.

Phases I and II of the Health Policy Commission's (HPC) Community Hospital Acceleration, Revitalization, and Transformation (CHART) Program included a goal to improve the capacity of community hospitals to treat substance abuse conditions while avoiding unnecessary hospital readmissions and ED use. For example, a Phase I program emphasizing the appropriate prescribing of opioids reduced opioid prescriptions from baseline by 43% at Lawrence Memorial Hospital and by 26% Melrose-Wakefield Hospital.[92] The same program dramatically increased the provider use of a prescription drug monitoring program (PDMP), which compels providers to check a database of previous prescriptions, at both hospitals.

According to an analysis of national data from 2001 to 2010, PDMPs are associated with a 30% reduction in the prescribing of Schedule II opioids (e.g., hydrocodone, oxycodone, and fentanyl).[93] Another recent study found that a state PDMP is associated with a reduction of 1.12 opioid-related overdose deaths per 100,000 population, with the potential for greater impact if more rigorous elements are required.[94] Under Massachusetts' new opioid law, as of October 2016, providers are required to check a PDMP before prescribing opioids (though there is no penalty for noncompliance).[95] Further, the DPH rolled out a new system called the Massachusetts Prescription Awareness Tool at the end of summer 2016, which medical residents can access for the first time.[96] In August 2016, amid reports that 57% of the Commonwealth's prescribing providers had not registered to use the PDMP, the president of the Massachusetts Medical Society expressed support for the program and urged clinicians to sign up.[97]

Policymakers and providers also are turning to interventions previously dismissed as too controversial. For example, Boston Health Care for the Homeless (BHCH), located next to Boston Medical Center, plans to open a room where people can stay after using heroin[98] to be shielded from harsh weather, monitored by nurses for overdose, and learn about treatment options. Drug use will not be allowed in the room. Governor Charlie Baker and Mayor Martin J. Walsh have expressed openness to the plan.[99]

The BHCH program is a harm-reduction approach similar to supervised-injection services (SISs), where people can inject drugs using clean needles under medical supervision. A 2014 systematic review of 75 studies found that SISs successfully attract the most marginalized people who inject drugs, enhance access to primary health care, reduce overdose frequency, reduce drug injection on the streets, and promote safer injection.[100] SISs were not linked to increased drug trafficking, injecting, or crime in the surrounding areas.

EPIDEMIOLOGY:
ILLICIT DRUG USE, AGED 12–17

Background

Nationally, teen illicit-drug use has declined slightly among all age groups in the last few years.[101] Indeed, 38.6% of 12th graders used an illicit drug in 2015,[102] down from a peak of 42.4% in 1997.[103] However, use of marijuana may be up: 34.9% of 12th-graders used marijuana in 2015, up from 32.8% in 2009.[104] One reason for the increase may be the shrinking share of young people who think regular marijuana use is harmful; 31.9% said it is harmful in 2015, down from 39.5% in 2013 and 52.4% in 2009. [105]

Though not included in the definition of "illicit drug," alcohol/tobacco use among 12- to 17-year-olds is very important to lifetime health and well-being.[106] In Massachusetts, past-month cigarette use among this age group declined from 8.2% in 2010–2011 to 4.6% in 2013–2014, while past-month binge drinking declined from 19.5% to 17.7% over the same period.[107] Additionally, 8% of U.S. 8th graders, 14.2% of 10th graders, and 16.3% of 12th graders used electronic vaporizers, which can be used to inhale nicotine and marijuana, in 2015.[108]

Massachusetts trend, 2008–2014

In Massachusetts, about 9.7% of adolescents reported using illicit drugs in the past month in 2013 and 2014, down from 12.3% in 2011 and 2012, as shown in Figure 3.2.9.[109]

MEAN AGE OF FIRST USE OF SUBSTANCES, AGED 12–17

Table 3.2.1 shows data regarding the first use of substances by 12- to 17-year-olds.

Table 3.2.1 Mean Age of First Use (U.S., 12- to 17-Year-Olds)

	2012	2014
Nonmedical use of psychotherapeutics[111]	15.3	15.2
Cigarettes	15.8	15.7
Alcohol	15.0	15.2
Marijuana	15.2	15.2

Source: Center for Behavioral Health Statistics and Quality. National Survey on Drug Use and Health: detailed tables, 2013–2014.

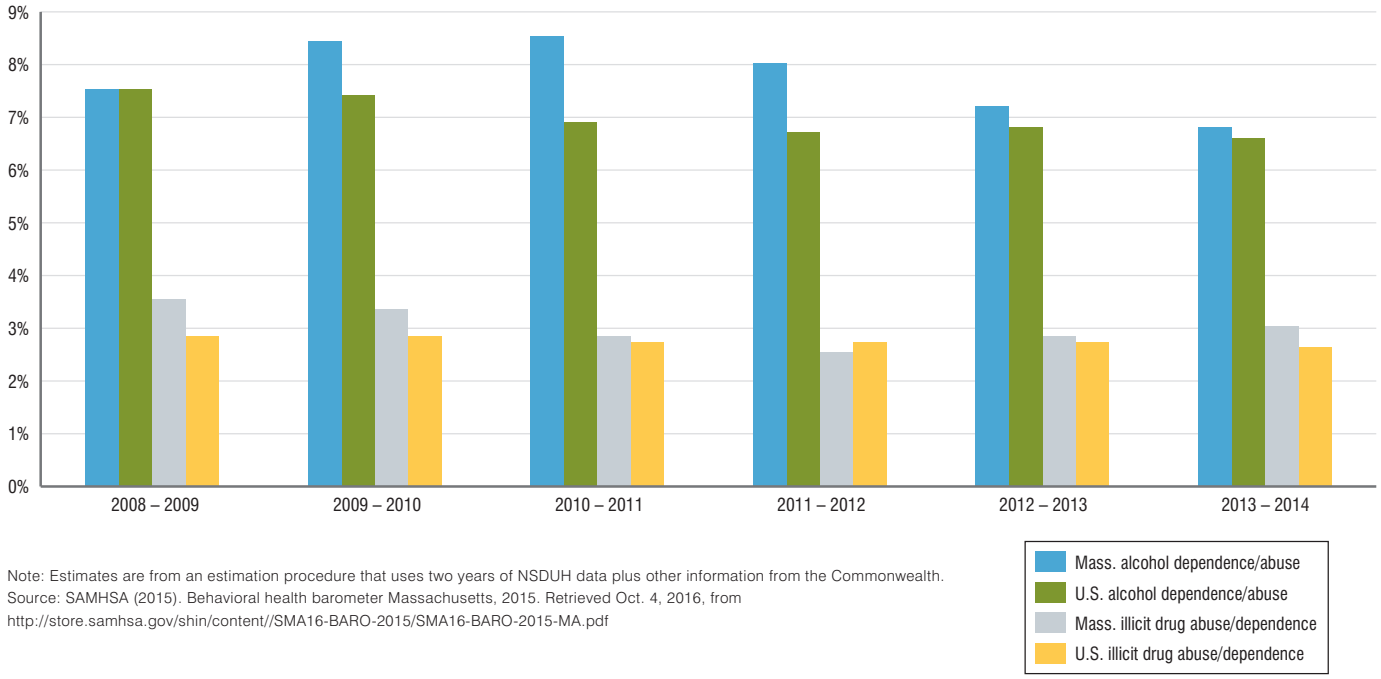
Massachusetts residents aged 12–17, from 2008 to 2012, had a mean age of first use of 13.3 years old for psychotherapeutics (non-medical use), 13.5 for alcohol, and 14.1 for marijuana.

Among this age group, the 2010–2014 annual averages for first-use were: 2.2%, psychotherapeutics (non-medical use); 4%, cigarettes; 11.2%, alcohol; and 6.4%, marijuana. This compares to the national averages of 2.8%, 4.2%, 9.9%, and 5.0%, respectively.[112] Due to a data collection change, 2010–2014 data are not available for Massachusetts adolescents' mean age of first use.

Figure 3.2.9. Past-month illicit drug use, aged 12–17

Source: SAMHSA (2016). Behavioral health barometer: Massachusetts, 2015.[110]

Figure 3.2.10. Past-year alcohol/drug dependence or abuse, aged 12 and older



Note: Estimates are from an estimation procedure that uses two years of NSDUH data plus other information from the Commonwealth.
Source: SAMHSA (2015). Behavioral health barometer Massachusetts, 2015. Retrieved Oct. 4, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

ALCOHOL AND DRUG DEPENDENCE/ABUSE

Background

Approximately 10% of the Massachusetts population aged 13 and older suffers from a substance use/abuse disorder.[113] SUD rates were higher among those with more than one comorbid physical health condition: 13.1% among people with two comorbid health conditions and 14.0% among those with three or more conditions.[114]

Compared to Whites, alcohol-treatment completion in Massachusetts is lower among African Americans and Native Americans.[115] Individuals with SUDs live, on average, 22.5 fewer years than those without.[116]

Massachusetts trend, 2008–2014

From 2013 to 2014, about 6.6% of people aged 12 and older in the Commonwealth were dependent on or abused alcohol within the past year, as shown in Figure 3.2.10.[117] About 3.0% were dependent on or abused illicit drugs.[118]

> "All these kids, ... they would have a wisdom tooth pulled, or they were involved in a sport and got a broken arm, and the next thing you know, they all have highly addictive medications."
>
> **— Daniel Mumbauer (on opioid prescribing)**

PRESCRIPTION OPIOIDS AND HEROIN DEATHS, U.S.

Background

Changes in prescribing and growing interest among providers in more aggressively treating patient pain have contributed to the increased clinical use of opioid analgesics.[119] Since the 1990s, efforts by providers to improve pain management inadequately accounted for opioids' addictiveness and their limited efficacy in treating chronic pain.[120]

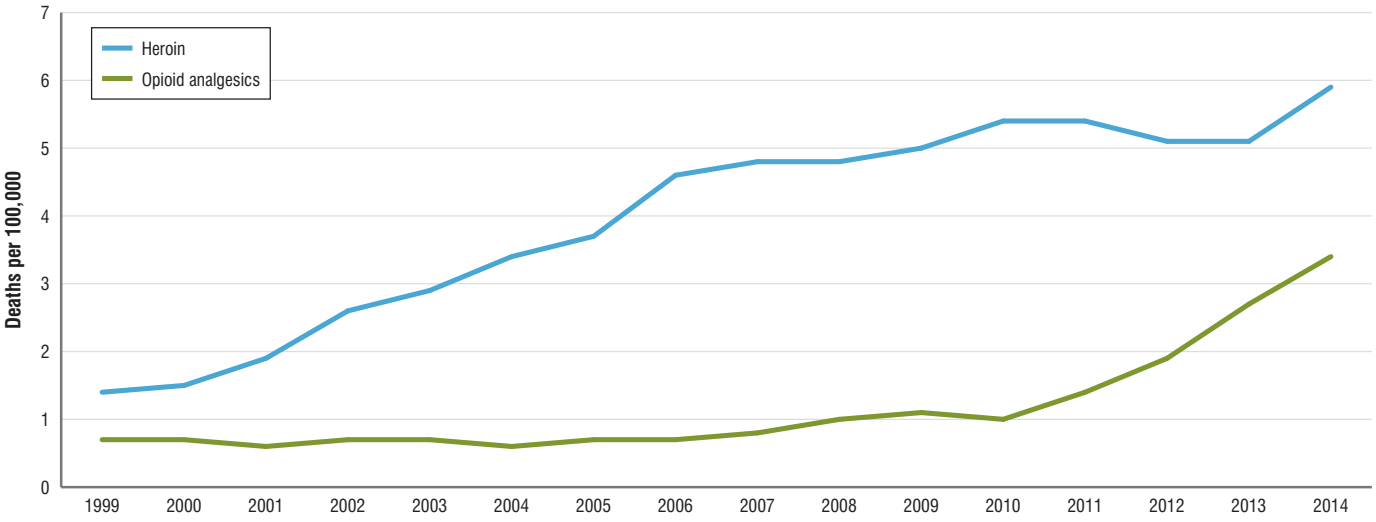
Once individuals are addicted, many turn to heroin, which provides the high of opioid analgesics at a much lower price.[121] Indeed, an analysis using national data shows that heroin users were 3.9 times as likely to report nonmedical use of opioids in the previous year as persons who did not use heroin.[122] In 2013-2014 in Massachusetts, 8.3% of opioid-related overdose decedents had an opioid prescription the month of their death; an estimated 85% had heroin and/or fentanyl, a particularly potent and dangerous opioid associated with 70% of opioid overdose deaths in 2016.[123] Because overdose deaths can be very sudden, and because the stigma surrounding drug use can deter users from seeking treatment, many people die before their addiction can be treated.

In 2013-2014 in Massachusetts, the death rate among former prison inmates was more than 50 times higher than the rate among all others, with the first month following release proving particularly pivotal.[124]

U.S. trend, 1999–2014

As shown in Figure 3.2.11, overdose death rates for prescription opioids and heroin have increased dramatically over the past decade.[125] An exception to this trend is the death rate due to methadone overdose, which in 2014 reached the lowest level in a decade,[126] despite a substantial increase in the use of methadone for medication-assisted treatment (MAT) over that time.

Figure 3.2.11. Age-adjusted rates of drug-poisoning deaths involving opioid analgesics and heroin, U.S.



Source: CDC (2015). Number and age-adjusted rates of drug-poisoning deaths. Retrieved June 3, 2016, from http://www.cdc.gov/nchs/data/health_policy/AADR_drug_poisoning_involving_OA_Heroin_US_2000-2014.pdf

OPIOID-RELATED HOSPITALIZATIONS AND DEATHS, MASSACHUSETTS

Many SUD treatment providers do not accept MassHealth because it pays less than commercial insurance. This can leave an already vulnerable, low-income population with limited access to critical substance abuse care, which leaves many patients in crisis with few options besides visiting the hospital.

On the supply side of the opioid issue, the security of opioids that originate in medical facilities is a concern. These drugs can be sold on the black market, thereby increasing the supply of opioids in the community, which facilitates addiction. In 2015, there were at least 660 incidents of drugs going missing or getting stolen from medical facilities in the Commonwealth.[127] For example, Massachusetts General Hospital reached a settlement with the U.S. Attorney amid allegations that lax control of its drug supply allowed workers to steal thousands of pills.[128]

As shown in Figure 3.2.12, hospital visits have increased sharply for patients with health complications due to the abuse of prescription opioids and heroin. Hospitalizations related to heroin only have climbed at a faster rate than those related to non-heroin opioids, but the number of visits related to prescription opioids is higher than for heroin only. Males, people aged 25 to 34, and individuals with incomes below $50,000 are at a particularly high risk of opioid-related hospital visits.[129]

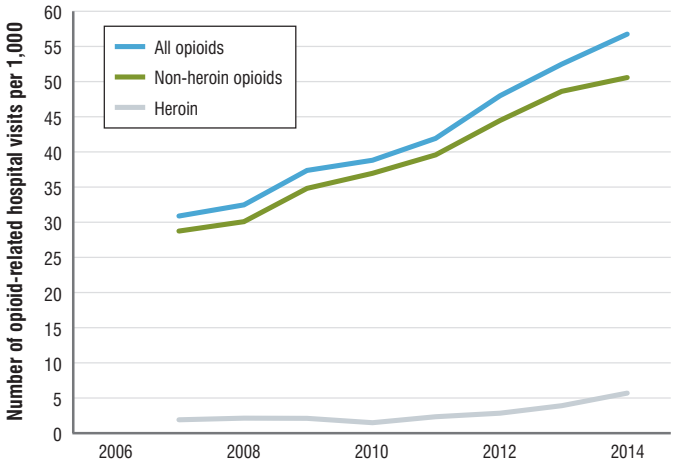
As shown in Figure 3.2.13, the rate of confirmed opioid-related deaths more than doubled from 2010 to 2014 in Massachusetts. Preliminary data from 2015 suggest that the death rate is not abating. Additionally, men remain at higher risk than women (751 of the 1,005 opioid deaths from January to September 2016 were among males), and Latinos have a higher risk than Whites.[131]

As shown in Figure 3.2.14, the opioid epidemic has affected every corner of the state, but Barnstable, Bristol, Dukes, Essex, and Plymouth counties have the highest rate of unintentional opioid-overdose deaths.

The rise in Massachusetts' opioid-overdose deaths has mirrored the nationwide increase, though the epidemic is generally more severe in northeastern states. As Congress takes little action to fund anti-overdose initiatives, governors nationwide are grappling with fallout from the crisis. In February 2016, the National Governor's Association announced it would develop prescription protocols similar to those employed by Blue Cross Blue Shield of Massachusetts,[132] which reports its protocols have significantly reduced the volume of opioid prescriptions, among other successes.[133]

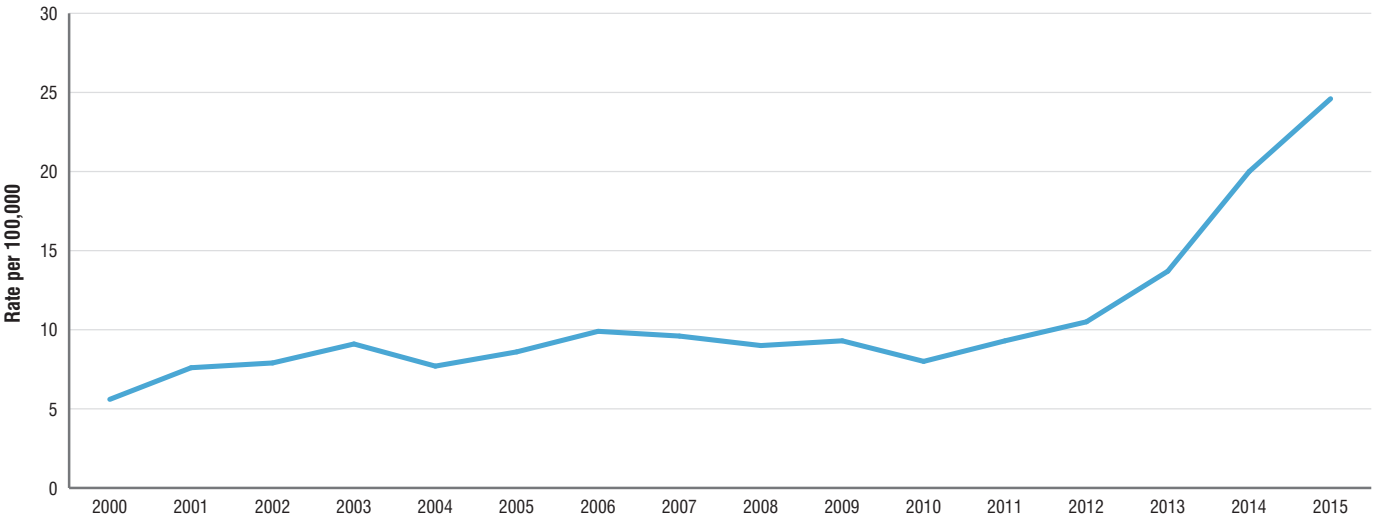
Program administrators beyond the health sector are beginning to recognize their role in fighting addiction. For example, inmates with SUDs at the

Figure 3.2.12. Opioids-related hospital visits, Massachusetts



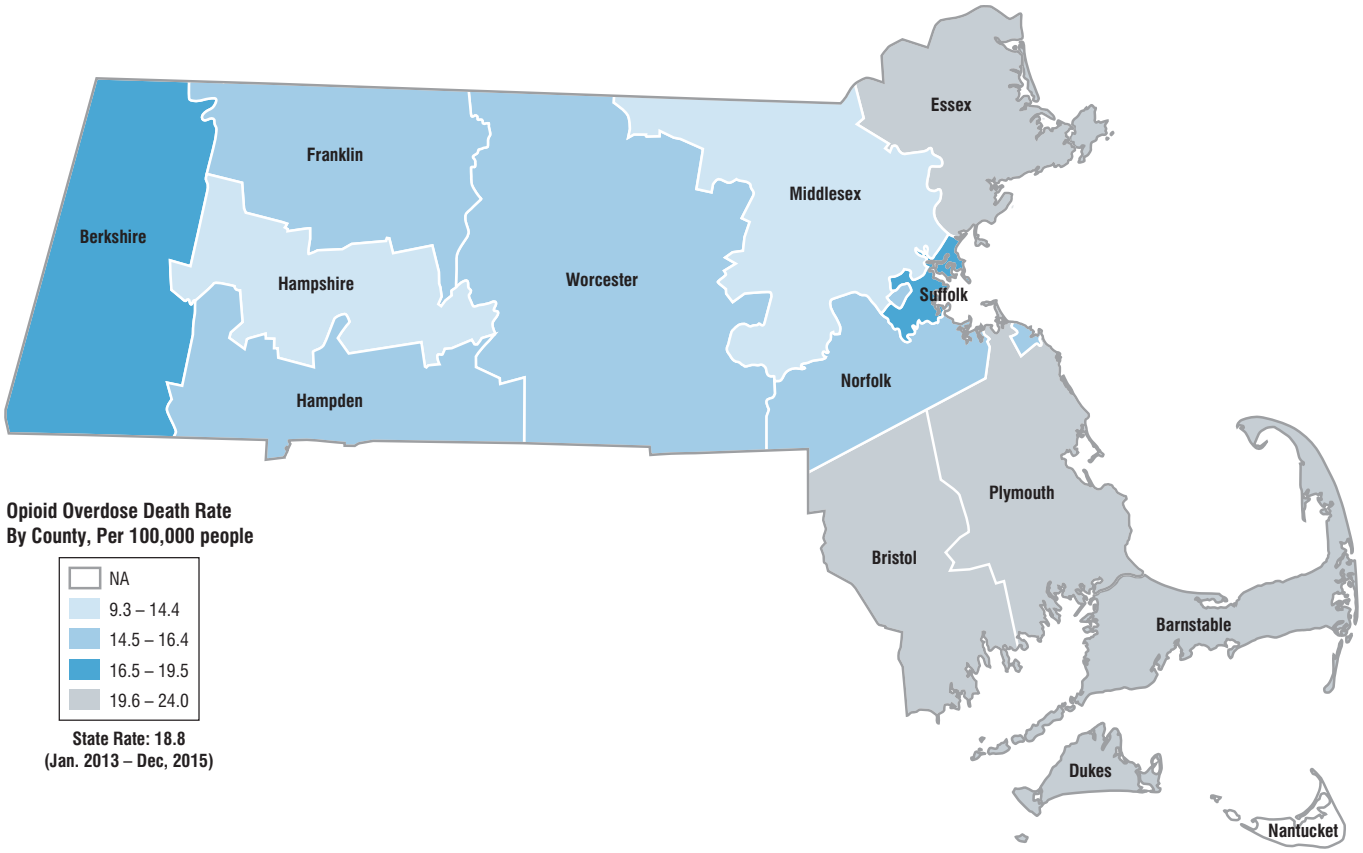
Source: Quality Improvement and Patient Protection (QIPP) Committee, Massachusetts Health Policy Commission[130]

Figure 3.2.13. Rate of unintentional/undetermined opioid-related deaths by year (Massachusetts residents)



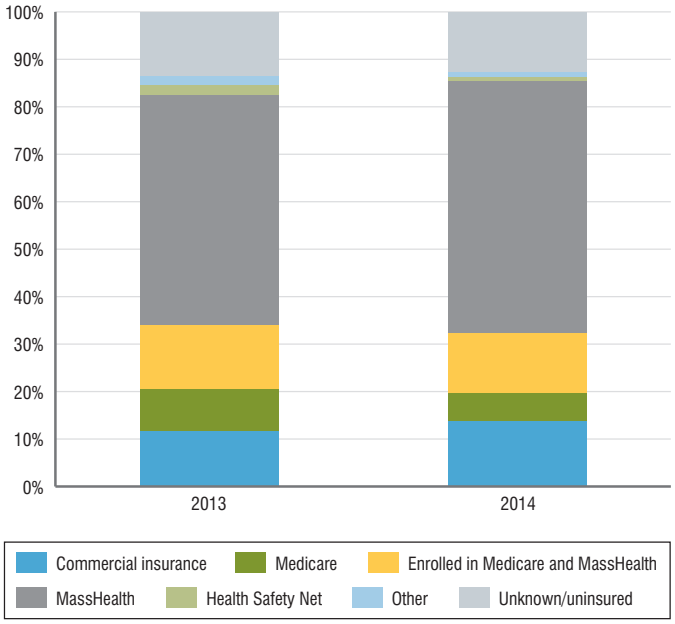
Note: Suicides are excluded from this analysis. Opioids include heroin, opioid-based prescription painkillers, and other unspecified opioids.
Source: Massachusetts Department of Public Health (2016, November). Data brief: opioid-related overdose deaths among Massachusetts residents. Retrieved November 8, 2016, from http://www.mass.gov/eohhs/docs/dph/stop-addiction/current-statistics/data-brief-overdose-deaths-nov-2016-ma-residents.pdf

Figure 3.2.14. Rate of unintentional opioid-overdose deaths by county (per 100,000 people), 2013–2015



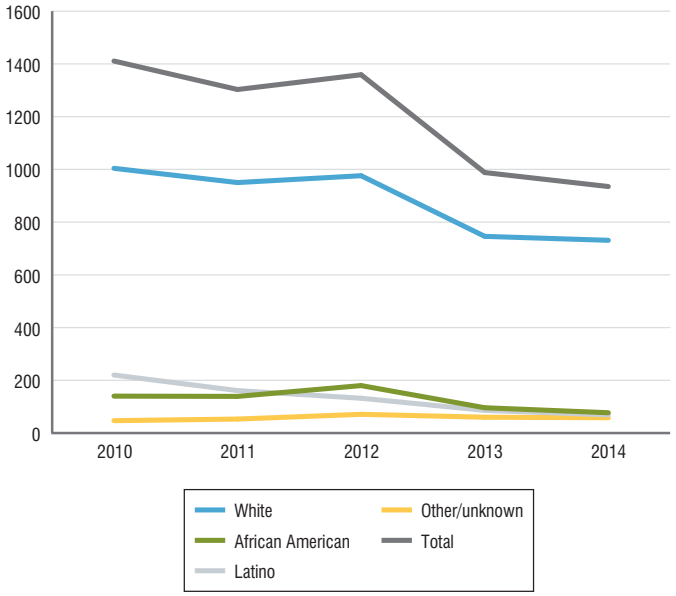
Source: Massachusetts Department of Public Health (2016, November). Data brief: opioid-related overdose deaths among Massachusetts residents. Retrieved November 8, 2016, from http://www.mass.gov/eohhs/docs/dph/stop-addiction/current-statistics/overdose-deaths-by-county-nov-2016.pdf

Figure 3.2.15. Opioid-related deaths by insurance type, Massachusetts



Source: Massachusetts Opioid Working Group (2015, June 11). Recommendations of the governor's opioid working group, p. 33. Retrieved June 26, 2015, http://www.mass.gov/eohhs/gov/departments/dph/stop-addiction/recommendations-from-the-governors-opioid-addiction-working-group.html

Figure 3.2.16. Hospital visits for acute alcohol poisoning, Massachusetts (all ages)



Note: Hospital visits were recorded under billing codes for "toxic effect of ethyl alcohol" and "accidental poisoning by alcohol."
Source: CHIA via Massachusetts Department of Public Health, Injury Surveillance Program

Hampshire County Jail and House of Correction are offered training on how to use naloxone—the medication that can reverse overdoses—and counseling about staying drug-free after their release.[134] Additionally, the opioid addiction law enacted in March 2016 requires schools to conduct substance abuse screenings, (though, in some cases, students, parents, and schools may opt out).[135] Moreover, housing advocates have identified stable and affordable housing as a way to reduce risk of addiction.[136]

According to a report from the governor's working group on opioid addiction, the Commonwealth must create new pathways to addiction treatment, such as through "step-down" settings—those that are less intense than acute treatment services (ATS).[137] The group endorsed increasing the availability of MAT, improving data resources to help identify overdose "hot spots," and enhancing the prescription-monitoring program, among other measures. Many of the group's aims were included in the 2016 opioid law.

The limited availability of affordable step-down treatment options has disproportionately affected members of MassHealth. Indeed, Figure 3.2.15 shows that members of the public insurance program account for a disproportionate share of opioid deaths. Conversely, those with commercial insurance are far less likely to die from opioid use.

HOSPITAL VISITS FOR ACUTE ALCOHOL POISONING

Background

Ethyl alcohol poisoning can occur after an individual drinks too many alcoholic beverages, particularly in a short period of time.[138] Complications include choking on vomit, cessation of breathing, severe dehydration, brain damage, and death.[139] According to the CDC, alcohol poisoning kills more than 2,200 people in the U.S. each year.[140] American Indians/Alaska Natives have the highest risk of death.[141]

Massachusetts trend, 2010–2014

In 2014, men accounted for 55.6% alcohol-poisoning hospitalizations in Massachusetts, while younger people (aged 15 to 44) accounted for 56.3% of poisonings.[142]

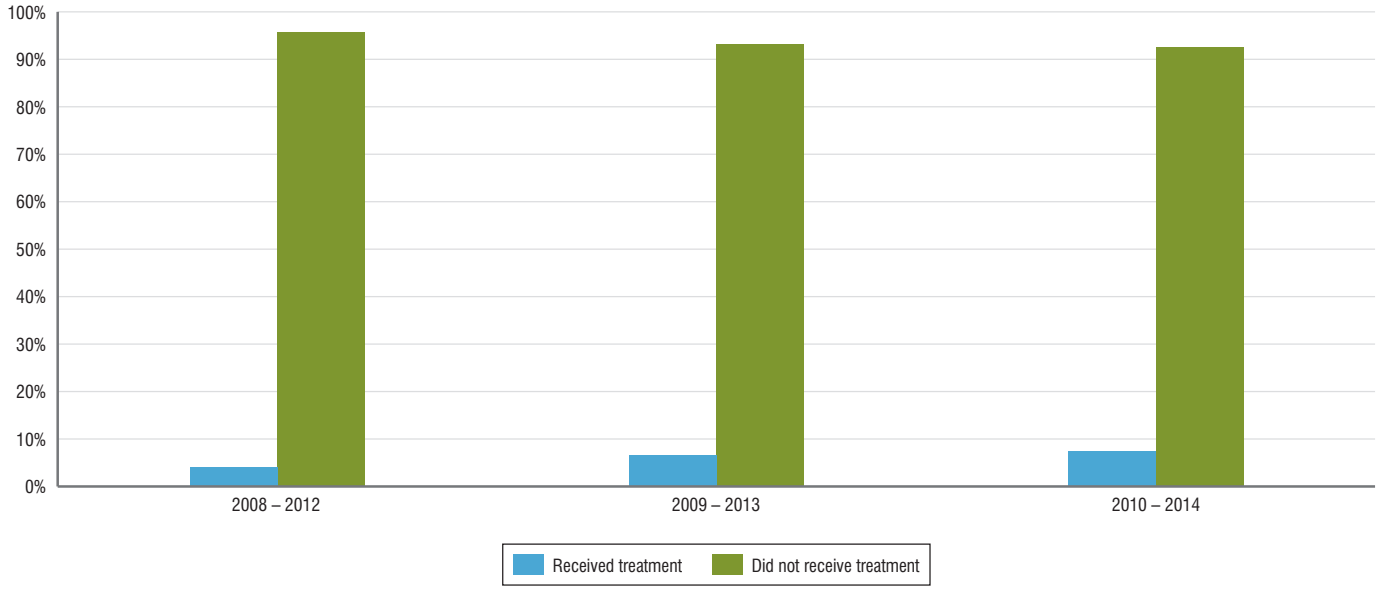
As shown in Figure 3.2.16, hospital visits for acute alcohol poisoning declined from 2010 to 2014. Whites, who account for 82.1% of the Massachusetts population,[143] made 78.2% of acute alcohol poisoning hospital visits in 2014.

TREATMENT UTILIZATION: TREATMENT AMONG HEAVY ALCOHOL USERS AGED 21 AND OLDER

Background

Among people who receive treatment for alcohol-use disorder, one-third show no symptoms one year after treatment, while many others substantially reduce drinking and have fewer alcohol-related problems.[144] Treatment may include medication, counseling, and/or mutual-support groups such as Alcoholics Anonymous.[145] Both in the Commonwealth and nationwide, fewer than 10% of people suffering from alcohol abuse/dependence receive treatment.[146]

Figure 3.2.17. Treatment among heavy alcohol users aged 21 and older, Massachusetts



Sources: SAMHSA. Behavioral health barometers for Massachusetts (2013-2015). Retrieved from samhsa.gov.

Massachusetts trend, 2008–2014

SAMHSA defines heavy alcohol use as drinking five or more drinks on the same occasion on each of 5 or more days in the past 30 days. In Massachusetts, about 7.4% of people aged 21 years or population reported heavy alcohol use within the last month from 2010 to 2014.[147] The nationwide rate during that same period was 6.7%.[148]

As shown in Figure 3.2.17, the share of heavy alcohol users who received treatment increased from 4.2% in 2008-2012 to 7.5% in 2010-2014.

HOSPITAL ADMISSIONS FOR SUD

Background

For years, Massachusetts residents with substance use problems have struggled to find appropriate treatment. The research shows:

- In Massachusetts, opioid-related overdose deaths have increased dramatically since 2012, going from 10.5 deaths per 100,000 residents to 25.8 per 100,000 in 2015.[149]
- From 2014 to 2016, U.S. residents became more concerned with the impact of drug use.[150]
- Well below half of people with treatment needs are currently in treatment.[151]
- Only 13.6% of people aged 12 or older with illicit-drug dependence or abuse received treatment annually from 2010 to 2014, similar to the national average of 14.1%.[152]

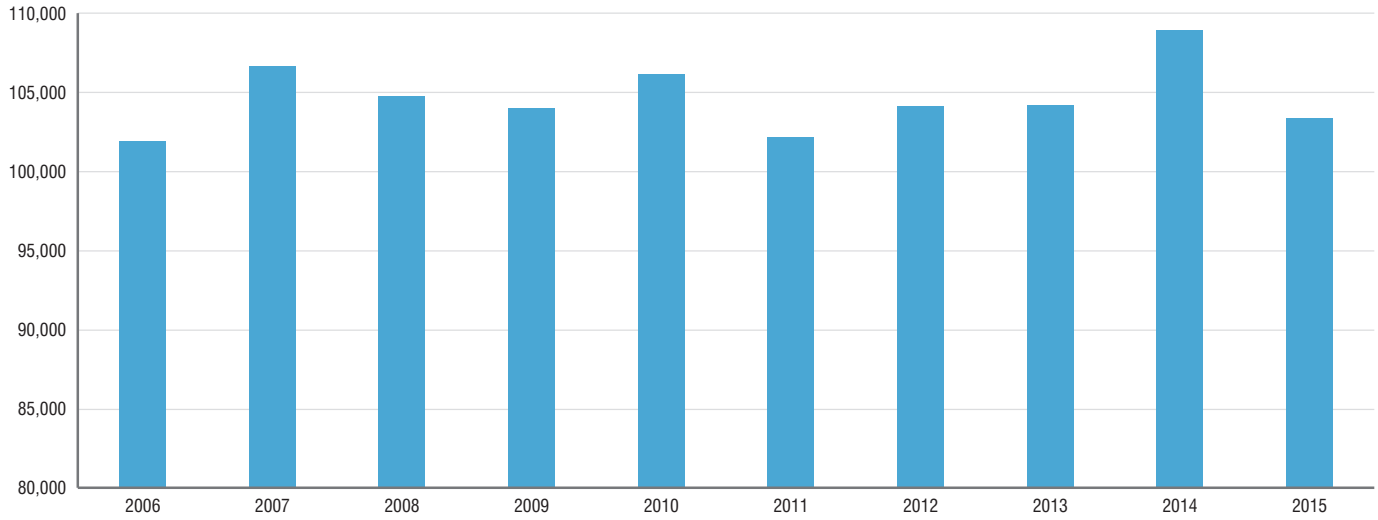
Legislators, local communities, and even the private sector are backing innovative approaches to address the opioid epidemic, including:

- Under the Commonwealth's civil commitment law, people deemed a risk to themselves or others due to addiction can be ordered by a judge to be held for up to three months in an inpatient substance-abuse facility. "If you're sick and you're detoxing and you want help, sometimes it's much faster to come down to the courthouse," Judge Rosemary Minehan, who leads the District Court Committee on Mental Health and Substance Abuse, told *Boston Globe*.[153]

- The Gloucester Police Department made waves in 2015 when it launched a program that invites community members addicted to opioids to surrender their drugs at police headquarters without risk of arrest.[154] Individuals receive help with finding treatment, financial assistance to pay for treatment, and are matched with volunteer "angels" to shepherd them through the ups, downs, and complications of treatment. Initial skepticism and legal concerns from the public gave way to plaudits.
  - In the first year of the program, about 420 addicts used the angel program.
  - The department spent $23,000 to run the program but estimates it would have cost $94,000 to arrest and jail the same number of people.[155]
  - As the ultimate metric of success, fatal heroin overdoses declined significantly: 16 people died in 2014 and before the program started in 2015, while only one person died during the rest of 2015 and the first four months of 2016.[156]

- The opioid epidemic has drawn investor attention to substance abuse treatment. Recovery Centers of America, which is backed by private equity, is renovating a defunct Danvers hospital to add a 210-bed substance-abuse treatment center.[157] Elsewhere, Ray Tamasi, the president and CEO of an addiction treatment center on Cape Cod, told WBUR "I've been doing this for 40 years, and I've been doing presentations at private equity firms [that] want to understand behavioral health because they want to understand and invest in it. I've done more of those in the past year than I've done in my entire career."[158]

Figure 3.2.18. Hospital admissions for substance abuse treatment, Massachusetts



Source: Bureau of Substance Abuse Services, Massachusetts Department of Public Health, 2016

Massachusetts trend, 2006–2015

Hospital admissions due to substance abuse in Massachusetts were generally stable from 2006 to 2015, increasing 1.4% over that period, as shown in Figure 3.2.18.

> "Finally, there's more support beginning to happen for community-based interventions. ... That's really where we need to put more effort, in trying to get that support in the community, which is obviously the lowest-cost place you can be."
>
> — Daniel Mumbauer

SUD TREATMENT UTILIZATION BY RACE/ETHNICITY

Background

Nationally, 10.2% of individuals aged 12 and older used an illegal drug in the last month, according to a 2014 study.[159] The rate was 12.4% among African Americans and 8.9% among Latinos. Among people aged 12 to 20, 22.8% reported past-month alcohol use, while the rate among African Americans alone was 17.3%.

For the 12–20 age group, 13.8% of Whites participated in binge-drinking in the past month, compared to 8.5% of African American youth.[160] The higher rate among Whites may be due to the association of binge drinking and college attendance; Whites attend college at higher rates.

In Massachusetts, among those fortunate enough to access a treatment program for substance abuse (non-alcohol), Whites and Native Americans had the highest completion rates, followed in order by African Americans, Latinos, and Asians. For alcohol treatment, Asians had the highest completion rate, followed in order by Whites, Latinos, African Americans, and Native Americans.[161]

Nationwide, counties with more African American, Latino, and/or uninsured residents are less likely to have an outpatient substance-use-disorder facility that accepts Medicaid, according to a nationwide analysis conducted before the Medicaid expansion under the ACA.[162] Moreover, there have been more closures of public treatment centers in counties where higher proportions of African American residents live.[163]

Massachusetts trend, 2006–2015

From 2011 to 2015, the racial/ethnic composition of Massachusetts substance abuse treatment utilization was generally stable. However, African American admissions as a share of total utilization declined 17%, from 7.37% to 6.13%, as shown in Table 3.2.20. Whites, who made up 80% of the Commonwealth's population in 2010,[164] accounted for about 77% of admissions in 2011 and 2015, as shown in Table 3.2.20.

TREATMENT UTILIZATION AMONG PEOPLE WITH ILLICIT-DRUG DEPENDENCE/ABUSE

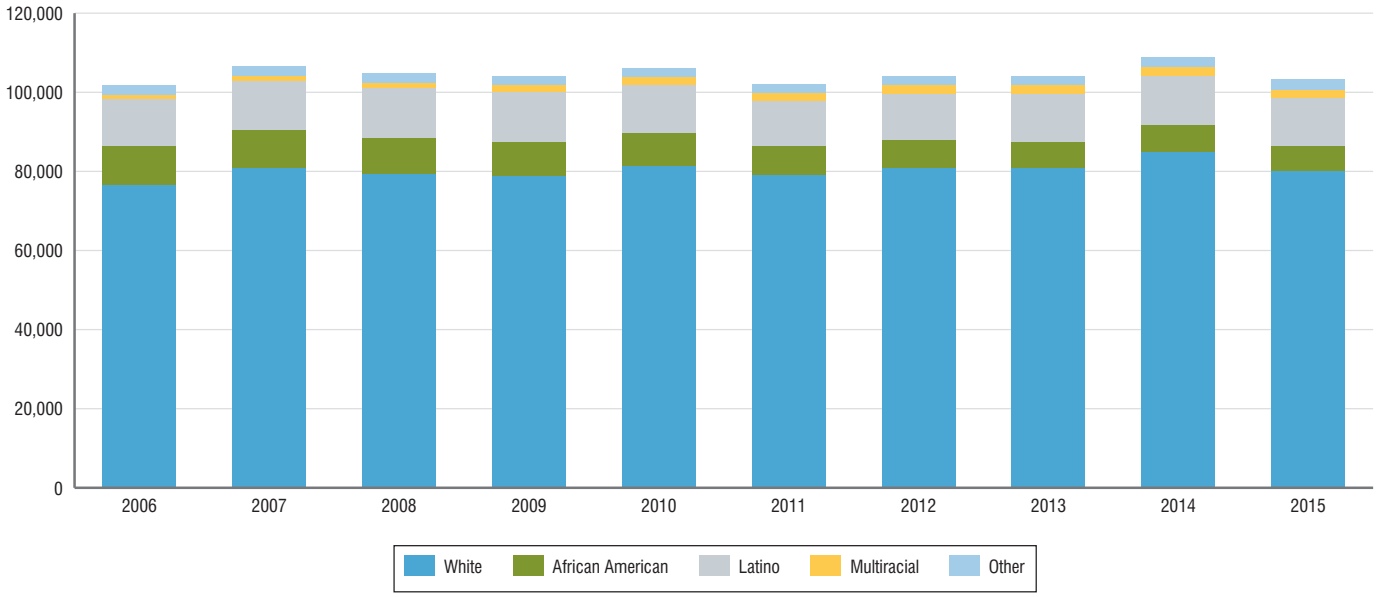
Background

Illicit drugs include marijuana/hashish, cocaine (including crack), inhalants, hallucinogens, heroin, and prescription drugs used non-medically. Treatment for illicit-drug use includes treatment received at any location, such as a hospital (inpatient or outpatient), rehabilitation facility (inpatient or outpatient), mental health center, emergency room, private practice, self-help group (e.g., Alcoholics Anonymous), or prison/jail.

Massachusetts trend, 2008–2014

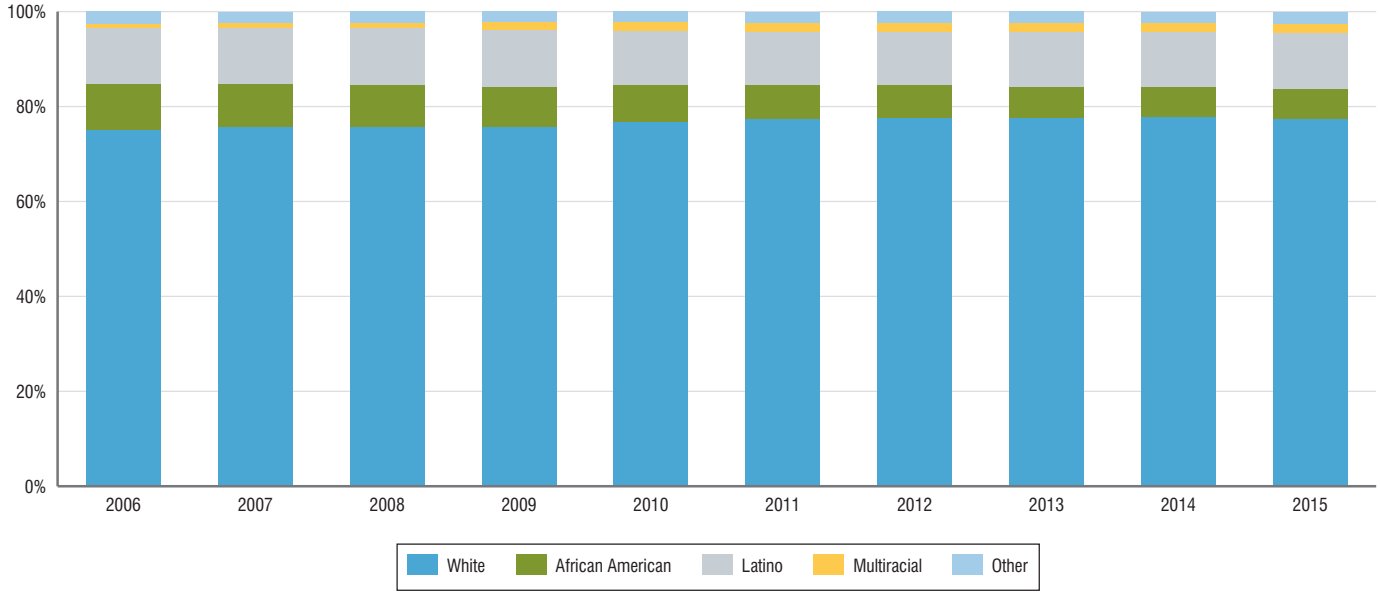
Figure 3.2.21 shows that, from 2008 to 2012, about 24,000 Massachusetts residents (aged 12 and older) received treatment for drug dependence/abuse in the past year, which constitutes only about 14.1% of people with drug dependence/abuse problems. From 2010 to 2014, the share decreased slightly, to 13.6%.

Figure 3.2.19. Substance-abuse-treatment admissions, number by race/ethnicity, Massachusetts



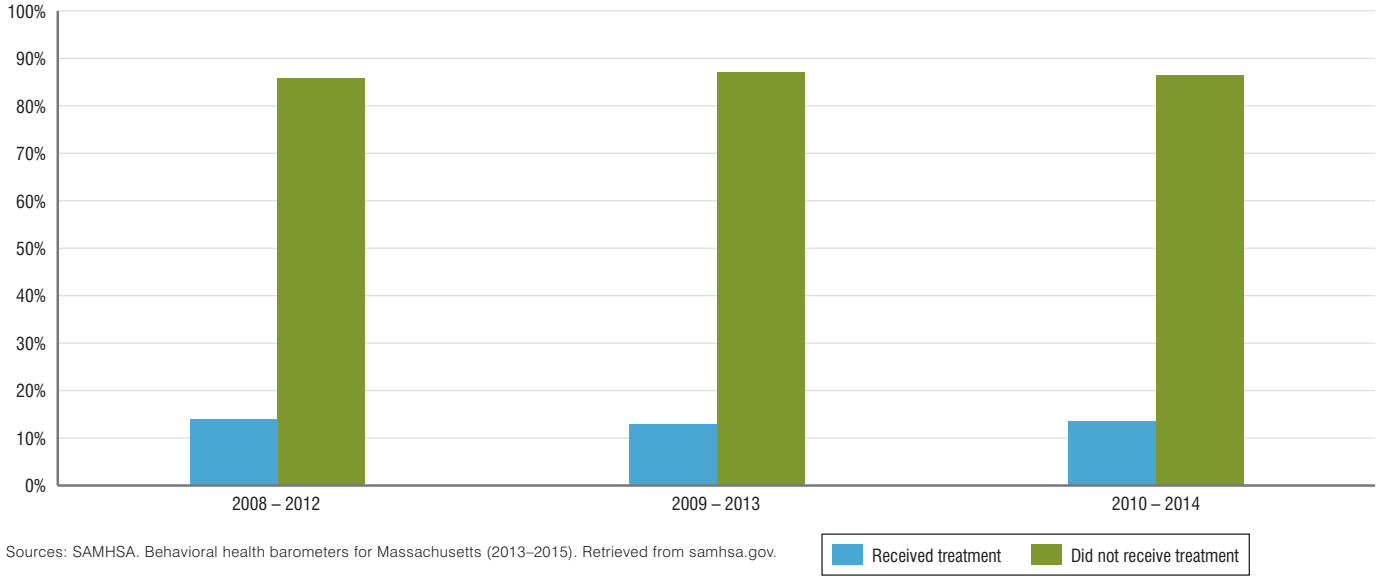
Source: Treatment statistics prepared by the Office of Data Analytics and Decision Support, Bureau of Substance Abuse Services (BSAS), Massachusetts Department of Public Health on April 1, 2016, with data as of March 11, 2016

Figure 3.2.20. Substance-abuse-treatment admissions, percentage by race/ethnicity, Massachusetts



Source: Treatment statistics prepared by the Office of Data Analytics and Decision Support, BSAS, Massachusetts Department of Public Health on April 1, 2016, with data as of March 11, 2016

Figure 3.2.21. Past-year illicit drug use treatment among individuals (aged 12 or older) with illicit drug dependence/abuse, Massachusetts



Sources: SAMHSA. Behavioral health barometers for Massachusetts (2013–2015). Retrieved from samhsa.gov.

INITIATION AND ENGAGEMENT OF SUD TREATMENT (MASSHEALTH MANAGED CARE POPULATION)

Background

As the opioid crisis (including use of heroin and fentanyl) persists, some providers are exploring new ways to identify and triage substance abuse cases. Since fall of 2014, for example, Massachusetts General Hospital has screened all patients for substance use, regardless of why they present for care,[165] South Shore Mental Health provides behavioral health clinical and navigation services in multiple settings, and Athol and Heywood Hospitals initiated a number of initiatives to benefit the entire region, including tele-behavioral health and school-based therapy.[166]

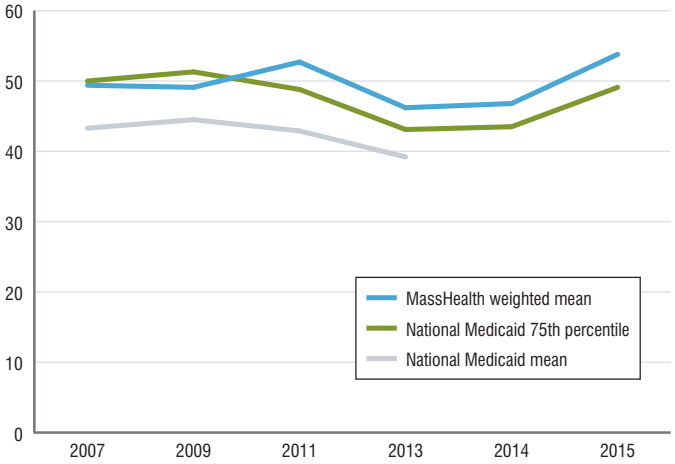
In Massachusetts from 2010 to 2014, 7.5% of those with alcohol dependence or abuse received treatment during the past year,[167] similar to the national rate of 7.3%.[168] For people with an illicit-drug-use disorder or dependence, the past-year treatment rate during the same period was 13.6% in Massachusetts and 14.1% nationally.[169]

Massachusetts trend, 2008–2014

This HEDIS measure tracks two elements: the percentage of MassHealth members in managed care, aged 13 and older, with a new episode of alcohol or drug dependence who initiate treatment within 14 days of diagnosis (see Figure 3.2.22), and the percentage of those members who initiated treatment and had at least two more services within 30 days of the initiation visit (see Figure 3.2.23).[170] Inpatient services include detoxification at either a hospital or treatment facility and intermediate services include day-treatment and partial-hospitalization programs.[171]

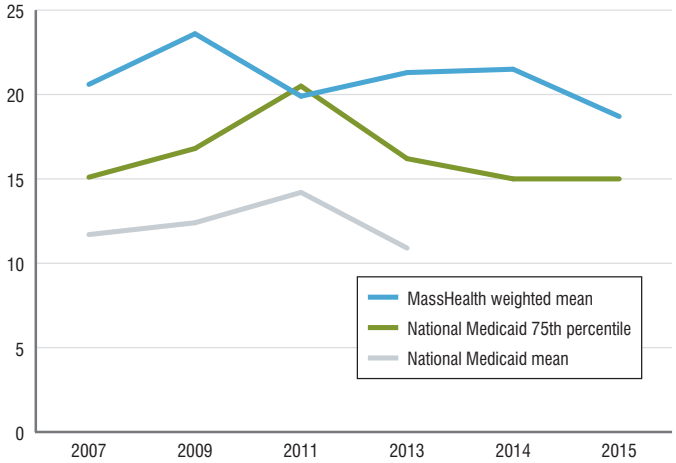
This portion of Massachusetts' population is performing above the national Medicaid 75th percentile, with more than 50% initiating treatment within 14 days of diagnosis and 18.7% having at least two additional treatment visits within 30 days of the initial visit (2015). The general trend of those engaging with treatment post-initial visit decreased from 2014 to 2015, suggesting additional or improved interventions are needed.

Figure 3.2.22. Initiation of drug/alcohol treatment among those with substance dependence (MassHealth managed care population)



Note: Data are for MassHealth managed care population only (60% of members in 2014).
Source: 2013 HEDIS report, p. 55. Retrieved June 17, 2016, from: http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

Figure 3.2.23. Engagement of drug/alcohol treatment among those with substance dependence (MassHealth managed care population)



Note: Data are for MassHealth managed care population only (60% of members in 2014).
Source: 2013 HEDIS report, p. 55. Retrieved June 17, 2016, from: http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2013.pdf

SUD TREATMENT UTILIZATION BY PROGRAM TYPE

Background

Providers offer several types of substance use programs, including:[172]

- Addiction treatment services (ATS), which entail detoxification and 24-hour nursing care designed to monitor and alleviate withdrawal symptoms. Typically, these residential programs last for less than 30 days.
- Outpatient counseling, for individuals and families affected by substance abuse. Participants are advised on building skills for staying substance-free.
- Day-treatment programs, which provide each client with several hours of daily counseling (including individual, group, and family counseling and case management), up to four days a week.
- Residential programs, which can take several forms and last for longer than 30 days. A popular variety is recovery homes, which provide a structured therapeutic setting where residents are encouraged to contribute to the community and find employment.[173] These "sober homes" are often unlicensed, raising concerns among regulators and advocates that they may not uphold rigorous standards of care.[174]

In the wake of the new Medicaid waiver agreement between the Obama Administration and the Commonwealth, MassHealth plans to cover residential rehabilitation treatment for people with SUD starting sometime in 2017.[175] Previously, the program had covered only shorter-term detoxification treatment.[176]

Policymakers trying to increase the availability of substance use care could examine Massachusetts' medical licensure policies. Adopting the Interstate Medical Licensure Compact would streamline licensure procedures and could increase provider supply by attracting providers from other states.[177]

Medication-assisted treatment (MAT) is another tactic used to treat substance abuse. According to SAMHSA research, the combination of medication and therapy is often the most successful strategy to address opioid addiction.[178] Other MAT findings include:

- In Massachusetts in 2013-2014, individuals engaged in MAT had a death rate about half that of those not engaged in MAT.[179]
- MAT providers are clustered in the most densely populated areas, particularly eastern Massachusetts.[180]
- The U.S. Food and Drug Administration (FDA) has approved three medications for use in MAT to treat opioid addiction: methadone (see Figure 3.2.24), naltrexone, and buprenorphine.
- A systematic review concluded that, in dependent opiate users, methadone and buprenorphine treatment are more effective and cost-effective than no drug therapy.[181]
- There are several barriers to access, including a cultural resistance to the use of medication for treatment and the lack of linkages between physicians and treatment centers.[182]
- For cannabis, cocaine, or methamphetamine dependence treatment, there are currently no FDA-approved medicines.[183]
- As of 2017, the Massachusetts Health Connector will compel plans offering subsidized care to eliminate all out-of-pocket costs for MAT and associated counseling.[184]

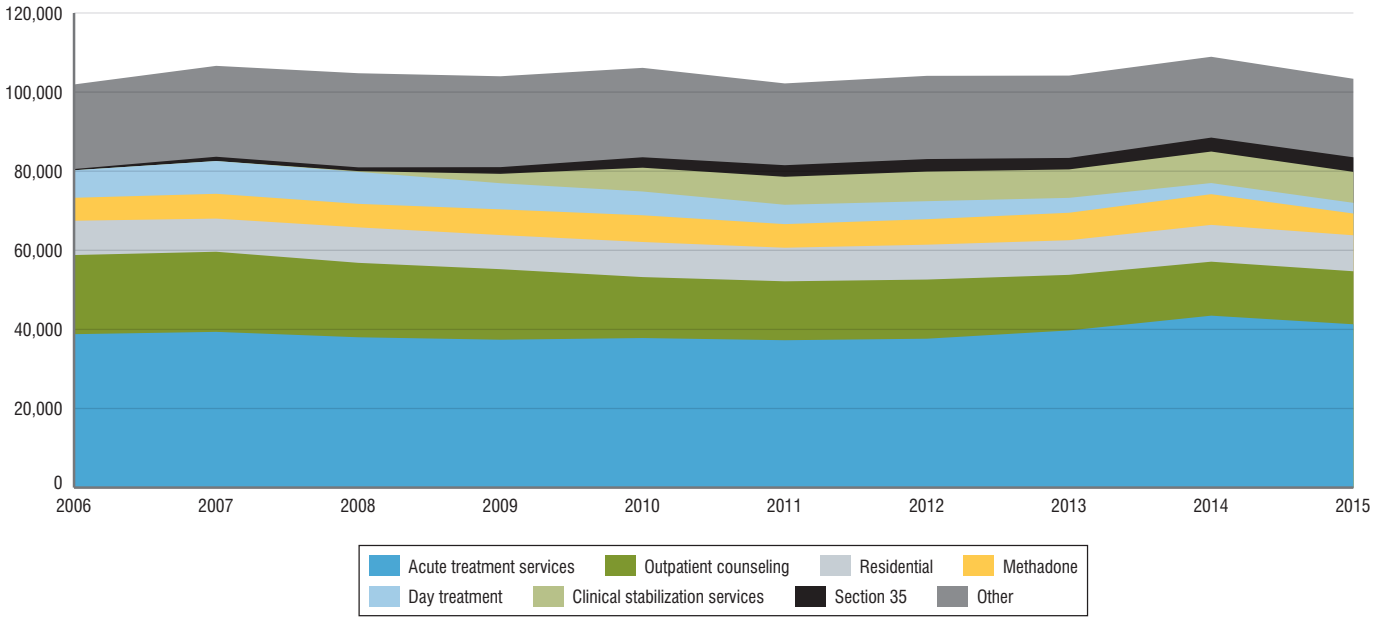
Massachusetts trend, 2006–2015

Overall admissions and admissions to methadone and residential programs were relatively stable from 2006 to 2012. However, outpatient counseling and day treatment volume decreased in Massachusetts, as shown in Figure 3.2.24.[185] After 2012, there was an increase in utilization that largely disappeared between 2014 and 2015.[186]

INPATIENT BEDS FOR ACUTE SUBSTANCE ABUSE TREATMENT

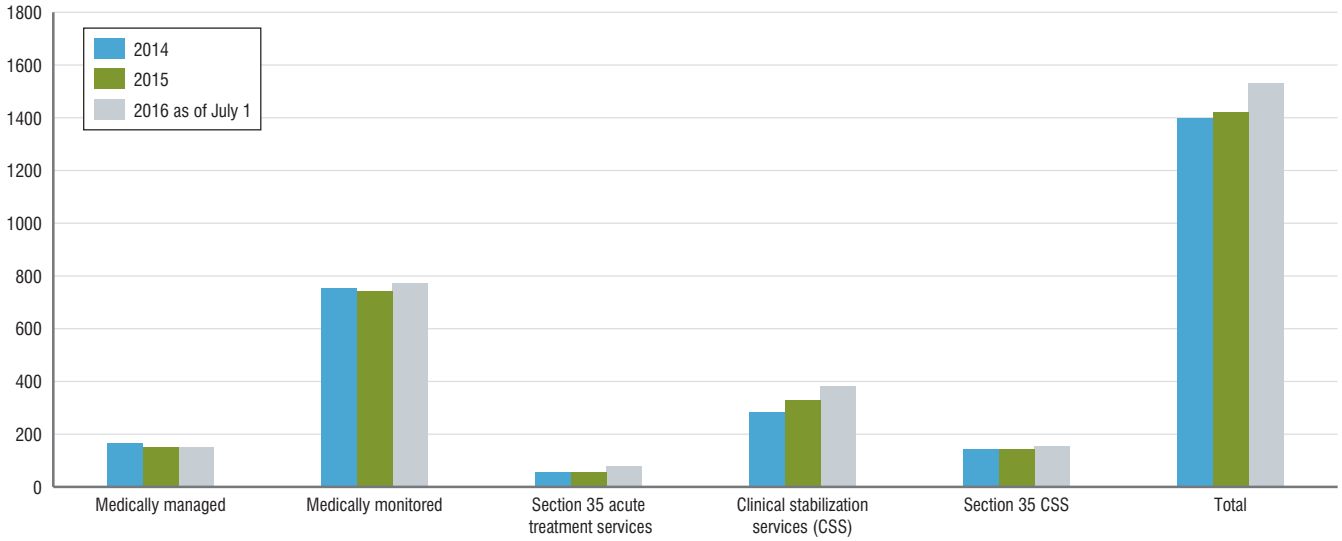
In 2014, 1,399 beds were available for inpatient and other acute substance abuse services in Massachusetts,[189] which increased slightly to 1,531 as of July 1, 2016, as shown in Figure 3.2.25. Generally, this increase was observed in all bed types, with the exception of medically managed slots, which slightly declined. With 5.6 million residents aged 13 and older, the ratio of beds to population was 25 beds per 100,000 people in 2014.[190]

Figure 3.2.24. Treatment admissions by service category



Source: Treatment statistics prepared by the Office of Data Analytics and Decision Support, Bureau of Substance Abuse Services, Massachusetts Department of Public Health, on April 13, 2016, with data as of March 11, 2016.[187, 188]

Figure 3.2.25. Inpatient beds for acute substance abuse



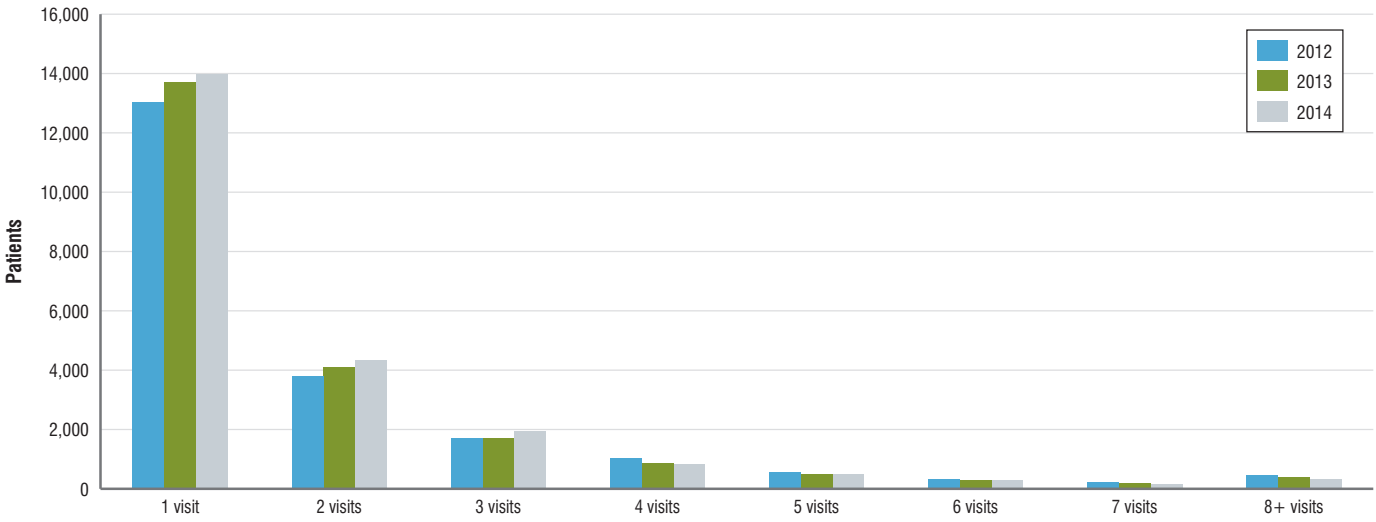
Note: Medically managed and medically monitored beds involve the highest level of medical oversight. Section 35 indicates court-ordered treatment. Section 35 CSS programs preferentially admit Section 35 ATS discharges for longer-term stabilization services.

Source, 2014: Massachusetts Department of Public Health (2014, December). State health plan: behavioral health [PowerPoint slide 43]. Retrieved April 21, 2016, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/deliverable/behavioral-health-state-health-plan.pdf

Source, 2015: Bureau of Substance Abuse Services (2015, April 27). Overview of substance use treatment capacity in the Commonwealth, p. 2. Retrieved April 21, 2016, from http://www.mass.gov/courts/docs/substance-use-treatment-capacity.pdf

Source, 2016: Personal communication with Bureau of Substance Abuse Services (July 19, 2016).

Figure 3.2.26. Use of ATS in a single year



Note: Data drawn from DPH-licensed ATS providers.
Source: Massachusetts Opioid Working Group Recommendations of the governor's opioid working group (2015, June 11). Retrieved June 26, 2015, from p. 13 http://www.mass.gov/eohhs/docs/dph/stop-addiction/recommendations-of-the-governors-opioid-working-group.pdf

RECIDIVISM AMONG THOSE RECEIVING ACUTE-TREATMENT SERVICES

Background

Patients in Massachusetts report difficulty with securing ATS for detoxification. A further challenge presents once patients are discharged from ATS, since few slots are available in stabilization services, community-based support services, or residential services.[191] Given the limited availability of follow-up care, some patients re-enter ATS multiple times.

Massachusetts trend, 2012–2014

In 2014, 4,524 Massachusetts residents utilized ATS services at least three times, as shown in Figure 3.2.26.[192] Two people received ATS treatment an astounding 23 times each. If repeat users of ATS services had received ongoing treatment, it would have freed up at least 16,000 additional ATS slots for additional patients.[193]

"Are we going to treat addiction [and other mental health conditions] as a disease, an illness like diabetes ... or not?"

— David Matteodo

Summary of Findings

3.1: PRIMARY CARE

- There was no statistically significant change between 2010 and 2013 in the percentage of adults aged 19 to 64 who saw a non-physician PCP. This is likely to shift, but sufficient data were lacking at the time of analysis.
- Among adults aged 19 to 64, there was no significant change from 2012 to 2013 in the number seeing a specialist.
- There was a slight decrease from 2010 to 2013 in those receiving help coordinating care from a doctor's office. The Accountable Care Organizations and Patient-Centered Medical Homes are just getting started and might have a positive impact on this trend.
- Survey data indicated, from 2011 to 2013, an increase in wait times for new patients to see a primary care provider and a general decrease in wait times for new patients to see a specialist.
- Survey data indicated mixed trends from 2011 to 2013 in the share of offices accepting new patients among different disciplines.

3.2: BEHAVIORAL HEALTH

Mental health

- Very limited data suggested a slight increase in mental health treatment utilization among the MassHealth managed care population.
- According to the Health Planning Council, between 2010 and 2014, bed capacity grew 5% among freestanding hospitals and 2% among all hospitals, but there was no growth in beds in general acute hospitals, which typically provide care for complex cases.
- Slightly less than 50% of Medicaid managed care enrollees were treated with antidepressant medication after being diagnosed with depression in 2015, which is similar to the 2012 rate.
- Among children enrolled in MassHealth managed care who were recently prescribed an ADHD medication, 53.8% had a follow-up visit within 30 days of the start of the medication (initiation) in 2015, which is lower than in 2011.
- Among children aged 6 and older with MassHealth managed care, 82.4% had a follow-up appointment within 30 days of hospitalization for mental illness in 2015, which was higher than in 2012.
- The Massachusetts Department of Mental Health budget increased 9.3% from FY 2012 to FY 2016.

Substance use disorders

- Massachusetts adolescents aged 12 to 17 had a rate of illicit drug use of 9.7% in 2014, down from 12.3% in 2012; however, this was still higher than the national average.
- Data were not available on the mean age of adolescents' first use of substances in Massachusetts.
- Among people aged 12 and older in the Commonwealth, about 6.6% were dependent on alcohol or drugs and 3% had a use disorder involving alcohol or drugs in 2014; both rates were lower than in 2012, but higher than the corresponding national averages.
- Mirroring national trends, opioid-related hospitalizations and deaths (greater than 25 per 100,000 people) in Massachusetts increased sharply from 2012 to 2016.
- Hospital visits for acute alcohol poisoning (all ages) decreased by about 33% from 2012 to 2014.
- The average share of heavy alcohol users who received treatment increased from 4.2% (from 2008 to 2012) to 7.5% (from 2010 to 2014).
- Hospital admissions due to substance abuse in Massachusetts were generally stable at around 104,000 (from 2012 to 2015), with a high of nearly 109,000 admissions in 2014.
- From 2012 to 2015, the racial/ethnic composition of people utilizing substance abuse treatment was generally stable. African Americans were the only group that saw a decline in treatment rates, and it is important to study whether this is due to a reduction in need or barriers to care. Treatment utilization by Whites held steady at 77% of total utilization.
- The average share of people aged 12 and older who received treatment for illicit drug dependence/abuse held steady at around 14% from 2012 to 2014.
- On the two HEDIS measures of initiation and sustained engagement of substance use disorder treatment, the MassHealth managed care population outperformed the national Medicaid 75th percentile from 2013 to 2015, although the sustained-engagement rate decreased from 2014 to 2015.
- From 2012 to 2015, admission volume decreased for 4 of 8 categories—day treatment, methadone, outpatient counseling, and "other." Admissions increased in four categories: acute treatment, section 35, residential, and clinical stabilization.
- The number of inpatient beds for acute substance-abuse treatment increased slightly from 2014 to 2016, although there was a slight decrease in medically-managed slots. Data preceding Chapter 224 were not available.
- In 2014, 4,524 Massachusetts residents utilized acute treatment services (ATS) at least twice, with a maximum of 23 admissions. Ongoing treatment may have freed up 16,000 additional ATS slots for additional patients.

Conclusion

Overall, there were a similar number of positive and negative trends. The primary care measures show that two major goals of Chapter 224, encouraging coordination of care and shifting more visits to non-physician PCPs, were not achieved. The findings for the behavioral health section show an intense scarcity for available treatment resources, although certain mental health treatment resources did expand slightly. Regarding substance use disorders, the opioid epidemic did not retreat and contributed to increased morbidity, mortality, and treatment needs.

PRIMARY CARE

Despite expectations that Chapter 224 would usher in broad reforms to primary care, including increased inter-provider cooperation and expanded use of non-physician PCPs, such changes have not yet occurred.

From 2010 to 2013, there was no statistically significant change in the share of adults aged 19 to 64 who saw a non-physician PCP and a slight decline in the share receiving help from a provider's office to coordinate care. (Due to survey methodology changes, data from 2014 to 2016 were not available for this section.) Patient demand for primary care and specialist appointments remained strong, with mixed findings regarding trends of appointment wait times and the share of providers accepting new patients. In some areas of the Commonwealth, and for MassHealth enrollees, it was much more difficult to get an appointment.

Looking forward, new initiatives connected to Chapter 224, including certification programs for patient-centered medical homes and accountable care organizations, aimed to transform primary care delivery. These programs may produce the desired transformative effects. Additionally, the Baker Administration is moving the MassHealth program, which has major market share in the Commonwealth, toward more care coordination and integrated model of care.

BEHAVIORAL HEALTH

Findings for behavioral health, which includes mental health and substance use disorders, reveal widespread morbidity and strong patient demand for treatment resources. With factors such as the opioid epidemic driving demand for care, the Commonwealth has struggled to expand the capacity of treatment modes, including inpatient psychiatric care, medication-assisted treatment, and addiction step-down services. Obstacles to equitable behavioral health care include low insurance-reimbursement rates, fear of violating patient privacy rules, a lack of quality management, and patient comorbidities.

Findings for mental health show the Commonwealth struggled to make headway on some important measures. Unfortunately, a lack of population-level data inhibited OSA's greater exploration of mental health trends. Hospital psychiatric bed capacity grew 2% from 2010 to 2014, lagging behind Massachusetts' population growth. Among the MassHealth managed care population (constituting about 60% of MassHealth enrollees), findings on mental health varied: From 2012 to 2015, a higher share of patients (82.4%) received follow-up appointments within 30 days of hospitalization for mental illness, consistent with best practices, but the share of patients with a diagnosis who were treated with antidepressants as recommended (50%) did not change. Finally, the share of children prescribed ADHD medication who had a recommended follow-up appointment within 30 days (53.8%) declined from 2011 to 2015.

The budget of the Massachusetts Department of Mental Health, which administers the Community Based Flexible Supports program for non-institutionalized adults, increased 9.3% from 2012 to 2016. MassHealth is also a principal source of mental health care.

Amid the opioid epidemic and close scrutiny from lawmakers, the Commonwealth showed mixed results in treatment utilization and the prevalence of substance use disorders. Regarding substance use, there was improvement among adolescents aged 12 to 17: only 9.7% used an illicit drug in 2014, down from 12.3% in 2012. Yet among Massachusetts residents aged 12 and older, the drug/alcohol dependency rate was higher than the national average.

Opioid-related hospitalizations and deaths increased sharply after 2012, and the most recent data suggest the opioid epidemic has not receded, despite coordinated efforts by policymakers and an assortment of new anti-addiction initiatives.

Treatment utilization among people with illicit-drug dependence/abuse remained steady around 14%. Moreover, MassHealth managed care plans outperformed the national Medicaid 75th percentile on initiation and sustained engagement of substance use disorder treatment from 2013 to 2015.

From 2011 to 2015, the racial/ethnic composition of people utilizing substance abuse treatment was generally stable. African American admissions was the only group to decline, moving from 7,527 in 2011 to 6,336 in 2015.

The overall number of inpatient substance abuse treatment beds increased 9% from 2014 to 2016, which included a slight decrease in medically-managed slots. Further expansion of capacity is in the pipeline as providers respond to demand for treatment, although the impact of these gains could be limited by repeat utilization. Indeed, in 2014, 4,524 Massachusetts residents utilized detoxification/acute treatment services (ATS) at least twice, which might have closed off up to 16,000 ATS slots for additional patients. This phenomenon is often attributed to the Commonwealth's paucity of addiction step-down services to which patients can transition after exiting ATS.

Generally, trends on measures specific to alcohol treatment were favorable. Hospital visits for acute alcohol poisoning (all ages) decreased 28.2% from 2011 to 2014. Moreover, treatment rates among heavy alcohol users (aged 20 and over) increased from 2012 to 2014 and were above the national average.

Endnotes

INTRODUCTION

1 Center for Health Information and Analysis (2016, June 23). Behavioral health hospital data collection project [PowerPoint slides]. Retrieved June 28, 2016, from http://www.chiamass.gov/assets/Uploads/casemix/Behavioral-Health-Project-June-23-2016.pdf

2 Codes include ICD-10, DRG, and DSM; procedure date; vital signs; previous episodes of care; lapse of time since last episode of care; reason for admission; description of treatment or services provided; and prescription information.

3 Sociodemographic data includes sex, date of birth, race, ethnicity, living arrangement (homeless indicator), rating category (disability status), veteran status, prisoner status, employment status, and wages/salary.

4 Center for Health Information and Analysis (2016, June 23). Behavioral health hospital data collection project. Retrieved June 28, 2016, from http://www.chiamass.gov/assets/Uploads/casemix/Behavioral-Health-Project-June-23-2016.pdf

5 WHO Regional Office for Europe (2004). What are the advantages and disadvantages of restructuring a health care system to be more focused on primary care services?, p. 17. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0004/74704/E82997.pdf

6 Bodenheimer, T. & Hoangmai, H. (2010, May). Primary care: current problems and proposed solutions. *Health Affairs, 29,* 5799–5805.

7 Nielsen, M. (2014, June). Behavioral health integration: a critical component of primary care and the patient-centered medical home. *Families, Systems & Health: The Journal of Collaborative Family HealthCare. 32(*2), 149–50.

8 Center for Health Information and Analysis, (2015, January). Performance of the Massachusetts health care system series. Retrieved March 9, 2016, from http://www.chiamass.gov/assets/Uploads/A-Focus-on-Provider-Quality-Jan-2015.pdf

9 Ibid.

10 Melnyk, B., Fulmer, T., Van Orman, S., et al (2015, October 1). The forgotten chronic disease: mental health among teens and young adults. Retrieved July 6, 2016, from http://healthaffairs.org/blog/2015/10/01/the-forgotten-chronic-disease-mental-health-among-teens-and-young-adults

11 Health Planning Council (2014, July 23) Advisory committee meeting 7, [PowerPoint slide 29 and slides 2327 for methodology]. Retrieved March 23, 2016, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/2014/hpc-presentation-7-23-14.pptx

12 Rezendes, M., Russell, J., Helman, S., et al (2016, June 23). Families in fear. *Boston Globe*. Retrieved June 28, 2016, from https://apps.bostonglobe.com/spotlight/the-desperate-and-the-dead/series/families

13 Hebert, P., Sisk, J., & Howell, E. (2008). When does a difference become a disparity? Conceptualizing racial and ethnic disparities in health. *Health Affairs, 27*(2), 376.

14 Smedley, B., Stith, A., & Nelson, A. (2003). Unequal treatment: confronting racial and ethnic disparities in health care. Retrieved from Institute of Medicine website: http://www.nap.edu/openbook.php?isbn=030908265X

15 Padwa H., Teruya C., Tran E., et al (2016, March). The implementation of integrated behavioral health protocols in primary care settings in project care. *Journal of Substance Abuse Treatment, 62,* 74–83.

16 Behavioral health and readmissions in Massachusetts acute care hospitals. (2016, August). Retrieved August 11, 2016, from http://www.chiamass.gov behavioral-health-and-readmissions-in-massachusetts-acute-care-hospitals

17 Ibid.

18 Quinn, M. (2016, March 31). "Obama finalizes new mental health rules for Medicaid". *Governing*. Retrieved June 15, 2016, from http://www.governing.com/topics/health-human-services/gov-mental-health-parity-substance-abuse-obama.html

19 Ibid.

20 Bishop, T., Seirup, J., Pincus, H., et al (2016). Population of U.S. practicing psychiatrists declined, 2003–13, which may help explain poor access to mental health care. *Health Affairs, 35*(7), 1271–1277.

21 Pincus et al (2016, June). Quality measures for mental health and substance use: gaps, opportunities, and challenges. *Health Affairs, 35,* 1000–1008.

22 Dworkowitz, A., & Belfort, R. (2016, March). Sharing behavioral health information in Massachusetts: obstacles and potential solutions. Retrieved June 2, 2016, from Blue Cross Blue Shield of Massachusetts Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/Behavioral_Health_Data_Sharing_FINAL.pdf

23 Massachusetts Department of Public Health (2015). Issue briefs: Massachusetts behavioral health analysis, p. 7. Retrieved June 2, 2016, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/deliverable/briefs/issue-briefs-complete.pdf

24 Pincus, H., Spaeth-Rublee, B., & Watkins, K. (2011). The case for measuring quality in mental health and substance abuse care. *Health Affairs, 30*(4), p.730.

25 Ibid.

26 Rezendes, M., Russell, J., Helman, S., et al (2016, June 23). Families in fear. *Boston Globe.* Retrieved June 28, 2016, from https://apps.bostonglobe.com/spotlight/the-desperate-and-the-dead/series/families

27 Ibid.

28 Ibid.

29 Commonwealth of Massachusetts Health Policy Commission (2016). Community hospitals at a crossroads: findings from an examination of the Massachusetts health care system, p. 3. Retrieved June 16, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/community-hospitals-at-a-crossroads.pdf

30 Ibid.

31 Alegria, M., et al (2016, June). Removing obstacles to eliminating racial and ethnic disparities in behavioral health care. *Health Affairs, 35,* 991–999.

32 Tervalon, M., & Murray-Garcia, J. (1998). Cultural humility versus cultural competence: a critical discussion in defining physician training outcomes in multicultural education. *Journal of Health Care for the Poor and Underserved, 9*(2), 117–125.

33 Reynoso-Vallejo, Humberto. "Support group for Latino caregivers of dementia elders: cultural humility and cultural competence." *Ageing International* 34.1, 67–78.

34 Santiago, C., & Miranda, J. (2014). Progress in improving mental health services for racial-ethnic minority groups: A ten-year perspective. *Psychiatric Services, 65*(2). Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/24178249

35 Alegria, M., et al. (2016, June). Removing obstacles to eliminating racial and ethnic disparities in behavioral health care. *Health Affairs, 35*:991–999.

36 Health Planning Council. (2014, July 23) Advisory committee meeting 7, [PowerPoint slide 29 and slides 2327 for methodology]. Retrieved March 23, 2016, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/2014/hpc-presentation-7-23-14.pptx

37 Ibid.

38 Office of the Attorney General, Commonwealth of Massachusetts (2015, June 30). Examination of health care cost trends and cost drivers pursuant to G.L. c. 6D, § 8, p. 24. Retrieved April 4, 2016, http://www.mass.gov/ago/docs/healthcare/hc-ct-cd-06-2015.pdf

39 Barry, C., Goldman, H., & Huskamp, H. (2016). Federal parity in the evolving mental health and addiction care landscape. *Health Affairs, 35*(6), 1009–1016.

40 Quinn, M. (2016, March 31). "Obama finalizes new mental health rules for Medicaid." Retrieved June 15, 2016, from http://www.governing.com/topics/health-human-services/gov-mental-health-parity-substance-abuse-obama.html

41 McGuire, T. (2016). Achieving mental health care parity might require changes in payments and competition. *Health Affairs, 35*(6), 1029–1035.

42 Majzoub Perez, K., Flier, L., D'Couto, H., et al. (2015). Behavioral health integration in primary care at Brigham and Women's Advanced Primary Care Associates, South Huntington. *Healthcare, 3*(3), 169–74.

43 Lewis, V., Colla, C., Tierney, K., et al (2014, October). Behavioral health in accountable care: Few ACOs pursue innovative models that integrate care for mental illness and substance abuse with primary care. *Health Affairs, 33*(101), 1808–1816.

44 Padwa, H., Teruya, C., Tran, E., et al (2016, March). The implementation of integrated behavioral health protocols in primary care settings in project care. *Journal of Substance Abuse Treatment, 62*, 74–83.

45 Creedon, T., & Cook, B. (2016). Access to mental health care increased but not for substance use, while disparities remain. *Health Affairs, 35*(6), 1017–1021.

46 Center for Health Information and Analysis (2015). *Performance of the Massachusetts health care system: A focus on provider quality.* Retrieved May 12, 2016, from http://www.chiamass.gov/assets/docs/r/pubs/15/2015-Focus-on-Provider-Quality-Full-Report.pdf

47 Dr. Carole Allen, personal communication, August 11, 2016.

SECTION 3.1

1 Nielsen, M. (2014, June). Behavioral health integration: a critical component of primary care and the patient-centered medical home. *Families, Systems & Health: The Journal of Collaborative Family HealthCare. 32*(2), 149–50.

2 Long, S., & Dimmock, T. (2016, March 23). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update, p. 4. Retrieved Oct. 4, 2016, from the Blue Cross Blue Shield of Massachusetts Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_FINAL.pdf

3 Long, S., & Dimmock, T. (2016, March 23). Health insurance coverage and health care access and affordability in Massachusetts: 2015 update, p. 26. Retrieved June 16, 2016, from the Blue Cross Blue Shield of Massachusetts Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2015_Report_FINAL.pdf

4 Ibid, 20.

5 Commonwealth of Massachusetts Health Policy Commission (2015). 2015 Cost Trends Report, p. 66. Retrieved March 15, 2016, from www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

6 Ibid.

7 Padwa, H., Teruya, C., Tran, E., et al (2016, March). The implementation of integrated behavioral health protocols In primary care settings in project care. *Journal of Substance Abuse Treatment, 62,* 74–83.

8 Tim O'Leary, personal communication. August 12, 2016.

9 Kenney, G., Haley, J., Anderson, N., et al. (2015). Children eligible for Medicaid or CHIP: who remains uninsured, and why? *Academic Pediatrics, 15*(3), S36–S43.

10 Syed, S., Gerber, B., & Sharp, L. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of Community Health, 38*(5), 976–993.

11 Kullgren, J., McLaughlin, C., Mitra, N., et al (2012). Nonfinancial barriers and access to care for U.S. adults. *Health Services Research, 47* (1 Pt 2), 462–485.

12 Ngo-Metzger, Q., Telfair, J., Sorkin, D., et al. (2006). Cultural competency and quality of care: Obtaining the patient's perspective. Retrieved from http://www.commonwealthfund.org/publications/fund-reports/2006/oct/cultural-competency-and-quality-of-care--obtaining-the-patients-perspective

13 Nielsen, M. (2014, June). Behavioral health integration: a critical component of primary care and the patient-centered medical home. *Families, Systems & Health, 32*(2), 149–50.

14 Among general internists, family physicians, cardiologists, and orthopedists

15 Casalino, L., Gans, D., Weber, R., et al (2016). U.S. physician practices spend more than $15.4 billion annually to report quality measures. *Health Affairs, 35*(3), 401–406.

16 Partners HealthCare, Partners Urgent Care. (2015, December 15). Partners urgent care opens two additional Boston-area locations [Press release]. Retrieved March 9, 2016, from http://www.partners.org/Newsroom/Press-Releases/Partners-Urgent-Care-Opens-Watertown-Newton-Locations.aspx

17 Ashwood, J., Gaynor, M., Setodji, C., et al (2016). Retail clinic visits for low-acuity conditions increase utilization and spending. *Health Affairs, 35*(3), 449–455.

18 Long, S., & Dimmock, T. (2015, June). Monitoring access to care in Massachusetts: comparing public coverage with employer-sponsored insurance coverage, p. 2. Retrieved March 9, 2016, from the Blue Cross Blue Shield Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/Comparing_Access_Report_RELEASE_0.pdf

19 Halasa, Y., Foley, M., Dellapenna, M., et al (2015). *Broken Smiles: Oral Health and Employment: Policy Brief.* Boston: DentaQuest Foundation.

20 Long, S.., & Dimmock, T. (2015, June). Monitoring access to care in Massachusetts: comparing public coverage with employer-sponsored insurance coverage, p. 3. Retrieved March 9, 2016, from the Blue Cross Blue Shield Foundation website: http://bluecrossfoundation.org/publication/monitoring-access-care-massachusetts-comparing-public-coverage-employer-sponsored

21 Wiysonge, C., Chopra, M. (2008, August). Do nurse practitioners working in primary care provide equivalent care to doctors? A SUPPORT Summary of a systematic review. Retrieved from http://apps.who.int/rhl/effective_practice_and_organizing_care/SUPPORT_Task_shifiting.pdf

22 Everett, C., Schumacher, J., Wright, A., et al (2009). Physician assistants and nurse practitioners as a usual source of care. *The Journal of Rural Health, 25*(4), 407–414.

23 Long, S. (2014, November). Health care access and affordability in Massachusetts: affordability still challenge, p. 80. Retrieved March 15, 2016, from the Blue Cross Blue Shield of Massachusetts Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/MHRS_2013_Report_FINAL.pdf

24 Centers for Disease Control and Prevention (2015). Table 77. Visits to primary care generalist and specialty care physicians, by selected characteristics and type of physician: United States, selected years 1980–2010. Retrieved June 16, 2016, from http://www.cdc.gov/nchs/data/hus/2015/077.pdf

25 Ibid.

26 Bodenheimer, T. (2008). Coordinating care — A perilous journey through the health care system. *New England Journal of Medicine, 358,* 1064–71.

27 Aysola, J., Bitton, A., Zaslavsky, A., et al (2013). Quality and equity of primary care with patient-centered medical homes: results from a national survey. *Medical Care, 51*(1), 68.

28 Ibid.

29 Burt, J., Garbacz, S., Kupzyk, K., et al (2014, March). Examining the utility of behavioral health integration in well-child visits: implications for rural settings. *Families, Systems, & Health, 32*(1), 20–30.

30 David, G., Gunnarsson, C., Saynisch, P., et al (2015). Do patient-centered medical homes reduce emergency department visits? *Health Services Research, 50*(2), 418–439.

31 Friedberg, M., Schneider, E.; Rosenthal, M., et al (2014). Association between participation in a multipayer medical home intervention and changes in quality, utilization, and costs of care. *JAMA, 311*(8), 815–825.

32 Kahn, K., Timbie, J., Friedberg, M., et al (2015, July). Evaluation of CMS FQHC APCP demonstration: second annual report. RAND Corporation. Retrieved June 15, 2016, from https://innovation.cms.gov/Files/reports/fqhc-scndevalrpt.pdf

33 Hancock, J. (2015, July 27). Health law experiment failed to show savings. *Kaiser Health News.* Retrieved March 17, 2016, from http://khn.org/news health-law-experiment-failed-to-show-savings

34 Merritt Hawkins (2014). 2014 survey: physician appointment wait times and Medicaid and Medicare acceptance rates. Retrieved March 17, 2016, from http://www.merritthawkins.com/uploadedFiles/MerrittHawkings/Surveys/mha2014waitsurvPDF.pdf

35 Long, S., & Dimmock, T. (2015, June). Monitoring access to care in Massachusetts: comparing public coverage with employer-sponsored insurance coverage, p. 9. Retrieved March 9, 2016, from the Blue Cross Blue Shield of Massachusetts Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/Comparing_Access_Report_RELEASE_0.pdf

36 Long, S., & Dimmock, T. (2016, March 23). Health insurance coverage and health care access and affordability: 2015 update summary of key findings. Retrieved March 23, 2016, from the Blue Cross

Blue Shield of Massachusetts Foundation website: http://bluecrossfoundation.org/sites/default/files/download/publication/2015_MHRS Chart Pack_FINAL.pdf

37 Massachusetts Medical Society (2013, July). 2013 MMS patient access to care study. Retrieved March 17, 2016, from http://web.archive.org/web/20141127132034/http://www.massmed.org/News-and-Publications/Research-and-Studies/2013-MMS-Patient-Access-to-Care-Study-(pdf)

38 The society conducted its most recent survey in 2013.

39 Physician supply and demand through 2025: key findings. (2015, March). Retrieved March 17, 2016, from https://www.aamc.org/download/153160/data/physician_shortages_to_worsen_without_increases_in_residency_tr.pdf

40 West, C., & Dupras, D. (2012). General medicine vs subspecialty career plans among internal medicine residents. *JAMA, 308*(21), 2241–2247.

41 Klink, K. (2014). Incentives for physicians to pursue primary care in the ACA era. *AMA Journal of Ethics, 17*(7), 637–646.

SECTION 3.2

1 Olfson, M. (2016). Building the mental health workforce capacity needed to treat adults with serious mental illnesses. *Health Affairs, 35*(6), 983–990.

2 Bishop, T., Seirup, J., Pincus, H., et al (DATE). Population of U.S. practicing psychiatrists declined, 2003–13, which may help explain poor access to mental health care. *Health Affairs, 35*(7), 1271–1277.

3 Olfson, M. (2016). Building the mental health workforce capacity needed to treat adults with serious mental illnesses. *Health Affairs, 35*(6), 983–990.

4 University of Massachusetts Donahue Institute, (2015, April). The challenges of private practice: a study of clinicians' experiences providing mental health care in Massachusetts, executive summary. Retrieved July 13, 2016, from http://cliniciansunited.org/wp-content/uploads/2015/05/UMDI-Executive-Summary-FULL-6215.pdf

5 UMass Donahue Institute. (2015, April). The challenges of private practice. Retrieved Sept. 29, 2016, from cliniciansunited.org/wp-content/uploads/2015/05/UMDI-Executive-Summary-FULL-6215.pdf

6 Ibid.

7 Creedon, T., & Cook, B. (2016). Access to mental health care increased but not for substance use, while disparities remain. *Health Affairs, 35*(6), 1017–1021.

8 McGuire, T. (2016). Achieving mental health care parity might require changes in payments and competition. *Health Affairs, 35*(6), 1029–1035.

9 Barry, C., Goldman, H., & Huskamp, H. (2016). Federal parity in the evolving mental health and addiction care landscape. *Health Affairs, 35*(6), 1009–1016.

10 The Substance Abuse and Mental Health Services Administration defines "mental illness" as the presence of any mental, behavioral, or emotional disorder in the past year that met DSM-IV criteria and "serious mental illness" as the presence of such disorder that causes substantial functional impairment, meaning the illness interferes with or limits one or more major life activities.

11 Source: Substance Abuse and Mental Health Services Administration (2014, February 28). State estimates of adult mental illness from the 2011 and 2012 national survey on drug use and health, p. 1. Retrieved October 17, 2014, from http://www.samhsa.gov/data/sites/default/files/sr170-mental-illness-state-estimates-2014/sr170-mental-illness-state-estimates-2014/sr170-mental-illness-state-estimates-2014.pdf

12 Reports by geography. (2014, September 12). Retrieved June 24, 2016, from http://www.samhsa.gov/data/reports-by-geography?tid=641&map=1

13 Massachusetts Department of Public Health. (2015, August). A profile of health among Massachusetts adults, 2014. Retrieved June 30, 2016, from http://www.mass.gov/eohhs/docs/dph/behavioral-risk/report-2014.pdf

14 Massachusetts Department of Public Health, (2014). Issue briefs: Massachusetts behavioral health analysis, 2014, p. 1, Retrieved October 21, 2014, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/2014/issue-briefs-sept-22.pdf See also, SAMHSA, Center for Behavioral Health Statistics and Quality, *National Survey on Drug Use and Health*.

15 Parks, J., Svendsen, D., Singer, P. et al (2006, October). Morbidity and mortality in people with serious mental illness. Retrieved from National Association of State Mental Health Program Directors website: http://nasmhpd.org/sites/default/files/Mortality%20and%20Morbidity%20Final%20Report%208.18.08.pdf

16 Parks, J., Svendsen, D., Singer, P. et al (2006, October). Morbidity and mortality in people with serious mental illness. Retrieved from National Association of State Mental Health Program Directors website: http://nasmhpd.org/sites/default/files/Mortality%20and%20Morbidity%20Final%20Report%208.18.08.pdf

17 SAMHSA. (2015). Behavioral health barometer Massachusetts, 2015. Retrieved June 15, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

18 Ibid.

19 Ibid.

20 Alegria, M., Cook, B., Loder, S. et al. (2014, December). The time is now: tackling racial and ethnic disparities in mental and behavioral health services in Massachusetts. Retrieved from The Massachusetts Health Policy Forum website: http://masshealthpolicyforum.brandeis.edu/forums/Documents/Health%20Disparities%20Documents/IssueBrief_Disparities.V2.pdf

21 Alegria, M. et al (June 2016). Removing obstacles to eliminating racial and ethnic disparities in behavioral health care. *Health Affairs, 35,* 991–999.

22 Cummings, J., Hefei, W., & Ko, M. (2016, June). Decline in public substance use disorder treatment centers most serious in counties with high shares of black residents. *Health Affairs, 35,* 1036–1044.

23 Why some individuals seeking psychiatric services are waiting extensive lengths of time for beds in EDs and what can be done. (2012, May). Retrieved March 9, 2016, from http://www.chiamass.gov/assets/Uploads/bhtf-DMH-ED-LOS-and-Psych-Bed-Access-Initiative-May-2012.pdf

24 Rezendes, M., Russell, J., Helman, S. (2016, June 23). Families In fear. *Boston Globe.* Retrieved June 28, 2016, from https://apps.bostonglobe.com/spotlight/the-desperate-and-the-dead/series/families

25 Outpatient care provided outside institutions.

26 Why some individuals seeking psychiatric services are waiting extensive lengths of time for beds in EDs and what can be done. (2012, May). Retrieved March 9, 2016, from http://www.chiamass.gov/assets/Uploads/bhtf-DMH-ED-LOS-and-Psych-Bed-Access-Initiative-May-2012.pdf

27 Rezendes, M., Russell, J., Helman, S. et al. (2016, June 23). Families in fear. *Boston Globe.* Retrieved June 28, 2016, from https://apps.bostonglobe.com/spotlight/the-desperate-and-the-dead/series/families

28 Health Planning Council (2014, July). Advisory committee meeting 7, [PowerPoint slide 40]. Retrieved October 20, 2014, from http://www.mass.gov/eohhs/gov/departments/dph/programs/admin/ohpp/shrp/service-lines/deliverables.html

29 Stuhan, C. (2014, May 27). Way behind: Report on the state of mental health in 2014. Retrieved July 7, 2016, from http://namimass.org/wp-content/uploads/Revised-Position-Paper-5-28-14-AM.pdf

30 CHIA, (2012, May). Why some individuals seeking psychiatric services are waiting extensive lengths of time for beds in EDs and what can be done, p. 5. Retrieved March 16, 2016, from http://www.chiamass.gov/assets/Uploads/bhtf-DMH-ED-LOS-and-Psych-Bed-Access-Initiative-May-2012.pdf

31 Health Planning Council, (2014, July). Advisory committee meeting 7, [PowerPoint slide 40]. Retrieved October 20, 2014, from http://www.mass.gov/eohhs/gov/departments/dph/programs/admin/ohpp/shrp/service-lines/deliverables.html

32 Health Policy Commission (2015). Community Hospital Acceleration, Revitalization, and Transformation Program Phase 1 — hospital factbook. Retrieved July 13, 2016 from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/chart/chart-phase-1-factbook.pdf

33 Ibid.

34 Health Policy Commission (2015). CHART Phase 2 awardees. Retrieved July 13, 2016, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/chart/phase-2/chart-phase-2-award-list.pdf

35 Health Policy Commission (2016). Innovation investments. Retrieved July 27, 2016 from www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/innovation-investments/

36 Ibid.

37 Norton, M. (2016, March 31). Bump okays privatization of SEMass mental health services. *State House News Service*. Retrieved April 1, 2016, from http://newbostonpost.com/2016/03/31/bump-okays-privatization-of-semass-mental-health-services

38 Scharfenberg, D. (2016, Sept. 13). Baker calls for change in treating mentally ill inmates. *Boston Globe*. Retrieved Sept. 29, 2016 from bostonglobe.com/metro/2016/09/12/baker-plans-overhaul-criminal-justice-system-handling-mentally-ill/KlpXNF1YTfD81TEY1zWvjN/story.html

39 Murphy, E. (2016, January 12). Testing the market-knows-best hypothesis. *CommonWealth*. Retrieved from http://commonwealthmagazine.org/health-care/testing-the-market-knows-best-hypothesis

40 Mayo Clinic (2015, October 13). Mental illness. Retrieved March 16, 2016, from http://www.mayoclinic.org/diseases-conditions/mental-illness/basics/risk-factors/con-20033813

41 World Health Organization (2012). Risks to mental health: an overview of vulnerabilities and risk factors. Retrieved from http://www.who.int/mental_health/mhgap/risks_to_mental_health_EN_27_08_12.pdf

42 DPH (2015, winter). Suicides and self-inflicted injuries in Massachusetts. Retrieved July 27, 2016, from mass.gov/eohhs/docs/dph/injury-surveillance/suicide/suicide-update-winter-2015.doc

43 Screening for Mental Health Inc. MassMen. Retrieved July 27, 2016 from massmen.org

44 Center for Health Policy & Research, MassHealth Office of Acute & Ambulatory Care, MassHealth Behavioral Health Program, & MassHealth Office of Clinical Affairs. (2006, October). MassHealth managed care HEDIS 2006 final report, p. 48. *MassHealth.* Retrieved Sept. 29, 2016, from https://web.archive.org/web/20150319073826/http://www.mass.gov/eohhs/docs/masshealth/research/hedis-2006.pdf

45 Health Planning Council (2014, July 23). Advisory Committee Meeting 7, [PowerPoint slide 33]. Retrieved October 22, 2014, from mass.gov/eohhs/docs/dph/health-planning/hpc/2014/hpc-presentation-7-23-14.pptx

46 Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health (2015). BRFSS prevalence & trends data. Retrieved March 8, 2016, from http://www.cdc.gov/brfss/brfssprevalence

47 Olfson, M., Marcus, S., Tedeschi, M. et al. (2006, January). Continuity of antidepressant treatment for adults with depression in the United States. *American Journal of Psychiatry, 163*(1), 101–108. Retrieved January 8, 2015, from http://psychiatryonline.org/doi/abs/10.1176/appi.ajp.163.1.101?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub%3Dpubmed&

48 Bishop, T., Ramsay, P., Casalino, L. et al (2016). Care management processes used less often for depression than for other chronic conditions in U.S. primary care practices. *Health Affairs, 35*(3), 394–400. Retrieved from http://content.healthaffairs.org/content/35/3/394.full

49 MassHealth Managed Care HEDIS 2015 Report. (2016, February). Retrieved July 14, 2016, from http://www.mass.gov/eohhs/docs/masshealth/research/mco-reports/hedis-2015.pdf

50 University of Massachusetts Medical School Center for Health Policy and Research, et al. (2007, November). MassHealth managed care HEDIS 2007 final report, p. 47. Retrieved January 8, 2015, from http://www.mass.gov/eohhs/docs/masshealth/research/hedis-2007.pdf

51 National Committee for Quality Assurance. (2015). Antidepressant medication management. Retrieved Sept. 29, 2016 from www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2015-table-of-contents/antidepressant

52 National Institute of Mental Health. (2016, March). Attention deficit hyperactivity disorder. Retrieved March 16, 2016, from http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml

53 Data Resource Center for Child and Adolescent Health. National survey of children's health, NSCH 2011/12. Data query from the Child and Adolescent Health Measurement Initiative. Retrieved March 16, 2016, from http://www.childhealthdata.org/learn/NSCH

54 Froehlich, T., Lanphear, B., Epstein, J., et al (2007). Prevalence, recognition, and treatment of attention-deficit/hyperactivity disorder in a national sample of U.S. children. *Archives of Pediatrics & Adolescent Medicine, 161*(9), 857–864.

55 American Academy of Pediatrics (2011). ADHD: clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics.* Retrieved from http://pediatrics.aappublications.org/content/pediatrics/128/5/1007.full.pdf

56 Ibid.

57 Wagman, N. (2013, November 4). It's a family affair: leading the way in mental health screening for moms and kids. *MassBudget.* Retrieved March 16, 2016, from http://massbudget.org/report_window.php?loc=family_affair.html

58 Sarvet, B., Gold, J., Bostic, J. et al (2010). Improving access to mental health care for children: the Massachusetts child psychiatry access project. *Pediatrics, 126*(6), 1191–1200.

59 Carson, N., Vesper, A., Chen, C. et al (2014). Quality of follow-up after hospitalization for mental illness among patients from racial-ethnic minority groups. *Psychiatric Services, 65*(7), 888–896.

60 CHIA (2015, November). Performance of the Massachusetts health care system: a focus on provider quality, p 27. Retrieved July 28, 2016, from http://www.chiamass.gov/assets/docs/r/pubs/15/2015-Focus-on-Provider-Quality-Full-Report.pdf

61 Carson, N., Vesper, A., Chen, C. et al (2014). Quality of follow-up after hospitalization for mental illness among patients from racial-ethnic minority groups. *Psychiatric Services, 65*(7), 888–896.

62 Ibid.

63 Fontanella, C., Hiance-Steelesmith, D., Bridge, J. et al (2016). Factors associated with timely follow-up care after psychiatric hospitalization for youths with mood disorders. *Psychiatric Services, 67*(3), 324–331.

64 Centers for Medicare & Medicaid Services. Inpatient psychiatric facility quality reporting program. Retrieved July 27, 2016 from medicare.gov/hospitalcompare/psych-measures.html#stateQQ

65 Ibid.

66 CHIA, ibid.

67 Department of Mental Health. Community based flexible supports. Retrieved October 14, 2014, from http://www.mass.gov/eohhs/consumer/behavioral-health/mental-health/community-based-flexible-supports.html

68 Massachusetts Budget and Policy Center. Budget browser: mental health. Retrieved October 15, 2014, from http://www.massbudget.org/browser/subcat.php?id=Mental+Health&inflation=cpi

69 O'Leary, T., personal communication, June 7, 2016.

70 Retrieved June 30, 2016, from http://massbudget.org/browser/subcat.php?c1=1&c2=12&id=-Mental+Health&inflation=cpi&budgets=517b16b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1#comparisons

71 Ibid.

72 SAMHSA (2016, March 08). Mental and substance use disorders. Retrieved June 23, 2016, from http://www.samhsa.gov/disorders

73 Massachusetts Department of Public Health (2016, November). Data brief: opioid-related overdose deaths among Massachusetts residents. Retrieved November 8, 2016, from mass.gov/eohhs/docs/dph/stop-addiction/current-statistics/data-brief-overdose-deaths-nov-2016-ma-residents.pdf

74 Creedon, T., & Cook, B. (2016). Access to mental health care increased but not for substance use, while disparities remain. *Health Affairs, 35*(6), 1017–1021.

75 Alegría, M., Cook, B., Loder, S., et al (2014). The time is now: tackling racial and ethnic disparities in mental and behavioral health services in Massachusetts (issue brief). Waltham, MA: The Massachusetts Health Policy Forum.

76 SAMHSA (2015). Behavioral health barometer: Massachusetts, 2015.

77 Massachusetts Department of Public Health (2014). Issue briefs: Massachusetts behavioral health analysis, p. 1. Retrieved October 21, 2014, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/2014/issue-briefs-complete.pdf.

78 Capoccia, V., Grazier, K., Toal, C., et al. (2012). Massachusetts's experience suggests coverage alone is insufficient to increase addiction disorders treatment. *Health Affairs, 31*(5), 1000–1008.

79 DPH. (2016, September). Data brief: an assessment of opioid related deaths in Massachusetts 2013–2014, p. 51. Retrieved on Oct. 3, 2016 from mass.gov/eohhs/docs/dph/stop-addiction/chapter-55-opioid-overdose-study-data-brief-9-15-2016.pdf

80 DPH. Moms do care project narrative. Retrieved July 27, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/innovation-investments/dph-moms-do-care-project-narrative.pdf

81 DPH. Moms do care project narrative. Retrieved July 27, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/innovation-investments/dph-moms-do-care-project-narrative.pdf

82 National Institute on Drug Abuse. (n.d.). Neonatal abstinence syndrome initiative. Retrieved July 27, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/innovation-investments/neonatal-abstinence-syndrome-initiative.html

83 CHIA (2015, April). Access to substance use disorder treatment. Retrieved March 10, 2016, from http://www.chiamass.gov/assets/Uploads/SUD-REPORT.pdf

84 Massachusetts Health Policy Commission (2015). 2015 Cost Trends Report, p. 9. Retrieved March 18, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2015-cost-trends-report.pdf

85 CHIA. Acute care hospital utilization trends in Massachusetts FY 2009–2012, Massachusetts Residents, p. 6. Retrieved July 2, 2015, from http://www.chiamass.gov/assets/docs/r/pubs/14/utilization-statewide.pdf.

86 Ibid.

87 CHIA (2015, April). Access to substance use disorder treatment. Retrieved March 10, 2016, from http://www.chiamass.gov/assets/Uploads/SUD-REPORT.pdf

88 Alegria, M. et al. (2016, June). Removing obstacles to eliminating racial and ethnic disparities in behavioral health care. *Health Affairs. 35*, 991–999.

89 CHIA, (2015, April). Access to substance use disorder treatment. Retrieved March 10, 2016, from http://www.chiamass.gov/assets/Uploads/SUD-REPORT.pdf

90 National Institute on Drug Abuse (2011, May). Drug-related hospital emergency room visits. Retrieved March 22, 2016, from https://www.drugabuse.gov/publications/drugfacts/drug-related-hospital-emergency-room-visits

91 Ali, M., & Mutter, R., (2016). The CBHSQ report: patients who are privately insured receive limited follow-up services after opioid-related hospitalizations. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality.

92 Massachusetts Health Policy Commission. (2015, September). Community hospital acceleration, revitalization, and transformation program: phase 1 — foundational investments for transformation. Retrieved March 10, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/chart/chart-report-final.pdf

93 Bao, Y., Pan, Y., Taylor, A., et al (2016). Prescription drug monitoring programs are associated with sustained reductions in opioid prescribing by physicians. *Health Affairs, 35*(6), 1045–1051.

94 Patrick, S., Fry, C., Jones, T., et al. (2016, July). Implementation of prescription drug monitoring programs associated with reductions in opioid-related death rates. *Health Affairs, 35*(7), 1324–1332. Published ahead of print June 22, 2016.

95 Miller, J. (2016, March 14). Governor Baker signs opioid bill. *Boston Globe*. Retrieved June 17, 2016, from https://www.bostonglobe.com/metro/2016/03/14/baker-due-sign-opioid-bill-monday/EYWh7oJXvKCRguHErxrWhI/story.html

96 DPH. (2016, July). State health officials announce open registration for new online PMP system. Retrieved Oct. 5, 2016, from mass.gov/eohhs/gov/newsroom/press-releases/dph/new-online-pmp-system.html

97 Lazar, K. (2016, Aug. 17). Tepid registration to track prescription abuse prompts urgent call. *Boston Globe.* Retrieved Oct. 4, 2016, from bostonglobe.com/metro/2016/08/17/tepid-registration-track-prescription-abuse-prompts-urgent-call/oI56wM35LrYiQJGYrTwXyH/story.html

98 Bebinger, M. (2016, March 3). Boston's heroin users will soon get a safer place to be high. Retrieved March 10, 2016, from http://khn.org/news/bostons-heroin-users-will-soon-get-a-safer-place-to-be-high

99 Ibid.

100 Potier, C., Laprévote, V., Dubois-Arber, F., et al (2014). Supervised injection services: what has been demonstrated? A systematic literature review. *Drug and Alcohol Dependence, 145*, 48–68.

101 Miech, R., Johnston, L., O'Malley, P., et al (2016). Monitoring the future national survey results on drug use, 1975–2015: volume I, secondary school students, p. 11. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved June 23, 2015, from monitoringthefuture.org/pubs/monographs/mtf-vol1_2015.pdf

102 Including any use of marijuana, LSD, other hallucinogens, crack, other cocaine, or heroin; or any use of narcotics other than heroin, amphetamines, sedatives (barbiturates), or tranquilizers not under a provider's orders

103 Miech, R., Johnston, L., O'Malley, P., et al (2016). Monitoring the future national survey results on drug use, 1975–2015: volume I, secondary school students, p. 51. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved June 23, 2015, from monitoringthefuture.org/pubs/monographs/mtf-vol1_2015.pdf

104 Miech, R., Johnston, L., O'Malley, P., et al (2016). Monitoring the Future national survey results on drug use, 1975–2015: volume I, secondary school students, p. 51. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved June 23, 2015, from monitoringthefuture.org/pubs/monographs/mtf-vol1_2015.pdf

105 Miech, R., Johnston, L., O'Malley, P., et al (2016). Monitoring the future national survey results on drug use, 1975–2015: volume I, secondary school students, p. 405. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved June 23, 2015, from monitoringthefuture.org/pubs/monographs/mtf-vol1_2015.pdf

106 Massachusetts tobacco use rates have declined substantially in recent years. See sections 5.2 and 5.4 for detailed statistics.

107 SAMHSA (2016). Behavioral health barometer: Massachusetts, 2015. Retrieved June 15, 2016, at http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

108 Miech, R., Johnston, L., O'Malley, P., et al (2016). Monitoring the Future national survey results on drug use, 1975–2015: volume I, secondary school students, p. 66. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved June 23, 2015 from monitoringthefuture.org/pubs/monographs/mtf-vol1_2015.pdf

109 SAMHSA (2016). Behavioral health barometer: Massachusetts, 2015. Retrieved June 15, 2016, at http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

110 Illicit drugs include marijuana/hashish, cocaine (including crack), inhalants, hallucinogens, heroin, and prescription-type drugs used non-medically, based on data from original NSDUH questions, not including methamphetamine-use items added in 2005 and 2006. Methodology note from National Surveys on Drug Use and Health: "State estimates presented in this report have been developed using a small area estimation procedure in which State-level NSDUH data from 2 survey years are combined with local-area county and census block group/tract-level data from the State. This model-based methodology provides more precise estimates of substance use at the State level than those based solely on the sample, particularly for smaller States. Caution is advised when examining differences between the 2008–2009 and 2011–2012 NSDUH State estimates. The 2008–2009 small area estimation (SAE) models (as well as the 2009–2010 and 2010–2011 models) used predictors and survey weights based on 2000 census data. The 2011–2012 SAE models used new predictors and survey weights based on 2010 census data. Although the underlying SAE methodology remained the same, the true change between the 2008–2009 and 2011–2012 State estimates could be confounded with changes resulting from using different predictors and census data to produce each set of estimates. For further information, see *2011–2012 National Surveys on Drug Use and Health: Impact of Using 2010 Census Data on 2010-2011 Small Area Estimates,* which will be available on the SAMHSA website at http://www.samhsa.gov/data/NSDUH/2k12State/NSDUHsae2012/Index.aspx."

111 Includes the nonmedical use of pain relievers, tranquilizers, stimulants, or sedatives and does not include over-the-counter drugs.

112 SAMHSA (2015). Behavioral health barometer United States, 2015. Retrieved July 20, 2016, from http://www.samhsa.gov/data/sites/default/files/2015_National_Barometer.pdf

113 CHIA (2015, April). Access to substance use disorder treatment. Retrieved March 10, 2016, from http://www.chiamass.gov/assets/Uploads/SUD-REPORT.pdf

114 Massachusetts Department of Public Health (2015, June). Issue briefs: Massachusetts behavioral health analysis. Retrieved March 11, 2016, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/deliverable/briefs/issue-briefs-complete.pdf

115 Alegría, M., Cook, B., Loder, S. et al (2014). *The Time is Now: Tackling Racial and Ethnic Disparities in Mental and Behavioral Health Services in Massachusetts* (Issue brief). Waltham, MA: The Massachusetts Health Policy Forum.

116 Massachusetts Public Payer Commission (2014, September). September 18, 2014, presentation. Retrieved Oct. 3, 2016, from mass.gov/eohhs/docs/eohhs/public-payer/ppcpres091814.pdf

117 SAMHSA (2015). Behavioral health barometer Massachusetts, 2015. Retrieved June 15, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

118 SAMHSA (2015). Behavioral health barometer Massachusetts, 2015. Retrieved June 15, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

119 Foy, R., Leaman, B., McCrorie, C., et al (2016). Prescribed opioids in primary care: cross-sectional and longitudinal analyses of influence of patient and practice characteristics. *BMJ Open, 6*(5).

120 Frieden, T., & Houry, D. (2016). Reducing the risks of relief—the CDC opioid-prescribing guideline. *New England Journal of Medicine, 374*(16), 1501–1504.

121 Compton, W., Jones, C., & Baldwin, G. (2016). Relationship between nonmedical prescription-opioid use and heroin use. *New England Journal of Medicine, 374,* 154–163.

122 Becker, W., Sullivan, L., Tetrault, J., et al (2008). Non-medical use, abuse and dependence on prescription opioids among US adults: psychiatric, medical and substance use correlates. *Drug and Alcohol Dependence, 94(*1), 38–47.

123 Health Policy Commission. (2016, August). Opioid use disorder in Massachusetts, p. 6. Retrieved Oct. 4, 2016 from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/opioid-use-disorder-report.pdf

124 DPH. (2016, September). Data brief: an assessment of opioid related deaths in Massachusetts 2013–2014. Retrieved on Oct. 3, 2016, from p. 6 mass.gov/eohhs/docs/dph/stop-addiction/chapter-55-opioid-overdose-study-data-brief-9-15-2016.pdf

125 Ibid.

126 Jones, C., Baldwin, G., Manocchio, T., et al (2016). Trends in methadone distribution for pain treatment, methadone diversion, and overdose deaths — United States, 2002–2014. *Morbidity and Mortality Weekly Report, 65,* 667–671. Retrieved July 13, 2016.

127 Stout, M. (2016, March 22). Authorities remain in the dark regarding 'drug incident' reports. *Boston Herald.* Retrieved July 27, 2016, from https://web.archive.org/web/20160403003334/http://www.bostonherald.com/news/local_coverage/2016/03/authorities_remain_in_the_dark_regarding_drug_incident_reports

128 U.S. Attorney's Office, District of Massachusetts (2015, September 28). MGH to pay $2.3 million to resolve drug diversion allegations [press release]. Retrieved July 27, 2016, from:

129 Massachusetts Health Policy Commission (2016, March 23). QIPP committee meeting analysis of opioid epidemic's impact on health care system and treatment availability, p. 6. Retrieved March 28, 2016, http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/20160322-opioid-report-presentation.pdf

130 Massachusetts Health Policy Commission (2016, March 23). QIPP committee meeting analysis of opioid epidemic's impact on health care system and treatment availability, p. 6. Retrieved March 28, 2016, from http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/20160322-opioid-report-presentation.pdf

131 DPH. (2016, November). Data Brief: Confirmed unintentional/undetermined opioid-related overdose deaths among Massachusetts residents – demographic data highlights. Retrieved November 8, 2016, from mass.gov/eohhs/docs/dph/stop-addiction/current-statistics/opioid-demographic-nov-2016.pdf

132 Urban, P. (2016, February 21). Governors eye Mass. insurer's efforts to curb opioid crisis. *Patriot Ledger.* Retrieved March 22, 2016, from http://www.patriotledger.com/article/20160221/NEWS/160229436

133 Blue Cross Blue Shield of Massachusetts. Stopping the national epidemic of prescription opioid and heroin use. Retrieved July 13, 2016, from: https://www.bluecrossma.com/opioid-crisis

134 Everett, R. (2016, March 8). At Hampshire County jail, addicted inmates get extra support, Narcan, before they are released. Retrieved March 22, 2016, from http://www.masslive.com/news/index.ssf/2016/03/at_hampshire_county_jail_addic.html

135 Miller, J. (2016, March 14). Governor Baker signs opioid bill. *Boston Globe.* Retrieved March 22, 2016, from https://www.bostonglobe.com/metro/2016/03/14/baker-due-sign-opioid-bill-monday/EYWh7oJXvKCRguHErxrWhl/story.html

136 Thadani, T. (2016, July 20). Housing is seen as missing link in opioid crisis. *Boston Globe.* Retrieved Oct. 3, 2016, from https://www.bostonglobe.com/metro/2016/07/19/the-missing-link-combatting-opioid-crisis-housing/WgLEnP9mto0j4KDjd4abBK/story.html

137 Massachusetts Opioid Working Group (2015, June 11). Recommendations of the governor's opioid working group. Retrieved March 28, 2016, from http://www.mass.gov/eohhs/docs/dph/stop-addiction/recommendations-of-the-governors-opioid-working-group.pdf

138 Mayo Clinic (2016, July 21). Alcohol poisoning. Retrieved August 12, 2016, from http://www.mayoclinic.org/diseases-conditions/alcohol-poisoning/home/ovc-20211589

139 Ibid.

140 CDC. (2015, January 6). Alcohol poisoning deaths. Retrieved August 12, 2016, from http://www.cdc.gov/media/dpk/2015/dpk-vs-alcohol-poisoning.html

141 Ibid.

142 Hume, B. (2016, August 8). Preliminary data on acute alcohol poisonings [E-mail]. Raw data from DPH.

143 U.S. Census. Massachusetts. Retrieved Oct. 3, 2016, from census.gov/quickfacts/table/PST045215/25/accessible

144 National Institute on Alcohol Abuse and Alcoholism (2014). Treatment for alcohol problems: finding and getting help. Retrieved March 21, 2016, from http://pubs.niaaa.nih.gov/publications/Treatment/treatment.htm

145 Ibid.

146 SAMHSA (2015). Behavioral health barometer: Massachusetts, 2015. Retrieved June 15, 2016, at http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf.

147 Ibid.

148 Ibid.

149 Massachusetts Department of Public of Health (2016, November). Data brief: opioid-related overdose deaths among Massachusetts residents. Retrieved November 8, 2016, from mass.gov/eohhs/docs/dph/stop-addiction/current-statistics/data-brief-overdose-deaths-nov-2016-ma-residents.pdf

150 Gallup. (2016, July). In U.S., opioids viewed as most serious local drug problem. Retrieved Oct. 4, 2016, from gallup.com/poll/194042/opioids-viewed-serious-local-drug-problem.aspx?g_source=Well-Being&g_medium=newsfeed&g_campaign=tiles

151 SAMHSA, (2015). Behavioral health barometer, Massachusetts, 2015. Retrieved June 15, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

152 SAMHSA, (2015). Behavioral health barometer, Massachusetts, 2015. Retrieved June 15, 2016, from http://store.samhsa.gov/shin/content//SMA16-BARO-2015/SMA16-BARO-2015-MA.pdf

153 Crimaldi, L. (2014, March 15). Heroin epidemic exposes deficiencies in care system. *Boston Globe*. Retrieved March 21, 2016, from https://www.bostonglobe.com/metro/2014/03/14/substance-abuse-treatment-system-massachusetts-overtaxed-heroin-crisis-surges/3Jy3bb7sv-5SuUhLAG0PukK/story.html

154 Johnston, K. (2016, May 11). Boston Globe Game Changers: Four innovative ideas for fixing the opioid crisis. *Boston Globe*. Retrieved June 3, 2016, from http://www.bostonglobe.com/magazine/2016/05/11/four-innovative-ideas-for-fixing-opioid-crisis/nxlYSjMzo0UMPEl9NBPbVI/story.html

155 Ibid.

156 Ibid.

157 Becker, D. (2016, March 1). The opioid treatment business is booming. Retrieved March 22, 2016, from http://commonhealth.wbur.org/2016/03/opioid-treatment-business

158 Becker, D. (2016, March 1). The opioid treatment business is booming. Retrieved March 22, 2016, from http://commonhealth.wbur.org/2016/03/opioid-treatment-business

159 SAMHSA, (2016, February 18). Racial and ethnic minority populations. Retrieved March 22, 2016, from http://www.samhsa.gov/specific-populations/racial-ethnic-minority

160 Ibid.

161 Alegría, M., Cook, B., Loder, S. et al (2014, December). The time is now: tackling racial and ethnic disparities in mental and behavioral health services in Massachusetts, *Issue brief (Massachu-*

setts Health Policy Forum), 43, 1–53.

162 Cummings, J., Wen, H., Ko, M., et al (2014). Race/ethnicity and geographic access to Medicaid substance use disorder treatment facilities in the United States. *JAMA Psychiatry, 71*(2), 190–196.

163 Alegria, M. et al (2016, June). Removing obstacles to eliminating racial and ethnic disparities in behavioral health care. *Health Affairs. 35,* 991–999.

164 Population estimates, July 1, 2015, (V2015). (n.d.). Retrieved August 12, 2016, from http://www.census.gov/quickfacts/table/PST045215/25,00

165 Kowalczyk, L. (2014, June 30). Mass. General Hospital plans to screen all patients for alcohol and illegal drug use. *Boston Globe*. Retrieved March 21, 2016, from https://www.bostonglobe.com/lifestyle/health-wellness/2014/06/29/mass-general-hospital-plans-screen-all-patients-for-alcohol-and-illegal-drug-use/RmDqYAUpFuQqI1e1LLicKI/story.html

166 Health Policy Commission (2016, June 26). Innovative, emergency department-based integrated care models to address pressing behavioral health needs. AcademyHealth 2016 Annual Research Meeting. Retrieved June 29, 2016, from https://academyhealth.confex.com/academyhealth/2016arm/meetingapp.cgi/Paper/9834

167 SAMHSA (2015). Behavioral health barometer: Massachusetts, 2015. Retrieved June 30, 2016, from: http://www.samhsa.gov/data/sites/default/files/2015_Massachusetts_BHBarometer.pdf.

168 Ibid.

169 Ibid.

170 See the "Well Child Visits in the First 15 Months of Life" measure of Section 2.2 for a note on the HEDIS methodology.

171 Center for Health Policy & Research, MassHealth Office of Acute & Ambulatory Care, MassHealth Behavioral Health Program, & MassHealth Office of Clinical Affairs. (2006, October). MassHealth managed care HEDIS 2006 final report. *MassHealth*, p. 49. Retrieved from http://www.mass.gov/eohhs/docs/masshealth/research/hedis-2006.pdf (Accessed: February 25, 2015).

172 Substance Abuse Services Descriptions (2016). Retrieved March 22, 2016, from http://www.mass.gov/eohhs/gov/departments/dph/programs/substance-abuse/providers/substance-abuse-services.html

173 Substance Abuse Services Descriptions (2016). Retrieved March 22, 2016, from http://www.mass.gov/eohhs/gov/departments/dph/programs/substance-abuse/providers/substance-abuse-services.html

174 Freyer, F. (2016, January 14). State regulators impose new standards on care of recovering addicts. *Boston Globe.* Retrieved March 22, 2016, from https://www.bostonglobe.com/metro/2016/01/13/state-regulators-impose-new-standards-care-recovering-addicts/RSGxw4dTpZO9XAb8qagmgN/story.html

175 McCluskey, P. (2016, November 4). Massive change coming to state health care for poor. *Boston Globe.* Retrieved Nov. 7, 2016, from bostonglobe.com/business/2016/11/04/massive-change-coming-state-health-care-for-poor/XX1EaYofaYv0pVhbCXiZMN/story.html

176 McCluskey, P. (2016, November 4). Massive change coming to state health care for poor. *Boston Globe.* Retrieved Nov. 7, 2016, from bostonglobe.com/business/2016/11/04/massive-change-coming-state-health-care-for-poor/XX1EaYofaYv0pVhbCXiZMN/story.html

177 Steinbrook, R. (2014). Interstate medical licensure: major reform of licensing to encourage medical practice in multiple states. *JAMA, 312*(7), 695–696.

178 Ali, M., & Mutter, R. (2016). The CBHSQ report: patients who are privately insured receive limited follow-up services after opioid-related hospitalizations. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality.

179 DPH. (2016, September). Data brief: an assessment of opioid related deaths in Massachusetts 2013-2014, p. 4. Retrieved on Oct. 3, 2016 from mass.gov/eohhs/docs/dph/stop-addiction/chapter-55-opioid-overdose-study-data-brief-9-15-2016.pdf

180 Health Policy Commission. (2016, August). Opioid use disorder in Massachusetts, p. 5. Retrieved Oct. 4, 2016, from mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/opioid-use-disorder-report.pdf

181 Connock, M., Juarez-Garcia, A., Jowett, S., et al (2007). Methadone and buprenorphine for the management of opioid dependence: a systematic review and economic evaluation.

182 Alanis-Hirsch, K., Croff, R., Ford II, J., et al (2016). Extended-release naltrexone: a qualitative analysis of barriers to routine use. *Journal of Substance Abuse Treatment, 62,* 68–73.

183 Mark, T., Lubran, R., McCance-Katz, E., et al (2015). Medicaid coverage of medications to treat alcohol and opioid dependence. *Journal of Substance Abuse Treatment, 55,* 1–5.

184 Freyer, F. (2016, July 15). Health connector will eliminate copays for addiction treatment. *Boston Globe.* Retrieved July 15, 2016, from http://www.bostonglobe.com/metro/2016/07/14/health-connector-eliminates-copays-for-addiction-treatment/WoKPjLIkoi2uWfk6zjp04K/story.html

185 Treatment statistics prepared by the Office of Data Analytics and Decision Support, Bureau of Substance Abuse Services, Massachusetts Department of Public Health on April 13, 2016, with data as of March 11, 2016.

186 Ibid.

187 The "other" category includes: OBOT, TSS, ATARP, BSAS Case Management/Sec 35 ACRA/ACC, BSAS Case Management/Sec 35 CSP, BSAS CJ Diversion, BSAS Family Intervention Clinical Support, BSAS Family Intervention – Family Support, BSAS Latina Res Serv, BSAS Recovery Support Outpatient Services, BSAS Supportive Case Management Levels, CAB Heat, Case Management, Case Mgmt. – Families in Sober Living, CHINS Subs Abuse Srvs, Compulsive Gambling, County Corrections, Crim Just Collab-Youth, Permanent Housing, Recovery High School, Recovery Support Services, State Parole Board, Street/Outreach/Engagement, Transitional Housing, Youth Intervention, Youth Program, Low Threshold Housing, Jail Diversion – Case Management Component, Housing Options Program, Family Focused Intervention & Care Coordination, Drug Court Programs, Drug Court Case Management. Note: Due to continuous data updates, do not compare these data to any prior statistics.

188 Description of service modalities: Acute treatment services are often referred to as inpatient detoxification programs and operate in freestanding and hospital-based settings. Methadone and other MAT programs are provided in an outpatient setting to those struggling with opiate addiction. Under Section 35 of Chapter 123 of the Massachusetts General Laws, courts may involuntarily compel for up to 90 days of inpatient treatment any individuals whose substance use puts themselves or others at risk. Day treatment, which offers several hours of daily counseling up to four days a week, is more intensive than outpatient treatment. Clinical stabilization services offer 24-hour treatment for substance abuse and are typically sought after ATS, but clients also come from residential rehabilitation programs and outpatient programs.

189 *Massachusetts Department of Public Health (2014, December).* State health plan: behavioral health [PowerPoint slide 43]. Retrieved March 22, 2016, from http://www.mass.gov/eohhs/docs/dph/health-planning/hpc/deliverable/behavioral-health-state-health-plan.pdf

190 Ibid.

191 CHIA (2015, April). Access to substance use disorder treatment in Massachusetts, p. 3. Retrieved July 20, 2015, http://www.chiamass.gov/assets/Uploads/SUD-REPORT.pdf

192 Darcy, L. (2015, July 8). Presentation by EOHHS to working group, p. 13. Retrieved March 28, 2016, from http://www.mass.gov/anf/docs/hpc/cdpsr/presentation-by-eohhs.pdf

193 Ibid.

CHAPTER

4

The Changing Nature of the Health Care Workforce in Massachusetts

Introduction

The economic expansion of the 1990s in Massachusetts was a period of extraordinary job creation that resulted in sharp increases in living standards. Employment levels increased by more than 20% between 1992 and 2000; the official unemployment rate fell to an historical low of 2.6% in 2000. Job losses in the state's once rapidly growing manufacturing sector were more than offset by a surging construction industry and fast growth in the professional and business sector.

Despite this prosperity, the health care and social assistance sector in Massachusetts was slow-growing during the 1990s. In fact, for job growth among all major industries, only government employment grew more slowly than health care and social assistance. The share of total employment concentrated in the health care and social assistance industry actually declined during the 1990s, even as the state economy added record numbers of new wage and salary jobs.[1]

The economic landscape changed dramatically around the turn of the century. From 2000 to 2012, the Commonwealth experienced a period of extreme economic turbulence marked by two economic declines—the dot.com collapse of 2001 and the Great Recession of 2008 to 2009—that resulted in massive job and income losses across all regions. This time, however, the health care and social assistance sector was able to add jobs and would emerge as the mainstay of countercyclical employment stability in the Commonwealth: While all other industries (ranging from construction and manufacturing to high-end services, leisure, and hospitality) *lost* 180,000 jobs, health care and social assistance organizations *added* more than 142,000 jobs. The sector accounted for about one-half of all employment gains posted during the dot.com recovery and 37% of new jobs during the early stages of the Great Recession recovery from 2009 to 2012.

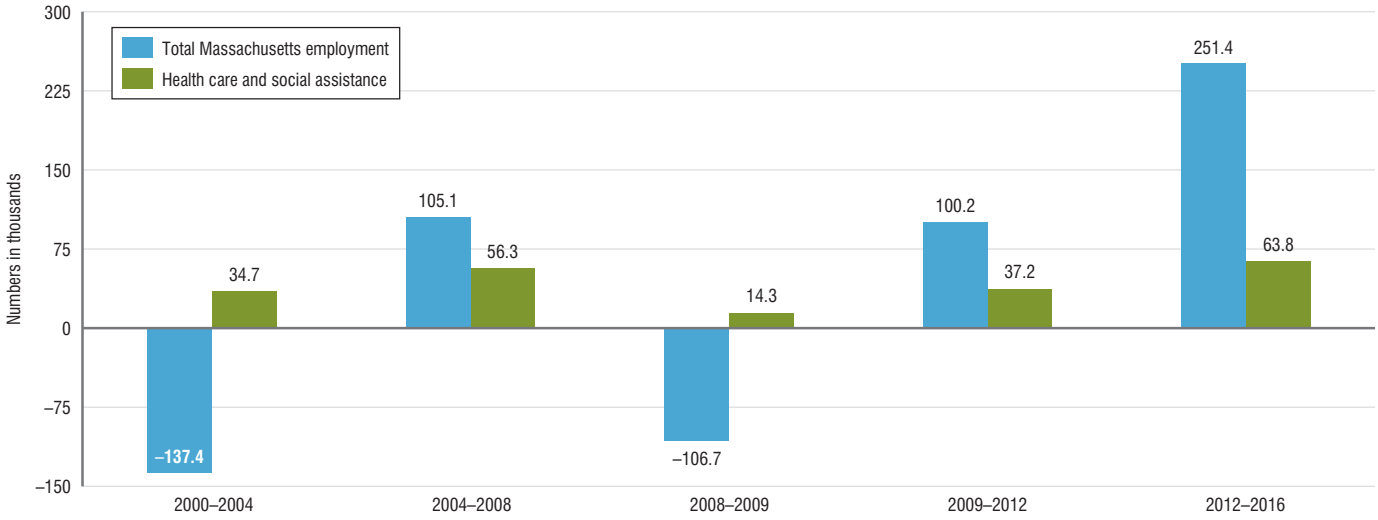
Since 2012, the state's pace of new job creation has accelerated, and employment growth is occurring in a much broader range of industries. Between 2012 and 2016, Massachusetts employers added more than 251,000 payroll jobs, driving the state's unemployment rate down to under 3.6% by the fourth quarter of 2016.[2] Firms in the health care and social assistance industry have increased employment levels by 64,000 jobs over the last four years, continuing to grow at a rate (11.5%) that is 1.5 times the overall pace of employment growth statewide (7.6%).

At the end of the 1990s, the health care and social assistance industry accounted for 12% of total payroll employment in Massachusetts (about 1 of every 8 jobs); today, it is 1 of every 6 jobs.[3] Available evidence suggests that, over the next 20 years, the sector will account for an even larger share of jobs in Massachusetts, and we expect continued above-average rates of job creation in years to come.

It is important to note that the health care delivery system in Massachusetts has changed fundamentally in recent years, as has the nature of demand for labor within the health care and social assistance sector. The dual mandate of Chapter 224 and the Patient Protection and Affordable Care Act (ACA)—to contain costs while maintaining or improving the quality of health care services that they provide—is one of many pressures on the health care system. In this chapter we examine the nature of these changes and offer an outlook for growth and future change in health care's diagnostic, practitioner, and support/direct-care occupations.

This chapter was researched and written by staff from the Center for Labor Markets and Policy at Drexel University and the Commonwealth Corporation, a workforce development organization created in 1997 by the Massachusetts Legislature.

Figure 4.1. Trends in non-farm payroll employment in the health care and social assistance industry, 2000–2016



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics Survey Program, Massachusetts Statewide Non-Agricultural Employment, Annual Averages

Health Care Industry Components

The health care and social assistance sector is composed of four key industry subsectors:

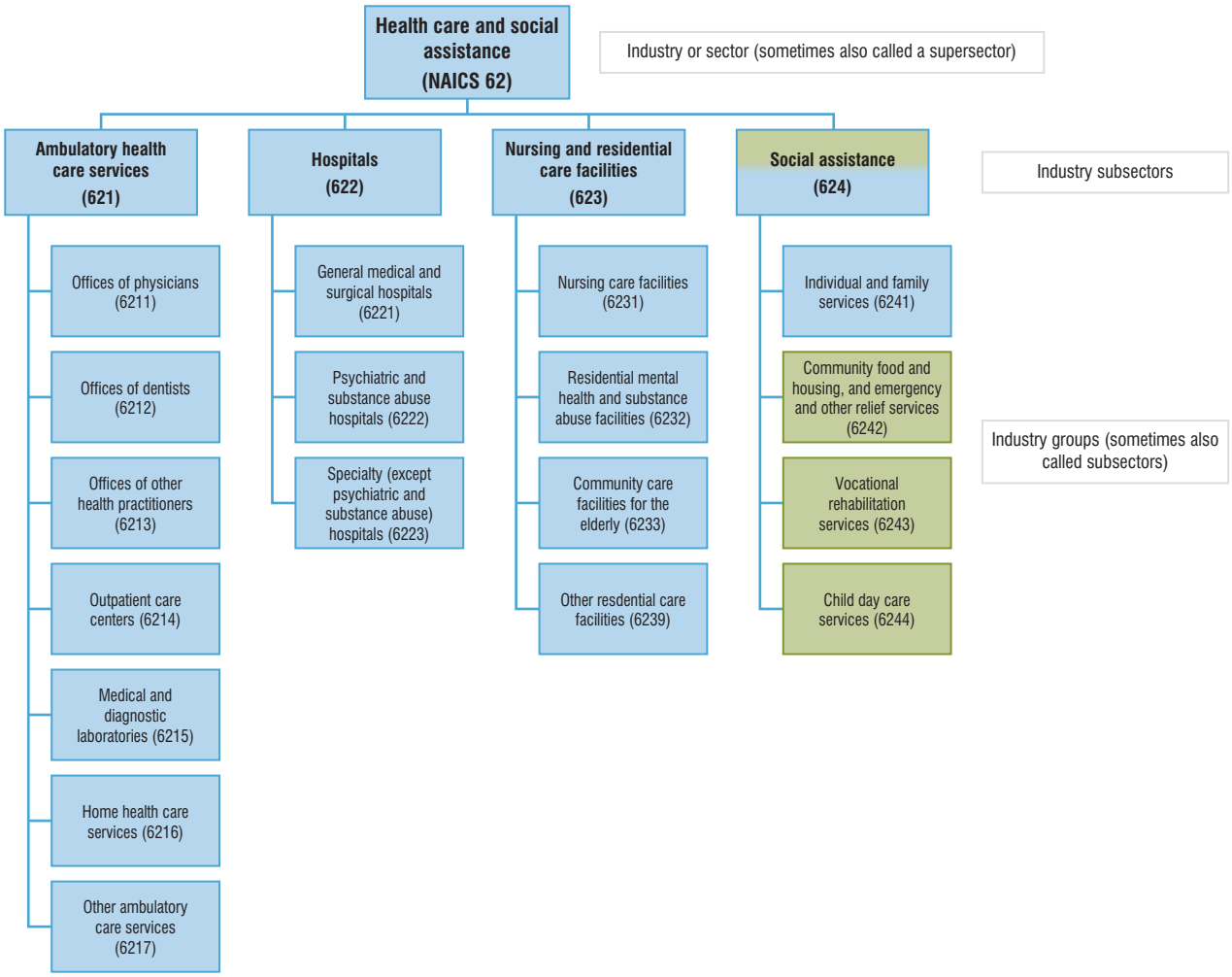
1. Ambulatory care,
2. Hospitals,
3. Nursing and residential care facilities
4. Social assistance organizations

Not all of these components are part of the state's health care sector. For example, child care services, an industry group within the social assistance subsector, is not part of the health care delivery system. Employment data for health care and social assistance providers are often aggregated and reported together by federal and state agencies and frequently interpreted by the media and many analysts as a general measure of health care employment. However, this measure of health care is overly broad.

Alternatively, many analysts define health care employment as inclusive of just the first three major subsectors—ambulatory care, hospitals, and nursing and residential care facilities—which are dominated by health care professionals and support occupations who work in establishments that provide health care services on an inpatient and outpatient basis. This definition excludes social assistance in its entirety, since so many social services organizations engage in activities unrelated to health care, such as community, food and housing services, and child care services.

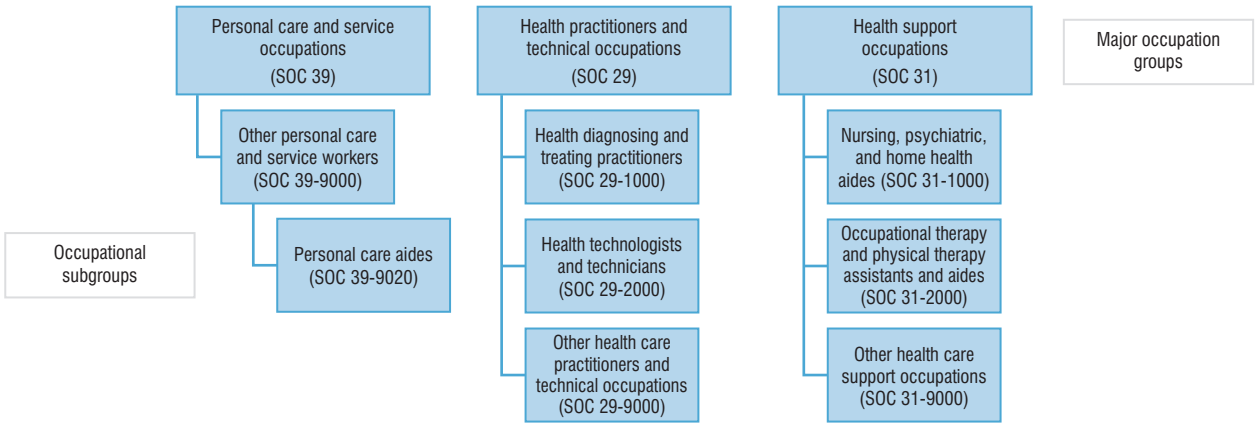
We have concluded that while including the entire social assistance sector in a definition of health care is overly broad, it is clear that part of the state's social assistance sector, the individual and family services subsector, has become an important source of "at home" health care support services and plays an increasingly important role in the care of the chronically ill and disabled.[4]

Figure 4.2. Hierarchy of the health care and social assistance industry



Note 1: Numbers in parentheses indicate industry hierarchies used throughout this chapter, based on the North American Industry Classification System (NAICS)
Note 2: Industries shaded in blue are included in our definition of the health care industry for this study. Services for the elderly and persons with disabilities (NAICS 624120) is a subcategory of individual and family services (NAICS 6241), not shown on this chart for ease of visualization. Where data are available, we specify to this 6-digit level.
Source: U.S. Bureau of Labor Statistics https://www.bls.gov/iag/tgs/iag62.htm

Figure 4.3. Hierarchy of the major health care occupational groups



Note 1: Numbers in parentheses indicate occupational hierarchies used throughout the chapter, based on the Standard Occupational Classification (SOC).
Note 2: This diagram does not include all subgroups under SOC 39, nor all occupations that are found throughout the health care industry. For ease of visualization, we have focused on the major health-related occupational categories here.
Source: U.S. Bureau of Labor Statistics https://www.bls.gov/Oes/current/oes_stru.htm

With recent changes in the Commonwealth regarding health care finance and insurance coverage, the social assistance subsector has taken on increasingly important roles in health care delivery, especially in the field of home care, which refers to the at-home assistance of individuals with chronic illness and/or disabling conditions (physical, mental, emotional, and cognitive). Indeed, we find that job growth in the health care and social assistance industry has been greatest in subsectors focused on helping these individuals remain at home and avoid admission into institutionalized settings, such as nursing homes and hospitals.

One of the most important impacts of this shift in care delivery from inpatient settings to home care has been rapid job growth in subsectors that employ substantial numbers of workers in direct-care occupations requiring little or no health or medical education or work experience. For example, the individual and family services subsector includes many workers—including home health aides, personal care aides and attendants, community health workers, and social and human service assistants—who care for the elderly and disabled.

Finally, we define the four major components in health care as: ambulatory care, hospitals, nursing and residential care facilities, and individual and family services. Figure 4.2 and Figure 4.3 show the industry and occupational hierarchies used throughout this chapter, based on the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC).

Trends in Employment in the Four Basic Components of Health Care

OVERVIEW

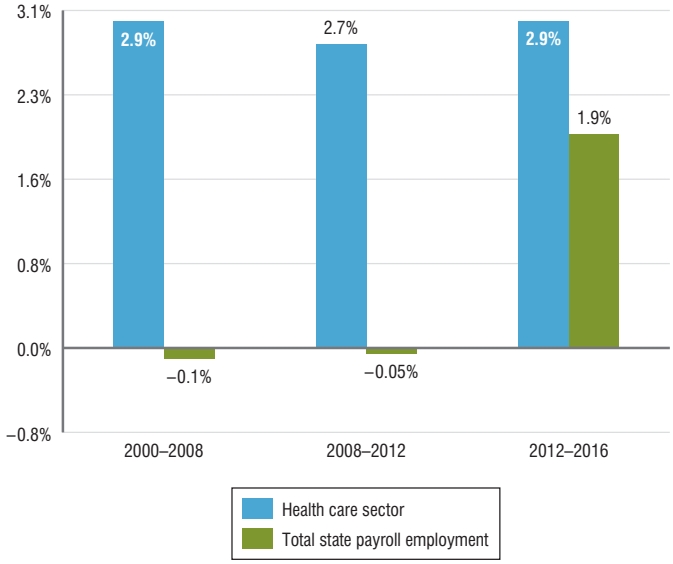
In this section, we explore employment developments in the four major components of the health care sector[5] over three distinct time periods:

- 2000 to 2008, a period of very rapid growth in health care employment in the state,
- 2008 to 2012, just prior to the enactment of Chapter 224 cost containment legislation, when the state labor market experienced substantial job losses followed by an initially weak jobs recovery, and
- Post-2012, following implementation of Chapter 224, when the state economy began creating jobs at a pace not seen since the 1990s.

We chose these time periods because they represent how employment growth changed from the period prior to the onset of the Great Recession (2000–2008), to the period including the recession prior to Chapter 224 (2008–2012), and finally through the post-recession recovery (2012–2015).

The rising demand for health care has been fueled by an aging population characterized by higher rates of patient acuity and morbidity, combined with federal and state legislation that mandated and subsidized health insurance coverage. The state's health care system has expanded payroll employment levels to meet the sharp increase in the demand for health care services. Since 2000, the pace of new job creation in health care has been

Figure 4.4. Annual average rate of growth in total non-farm employment and health care sector employment, 2000–2016



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics Survey Program, Massachusetts Statewide Non-Agricultural Employment, Annual Averages

quite rapid, and, despite cyclically unstable economic conditions, its pace of growth has remained largely unchanged.

Between 2000 and 2012, the state experienced widely varying rates of change in overall employment levels as the state economy weathered two severe recessions. Yet, undeterred by poor economic conditions, the health care sector's payroll employment levels increased by 2.9% from 2000 to 2008 and 2.7% from 2008 to 2012. Between 2012 and 2016, overall wage and salary employment levels rebounded, increasing by a relatively robust 1.9% per year, while new job creation in health care rose by an average of 2.9% per year.

While the pace of new job creation in health care has not changed much, the way the system deploys labor resources has changed considerably, with an increased emphasis on staffing that can serve patients on an outpatient and in-home basis. Between 2000 and 2008, a period including the dot.com recession and subsequent recovery, overall health care employment levels in the state increased from 376,100 to 463,300, a rise of 87,200 jobs, and a nearly one-quarter gain.

- Hospitals were the most important source of new job creation, accounting for 33,200 new jobs, or 38% of the total increase in health care.
- Ambulatory care providers added 20,000 new jobs, up 16.5%.
- Nursing home and residential care providers increased employment by 11,000 new jobs, up 12.7%.
- Individual and family service providers increased employment from 28,300 to more than 51,000, up 82%.

After 2008, most new jobs occurred in outpatient-oriented organizations. In contrast, both the hospital and nursing and residential care industries experienced substantial reductions in their annual average rate of new job creation over the period, as follows:

- Employment in the ambulatory care subsector increased from 140,200 in 2008 to 159,600 by 2012, an increase of 19,400 jobs; further, its annual pace of new job creation rose from 2.1% during 2000 to 2008 to 3.5% during 2008 to 2012.
- The individual and family services industry rapidly added more than 17,000 jobs and grew by 34% over just four years.
- Between 2008 and 2012, the ambulatory care and individual and family service industries together created 37,000 of the 50,000 new jobs generated by the state's health care sector, accounting for about 3 of 4 new health care jobs.
- The hospital industry added 8,800 jobs between 2008 and 2012, increasing employment by 5%. Between 2000 and 2008, hospital employment rose by an average of 2.9% per year, but between 2008 and 2012 the employment growth rate in the hospital subsector declined by 1.3% per year, a 60% decline.
- The nursing and residential care subsector also added jobs at a reduced pace during 2008 to 2012, growing by 1.2%, down from 1.6% per year between 2000 and 2008.

Over the past four years, the pattern of job growth in health care in Massachusetts has persisted: Overall employment has risen by an annual average of 2.9%, equating to nearly 60,000 jobs. However, most of this growth has been outside of the traditional hospital and nursing home (inpatient service providers). The ambulatory care industry added 26,600 jobs, up 17%, between 2012 and 2016, while the individual and family services subsector added 20,300 jobs, up 29%. Together, these two outpatient-oriented industries created about 47,000 new jobs, accounting for about 80% of the total increase in health care jobs.

Employment in the state's hospital subsector rose from 183,900 during 2012 to 186,200 by 2016, an increase of 11,100 jobs, or 1.5%. This rate of growth was about the same as the 2008–2012 period and well below the 2000–2008 period. The pace of job creation in the nursing and residential care industry declined further with annual job growth falling to just 0.4% between 2012 and 2016, equal to just 1,800 new jobs.

These findings offer additional evidence that, beginning in 2008, an important change occurred in the source of new job creation in the state's health care delivery system. Employment growth slowed considerably among the traditional inpatient-oriented provider industries and accelerated in outpatient-oriented subsectors. Hospitals and nursing homes accounted for one-half of all new jobs created between 2000 and 2008, but just one-quarter between 2008 and 2016. Ambulatory care and individual and family service providers are now the overwhelming source of new health care sector job creation in the Commonwealth.

This change in the sources of health care sector growth began well before Chapter 224 was enacted in 2012. Indeed, trends in health care job creation observed between 2012 and 2016 are quite similar to those we saw between 2008 and 2012. The economic recession of 2008 and a widespread effort by employers to reduce the rate of growth in health care costs likely had an important impact on the slowdown in employment growth among

Table 4.1. Annual Average Employment in the Four Major Health Care Subsectors, 2000–2016 (In Thousands)

	2000	2008	Absolute Change	Percent Change
Ambulatory care	120.3	140.2	19.9	16.5%
Hospitals	141.9	175.1	33.2	23.4%
Nursing and residential care	85.6	96.5	10.9	12.7%
Individual and family services	28.3	51.5	23.2	82.0%
Total health care sector	**376.1**	**463.3**	**87.2**	**23.2%**
	2008	2012	Absolute Change	Percent Change
Ambulatory care	140.2	159.6	19.4	13.8%
Hospitals	175.1	183.9	8.8	5.0%
Nursing and residential care	96.5	101.0	4.5	4.7%
Individual and family services	51.5	69.0	17.5	34.0%
Total health care sector	**463.3**	**513.5**	**50.2**	**10.8%**
	2012	2016	Absolute Change	Percent Change
Ambulatory care	159.6	186.2	26.6	17%
Hospitals	183.9	195.0	11.1	6%
Nursing and residential care	101	102.8	1.8	2%
Individual and family services	69	89.3	20.3	29%
Total health care sector	**513.5**	**573.3**	**59.8**	**12%**

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics Survey Program, Massachusetts Statewide Non-Agricultural Employment, Annual Averages

hospitals and nursing homes after 2008. The central role that ambulatory care and individual and family services began to play in creating health care jobs during the post-2008 period is likely the product of efforts to reduce health care costs even as demographic forces and the implementation of universal health care coverage in Massachusetts increased the potential demand for health care services.

In summary, the findings described above reveal an important shift in the pattern of job creation within the health care sector in Massachusetts since 2008. Instead of growth in the inpatient-oriented hospital and nursing home and residential care industries, such as that which occurred between 2000 and 2008, employment growth in recent years has been heavily concentrated in outpatient-oriented industries and, as we shall see in the following sections, in industries that employ large numbers of direct-care workers.

A NOTE ABOUT THE DATA

Up to this point, we have used employment data from the Current Employment Statistics (CES) survey program, a monthly sample survey of business establishments in Massachusetts and nationwide that measures total payroll employment and employment by industry. Findings from this survey serve as an important component of national and state monthly jobs reports released by the U.S. Bureau of Labor Statistics and the Massachusetts Department of Labor and Workforce Development (DLWD).

The CES survey offers a number of important advantages in measuring employment trends, but as a sample survey is limited in its ability to provide important data on more disaggregated components of the industry. Therefore, we rely on employment data derived from the Quarterly Census of Employment and Wages (QCEW), which produces employment measures at the detailed, industry level based on information submitted by employers as part of their quarterly tax filings under state unemployment insurance statutes. Essentially all employers (about 98%) must submit these tax filings each quarter, so this census covers a wide range of industries and is unhampered by sample-size limitations.

We examine employment data organized by industry from the QCEW program for Massachusetts to take a closer look at important elements within the four major subsectors of health care and to produce some very useful insights at a more refined level into changes in health care employment. However, because the QCEW is in effect a complete census of state employers conducted each calendar quarter, data from the program have a much longer time lag than findings from the CES monthly sample. Thus, the employment trends analysis that follows analyzes QCEW findings through the latest time period available—the fourth quarter of 2015. Below, we examine in greater detail the sources of employment growth in each of the four major subsectors of the health care delivery system (ambulatory care, hospitals, nursing and residential care, and individual and family services) in the state and specific elements within these four components.

AMBULATORY CARE

The ambulatory care industry in Massachusetts is composed of health care practitioners and support staff who provide outpatient services. Unlike hospitals and nursing homes, ambulatory care organizations do not rely as extensively on facilities and equipment and do not provide inpatient services. The industry is composed of the following service providers:

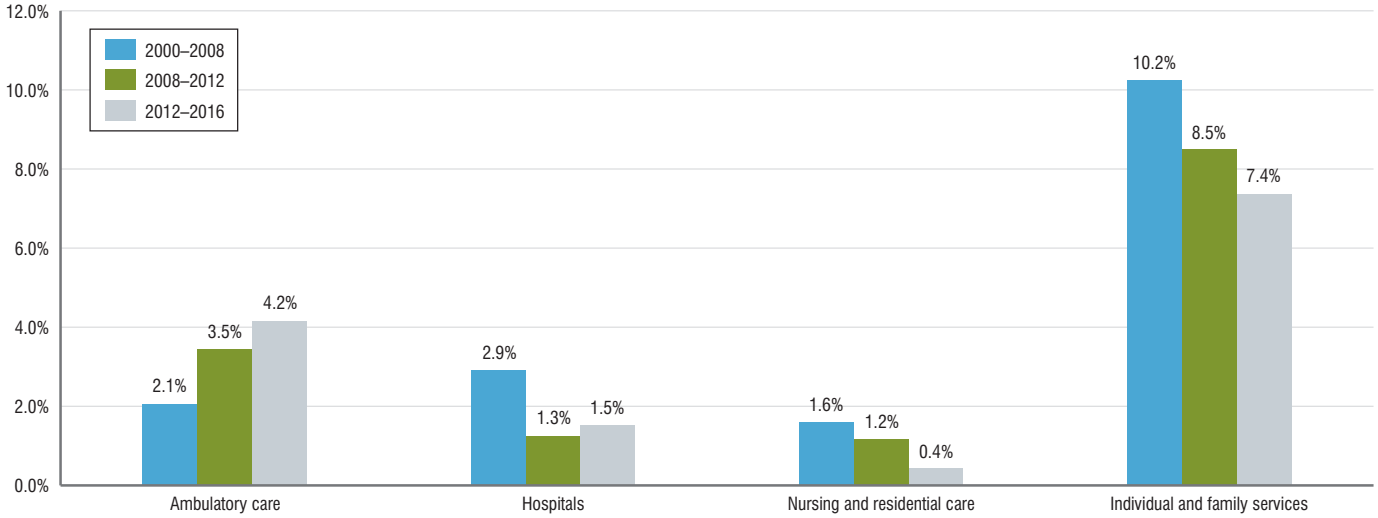
- Offices of physicians, including mental health physicians
- Offices of dentists
- Offices of other health practitioners, including chiropractors, optometrists, mental health practitioners, specialty therapists, podiatrists, dietitians, midwives, and registered nurses
- Outpatient care centers
- Medical and diagnostic laboratories
- Home health care services
- Other ambulatory care services, such as ambulance services, blood banks, and organ banks

Even a casual review of these elements would suggest a large variation in the staffing structures of these organizations and the nature of services provided. For example, in Massachusetts, physician offices comprise the doctors themselves (with various specializations), as well as clerical workers and health care support workers, while home health agencies employ home health aides, personal care workers, registered nurses, and licensed practical nurses.

Employment trends, 2000–2015

Obviously, the educational attainment, licensing requirements, and need for medical knowledge vary dramatically between physician offices and home care organizations. The former requires the very highest level of education and medical knowledge, while the latter requires minimal schooling and almost no medical knowledge.

Figure 4.5. Annual average rate of growth in employment in the four major health care subsectors



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics Survey Program, Massachusetts Statewide Non-Agricultural Employment, Annual Averages

Table 4.2. Employment Trends in Ambulatory Care Subgroups, 2000–2008

	2000	2008	Absolute Change	Percent Change
Offices of physicians	44,876	50,403	5,527	12.3%
Offices of dentists	18,119	21,662	3,544	19.6%
Offices of other health practitioners	10,213	13,042	2,829	27.7%
Outpatient care centers	17,304	18,751	1,447	8.4%
Medical and diagnostic laboratories	3,634	4,830	1,196	32.9%
Home health care services	19,664	24,548	4,883	24.8%
Other ambulatory health care services	6,344	7,129	784	12.4%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Table 4.3. Employment Trends in Ambulatory Care Subgroups, 2008–2012 and 2012–2015

	2008	2012	Absolute Change	Relative Change
Offices of physicians	50,403	53,989	3,587	7.1%
Offices of dentists	21,662	22,391	729	3.4%
Offices of other health practitioners	13,042	15,507	2,465	18.9%
Outpatient care centers	18,751	21,745	2,993	16.0%
Medical and diagnostic laboratories	4,830	5,029	199	4.1%
Home health care services	24,548	32,971	8,423	34.3%
Other ambulatory health care services	7,129	7,922	793	11.1%
	2012	2015	Absolute Change	Relative Change
Offices of physicians	53,989	55,785	1,796	3.3%
Offices of dentists	22,391	23,831	1,440	6.4%
Offices of other health practitioners	15,507	17,643	2,136	13.8%
Outpatient care centers	21,745	23,482	1,737	8.0%
Medical and diagnostic laboratories	5,029	5,585	556	11.1%
Home health care services	32,971	44,134	11,163	33.9%
Other ambulatory health care services	7,922	8,156	234	3.0%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program.

Each ambulatory care subgroup posted substantial employment gains from 2000 to 2008. Home health care employment rose by about one-quarter, from 19,700 to 24,500. The offices of other health practitioners, including mental health practitioners (except physicians) and physical, occupational, and speech therapists, saw covered employment levels increase by 27%, equal to more than 2,800 jobs. Physician offices added 5,500 jobs and expanded by 12%.

Table 4.3 examines the rapid growth in covered employment levels in each ambulatory care subgroup from 2008 to 2012 and from 2012 to 2015. During the 2008 to 2012 recession/recovery period, all subgroups added jobs. Most of the new job creation was concentrated among home health care services, which increased employment by 8,400 jobs, more than one-third. The offices of other health care practitioners also had very rapid growth, expanding employment levels by 19%, or 2,500 jobs. Similarly, outpatient care centers—including family planning, mental health, substance abuse organizations, and freestanding surgical and medical centers—added 3,000 jobs, growing by 16%. Employment in physicians' offices grew by more than 3,500 jobs, or a robust 7%.

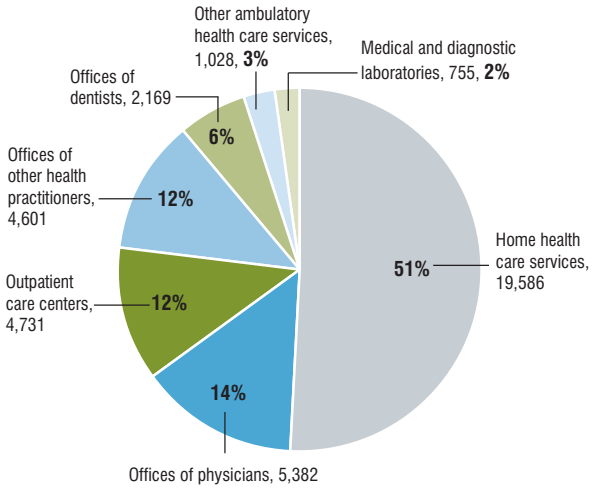
The shift of employment growth toward home health care providers accelerated further between 2012 and 2015, from about 33,000 to 44,100, a remarkable 34% rise in just three years. The offices of other health practitioners continued its robust pace of growth, adding 2,100 jobs, a 14% rise. However, employment growth slowed to just 1% per year in physicians' offices.

Table 4.4. Employment Trends in Ambulatory Care Subgroups, 2008–2015

	2008	2015	Absolute Change	Relative Change
Offices of physicians	50,403	55,785	5,382	10.7%
Offices of dentists	21,662	23,831	2,169	10.0%
Offices of other health practitioners	13,042	17,643	4,601	35.3%
Outpatient care centers	18,751	23,482	4,731	25.2%
Medical and diagnostic laboratories	4,830	5,585	755	15.6%
Home health care services	24,548	44,134	19,586	79.8%
Other ambulatory health care services	7,129	8,156	1028	14.4%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Figure 4.6. Sources of new job creation in ambulatory care, 2008–2015



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

These findings reveal that the large and rapid growth in ambulatory care employment was fueled by an extraordinary increase in employment in the home health care services subgroup, as well as in offices of other health care practitioners and outpatient care centers.

Over the entire seven-year period between 2008 and 2015, home health care firms increased their employment levels from 24,500 to 44,100, representing an 80% increase. Home health care provider growth accelerated from 8% per year between 2008 and 2012 to 11% per year between 2012 and 2015.

Between 2008 and 2015, other health practitioners expanded their employment levels by more than one-third, adding 4,600 jobs, while outpatient care centers expanded by one-quarter, adding 4,700 positions. Offices of physicians and dentists both saw increases of about 10%, together adding over 7,500 jobs.

The explosive growth in labor demand in home health care accounted for one-half of the total increase in ambulatory care employment between 2008 and 2015 and, remarkably, for 1 in 9 private sector jobs created statewide.

Occupational structure and wages

Table 4.5 shows the staffing pattern and wage structure of the ambulatory care subsector's two largest subgroups: offices of physicians and home health agencies. The data reveal marked differences in the distribution of employment across major occupations in these two subgroups. In the offices of physicians, half of all workers are health care practitioners, which generally require post-secondary education and pay a mean wage of about $72 per hour.

In contrast, 54% of occupations in home health agencies are dominated by health care support and personal care occupations, which have minimal education and training requirements and pay, on average, between $13 and $14 per hour. The overall average hourly wage for home health care is $22.71, less than one half the $47.27 average rate of employees in the offices of physicians.

Much of the new growth in ambulatory care overall is in occupations that pay well below the industry-wide average hourly rate. As discussed previously, this is due to the rapid growth in home care, which has resulted in heightened demand for workers with little or no formal health education or training.

Table 4.5. Occupational Employment and Hourly Wages in Two Key Ambulatory Care Subgroups, May 2015

	Offices of Physicians		Home Health Care Agencies	
Major Occupations	Share of Employment	Mean Hourly Wage	Share of Employment	Mean Hourly Wage
Total	**100%**	**$47.27**	**100%**	**$22.71**
Non-health professional and managerial	6%	NA	8%	NA
Health care practitioners and technical occupations	50%	$72.13	30%	$34.50
Health care support occupations	14%	$17.73	42%	$13.98
Personal care and service occupations	0%	$22.10	12%	$13.20
Office and administrative support occupations	28%	$19.26	7%	$19.98

Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, Employment and Wages Research Data Files, Massachusetts, May 2015.

HOSPITALS

Hospital organizations use physician and nursing services, as well as sophisticated technological tools, to provide diagnostic and treatment services in facilities built to accommodate patients. In this section, we analyze data for three key elements of the hospital industry in Massachusetts:

- **General medical/surgical hospitals,** which provide inpatient diagnostic and treatment services to patients with a wide range of medical conditions.
- **Psychiatric and substance abuse hospitals,** which provide inpatient diagnostic, treatment, and monitoring services to patients with mental illness or substance abuse issues. These hospitals emphasize psychiatric, psychological, and social work-related services, and treatment often requires longer stays than those for medical/surgical hospitals.
- **Specialty hospitals,** including rehabilitation hospitals, which provide therapeutic services to patients with physical challenges; cancer hospitals; eye, ear, nose, and throat hospitals; obstetrical hospitals; and children's hospitals.

Employment trends, 2000–2015

General medical/surgical hospitals are by far the largest component of the hospital industry, accounting for 87% of all hospital employment in Massachusetts and the bulk of new hospital jobs from 2000 to 2008. Employment in hospitals rose from 122,300 in 2000 to 153,600 by 2008, a net increase of 31,200 positions, or 25%. This rapid expansion created very strong demand for workers in health care practitioner occupations, most notably in the registered nursing fields—where widespread labor supply problems developed during the early part of the decade and persisted through 2008 and beyond.

Psychiatric and substance abuse hospitals added 1,200 positions, a gain of 40%, between 2000 and 2008. These organizations employ lower shares of health care practitioners and instead rely more heavily on staff involved in community and social work.

Specialty hospitals added 3,800 jobs, a gain of 27%, between 2000 and 2008 and also experienced labor supply problems among skilled health care practitioner occupations.[6]

Employment growth in all three subgroups slowed considerably between 2008 and 2012, as the provision of services began shifting from inpatient care toward outpatient care. General medical/surgical hospitals increased employment by just 3.9% over the four-year period and just 1% per year, a sharp decline from the subgroup's greater-than-3% annual growth observed between 2000 and 2008. This slowdown, combined with an expansion in the number of new college graduates entering the health care practitioner workforce, substantially eased the labor supply problems that these institutions experienced in the earlier period, especially in registered nursing occupations.

The pace of new job creation in specialty hospitals was 3.3% per year between 2008 and 2012, about the same as the very robust 3.4% annual pace of 2000 to 2008. Between 2012 and 2015, job creation slowed considerably in both specialty and psychiatric and substance-abuse hospitals. In recent years, specialty hospital average employment growth has fallen to 1.3% per year, just slightly higher than the growth rate for general medical/surgical hospitals.

Table 4.6. Employment Trends in Hospital Subgroups, 2000–2008

	2000	2008	Absolute Change	Relative Change
General medical and surgical hospitals	122,334	153,574	31,240	25.5%
Psychiatric and substance abuse hospitals	3,022	4,235	1,213	40.1%
Specialty hospitals	13,542	17,293	3,751	27.7%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program.

Table 4.7. Employment Trends in Hospital Subgroups, 2008–2012, 2012–2015

	2008	2012	Absolute Change	Relative Change
General medical and surgical hospitals	153,574	159,543	5,969	3.9%
Psychiatric and substance abuse hospitals	4,235	4,738	503	11.9%
Specialty hospitals	17,293	19,586	2,294	13.3%
	2012	2015	Absolute Change	Relative Change
General medical and surgical hospitals	159,543	164,688	5,145	3.2%
Psychiatric and substance abuse hospitals	4,738	4,956	218	4.6%
Specialty hospitals	19,586	20,345	758	3.9%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Occupational structure and wages

One-half of staff in general medical/surgical hospitals in Massachusetts are high-skill, high-wage health care practitioners who earn an average of just over $50 per hour. These occupations, which require post-secondary degrees and certifications of medical knowledge, comprise the following:

- About one-half of all health care practitioners in general medical/surgical hospitals are registered nurses, who earn an average of $48 per hour.
- More than 1 in 4 are health technologists, ranging from lab technicians to medical records and health informatics technicians.
- Physicians account for just 5% of health care practitioners.
- Therapeutic occupations account for about 7%.
- Health care support workers, primarily nursing assistants and medical assistants, make up about 12% of staff. These occupations pay an average of just over $12 per hour—about one-fourth the average hourly wage of all health care practitioners—and do not require education beyond the high school diploma level yet do require certifications of medical knowledge.

Table 4.8. Occupational Employment and Hourly Wages in Hospital Subgroups, May 2015

	General Hospitals		Specialty Hospitals		Psychiatric Hospitals	
	Staffing Pattern	Hourly Wage	Staffing Pattern	Hourly Wage	Staffing Pattern	Hourly Wage
Total	**100%**	**$34.72**	**100%**	**$34.70**	**100%**	**$26.68**
Non-health professional and managerial	15%	NA	8%	NA	42%	NA
Health care practitioners and technicians	50%	$50.48	43%	$42.98	30%	$30.23
Health care support	12%	$12.16	17%	$16.63	8%	$14.55
Non-health service occupations	6%	NA	6%	NA	7%	NA
Office and administrative support	14%	$14.12	11%	$21.35	9%	$20.74

Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, Employment and Wages Research Data Files, Massachusetts, May 2015

Forty-three percent of staff in specialty hospitals are in health care practitioner occupations, with about one-quarter employed in various allied health and therapist occupations and about 44% working in registered nurse positions.

These occupations require both post-secondary degrees and specialty-specific certifications of proficiency. Hourly wages averaged $43 in 2015. Health care support workers, including nursing assistants and therapist assistants, accounted for about 1 in 6 positions in specialty hospitals; their average hourly wage was $16.63 in 2015, which was 39% of the rate of health care practitioners employed in specialty hospitals.

Psychiatric hospitals differ markedly from general medical/surgical hospitals and specialty hospitals in their occupational composition, as follows:

- About 42% of workers in psychiatric hospitals are non-health professionals, primarily community and social worker occupations, including mental health and substance abuse counselors and social services assistants.
- Health care practitioners account for about 30% of workers, one-half of which are registered nurses.
- The overall hourly wage for psychiatric hospital workers was $26.68 in 2015, about three-quarters the average wage paid to the other hospital subgroups. This difference is partly the product of differences in the occupational staffing mix, but also of lower wages for workers in the same occupation relative to their counterparts in general medical/surgical hospitals and specialty hospitals. For example, RNs employed in psychiatric hospitals had a mean hourly wage of $39.30 in 2015, compared to $45.37 and $48.13 for their counterparts working in specialty hospitals and general medical/surgical hospitals, respectively.

NURSING AND RESIDENTIAL CARE

The nursing and residential care subsector in Massachusetts includes facilities that employ health care professionals and support staff, as well those primarily staffed by social and human service personnel with little or no health or medical background. Major subgroups of the subsector include:

- The **nursing care facilities** group includes traditional nursing homes, rest homes, convalescent homes, and skilled nursing facilities that provide nursing care and rehabilitation service, often for an extended period of time. These organizations employ large numbers of registered nurses, nursing assistants, licensed practical nurses, and some staff in health therapy occupations, but few physicians or workers in other health care diagnostic, treatment, or technical occupations.
- **Residential mental-health facilities** include psychiatric facilities, alcohol and drug treatment residences, halfway houses, and residential group homes. These facilities provide residential care and treatment for patients with mental health and substance abuse conditions.
- **Community care facilities for the elderly** provide residential and personal care services for the elderly and others who either are unable to fully care for themselves or who do not wish to live independently. These facilities do not provide nursing services and instead provide room and board, supervision, and help with activities of daily living.
- Organizations classified as **other residential care facilities** are primarily engaged in providing residential support to minors, including group homes for youth with disabilities, juvenile halfway houses, group foster homes, and boot camps for delinquent youth. Few health care staff work in this subgroup.

Employment trends, 2000–2015

While overall employment in nursing and residential care has increased steadily since 2000, this growth pattern has masked employment declines in the nursing home subgroup.

- The traditional nursing home industry in Massachusetts added relatively few new jobs between 2000 and 2008, even as most other health care subsectors added jobs at a robust pace. Payroll employment levels in nursing care facilities increased from about 57,100 to 58,300 between 2000 and 2008, an increase of just 2.1%, or about 0.3% per year.
- In contrast, residential mental health facilities and community care facilities for the elderly posted very sharp increases of 6.0% and 4.7%, respectively.
- Employment in Massachusetts nursing care facilities stopped growing in 2008 and remained largely unchanged between 2008 and 2012, averaging just over 58,000 jobs at both ends of the period. However, employment levels declined 5.7% between 2012 and 2015, dropping to about 54,800, a loss of 3,300 jobs.

- Residential mental health facilities continued their rapid pace of growth (11%) even during the recession/early recovery years of 2008 to 2012, adding 2,000 jobs.
- Community care facilities also continued to hire rapidly, increasing by more than 2,800 jobs, or 20%, between 2008 and 2012.
- The pace of new job growth in two industry subgroups—residential mental health facilities and community care facilities for the elderly—has remained robust in recent years. Residential mental health facilities added more than 2,000 jobs, a nearly 10% gain between 2012 and 2015. Community care facilities rapidly added jobs at a 5% annual pace since 2012. Other residential-care facilities (which primarily provide residential services to minors) had essentially flat employment levels between 2000 and 2012 but a sharp rise in the last three years, adding 1,400 jobs and increasing employment by one-quarter between 2012 and 2015.

Occupational structure and wages

Since 2008, employment in the nursing and residential care subsector has shifted from more medically oriented nursing homes toward residential care, elderly community care organizations, and, more recently, other residential care firms. Average wages have declined with this shift.

As stated previously, a majority of workers in residential mental health and community care facilities are outside of the health care practitioner/technician and health care support fields. Residential mental health facilities employ primarily community and social service specialists and personal care aides. Community care facilities concentrate their staffing in food preparation and service positions, nursing assistants, and personal care aides. Hourly wages in both subgroups averaged about $16.80 in 2015, well below the mean hourly wage rate of $20.70 earned by workers employed in the nursing home subgroup.

The reduced overall average wage in the nursing and residential care subsector is due to the sharply lower utilization of health care practitioners (primarily registered nurses) in residential mental health (5% of staff), community care (7% of staff) and other residential care (4% of staff) subgroups as compared to the nursing homes subgroup (31%).

Table 4.9. Employment Trends in Nursing and Residential Care Subgroups, 2000–2008

	2000	2008	Absolute Change	Relative Change
Nursing care facilities	57,062	58,277	1,215	2.1%
Residential mental health facilities	12,507	18,537	6,031	48.2%
Community care facilities for the elderly	10,198	14,029	3,831	37.6%
Other residential care facilities	5,768	5,541	–226	–3.9%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Table 4.10. Employment Trends in Nursing and Residential Care Subgroups, 2008–2012, 2012–2015

	2008	2012	Absolute Change	Relative Change
Nursing care facilities	58,277	58,075	–202	–0.3%
Residential mental health facilities	18,537	20,567	2,030	11.0%
Community care facilities for the elderly	14,029	16,892	2,863	20.4%
Other residential care facilities	5,541	5,401	–140	–2.5%
	2012	2015	Absolute Change	Relative Change
Nursing care facilities	58,075	54,774	–3,301	–5.7%
Residential mental health facilities	20,567	22,601	2,034	9.9%
Community care facilities for the elderly	16,892	19,509	2,617	15.5%
Other residential care facilities	5,401	6,801	1,400	25.9%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

INDIVIDUAL AND FAMILY SERVICES

The individual and family services subsector is not generally considered a part of the health care sector of the state or national economies, since it is not closely connected to the delivery of health care services. We are including it in our report, though, because a large and rapidly growing subgroup—services to the elderly and disabled—has become a critical component of strategies to keep persons with physical, cognitive, emotional, and mental infirmities at home in their communities and out of inpatient facilities.[7] This subsector is composed of three very distinct subgroups:

- **Services to the elderly and disabled.** Workers employed in this subgroup provide direct care assistance, primarily with activities of daily living, to the elderly and individuals with disabilities in their homes. The QCEW program counts all personal care attendants who are financed by MassHealth as employed in this subgroup,[8] as discussed in detail below.
- **Child and youth services.** Workers employed in this subgroup provide assistance to children through the provision of adoption services, child welfare, foster placement, and teen outreach services.
- **Other individual and family services,** including alcohol and drug addiction self-help providers, ex-offender programs, rehabilitation organizations, neighborhood multi-service centers, rape crisis centers, and suicide crisis centers.

Understanding individual and family services and employment classification changes

Firms that provide **services to the elderly and disabled** provide direct care services—primarily through health care support and personal care aide and attendant workers—to persons who are chronically ill, disabled, or at risk of admittance to an inpatient health care facility. During 2015, two-thirds of all individual and family care jobs were in the subgroup of services to the elderly and disabled. Approximately 35,000 MassHealth-funded personal care attendant positions were classified in this subgroup during 2015, accounting for about 60% of jobs in the subgroup.

Table 4.11. Occupational Employment and Hourly Wages in Nursing and Residential Care Subgroups, May 2015

	Nursing Homes		Residential Mental Health Facilities		Elderly Community Care		Other Residential Care	
	Staffing Pattern	Hourly Wage	Staffing Pattern	Hourly Wage	Staffing Pattern	Hourly Wage	Staffing Pattern	Hourly Wage
Total	**100%**	**$20.70**	**100%**	**$16.87**	**100%**	**$16.83**	**100%**	**$17.42**
Non-health professional and managerial	11%	$36.29	49%	$17.93	9%	$30.38	54%	$18.03
Health care practitioners and technicians	31%	$30.45	5%	$32.75	7%	$29.36	4%	$ 28.57
Health care support	39%	$14.38	7%	$14.41	23%	$13.60	9%	$13.19
Non-health service occupations	16%	$12.87	34%	$13.25	49%	$12.76	21%	$13.83
Office and administrative support	5%	$18.65	3%	$17.40	7%	$17.01	5%	$17.98

Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, Employment and Wages Research Data Files, Massachusetts, May 2015

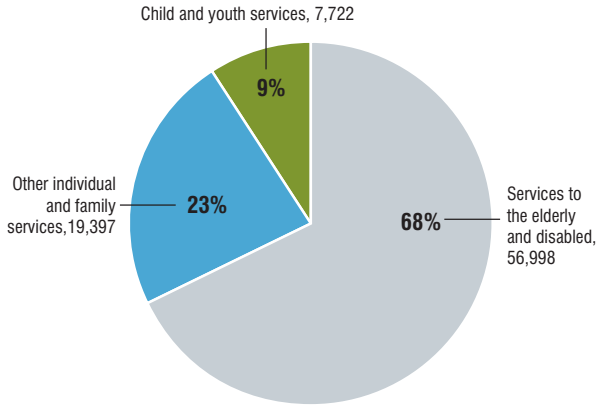
The **child and youth services** subgroup employs about 7,700 workers, and **other individual and family services** employs 19,400 staffers, accounting for about 9% and just under one-quarter, respectively, of all jobs in the subsector.

Understanding and properly interpreting employment trends in the individual and family services subsector and services to the elderly and disabled subgroup is complicated by a major re-classification of persons employed in the personal care attendant (PCA) programs financed by MassHealth. Historically, PCAs were considered domestic workers under the federal Fair Labor Standards Act (FLSA) wage and hour provisions. The categorization of PCAs as domestic workers under FLSA meant that PCAs were household workers who were excluded from all business establishment surveys of employment conducted by the U.S. Bureau of Labor Statistics—including both of the CES and QCEW statistical programs. This meant that prior to 2013, PCAs funded under Medicaid long-term care provisions were not included in any of the monthly/quarterly job counts produced at either the federal or state level.

In 2012, U.S. Secretary of Labor Thomas Perez changed the status of PCA jobs under provisions of FLSA so that they were no longer considered domestic workers who were exempt from wage and hours provisions of the statute. One side effect of this re-classification is that PCAs were shifted from household-based domestic workers to wage and salary workers within the scope of all BLS establishment surveys. At the state level, this meant MassHealth-funded PCAs would be included in the monthly sample survey jobs measures published by DLWD, as well as its quarterly census of jobs counts.

PCAs financed by the Commonwealth's MassHealth Office of Long Term Services and Supports were not included within the scope of regular wage and salary workers in any BLS establishment survey until the beginning of 2013.[9] Prior to that time, MassHealth-funded PCAs were classified as domestic household workers (similar to live-in maids or nannies) and not included in the scope of any BLS payroll survey. The monthly employment data produced by the Current Employment Statistics Survey were revised on a retrospective basis back to 2000 to include Mass Health PCA employment each month, continuing through the present day. In this way, a historical time series of employment trends within the individual and family services subsector in Massachusetts is available. Unfortunately, as we noted earlier, the monthly CES data do not produce more detailed measures of employment for the three subgroups because of sampling and other methodological considerations.

Figure 4.7. Annual average wage and salary employment in individual and family services subgroups, 2015

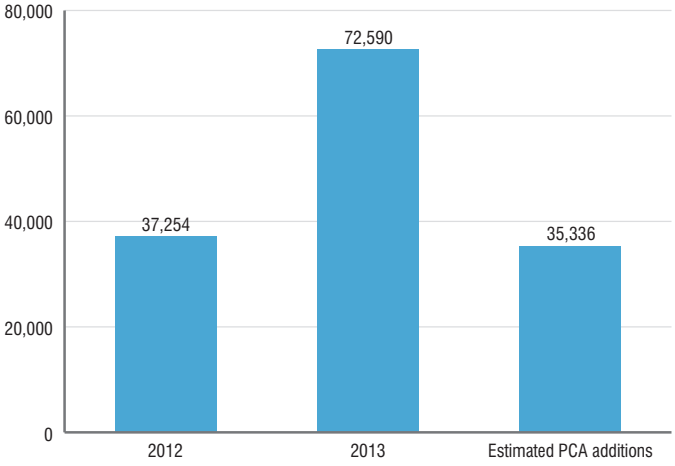


Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Beginning in 2013, the federal and state QCEW programs began to produce measures of employment that included the state PCA employment in their totals. Because of the QCEW's "census" nature, PCA employment data could be added directly into the measure of services to the elderly and disabled and thus in its measure of employment levels in the individual and family services subsector and health care and social assistance industry measure. Prior to this period, these individuals were not included and no effort was made to revise the state's QCEW measure back to 2000, as was the case for the CES program.

As shown in Figure 4.9, the CES survey and the QCEW program for Massachusetts differ in their annual average employment levels of the individual and family services subsector from 2001 to 2015. From 2013 to 2015, the CES and QCEW employment measures are essentially identical, with both programs indicating a 15% increase in employment, from about

Figure 4.8. Annual average wage and salary employment in individual and family services



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program. PCA employment estimates are produced by authors from revised Current Employed Statistics (CES) survey employment data in the state's individual and family services subsector for 2001 to 2012 that includes PCA employment.

72,600 to 84,000 jobs. Prior to 2013, however, the programs diverge. In 2012, CES estimated the subsector had 69,000 jobs, while the QCEW figure was just 37,250.

Underlying this difference is that the CES measure was revised back to 2001 to include the state PCA program, while the pre-2012 QCEW data were not revised. This means we are unable to sort out employment trends among the three elements of the subsector prior to 2012 by directly using these data. The CES data do not provide detailed employment information for each subgroup, and, while the QCEW does provide detail beginning in 2013, it does not revise prior years' data to reflect PCA employment that existed in the services to the elderly and disabled subgroup.

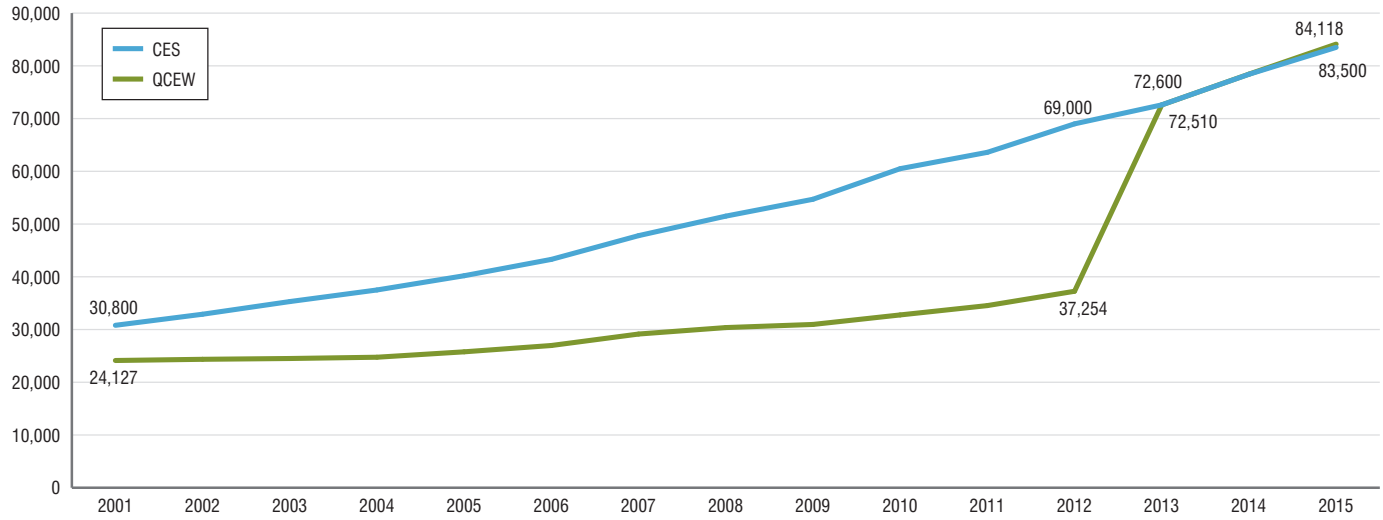
In order to compensate for this data limitation, we have developed our own measures of trends in the services to the elderly and disabled subgroup at the state level, based on our analysis of the historically adjusted CES data and the unadjusted QCEW data. Figure 4.10 presents our findings on statewide employment trends in the adjusted subgroup,[10] revealing a steady and sharp increase in employment levels.

Employment trends, 2000–2015

Employment levels in the individual and family services subsector in Massachusetts rose by 20,700 between 2001 and 2008. Nearly all of that increase (87%) was attributable to explosive growth in the subgroup of services to the elderly and disabled, which increased from 12,400 in 2001 to 30,600 by 2008, a gain of more than 18,000 jobs. A smaller share of the subsector's overall growth was attributable to non-health care components: child and youth services and all other individual and family services.

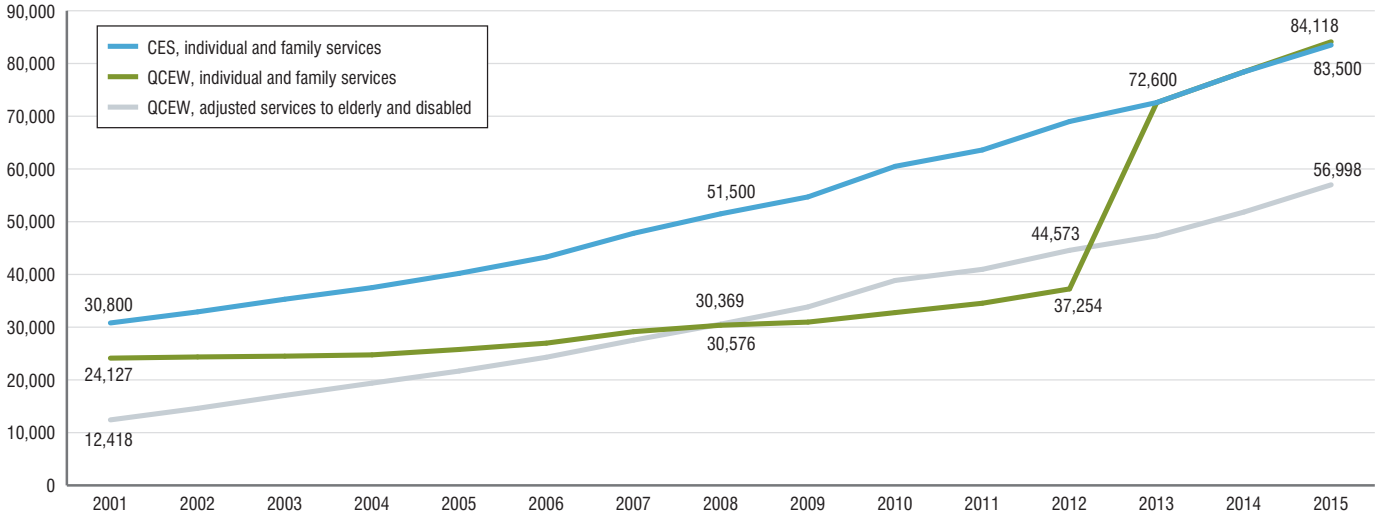
The pace of employment growth among providers of services to the elderly and disabled during 2001 to 2008 was nothing less than stunning: 20%, or about 2,600 jobs, per year. Few elements of the Commonwealth's

Figure 4.9. Comparison of annual average wage and salary employment in individual and family services from the CES and QCEW statistical programs, 2001–2015



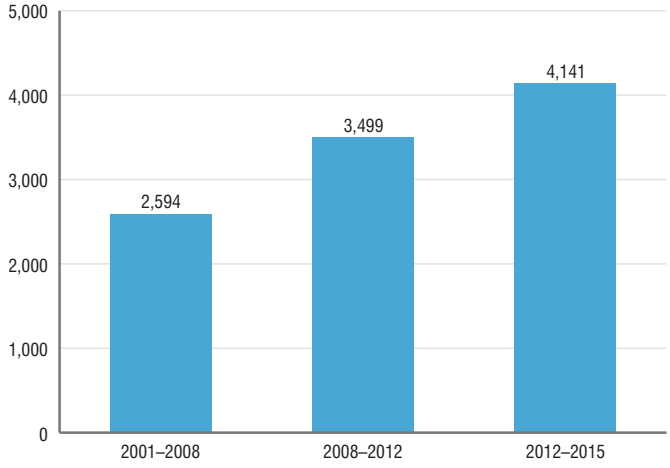
Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program, and Current Employment Statistics Survey

Figure 4.10. Annual average employment: individual and family services subsector and estimated services to the elderly and disabled subgroup, 2001–2015



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program, and Current Employment Statistics (CES) Survey. Adjusted QCEW employment in the services to the elderly and disabled subgroup is based on authors' estimates from revised Current Employed Statistics (CES) survey employment data in the state's individual and family services subsector for 2001 to 2012 that includes PCA employment.

Figure 4.11. Annual average employment change among providers of services to the elderly and disabled, 2001–2015



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

labor market have ever posted such a rapid pace of job creation over such a sustained time.

Employment levels in this subgroup continued to grow rapidly between 2008 and 2012, again accounting for the lion's share of new job creation in the subsector. Of the 17,500 new subsector jobs, 80% (14,000) were attributable to providers of services to the elderly and disabled. The subgroup saw employment rise an extraordinary 11.5% annually, averaging 3,500 jobs per year (up from 2,600 jobs per year from 2001 to 2008).

This rapid pace has continued since 2012. Between 2012 and 2015, employment among providers of services to the elderly and disabled increased by 12,400, or 28%. Overall employment levels among providers of services to the elderly and disabled grew at an average of 4,100 jobs per year over the last three years, an annual average rate of growth of 9%.

Although the 9% annual average growth rate between 2012 and 2015 is less than the extraordinary growth rate of 20% between 2001 and 2008, this is still an unusually rapid rate of growth. These service providers added about 2,500 jobs per year from 2001 to 2008, 3,500 per year from 2008 to 2012, and more than 4,100 jobs per year in recent years, making it among the most important and consistent sources of new job creation.

Occupational structure and wages

Table 4.14 offers information about employment and mean hourly wages across occupations in the individual and family services subsector and the services to the elderly and disabled subgroup. Unlike the occupational data for other subsectors, the data that are available and therefore shown here for the individual and family services subsector and for the services to elderly and disabled subgroup underestimate employment levels in the

Table 4.12. Employment Trends in Subgroups of Individual and Family Services, 2001–2008

	2001	2008	Absolute Change	Relative Change
Adjusted Services to Elderly and Disabled	12,418	30,576	18,158	146%
Child and Youth Services	4,808	5,910	1,102	23%
All Other Individual and Family Services	13,574	15,014	1,440	11%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program.

non-health service occupations, especially for personal care aides and attendants. While both the CES and QCEW added the state-financed PCA workers into their employment measures, the Occupational Employment Statistics (OES) survey program did not, which means that perhaps as many as 35,000 to 38,000 PCA positions were not included in the OES staffing-pattern data for Massachusetts included in Table 4.14. If we were to adjust these data, we would find that as much of 75% of subgroup staff would be non-health service occupations, primarily PCAs, instead of one-half of as shown.

A hallmark of work in the services to the elderly and disabled subgroup is relatively low hourly wages: just $18.04 (average) at the time of the OES findings for 2015. Non-health professionals and managers (24% of workers) had mean hourly wages of $20.21, but non-health service occupations (largely PCAs and aides) had average hourly wages of just $13.53. Health care support workers averaged $13.31 per hour in 2015.

These findings reveal that the rapid employment growth among providers of services to the elderly and disabled is closely associated with growth in low-wage occupations. The most conservative estimate implies that half of job growth for this subgroup was concentrated in jobs near the bottom of the state's overall hourly wage distribution during 2015.

Table 4.13. Employment Trends in Subgroups of Individual and Family Services, 2008–2012, 2012–2015

	2008	2012	Absolute Change	Relative Change
Adjusted Services to Elderly and Disabled	30,576	44,573	13,997	46%
Child and Youth Services	5,910	7,042	1,132	19%
All Other Individual and Family Services	15,014	17,385	2,371	16%
	2012	2015	Absolute Change	Relative Change
Adjusted Services to Elderly and Disabled	44,573	56,998	12,425	28%
Child and Youth Services	7,042	7,722	680	10%
All Other Individual and Family Services	17,385	19,397	2,012	12%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Table 4.14. Occupational Employment and Hourly Wages in the Subgroups of Individual and Family Services, May 2015

	Child and Youth Services & All Other Individual and Family Services		Services to Elderly and Disabled		Adjusted Services to Elderly and Disabled
	Staffing Pattern	Hourly Wage	Staffing Pattern	Hourly Wage	Staffing Pattern
Total	**100.0%**	**NA**	**100.0%**	**$18.04**	**100.0%**
Non-health professional and managerial	59.0%	NA	24.0%	$20.21	11.0%
Health care practitioners and technicians	6.1%	NA	7.9%	$29.41	3.6%
Health care support	3.2%	NA	12.0%	$13.31	5.5%
Non-health service occupations	19.8%	NA	50.0%	$13.53	77.1%
Office and administrative support	12.0%	NA	6.0%	$17.55	2.8%

Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, Employment and Wages Research Data Files, Massachusetts, May 2015

Changing Nature of Job Growth

As shown in Table 4.15, the health care delivery system consists of 15 industry subgroups within the overall health care and social assistance sector. Only one subgroup is not classified by the Bureau of Labor Statistics as part of the health care sector, which includes ambulatory care, hospitals, and nursing and residential care industry subsectors. We add services to the elderly and disabled, the subgroup within the individual and family services subsector, to this classification because of the central role that persons employed in that subgroup play in helping the elderly and individuals with disabilities avoid admittance to health care facilities as either acute or chronic patients. Personal care aides and attendants, home health aides, and others in this subgroup are front-line staff charged reducing the pace of growth of health care costs in Massachusetts by preventing the institutionalization of their clients. As we discuss later in this chapter, their role in cost containment and health care delivery is likely to grow at a rapid pace over the next 15 to 20 years.

Table 4.15 examines the annual average rate of employment change in the Commonwealth over three time periods: 2000 to 2008, a period of rapid growth in health care employment; 2008 to 2012, a period of recession and slow recovery in the state and a sharp slowdown in growth; and 2012 to 2015, the post-Chapter 224 period and a time of accelerated job creation.

From 2000 to 2008, a substantial share of new job creation was in industries serving inpatients in acute or chronic care facilities, as follows:

- General medical/surgical hospitals added 31,200 new jobs, growing at a robust annual rate, despite this being a period when overall employment levels in the state fell drastically.
- Psychiatric hospitals also added 1,200 jobs, growing by 5% per year, and specialty hospitals added 3,700 jobs at a pace of 3.5% per year.
- Nursing homes grew by just 0.3% per year, but residential mental health facilities saw employment rise by a 6% per year, adding 6,000 jobs.
- Community care facilities, including assisted living organizations, also grew at a strong average rate of 4.7% per year, adding more than 3,800 jobs.

Health care organizations serving patients on an outpatient basis also added large numbers of workers to their payroll from 2000 to 2008. Services to the elderly and disabled led this rise, adding 18,100 jobs and growing by an extraordinary 20% per year. Offices of physicians added 5,500 jobs, growing at a solid 1.5% annually. Home health care service providers saw their payrolls rise by 4,800 jobs, with a robust annual average growth rate of 3.1%, although this subgroup was yet to achieve the extraordinary growth it experienced after 2008.

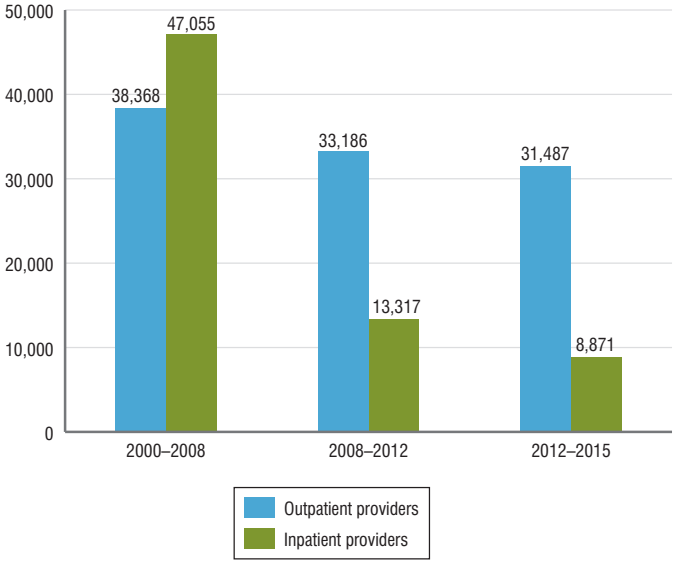
Led by strong gains in medical/surgical hospitals and residential mental health facilities, inpatient health organizations were the dominant source of new job creation in the health care sector before 2008. Inpatient organizations added more than 47,200 jobs to their payrolls, while outpatient organizations added 38,300 jobs. However, after 2008, the role of inpatient organizations as a source of job growth was greatly diminished.

Employment levels in home health care agencies began to explode in 2008, experiencing 8.6% annual growth (8,400 new jobs) through 2012. Employment levels among services to the elderly and disabled also continued their extraordinary expansion, adding 14,000 jobs (11% annual growth), while outpatient care centers added 3,000 jobs (6% growth per year). Offices of other practitioners, including many therapeutic specialist firms, added 2,400 jobs (4.7% growth per year). From 2008 to 2012:

- General medical/surgical hospitals added 6,000 jobs, yet at a sharply reduced rate of growth (just 1% per year) over the prior period.
- Specialty hospitals added a robust 2,300 jobs and grew at 3.3% per year, while psychiatric hospitals added about 500 jobs.
- Unlike other health care provider groups, the nursing home industry shrank by 200 jobs in 2008, a tiny reduction relative to the base of 58,200 workers in the industry. This counter-trend job loss foreshadowed much larger employment declines among nursing home providers after 2012.
- Community care facilities for the elderly increased by 2,800 jobs, growing annually at a very strong 5%.
- Residential mental health facilities added 2,000 jobs, growing by a solid 2.7% per year during the 2008 to 2012 period.

Led by strong gains among home health agencies and providers of services to the elderly and disabled, outpatient service providers became the overwhelmingly dominant source of job creation in the state's health care sector, creating 2.4 jobs (32,000 total) for every 1 job created by inpatient providers (13,000 total). This was a sharp reversal from the earlier period when inpatient providers generated 1.2 jobs for every 1 job created by outpatient organizations.

Figure 4.12. Employment change among inpatient and outpatient providers in health care, 2000–2015



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Table 4.15. Total Employment Change and Annual Average Rate of Change Among 15 Health Care Subgroups, 2000–2015

	2000–2008		2008–2012		2012–2015	
	Total Net Job Change	Annual Average Percent Change	Total Net Job Change	Annual Average Percent Change	Total Net Job Change	Annual Average Percent Change
Offices of physicians	5,527	1.5%	3,587	1.7%	1,796	1.1%
Offices of dentists	3,544	2.5%	729	0.9%	1,440	2.1%
Offices of other health practitioners	2,829	3.5%	2,465	4.7%	2,136	4.6%
Outpatient care centers	1,447	1.1%	2,993	4.0%	1,737	2.7%
Medical and diagnostic laboratories	1,196	4.1%	199	1.0%	556	3.7%
Home health care services	4,883	3.1%	8,423	8.6%	11,163	11.3%
Other ambulatory health care services	784	1.6%	793	2.8%	234	1.0%
General medical and surgical hospitals	31,240	3.2%	5,969	1.0%	5,145	1.1%
Psychiatric and substance abuse hospitals	1,213	5.0%	503	3.0%	218	1.5%
Specialty hospitals	3,751	3.5%	2,294	3.3%	758	1.3%
Nursing care facilities	1,215	0.3%	–202	–0.1%	–3,301	–1.9%
Residential mental health facilities	6,031	6.0%	2,030	2.8%	2,034	3.3%
Community care facilities for the elderly	3,831	4.7%	2,863	5.1%	2,617	5.2%
Other residential care facilities	–226	–0.5%	–140	–0.6%	1,400	8.6%
Adjusted services to elderly and disabled	18,158	20.9%	13,997	11.5%	12,425	9.3%

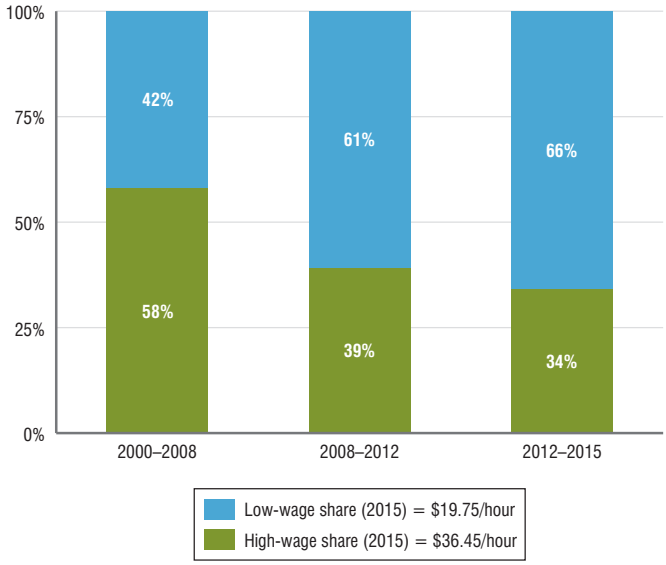
Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program

Table 4.16. Mean Hourly Wage and Contributions to Employment Growth Among Health Care's 15 Subgroups, 2015

		Percent Contribution to Overall Health Care Employment Growth		
Health Care Industry Subgroups	2015 Mean Hourly Wage	2000 to 2008	2008 to 2012	2012 to 2015
Offices of physicians	$47.27	6%	8%	4%
Offices of dentists	$36.89	4%	2%	4%
General medical and surgical hospitals	$34.72	37%	13%	13%
Specialty hospitals (except psychiatric and substance abuse)	$34.70	4%	5%	2%
Outpatient care centers	$31.57	2%	6%	4%
Medical and diagnostic laboratories	$29.41	1%	0%	1%
Offices of other health practitioners	$28.38	3%	5%	5%
Total, all occupations, Massachusetts	**$28.37**			
Psychiatric and substance abuse hospitals	$26.68	1%	1%	1%
Home health care services	$22.71	6%	18%	28%
Other ambulatory health care services	$21.88	1%	2%	1%
Nursing care facilities (skilled nursing facilities)	$20.70	1%	0%	–8%
Services for the elderly and persons with disabilities	$18.04	21%	30%	31%
Other residential care facilities	$17.42	0%	0%	3%
Residential mental health facilities	$16.87	7%	4%	5%
Community care facilities for the elderly	$16.83	4%	6%	6%

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program and Occupational Employment Statistics, Employment and Wages Research Data Files, Massachusetts, May 2015

Figure 4.13. Share of new job creation in high-wage and low-wage components over three time periods



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages Statistics Program and Occupational Employment Statistics, Employment and Wages Research Data Files, Massachusetts, May 2015

The shift of job creation from inpatient to outpatient providers accelerated between 2012 and 2015. Despite a slowing in some parts of the ambulatory care industry, including physicians' offices and outpatient care centers, home health agencies added 11,000 jobs (11% annual growth), up from the already high 8% annual increase during 2008 to 2012. Providers of services to the elderly and disabled also saw remarkable growth between 2012 and 2015, adding 12,400 jobs (9.3% annual rate).

Meanwhile, employment growth among inpatient providers continued to slow between 2012 and 2015. General medical/surgical hospitals grew by about 1% per year, adding 6,000 jobs, but psychiatric, substance abuse, and specialty hospitals together added only 1,000 jobs. Residential mental health facilities added 2,000 jobs, and community care facilities for the elderly continued their strong growth of 2,600 jobs (5% per year). However, nursing home employment declined by 3,300 jobs, as nursing home shutdowns forced widespread layoffs.

Inpatient providers added just 7,500 jobs between 2012 and 2015, while outpatient providers, fueled by extraordinary growth among home health agency providers and providers of services to the elderly and disabled, added 31,800 jobs. In a dramatic reversal, outpatient organizations created 4.2 jobs for every 1 job created by inpatient providers, which had important impacts on the skill requirements and wages of health care workers. Increasingly, job growth has been concentrated in low-skill, low-wage occupations, especially home health care workers, personal care aides and attendants, nursing aides, community health workers, and social and human service assistants. However, the modest growth in hospital employment and key parts of the ambulatory care industry has meant continuing demand for staff in occupations that require very high levels of educational attainment and intensive understanding of various aspects of medical knowledge.

Table 4.16 ranks the state's 15 health care provider subgroups based on overall average hourly wage and connects these wages to the relative contribution of each group to overall sector employment growth during the three time periods examined in this chapter. For example, the highest average wage is in offices of physicians ($47.27 per hour during 2015), which is about $19 higher than the state's overall average wage for employment in all industries. Offices of physicians accounted for just 4% of overall new job growth in the health care sector between 2012 and 2015, down from an 8% share during 2008 to 2012.

The most striking finding is the sharp reduction in new job creation among the relatively high-wage medical/surgical hospital providers. Hourly wages were $34.72 in 2015, 22% higher than the average wage for all occupations in the state. From 2000 to 2008 period, more than 1 in 3 new health care jobs were generated in this subgroup. "Other health care practitioners"—including mental health practitioners and physical, occupational, and speech therapists—was the only subgroup with above-average wages that increased its share of overall health care job creation, rising from 3% between 2000 to 2008 to 5% between 2008 to 2015. Mean hourly wages among organizations providing these diagnostic and therapeutic services were $28.38 during 2015, about the same as the overall wage across all occupations.

The most important sources of new health care jobs in recent years have been subgroups paying below-average wages. Home health agencies have experienced very rapid growth in recent years but had mean hourly wages that were 20% below the average wage for all occupations. Home health agencies accounted for just 6% of all new health care jobs created between 2000 and 2008 but more than one-quarter by the 2012 to 2015 period.

The services to the elderly and disabled subgroup has consistently accounted for a large share of all new health care jobs. Dominated by personal care aides and attendants, this subgroup had mean hourly wages of $18.04 in 2015, which is more than one-third below the state's average wage. Further, the group accounted for 21% of all health care jobs created from the 2000 to 2008 period, but this proportion increased to 31% from 2012 to 2015.

An important change in the nature of work and associated wages has resulted from large reductions in the share of job growth in the state's general medical/surgical hospitals after 2008, combined with rapid growth in the share of new jobs created by home health care agencies and providers of care to the elderly and disabled.[11]

High-wage components of the health care sector accounted for 58% of the net increase in health care jobs in Massachusetts from 2000 to 2008, but this figure fell to 39% (2008 to 2012) and again to just 34% (2012 to 2015). Conversely, low-wage components created two new jobs for every one high-wage job in 2015. (In 2015, high-wage components paid an average hourly wage of $36.45 versus $19.75 for low-wage.)

High-wage components continue to add jobs (and likely will do so for the foreseeable future), but the overall nature of job growth has clearly shifted to low-wage occupations.

Our review suggests that about 1 in 10 new jobs created in Massachusetts over the next 10 years will be in the low-wage, low-skill occupations of home health aide, PCA, and community health worker/social service occupations.[12] Factors driving this demand include the following::

Table 4.17. Trends in Health Care Degree and Certificate Awards, 2001–2012

Award Level	2001	2012	Absolute Change	Relative Change
	Degree Awards			
Associate's degree	1,901	2,924	1,023	54%
Bachelor's degree	2,576	4,483	1,907	74%
Master's degree	2,256	3,377	1,121	50%
Doctorate	1,365	2,666	1,301	95%
Total degrees	**8,098**	**13,450**	**5,352**	**66%**
	Certificate Awards			
Less than one year	1,027	2,208	1,181	115%
One to less than two years	1,178	4,680	3,502	297%
Two to four years	32	111	79	247%
Post-bachelor's	62	257	195	315%
Post-master's	100	196	96	96%
Total certificates	**2,399**	**7,452**	**5,053**	**211%**

Note: Among Massachusetts postsecondary educational institutions.
Source: National Center for Education Statistics, Integrated Possecondary Education Data System Public Use Files; tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.18. Trends in Health Care Certificate and Degree Awards by Broad (Four Digit) CIP Field of Study, 2001 to 2012

Major Field of Study	2001	2012	Absolute Change	Relative Change
Health services/allied health/health sciences	0	279	279	—
Communication disorders sciences and services	363	460	97	27%
Dentistry (DDS, DMD)	319	401	82	26%
Advanced/graduate dentistry and oral sciences	96	194	98	102%
Dental support services and allied professions	293	583	290	99%
Health and medical administrative services	681	1,844	1,163	171%
Allied health and medical assisting services	1,027	3,118	2,091	204%
Allied health diagnostic/treatment professions	560	1,172	612	109%
Clinical/medical laboratory science professions	108	359	251	232%
Health/medical preparatory programs	70	176	106	151%
Medicine (MD)	579	642	63	11%
Medical clinical sciences/graduate medical study	13	9	–4	–31%
Mental/social health services and allied professions	385	536	151	39%
Nursing	2,817	6,111	3,294	117%
Optometry (OD)	150	120	–30	–20%
Ophthalmic and optometric support services	5	14	9	180%
Pharmacy, pharmaceutical sciences	462	1,461	999	216%
Public health	556	943	387	70%
Rehabilitation and therapeutic professions	1,318	1,280	–38	–3%
Veterinary medicine (DVM)	76	80	4	5%
Health aides/attendants/orderlies	31	0	–31	–100%
Medical illustration and informatics	0	25	25	—
Dietetics and clinical nutrition services	5	69	64	1280%
Alternative/complementary medicine	80	69	–11	–14%
Alternative complementary medical support svc	0	5	5	—
Somatic bodywork and related therapeutic svc	176	850	674	383%
Energy and biologically based therapies	0	11	11	
Health professions and related clinical sciences	327	91	–236	–72%
Total	**10,497**	**20,902**	**10,405**	**99%**

Note: Among Massachusetts postsecondary educational institutions.
Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University

- Demographic changes
- The close association of disabling conditions with aging
- Reductions in the ability of families to provide care to those in need
- Cost-containment efforts by federal and state laws and regulations
- Potent private-sector efforts to curb health care costs
- Consumer desires for services at home (and avoiding hospital and nursing home admission)

Postsecondary Education's Response to Health Care Employment Growth

This section focuses on the supply side of the health care labor market in Massachusetts, specifically our examination of postsecondary educational institutions and their response to labor-market growth and supply problems faced by employers of direct care workers. A considerable proportion of health care employment is concentrated in health care practitioner and technical occupations, which range from physician specialties, registered nurse and advanced-practitioner nurse specialties, therapeutic occupations, and technicians, including dental hygienists, EMTs, and surgical technologists. Employment in these occupations requires medical knowledge generally developed at the postsecondary level, certification and/or licensure following a test of that knowledge, and clinical experience. About 37% of employment in the Massachusetts health care sector is concentrated in medical diagnostic and/or treatment occupations (a subcategory of health care practitioner and technical occupations).

Health care support occupations also play an important role in the delivery of care. These positions generally do not require a postsecondary degree, although some require a certificate. For example, employment as a nursing assistant requires short-term training leading to certification and a license to engage in a limited set of medical activities, such as the measurement of basic vital signs. Other support occupations, including home health aides, do not require any certification or license. About 18% of staff employed in the state's health care sector work in health care support occupations, with a large and rapidly growing fraction employed as home health aides.

PCAs are classified not as health care workers but as personal service occupations, according to the standard occupational taxonomy. However, PCAs do provide home health care to individuals who are chronically ill or disabled, as well as to infirm elderly individuals. No education or training is required for entry into this occupation.

Table 4.19. Trends in Health Care Degree and Certificate Awards by Level of Award, 2012–2015

Award Level	2012	2015	Absolute Change	Relative Change
	Degree Awards			
Associate's degree	2,924	2,973	49	2%
Bachelor's degree	4,483	6,075	1,592	36%
Master's degree	3,377	3,839	462	14%
Doctorate	2,666	2,947	281	11%
Degree total	**13,450**	**15,834**	**2,384**	**18%**
	Certificate Awards			
Less than one year	2,208	1,886	–322	–15%
One to less than two years	4,680	2,655	–2,025	–43%
Two to four years	111	79	–32	–29%
Post-bachelor's	257	354	97	38%
Post-master's	196	250	54	28%
Certificate total	**7,452**	**5,224**	**–2,228**	**–30%**

Note: Among Massachusetts postsecondary educational institutions.
Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.20. Trends in Health Care Certificate and Degree Awards by Broad (Four–Digit) CIP Field of Study, 2012–2015

Major Field of Study	2012	2015	Absolute Change	Relative Change
Health services/allied health/health sciences	279	354	75	27%
Communication disorders sciences and services	460	564	104	23%
Dentistry (DDS, DMD)	401	450	49	12%
Advanced/graduate dentistry and oral sciences	194	237	43	22%
Dental support services and allied professions	583	442	–141	–24%
Health and medical administrative services	1,844	1,495	–349	–19%
Allied health and medical assisting services	3,118	1,929	–1,189	–38%
Allied health diagnostic/treatment professions	1,172	1,165	–7	–1%
Clinical/medical laboratory science professions	359	450	91	25%
Health/medical preparatory programs	176	307	131	74%
Medicine (MD)	642	637	–5	–1%
Medical clinical sciences/graduate medical study	9	30	21	233%
Mental/social health services and allied professions	536	774	238	44%
Nursing	6,111	6,908	797	13%
Optometry (OD)	120	123	3	3%
Ophthalmic and optometric support services	14	15	1	7%
Pharmacy, pharmaceutical sciences	1,461	1,630	169	12%
Public health	943	1,041	98	10%
Rehabilitation and therapeutic professions	1,280	1,523	243	19%
Veterinary medicine (DVM)	80	94	14	18%
Veterinary biomedical and clinical sciences (certificate)	—	6	6	—
Health Aides/attendants/orderlies	0	1	1	—
Medical illustration and informatics	25	65	40	160%
Dietetics and clinical nutrition services	69	95	26	38%
Alternative/complementary medicine	69	53	–16	–23%
Alternative complementary medical support svc	5	1	–4	–80%
Somatic bodywork and related therapeutic svc	850	502	–348	–41%
Movement and mind-body therapies and education	—	0	0	—
Energy and biologically based therapies	11	14	3	27%
Health professions and related clinical sciences	91	153	62	68%
Total	**20,902**	**21,058**	**156**	**1%**

Note: Among Massachusetts postsecondary educational institutions.
Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University

The strong growth between 2000 and 2008 in the demand for workers in the high-wage/high-medical-knowledge subsectors created a sharply greater need for a wide range of health practitioner professionals, especially in general medical/surgical hospitals, specialty hospitals, physicians' offices, and outpatient treatment centers.

How did labor supply respond to this sudden and significant increase in demand for medical professionals? We explored this question by analyzing data files—available from the National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS)—on postsecondary completions, and more detailed data on awards by certificate and degree level and major field of study. These data are derived from annual reports submitted by virtually all postsecondary educational institutions in the Commonwealth and thus serve as a fairly complete annual census of the degree and certificate awards by field of study granted each year by private and public colleges, universities, and other postsecondary institutions operating in Massachusetts.

Substantial labor market imbalances can occur when the demand rises quickly for workers with specific skills and knowledge. Educational and training institutions can take four or five years to prepare graduates with the required proficiencies, certifications, and licenses. The result of these lags, called the cobweb effect, can be sustained labor shortages characterized by high job-vacancy rates, substantial increases in real wages in the desired occupations, and lost output and income for employers.[13] This was the case between 2000 and 2008, when hospital employment levels in Massachusetts rose rapidly and labor shortages emerged among many health care practitioner occupations. Shortages were especially severe for RN specialties. In response, medical/surgical hospitals adjusted by raising wages, reducing educational requirements, and hiring graduates with associate's degrees.

Labor shortages diminished after 2008, when the number of degrees conferred by collegiate nursing programs rose sharply at both the two- and four-year levels. This development, combined with a sharp reduction in the pace of hospital employment growth after 2008, largely mitigated the RN supply problems confronting hospitals in Massachusetts.

Today, little evidence of an RN shortage exists in Massachusetts, and the practice of regularly hiring RNs at the associate's degree level has greatly declined. Slower employment growth in hospitals and substantial employment declines in nursing homes have substantially reduced the demand for RNs relative to the pre-2008 period. In response, many colleges are now offering programs to help nurses with associate's degrees earn bachelor's degrees to compete more effectively in a labor market with an ample nursing supply.

Degree and certificate completions, 2001–2012

Because the training and education required for most health care professions takes many years, we begin our analysis of IPEDS completion data for the 11 year period prior to Chapter 224 (2001 to 2012). As shown in Table 4.17, the number of health care certificates and degrees awarded by Massachusetts colleges and universities rose from 8,100 in 2001 to nearly 13,500 in 2012. This represents a two-thirds increase over the period, or 6% per year.

Sharp increases occurred across all degree levels, representing a major investment by postsecondary educational institutions to expand their existing programs and create new programs to respond to rising labor demand. The increase in doctorates was especially large, as some therapeutic fields of study shifted their degree requirements from the bachelor's to doctoral level.

The number of health care certificates awarded tripled from 2,400 in 2001 to nearly 7,500 in 2012, averaging 19% growth per year. A large fraction were for programs of relatively short duration—about 30% for programs of less than one year duration and nearly 63% for programs of one to two years, according to 2012 data. Many of these awards were in the medical/dental assistant and therapy assistant fields.

From 2001 to 2012, the number of nursing awards more than doubled, accounting for one-third of the total increase in postsecondary awards in health care. The number of allied health and medical assistance awards also skyrocketed, from 1,000 to over 3,100. Awards in health and medical administrative services—including medical coding, insurance specialist, and medical office assistant—also rose sharply by 1,100 awards and accounted for 11% of total increase in postsecondary healthcare certificate and degree awards. Many of the awards in health and medical administrative services were at the less than two-year certificate level.

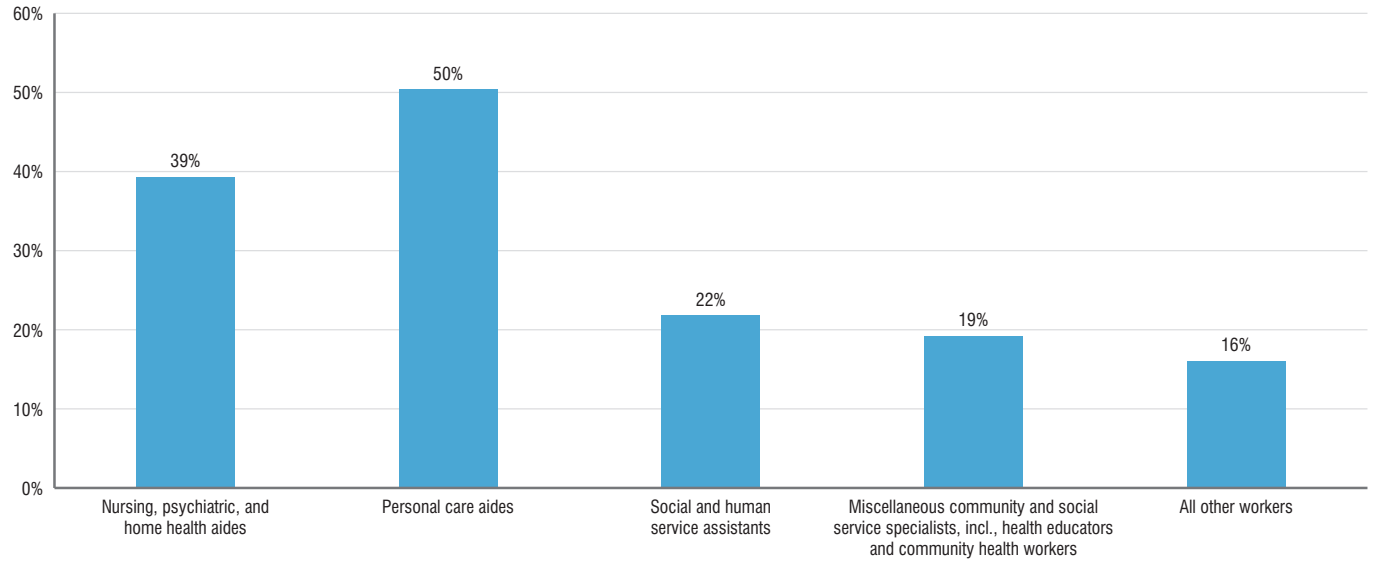
Degree and certificate completions, 2012–2015

Since 2012, the number of postsecondary health care degrees and certificates granted by the state's colleges and universities has remained essentially unchanged. A total of 21,000 awards were granted in 2015, up just over 100 from 2012 (20,900). As shown in Table 4.19, this flatness masks large changes in the composition of health awards granted by the state's institutions of higher learning. The number of certificates awarded at the below-two-year level plunged 30% between 2012 and 2015; almost the entire decline was at the one-year to less-than-two-year certificate level. On the other hand, the number of health care degrees continued to rapidly rise, from 13,400 in 2012 to 15,800 in 2015, an increase of 18% overall or 6% per year.

The large decline in the number of less-than-two-year certificates granted each year can be explained by looking at trends by field of study. Declines were heavily concentrated in certificate programs for clinical and medical assistant fields and medical billing. The gains in bachelor's degrees were heavily concentrated in the nursing fields, nearly 3,100 awarded by 2015. As discussed earlier, this trend occurred as institutions added ASN-to-BSN upgrading programs in response to changing labor market conditions and rising education requirements.

As noted earlier, the slowdown in employment growth in hospitals since 2008 and in nursing homes since 2012 have resulted in a slowdown in demand for registered nurses at the bachelor's degree level and likely at the associate's degree level. Although the long-term outlook for nursing remains strong, in part due to the anticipated retirement of older nurses, the continued expansion of academic nursing programs at current rates may not be warranted. Increasingly, the provision of health care services has shifted from traditional inpatient care to outpatient and home care; as

Figure 4.14. Incidence of participation in public assistance benefit transfer programs in selected health care support and direct care occupations, 2012–2014



Source: U.S. Bureau of the Census, American Community Survey, Public Use Microdata Sample (PUMS) Files, 2012–2014, tabulations by Center for Labor Markets and Policy, Drexel University.

explained earlier, most new health care jobs in Massachusetts in recent years have been among home health care agencies and providers of care to the elderly and disabled. These subsectors are staffed primarily with entry-level positions that require little formal schooling or work experience in health care. We examine some labor supply issues in key direct-care, at-home occupations in the next section.

Labor Supply Problems in Direct Care Occupations

The unemployment-to-job vacancy (U/V) ratio is a measure indicating the number of unemployed job seekers per unfilled job opening. When this ratio approaches 1.0, labor shortages can develop quickly. Firms may adjust their recruitment, hiring, retention processes, and wage levels but might still lose potential revenues as they struggle to fill job openings.

From August to October 2016, the unemployment rate in Massachusetts averaged just 3.6% (well below the 4.9% national unemployment rate), indicating the Commonwealth's near-full employment status and tightened labor market. Nationally, the U/V ratio during the third quarter of 2016 fell to 1.4. The national monthly job vacancy survey conducted by the Bureau of Labor Statistics found that the health and social assistance sector averaged 1 million vacant jobs per month in the third quarter of 2016, yielding a job vacancy rate of 5.0 percent; that is, 5% of total employment opportunities were unfilled at any point in time during this period. This is the highest job vacancy rate among all the major industry sectors in the American economy. Given the lower overall unemployment rate in Massachusetts and the above-average share of total payroll employment in the state's health care sector, it seems likely that the state labor markets are characterized by similarly low or quite possibly even lower U/V ratios than the nation as a whole. Shortages in the state are more likely concentrated in occupations in high-growth subsectors of the health care industry.[14] In a separate paper for the Office of the State Auditor, we analyzed developments in direct care occupations that make up the bulk of employment among high-growth providers of services to the elderly and disabled and home health care agencies. This analysis included information obtained through interviews with home care employers, trade association representatives, and workers.[15]

The employers we spoke with often noted they had difficulty finding workers in the home health aide and personal care occupations, although there appears to be less reason to think a labor supply problem exists for community health workers and social and human services assistants. We worked with the Home Care Aide Council (HCAC) to complete a survey about small-job openings and labor turnover among their employer members and to ask about their labor requirements and difficulties in meeting labor-supply objectives. The survey found a 9% job vacancy rate among HCAC members in the fall of 2015. Our discussions with a substantial number of home care employers at that time (and subsequently) suggest a chronic problem with filling positions in order to provide services to clients, leading to revenue losses.

To adjust to these labor shortages, employers have tried to expand their recruitment and outreach, but the challenges remain since the workers they seek often have the option to work in other occupations and industries that have similar proficiency requirements and wages—many unrelated to health care. For example, home health aide employers have told us they compete with grocery stores, department stores, restaurants, and fast food firms, to name a few. We found these occupations require little to no specialized medical knowledge, and the most important proficiency requirements are the "soft skills" of strong social skills and positive character traits, among others.

At one of our meetings, the employers illustrated this issue by pointing out a help-wanted sign displayed by a nearby donut shop, offering $14-per-hour plus bonuses for a counter position. This position, they commented, could be attractive for their own employees due to its hourly wage, more clearly established and regular hours of work, and, even more fundamentally, consistent work location. This stands in contrast to many positions these employers seek to fill, where wages are lower, hours and weeks of work can be irregular, and the location where duties are performed can change frequently, compounding commuting and related family issues.

In our analysis of the OES survey, we identified eight occupations that would likely serve as appropriate alternatives for home health aides and personal care occupations. These jobs require soft-skill proficiencies but do not require substantial cognitive abilities or specific occupational knowledge learned either in the classroom or on the job. About 360,000 people in Massachusetts held these eight occupations in 2015. Home health care employers told us it is difficult to compete with other firms on the basis of wages, since a substantial share of their revenues are derived from reimbursements made by Medicare and Medicaid and these rates have remained unchanged in recent years. They fear that wage competition from both inside the health and social assistance industry, as well as from retail sales, eating and drinking establishments, hospitality, and business services, will further exacerbate their labor supply problems.

Finally, individuals employed in home health aide, PCA, nursing assistant, and other direct care occupations have a very high incidence of participation in public assistance transfer programs. Our conservative measure found that about 40% of home health aide workers and 50% of personal care aides employed in Massachusetts participate in a public assistance program.[16] Because these programs are means-tested, they create incentives for low-income workers to reduce their weekly and yearly hours of work in order to maintain eligibility for benefits. Participants consider the trade-offs between increased income associated with supplying more hours of labor (or getting an hourly pay raise) with their potential loss in public assistance benefits.

Means-tested benefit programs are characterized by a "benefit cliff," which is the point where the value of cash and in-kind benefits begins to decline with additional earnings.[17] In such an instance, a family becomes worse off by supplying more hours of work—because benefit levels are reduced or eliminated at a steeper rate than can be replaced by the increased earnings. Our analysis of ACS data found that direct care workers participating in public assistance programs worked substantially fewer hours during the year compared to direct care workers who did not participate in public assistance programs.

For a considerable proportion of workers employed as nursing aides, home health aides, and personal care aides, careful attention must be given to the number of hours of work supplied in a given month to make sure that monthly

earnings do not diminish or eliminate the value of public assistance transfer benefits largely related to housing, child care, health care, energy, and food.[18] Our interviews with both workers and employers confirmed that managing monthly hours relative to continued participation in public assistance is important both for employers to retain dependable workers and for employees to avoid a loss in living standards. An unexpected earnings increase may eliminate or reduce the value of the benefit subsidy by far more than the increase in monthly earnings associated with additional hours of work.

It is important to note that the benefit transfers received by these health care support and direct care aides are not a subsidy to the employer.[19] To the contrary, public assistance programs reduce the labor hours supplied by workers—reducing labor supply to these occupations and putting upward pressure on overall labor costs for employers. However, for many health care support and direct care occupations where wages are primarily determined by Medicare/Medicaid reimbursement rates, this upward pressure is stymied by what is in effect a wage ceiling.

Employers also noted a problem of frequent client/patient turnover contributing to their staffing shortfalls. Clients of home health care providers often seek services for a relatively short duration, making it difficult for a worker to have a regular schedule at a single place of work for any length of time. Many workers are unwilling or unable to commute longer distances, which leads to a geographic imbalance for employers. Indeed, in some regions employers must maintain knowledge of bus routes in order to assign work.

Employers of direct care workers also pointed to unanticipated family responsibilities as an important staffing challenge. Many workers have children with complicated medical, disability, or behavioral (court involvement) issues that can interfere with their ability to work more hours. Like many employed persons with children, home health aides and personal care aides sometimes cannot work because they must respond to an assortment of child-related issues at school, home, and in the criminal justice system. Some organizations report trying to resolve these issues in cooperation with their employees.

One strategy adopted by ASAPs, a home care support organization, may also exacerbate staffing difficulties. ASAPs may hire multiple home health care firms to service a single consumer in a given week. This staffing strategy hedges against relying on a single firm and increases the chance that a shift can be covered in the event of a staff call-out or no-show. Home health agencies argue that this strategy reduces the willingness of workers to work because of the limited number of hours available for any given client. Ironically, some workers adjust to limited hours by becoming employees of multiple firms and may call out on a shift at one firm to gain access to more and steadier hours at another firm.

How do firms adjust to these labor supply problems? Increasing worker wages, while an obvious strategy, is difficult, since state and federal reimbursement for services has not changed in many years. Interestingly, employers believe more of their staff will seek personal care attendant positions, since MassHealth's planned wage increase to $15 per hour by 2018 for personal care attendants is well above the mean wage for home health and personal care aides.

Employers have also tried to reduce quit rates by improving the recruitment and hiring process. One firm we spoke with employs an intensive screening process; only half of job applicants proceed past an initial interview, and, among those who do, just 1 in 5 passes through the remaining screening elements. Although this screening is costly, it has resulted in a very low annual quit rate. Other employers screen prospective new hires through physical exams, tuberculosis testing, CORI checks, and drug tests. Still others opt for less rigorous screenings and rely largely on the references of incumbent workers.

Recruitment and screening processes are costly relative to the employee yield. Some employers told us they provide three weeks of orientation and training to new hires, but thereafter a 10% retention rate is considered a success. We heard widespread reports of new hires often quitting after just a few days or weeks, frequently by not showing up for assignments and ending contact with the employer.

One way to solve short-term labor requirements is to pay overtime to existing staff to undertake more hours of work. The problem, however, is that home health agencies incur a loss when paying overtime, since the rate of $18 or $19 per hour is very close to the total reimbursement the firm receives from federal and state organizations. Consequently, employers use overtime payments rarely and only when there are no alternatives.[20]

Some firms told us their last resort is to lower their search criteria and hiring standards, putting into contention candidates they may not have considered in the past. While employers work hard to avoid this, the alternative is an inability to provide services for clients in need and revenue losses for the firm.

Table 4.21. Women in the Workforce, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

	Female Share of the Workforce		
	2010–11 (Percent)	2014–15 (Percent)	Absolute Change (Percentage Points)
Health care sector, total	75.0	76.1	1.1
Ambulatory care	76.2	77.9	1.7
Hospitals	73.1	74.8	1.7
Nursing and residential care facilities	78.2	75.1	–3.1
Individual and family services	73.0	77.7	4.7
Non-health care sectors	44.4	44.0	–0.4
All industry sectors	**48.9**	**48.8**	**–0.1**

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.22. Change in the Workforce by Race-Ethnicity, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

Race-Ethnicity	2010–11	2014–15	Absolute Change	Relative Change	2010–11	2014–15	Absolute Change	Relative Change
	Health Care Sector				Non-Health Care Sectors			
White, non-Latino	358,152	369,330	11,178	3.1%	2,222,388	2,302,556	80,168	3.6%
African American, non-Latino	49,142	65,572	16,431	33.4%	128,642	150,153	21,511	16.7%
Latino	34,975	49,435	14,460	41.3%	210,711	273,667	62,956	29.9%
Asian, non-Latino	22,077	27,093	5,017	22.7%	149,822	185,009	35,187	23.5%
Other, non-Latino	9,276	10,584	1,308	14.1%	56,884	61,588	4,704	8.3%
Total	**473,620**	**522,013**	**48,393**	**10.2%**	**2,768,446**	**2,972,971**	**204,526**	**7.4%**

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

Demographic Characteristics of the Health Care Workforce

We examined changes in the demographic characteristics of the health care workforce in Massachusetts by comparing workers employed in the four subsectors in 2010–2011 (before the passage of the Chapter 224 health care cost containment legislation) and in 2014–2015 (the most recent time period for which data are available). The data for this section come from the U.S. Census Bureau's American Community Survey (ACS) Public Use Microdata Sample (PUMS). We used two years of combined data files for our analysis in order to have a sufficiently large sample to produce statistically reliable estimates of the demographic characteristics, employment patterns, and level and distribution of earnings.[21]

In this section, the workforce is defined as all workers employed in Massachusetts regardless of where they reside, such as, for example, a medical assistant employed in the Greater Lawrence Family Health Center in Lawrence who resides in New Hampshire. This definition is similar to that measured using the BLS's QCEW.

GENDER

The health care workforce in Massachusetts is overwhelmingly female. In 2014–2015, over three-quarters (76.1%) of the state's health care workers were women, up slightly from 75% in 2010–2011. The share of women in industries outside of health care was much smaller (44%) and women accounted for nearly half of the state's overall workforce in 2014–2015. Within the four health care subsectors, women made up 78% of the workforce in ambulatory care and in individual and family services and about 75% in hospitals and in nursing and residential care. Between 2010–2011 and 2014–2015, the share of female workers declined in nursing and residential care and rose in the remaining three subsectors.

RACE/ETHNICITY

From 2010–2011 to 2014–2015, the health care workforce in Massachusetts increased from 473,600 to 522,000, up 48,400, or 10%. Although the workforce grew across all race/ethnicity groups, the rates of growth varied widely. The White workforce grew by just 3%, or 11,200 workers, while the African American workforce, representing the second-largest group in health care, increased by one-third, or 16,400 workers. The number of Latino workers increased sharply, from 35,000 workers in 2010–2011 to 49,500 in 2015–2016, an increase of 14,500 workers, or 41%. The state's Asian workforce grew by 23%, adding about 5,000 workers.

Outside of health care, the workforce increased at a slower pace of 7%, or 204,500 workers over the same four-year period. Here the rates of growth across race/ethnicity groups were similar to trends in health care: The slowest growth occurred among White workers (3.6%), with much steeper growth rates among Latino workers (30%), Asian workers (24%), and African Americans (17%). However, unlike the health care sector, where Latino workers made up the third-largest group, Latinos were the second-largest race group in the non-health industries.

This wide variation in the rate of growth across race-ethnicity groups led to a change in the race-ethnicity composition of the workforce in the health care and non-health care sectors in Massachusetts. Between 2010–2011 and 2014–2015, the share of White workers in the Commonwealth's health care sector dropped by nearly 5 percentage points (75.6% to 70.8%), which was a larger decline than the 3 percentage point decline in the share of White workers in the state's non-health industries over the same period (80.3% to 77.4%).

The share of African American and Latino workers in Massachusetts increased in both health care and non-health care, but the increase was much higher in the former. The African American share of the health care workforce rose by 2.2 percentage points, versus 0.5 percentage points in non-health care industries, while the Latino percentage-point increases were 2.1 and 1.6, respectively.

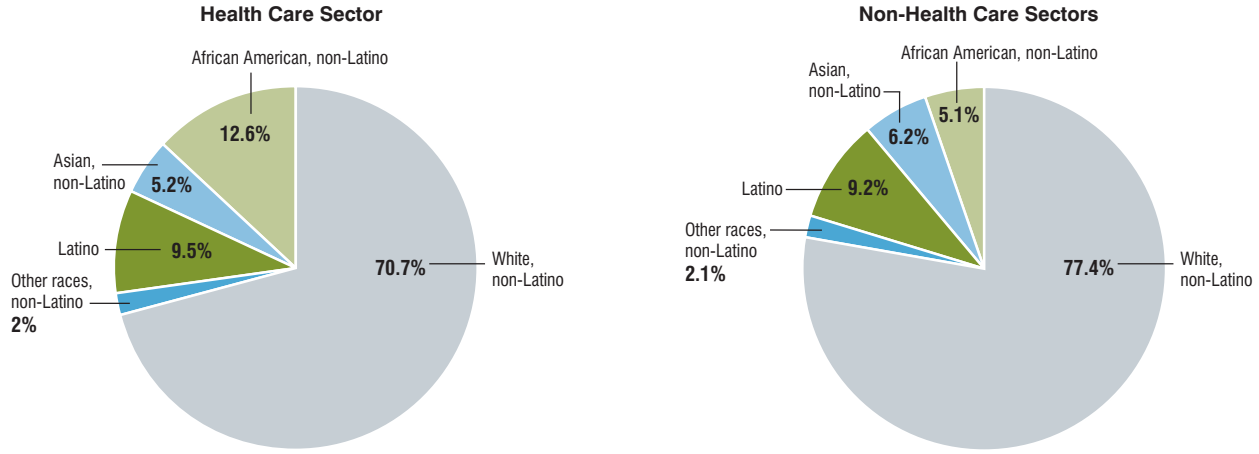
These changes widened the gap of race-ethnicity composition between the state's health care and non-health care industries. In 2014–2015 the state's health care sector employed a larger share of non-White workers than non-health care industries. Nearly 71% of the state's health care workforce consisted of White workers, compared to 77% of the workforce

Table 4.23. Percentage Distribution of the Workforce by Race-Ethnicity, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

Race-Ethnicity	2010–11 (Percent)	2014–15 (Percent)	Absolute Change (Percentage Points)	2010–11 (Percent)	2014–15 (Percent)	Absolute Change (Percentage Points)
	Health Care Sector			Non-Health Care Sector		
White, non-Latino	75.6	70.8	–4.8	80.3	77.4	–2.9
African American, non-Latino	10.4	12.6	2.2	4.6	5.1	0.5
Latino	7.4	9.5	2.1	7.6	9.2	1.6
Asian, non-Latino	4.7	5.2	0.5	5.4	6.2	0.8
Other, non-Latino	2.0	2.0	0.0	2.1	2.1	0.0

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

Figure 4.15. Distribution of the workforce by race-ethnicity, health care and non-health care, 2014–2015 averages



Source: 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

outside health care. In 2014–2015, African American workers accounted for 12.6% of the state's health care workforce, nearly 2.5 times higher than the 5.1% share in non-health care. The share of Latino workers in health care (9.5%) exceeded that of non-health care (9.2%), while Asian workers made up a smaller share of the state's health care workforce (5.2%) than the non-health care workforce (6.2%)

NATIVITY

The share of foreign-born workers in Massachusetts was higher in the health care sector than in non-health care. In 2014–2015, over 22% of the health care workforce was foreign-born, up from 20.5% in 2010–2011.[22] Foreign-born workers accounted for 19.6% of the non-health care workforce in 2014–2015, up from 18.5% in 2010–2011.

Between 2010–2011 and 2014–2015, each of the four health care subsectors saw an increase in foreign-born workers, although the share varied widely. In 2014–2015, the highest share of foreign-born workers was in the state's nursing and residential care subsector (31%), which has a higher

Table 4.24. Foreign-Born Workers in the Workforce, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

	Foreign-Born		
	2010–11 (Percent)	2014–15 (Percent)	Absolute Change (Percentage Points)
Health care sector, total	20.5	22.3	1.8
Ambulatory care	16.0	20.1	4.1
Hospitals	20.8	21.0	0.2
Nursing and residential care facilities	29.5	31.3	1.8
Individual and family services	19.0	19.1	0.1
Non-health care sectors	18.5	19.6	1.1
All industry sectors	**18.8**	**20.0**	**1.2**

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.25. Foreign-Born Workforce by Self-Rated English-Speaking Ability, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

	2010–11			2014–15		
Industry Sector	Only English	Very Well or Well	Not Well or Not At All	Only English	Very Well or Well	Not Well or Not At All
Health care sector, total	20.8	69.4	9.8	20.8	69.6	9.7
Ambulatory care	19.9	70.0	10.0	20.4	69.2	10.3
Hospitals	23.0	69.3	7.7	24.0	69.4	6.6
Nursing and residential care facilities	20.9	68.2	10.8	16.5	72.2	11.3
Individual and family services	12.4	70.9	16.7	19.3	63.9	16.9
Non-health care sectors	16.9	63.6	19.5	17.7	63.7	18.6
All industry sectors	**17.5**	**64.6**	**17.9**	**18.2**	**64.7**	**17.1**

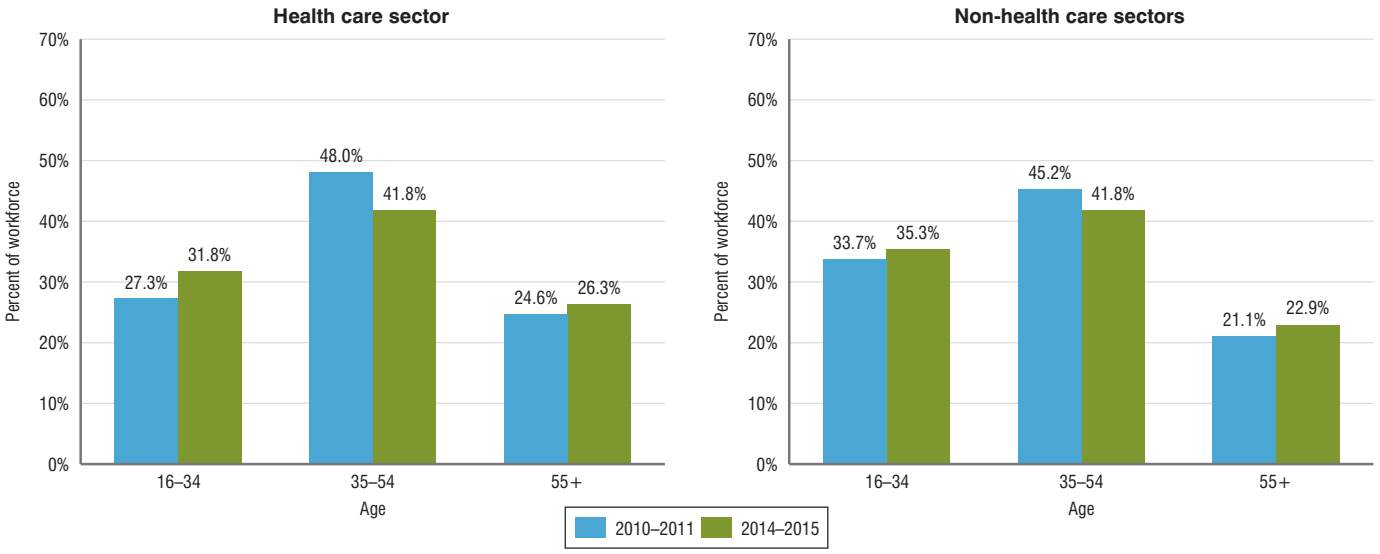
Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.26. Number of Workers by Age, Health Care and Non–Health Care, 2010–2011 and 2014–2015 Averages

	2010–11	2014–15	Absolute Change	Relative Change	2010–11	2014–15	Absolute Change	Relative Change
	Health Care Sector				Non-Health Care Sectors			
16–24	39,292	48,207	8,915	22.7%	370,933	416,786	45,853	12.4%
25–34	90,205	117,912	27,707	30.7%	562,977	632,475	69,498	12.3%
35–44	105,328	100,232	–5,096	–4.8%	586,427	575,069	–11,358	–1.9%
45–54	122,143	118,188	–3,955	–3.2%	663,988	668,120	4,133	0.6%
55–64	91,960	105,236	13,277	14.4%	447,686	509,939	62,253	13.9%
65+	24,694	32,240	7,546	30.6%	136,436	170,583	34,147	25.0%
Total	**473,620**	**522,013**	**48,393**	**10.2%**	**2,768,446**	**2,972,971**	**204,526**	**7.4%**

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

Figure 4.16. Distribution of the workforce by age, health care and non-health care, 2010–2011, 2014–2015 averages



Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.27. Change in the Workforce Median Age, Health Care and Non-Health Care, 2010–2011 and 2014–2015

	2010–11	2014–15	Absolute Change
	Median Age		
Non-health care sectors	42	42	0.0
Health care sector, total	45	44	–1.0
Ambulatory care	45	45	0.0
Hospitals	45	44	–1.0
Nursing and residential care facilities	44	42	–2.0
Individual and family services	44	44	0.0
All industry sectors	**43**	**43**	**0.0**

Source: 2010, 2011, 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University.

Table 4.28. Number of Workers by Educational Attainment, Health Care and Non-Health Care, 2010-2011 and 2014-2015 Averages

Educational Attainment	2010–11	2014–15	Absolute Change	Relative Change	2010–11	2014–15	Absolute Change	Relative Change
	Health Care Sector				Non-Health Care Sectors			
No high school diploma	23,374	22,134	–1,240	–5.3%	202,623	219,064	16,442	8.1%
High school diploma/GED	81,062	86,666	5,604	6.9%	651,694	672,761	21,068	3.2%
Some college, no diploma	89,947	97,263	7,316	8.1%	527,953	545,684	17,731	3.4%
Associate degree	66,595	65,489	–1,107	–1.7%	196,570	209,005	12,436	6.3%
Bachelor's degree	107,741	128,752	21,011	19.5%	706,486	792,909	86,423	12.2%
Master's degree	53,248	65,038	11,791	22.1%	352,319	387,933	35,615	10.1%
Professional degree	35,266	36,724	1,458	4.1%	63,133	68,155	5,022	8.0%
Doctorate	16,389	19,949	3,560	21.7%	67,670	77,461	9,791	14.5%
Total	**473,620**	**522,013**	**48,393**	**10.2%**	**2,768,446**	**2,972,971**	**204,526**	**7.4%**

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

concentration of entry-level and non-clinical workers, followed distantly by shares in the hospital workforce (21%), ambulatory care (20%), and individual and family services (19%). In 2014–15, nearly 53% of the state's nursing and residential care workforce was employed in the subsector of health care support and service occupations, compared to 29% in individual and family services, 24% in ambulatory care, and 16% in hospitals.

ENGLISH-SPEAKING ABILITY

The ACS questionnaire asked foreign-born health care workers in Massachusetts who speak a language other than English at home to rate their English-speaking ability on a four-point scale: 1 = speaks English very well, 2 = speaks English well, 3 = speaks English but not well, and 4 = does not speak English. According to these self-ratings, in 2014–2015, 21% of foreign-born health care workers spoke only English, while 70% spoke English very well or well (1 or 2) and 10% had limited English-speaking ability (3 or 4). These figures were almost unchanged between 2010–2011 and 2014–2015.

The state's foreign-born workforce outside the health care sector was nearly twice as likely (19%) as the health care workforce (10%) to have limited-English speakers. Among workers outside of health care, there was a slight increase in the share of foreign-born workers who spoke only English, no change in the share who spoke English very well or well, and a small decline in the share of limited-English speakers between 2010–2011 and 2014–2015.

An examination of the English-speaking ability of foreign-born workers employed in each health care subsector finds that in 2014–2015, the share of workers who spoke only English was 24% in the hospital subsector, 20% in ambulatory care, 19% in individual and family services, and 17% in nursing and residential care facilities. Seventy-two percent of foreign-born workers in nursing and residential care facilities assessed their English-speaking ability as very well or well, 69% in both hospitals and ambulatory care, and 64% in individual and family services. Limited-English speakers (speaking English not well or not at all) comprised 6.6% of the foreign-born workforce in hospitals, 10% in ambulatory care, 11% in nursing and residential care facilities, and nearly 17% in individual and family services.

Foreign-born workers in health care were half as likely to be limited English speakers as their counterparts employed outside of health care. However, about 1 in 10 foreign-born workers were limited-English speakers in 2014–2015. The prevalence of foreign-born workers with limited-English-speaking proficiency provides insights into the potential barriers to labor market success and upward mobility among health care workers. Foreign-born workers with lower levels of education are more likely to have limited English-language proficiency, presenting additional challenges to their integration into and upward mobility in the labor market.

AGE

Growth in the state's health care and non-health care workforces occurred at two ends of the age distribution: 16 to 34 and 55 and older. Among the younger cohort, 2014–2015 job growth was partly the result of more millennials aging into adulthood (with millennials defined as adults aged 18 to 34) and also of improvement in the state's labor market, resulting in more jobs available to this population, especially among young adults (20 to 24 and 25 to 34). Among workers aged 55 and older, the increase in employment continued the trend of greater labor-force attachment (defined as working or actively seeking work), even as the Baby Boom generation was aging into the traditionally pre-retirement and retirement ages.

Between 2010–2011 and 2014–2015, the number of young workers aged 16 to 24 working in health care increased by nearly 23%, while the number of 25 to 34 year-olds increased by 31%. Workers in the pre-retirement age of 55 to 64 also saw a sizable increase of 14% and retirement-age workers increased by 31% (7,500 workers). In sharp contrast, declines were seen for the prime-age workers of 35 to 44 year-olds (down 5%) and 45 to 54 year-olds (down 3%).

Non-health care industries saw a similar bimodal change in their workforces, with sizeable increases in younger and older workers accompanied by declines in the prime-age workforces. Between 2010–2011 and 2014–2015, the numbers of 16 to 24 year-old and 25 to 34 year-old workers in non-health care both grew by 12%. Similarly, the pre-retirement workforce

Table 4.29. Distribution of the Workforce by Educational Attainment, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

Educational Attainment	Health Care Sector			Non–Health Care Sectors		
	2010–11	2014–15	Absolute Change	2010–11	2014–15	Absolute Change
No high school diploma	4.9	4.2	–0.7	7.3	7.4	0.1
High school diploma/GED	17.1	16.6	–0.5	23.5	22.6	–0.9
Some college, no diploma	19.0	18.6	–0.4	19.1	18.4	–0.7
Associate degree	14.1	12.5	–1.6	7.1	7.0	–0.1
Bachelor's degree	22.7	24.7	2.0	25.5	26.7	1.2
Master's degree	11.2	12.5	1.3	12.7	13.0	0.3
Professional degree	7.4	7.0	–0.4	2.3	2.3	0.0
Doctorate	3.5	3.8	0.3	2.4	2.6	0.2

Source: 2010, 2011, 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

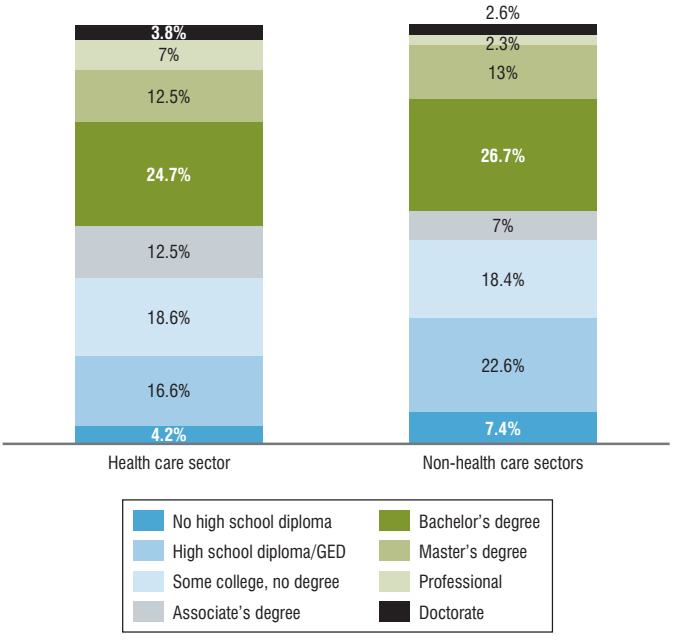
grew sharply by 14% (an additional 62,300 workers), while the retirement-age workforce grew by one-quarter. In contrast, the workforce of prime-aged workers between the ages of 35 and 44 declined by 1.9%, while their counterparts aged 45 to 54 saw no change.

These demographic shifts resulted in sizable changes in the age composition of the workforce both inside and outside of health care. The shares of younger and older workers increased while the share of prime-aged workers declined. Between 2010–2011 and 2014–2015, the share of workers aged 16 to 34 increased from 27% to 32% in health care and 34% to 35% outside of health care, while older workers aged 55 and older increased from under 25% to 26.3% in health care and from 21% to nearly 23% outside of health care. In contrast, the share of prime-age workers declined by over 6 percentage points in health care (48% to 41.8%) and by 3 percentage points in non-health care (45.2% to 41.8%).

While the median age of workers outside of health care remained unchanged at 42 years, the median age of health care workers declined from 45 to 44 between 2010–2011 and 2014–2015. Despite this decline, the average health care worker continued to be older than other workers in the state.

Looking at the median age of workers in each of the four health care subsectors, we find ambulatory care to have the oldest median age of 45 (in 2014–2015). The median age was 44 years in both hospitals and individual and family services and 42 years in nursing and residential care. Between 2010–2011 and 2014–2015, the median age remained stable among workers in ambulatory care and individual and family services, but it declined from 45 to 44 among hospital workers and from 44 to 42 among nursing home and residential care workers.

Figure 4.17. Distribution of the workforce by educational attainment, health care and non-health care, 2014–2015 averages



Source: 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

EDUCATIONAL ATTAINMENT

Looking at educational attainment between 2010–2011 and 2014–2015, the number of health care workers without a high school diploma/GED or with an associate's degree declined (despite the overall number of health care workers increasing by 48,400, or 10%). However, the numbers of health care workers went up among other educational attainment categories: Workers with a bachelor's degree grew by 21,011 (20%), workers with a master's degree increased by 11,800 (22%), and workers with doctorates grew by 3,560 (22%).

The number of workers with a high school diploma/GED and with some college education / no diploma also increased, but at below-average rates.

("Some college education / no diploma" is defined as workers that have either: enrolled in college and are working toward earning a college degree, earned a postsecondary certificate, or quit college before earning any credential.)

- From 2010–2011 to 2014–2015, workers in health care with high school degrees increased by 5,600 (7%), while there were 7,300 additional workers with some college education (8% growth).
- The rate of growth among workers with a professional degree was considerably below average, with fewer than 1,500 additional workers (4%). (In this dataset, "professional degrees" include physicians (MDs), dentists, and other specialized providers. Doctorates are PhDs.)

For all educational categories, the Massachusetts workforce outside of health care grew by 7.4% between 2010–2011 and 2014–2015.

- Below-average growth was seen for high school graduates, workers with some college / no diploma, and workers with an associate's degree.
- Above-average growth was seen in the remaining educational groups: no high school diploma (8%), workers with professional degrees (8%), and workers with doctorates (14.5%).

Job growth among high school dropouts in non-health care was especially significant, since employment for this group fell more than for other educational groups during the Great Recession (the trough of which was in 2010–2011). As the state's economy grew and the labor market tightened, employment began to rise across all groups, including high school dropouts. In contrast, the number of employed high school dropouts in health care declined over these four years, partly due to the continued growth in health care employment during the recession and changes in the state's health care sector beginning in 2008.

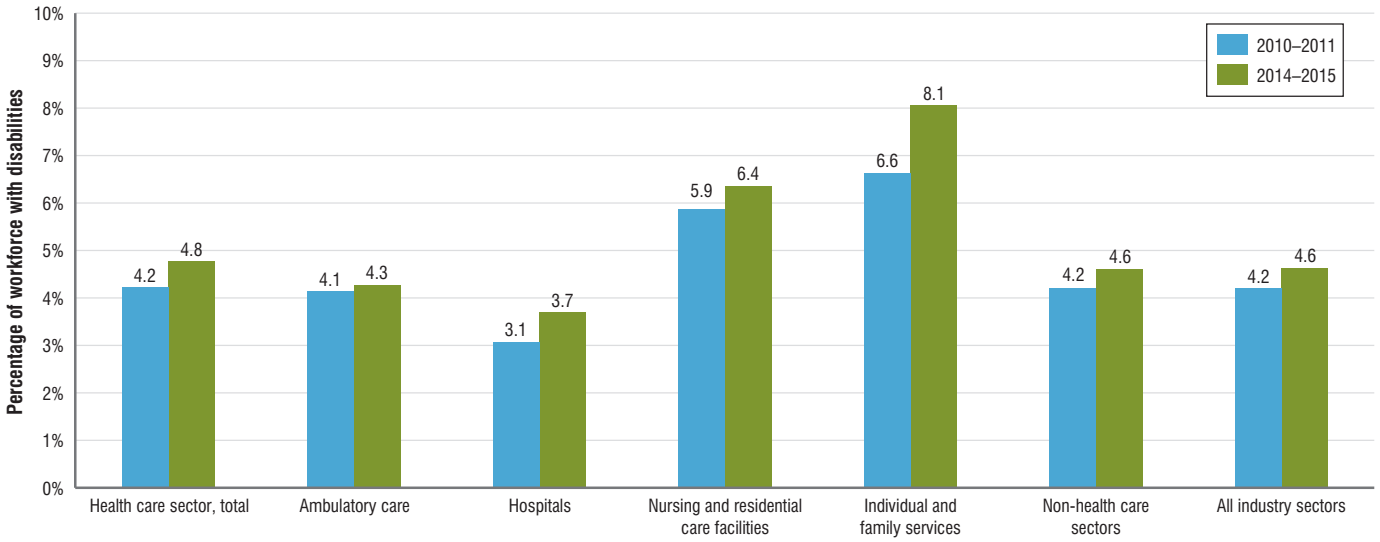
First, the health care sector was largely shielded from the Great Recession, so employment actually increased, albeit at a slower pace. Second, the shift from inpatient to outpatient care that began in 2008 resulted in rapid growth in health care occupations (including home health and PCAs) that required little to no specialized medical or health knowledge and only basic soft skills, which opened up the job market to workers from other industries and occupations. Low-skill workers in non-health

Table 4.30. Distribution of Registered Nurses in Health Care by Educational Attainment, 2010–2011 and 2014–2015 Averages

Educational Attainment	2010–11	2014–15	Absolute Change	Relative Change
Associate's degree	21,167	20,099	–1,069	–5.0%
Bachelor's degree	34,886	38,853	3,967	11.4%
Master's degree or higher	6,692	8,548	1,856	27.7%
Total	**66,785**	**73,306**	**6,521**	**9.8%**
Percentage Distribution				
Associate's degree	31.7%	27.4%	–4.3%	
Bachelor's degree	52.2%	53.0%	0.8%	
Master's degree or higher	10.0%	11.7%	1.6%	

Note: Since the sample size of RNs with less than an associate degree was not large enough for statistical precision, that educational category is not reported in the table. Therefore, the total is greater than the sum of the three education categories.
Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Figure 4.18. Workforce with disabilities, health care and non-health care, 2010–2011 and 2014–2015 averages



Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

care industries—such as grocery stores, department stores, restaurants, and fast food firms—and low-skill workers in health care occupations can be substituted for one another relatively easily since they share the same basic soft-skill requirements and do not require any particular specialized knowledge before entering employment. In addition, wages are very similar now for these low-skill occupations. It is likely that during the Great Recession, many workers employed outside of health care took the low-skill jobs available inside health care. Now that the economy has improved and job opportunities in non-health sectors have grown, these workers may just as easily leave health care for non-health care jobs.[23]

The health care workforce in Massachusetts is better educated than the rest of the state's workforce, according to an analysis of 2014–2015 data. Most of this difference in education occurs at the lower end; about 21% of the state's health care workforce had either completed just a high school education (17%) or had failed to complete high school (5%), compared to 30% for non-health care workers (23% were high school graduates, 7% were high school dropouts). The health care sector saw a decline in the shares of workers with an associate degree or lower, and an increase in the workforce with a bachelor's degree or higher, with the exception of workers with professional degrees, which declined slightly (7.4% to 7%).

One of the ways health care employers will address the cost containment pressures from Chapter 224 and the ACA is to train workers to perform their jobs to the top of their license, according to our conversations with health care leaders. This means the job duties of workers across health care, from certified nursing assistants (CNAs) and home health aides to advanced practitioners (nurse practitioners and physician assistants), are expected to change so that workers are performing duties at the highest level. The presence of workers with limited education, skills, and English-language proficiency (foreign-born and native-born) is likely to pose a challenge to health care employers in implementing this strategy successfully.

In 2014–2015, nearly 19% of health care workers had completed some college education without earning a college degree, about the same share as workers outside of health care. The share of health care workers with an associate's degree was nearly twice as large (13%) as that for non-health care workers (7%), likely attributable to the prevalence of nurses with an ASN in the state's nursing workforce. Unsurprisingly, health care had a threefold higher concentration of workers with a professional degree (7%), compared to the non-health care workforce (2.3%) in 2014–2015.

The share of workers with a bachelor's degree was slightly lower among health care workers (24.7%) compared to non-health care workers (26.7%). This was also the case for workers with a master's degree (12.5% versus 13%). In contrast, health care workers were somewhat more likely than non-health care workers to have earned a doctorate (3.8% versus 2.6%).

The educational attainment of the nursing workforce spans the educational spectrum: associate's degrees, bachelor's or master's degrees, and doctorates. An examination of the education of the RN workforce in Massachusetts found that, while the total number increased by 6,500 or 9.8% between 2010–2011 and 2014–2015, RNs with an associate degree declined by 1,070 or 5%. During this period RNs with a bachelor's degree increased by nearly 4,000 or 11%, and those with a master's or higher degree increased by 1,850 or 28%. The share of RNs with a bachelor's or higher degree in Massachusetts increased from 62% to 65%.

DISABILITY STATUS

Workers with disabilities accounted for 4.2% of both the health care and non-health care workforces in 2010–2011. By 2014–2015, the share increased to 4.8% in health care and 4.6% outside of health care. Since the incidence of disabilities typically rises with age, an aging workforce might underlie some of this increase. Further, the share of workers with disabilities increased across all four subsectors of health care, with the smallest increase among workers in ambulatory care and the largest increase in individual and family services.

According to the 2014–2015 ACS surveys, the share of the workforce with disabilities was 8.1% in individual and family services and 6.4% in nursing and residential care. Less likely to have disabilities were workers in ambulatory care (4.3%) and hospitals (3.7%).

Characteristics of Jobs in Health Care: Hours, Weeks, and Earnings

In this section we assess trends in intensity of employment and levels of earnings. Intensity of employment is measured by weekly hours, annual weeks, and annual hours.

At the time of our baseline study, we had performed a review of the Health Care Workforce Transformation Fund planning grant proposals submitted by 51 health care employers in order to shed light on workforce training needs and potential issues resulting from Chapter 224. Our review found that health care employers were adjusting to Chapter 224 in different ways. Some were focused on higher-level workers, such as adding more advanced practitioners to take on additional primary care duties from physicians. Others wanted to train their workers to move up the career ladder or create higher-level roles for them to improve their skills and productivity. A number of employers planned to train all staff members to be effective at delivering team-based care and other service delivery models. Still others identified the integration of behavioral health care with primary care; this practice allows for greater staff interaction with patients with complex health and behavioral health needs, resulting in a need to train staff, particularly non-clinical staff, to effectively handle such interactions.

It also appeared at that time that some health care employers were trying to contain costs by either cutting back on higher-level workers or hiring more lower-level workers. This adjustment would increase the concentration of lower-level occupations in the sector, which in turn would put downward pressure on earnings and change the hours and weeks of employment. Conversely, some employers were choosing to have fewer workers but still deliver high-quality care and contain costs by improving worker productivity and having workers practice at the top of their licenses. This adjustment would result in a greater concentration of the health care workforce in higher-level occupations, leading to an increase in earnings, while at the same time reducing employment opportunities for workers in lower-skill and lower-wage occupations.

Both of these avenues would change the employment patterns, employment intensity, and earnings of workers. Earnings and hours and weeks worked could also change from a shift in the sector's workforce distribution; if the workforce becomes concentrated in subsectors with more full-time and year-round employment and higher earnings, we can expect a rise in overall full-time, year-round employment and a corresponding increase in sector-wide earnings. Conversely, a shift to lower-level occupations might put downward pressure on the hours, weeks, and earnings of health care workers.

Statewide employment levels rose by 195,000 jobs or 6% between 2012 and 2015. Health care practitioner and technical occupations grew only 3%, adding 6,100 jobs, while health care support occupations grew only 5%, adding 5,300 jobs.[24] In contrast, employment rose by 21% among personal care and service occupations and by 11% in community and social service occupations. Driving this sharp increase were three occupations—PCAs, home health aides, and community health workers—as follows:

- Employment of PCAs increased by 10,800 jobs or 54%,
- Home health aides grew by 4,620 jobs or nearly one-quarter, and
- Community health workers, although small in number, doubled their employment from 1,290 to 2,530, a growth rate of 96%.

Together, these three occupations accounted for 2% of all jobs in the state in 2012 (60,500 out of 3.202 million) but nearly 9% of all job growth between 2012 and 2015 (16,700 out of 195,000 new jobs created).[25]

Uneven changes in employment across different subsectors and occupations, especially the sharp increase in employment of lower-wage, direct care workers, are expected to affect health care employment patterns and wages.

HOURS AND WEEKS OF EMPLOYMENT OF HEALTH CARE WORKERS

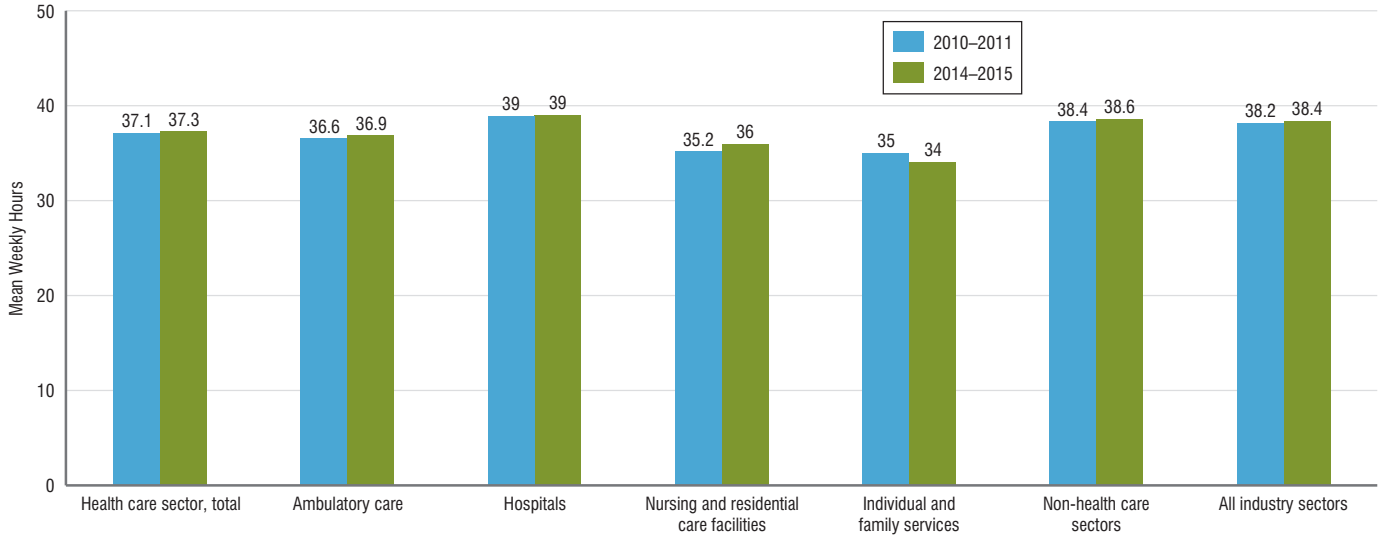
Information on the hours of work that employees perform in a typical week or year provides valuable insights into how employers deploy their workforce, the extent to which workers are engaged in full-time work, and whether those workers are employed for most of the year or just part of it. We analyzed the intensity of work by utilizing a few key measures of hours and weeks of employment, including: (1) mean weekly hours of work and the distribution of workers by those hours, (2) percentage of workers employed full-time (35-plus weekly hours), (3) percentage of workers employed full-time and year-round (35-plus weekly hours for 40-plus annual weeks), and (4) mean annual hours of work. Using the 2010–2011 and 2014–2015 ACS PUMS data, we provided estimates of each of these four measures for the health care and non-health care workforces in Massachusetts.

Weekly hours of work

As the economy improved after the Great Recession, the state workforce's mean weekly hours of work increased by just 0.2 hours, from 38.2 hours to 38.4 hours between 2010–2011 and 2014–2015. Mean weekly hours of health care and non-health care workers also increased by 0.2 hours over the four years. The average workweek of health care workers was shorter (37.3 hours) than that of non-health care workers (38.6 hours) in 2014–2015, a difference of 1.3 hours per week.

From 2010–2011 to 2014–2015, the mean weekly hours of employment increased by 0.8 hours for nursing and residential care (35.2 to 36 hours) and by 0.3 hours for ambulatory care (36.6 to 36.9 hours). Weekly work hours remained constant at 39 hours per week among hospital workers and declined in individual and family services from 35 to 34 hours per week. Hospital workers had the longest average workweek in the health care

Figure 4.19. Mean weekly hours of employment, health care and non-health care, 2010–2011 and 2014–2015 averages



Source: 2010, 2011, 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.31. Distribution of the Workforce by Weekly Hours of Employment, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

	Health Care Sector, Total	Ambulatory Care	Hospitals	Nursing and Residential Care Facilities	Individual and Family Services	Non–Health Care Sectors	All Industry Sectors
Percentage of workers with under 30 hours per week							
2010–2011	18.6	21.2	14.2	21.0	23.7	17.8	17.9
2014–2015	18.3	20.0	13.7	20.9	27.1	17.4	17.5
Absolute Change	–0.3	–1.2	–0.5	–0.1	3.4	–0.4	–0.4
Percentage of workers with 30–39 hours per week							
2010–2011	20.8	21.1	19.0	21.9	25.5	14.2	15.1
2014–2015	20.6	22.0	19.5	21.2	18.7	13.1	14.2
Absolute Change	–0.2	0.9	0.5	–0.7	–6.7	–1.1	–0.9
Percentage of workers with 40+ hours per week							
2010–2011	60.6	57.7	66.8	57.0	50.9	68.0	66.9
2014–2015	61.1	57.9	66.8	57.9	54.2	69.5	68.2
Absolute Change	0.5	0.2	0.0	0.9	3.3	1.5	1.3

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

sector (39 hours) in 2014–2015, while workers in individual and family services had the shortest (34 hours).

While average weekly hours provides a good summary of employment intensity, a look at the distribution of workers by those weekly hours provides further insights. In Table 4.31 we provide a distribution of the health care workforce by workweek length in 2010–2011 and 2014–2015, ranging from less than 30 hours, 30 to 39 hours, and 40 hours or more per week.

Between 2010–2011 and 2014–2015, the percentage of workers with a low-intensity workweek (*fewer* than 30 hours of work) declined in both health care and non-health care. Within health care the share of workers with a low intensity workweek declined in all but one subsector: individual and family services. The share of workers with a low intensity workweek declined in the ambulatory care sector (-1.2 percentage points or 5.5%), hospitals (-0.5 percentage points or -3.5%), and nursing and residential care facilities (-0.2 percentage points or -0.7%). The share *increased* among individual and family services workers (+3.4 percentage points or +14%).

Health care workers were somewhat more likely to be employed for less than 30 hours per week in 2014–2015 compared to non-health care workers (18.3% versus 17.4%). These workers made up a smaller share of the state's hospital workforce (14%) compared to ambulatory care (20%), nursing and residential care facilities (21%), and individual and family services (27%).

At the other extreme are workers with a high-intensity workweek, employed for 40 or more hours per week. We found this work to be more prevalent outside the state's health care sector. Furthermore, the non-health care sector saw an increase of 1.5 percentage points or 2.2% in the share of high-intensity workers between 2010–2011 and 2014–2015, while in health care the share of high-intensity workers increased by just 0.5 percentage points or 0.8%.

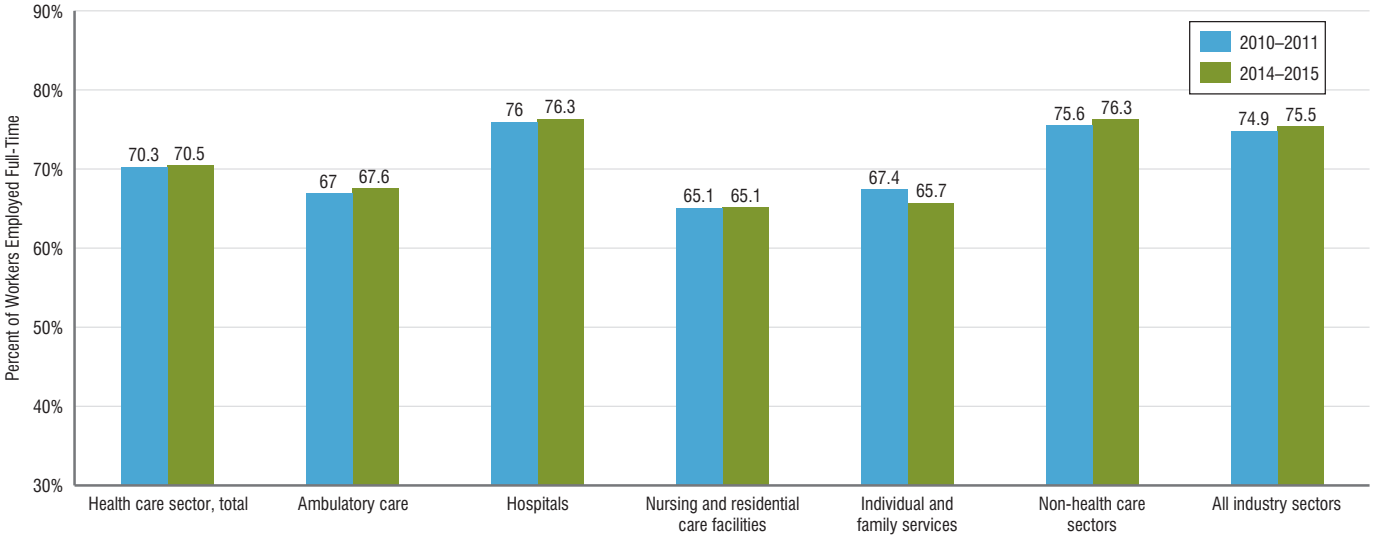
The share of high-intensity workers remained constant at two-thirds in the state's hospital subsector and increased in the remaining three subsectors— by 0.2 percentage points or 0.5% in ambulatory care, 0.9 percentage points or 1.5% in nursing and residential care facilities, and 3.3 percentage points or 6.6 % in individual and family services. Even after its increase, individual and family services continued to have the lowest share of high-intensity workers in 2014–2015 (54%) of all four subsectors.

The middle-intensity group, workers with 30 to 39 weekly hours of employment, saw a decline in its share of the workforce both inside and outside the state's health care sector. The decline was much smaller in health care (-0.2 percentage points or -1.1%) compared to non-health care (-1.1 percentage points or 7.4%).

Within health care, the change in workweek patterns was similar in three out of the four subsectors. The workforce in the ambulatory care and nursing and residential care subsectors moved slightly from a low- and middle-intensity workweek to a high-intensity workweek, while hospital workers saw a small decline in the share of low-intensity workers, an increase in middle-intensity workers, and no change in high-intensity workers.

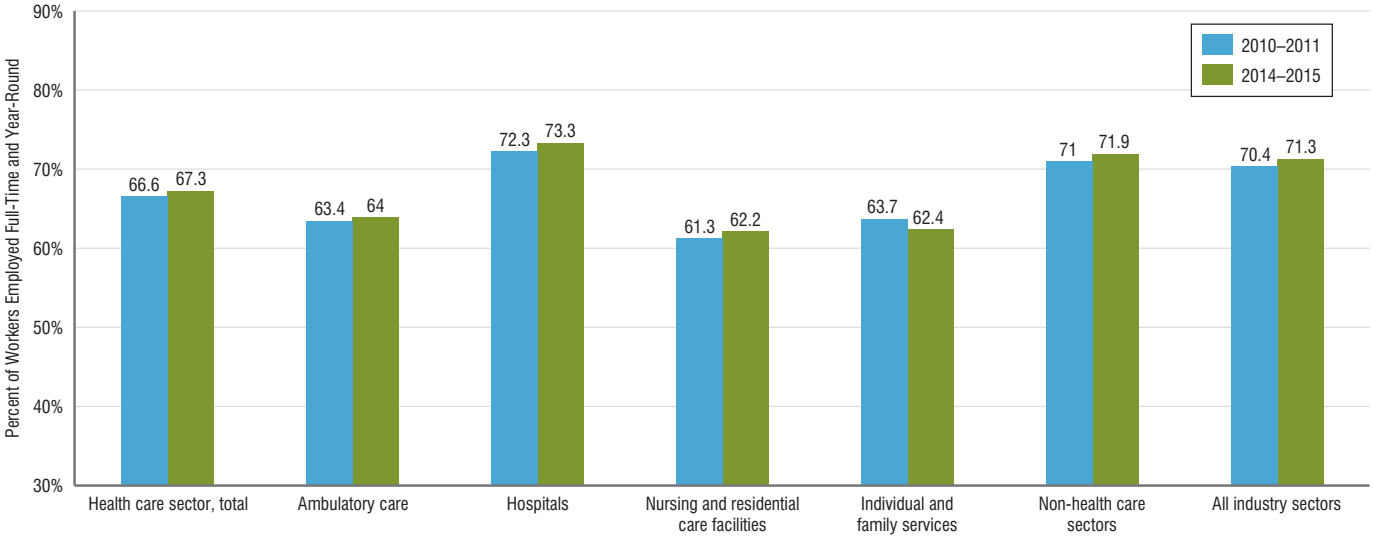
The state's individual and family services subsector saw a decline of 6.7 percentage points in the share of middle intensity workers, an increase of 3.4 percentage points in the share of low-intensity workers and an increase of 3.3 percentage points in the share of high-intensity workers. This finding supports what we learned from employers in the home care subsector: the preferred workweek among employees is at two extremes. Some employees prefer a short workweek, while others want to work many more hours. Employers described how some of their employees asked for many more hours (a high-intensity workweek) but, if the employer were unwilling to extend the workweek substantially due to concerns that over-extended workers would lead to a decline in service quality, the workers secured additional hours by working for two or more employers. On the other hand, many home care employers expressed concerns about the preference of employees to work a short workweek, which caused labor supply problems.

Figure 4.20. Workers employed full-time (35+ hours/week), health care and non-health care, 2010–2011 and 2014–2015 averages



Note: "Full-time" is at least 35 hours per week.
Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Figure 4.21. Workers employed full-time and year-round, health care and non-health care 2010–2011 and 2014–2015 averages



Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

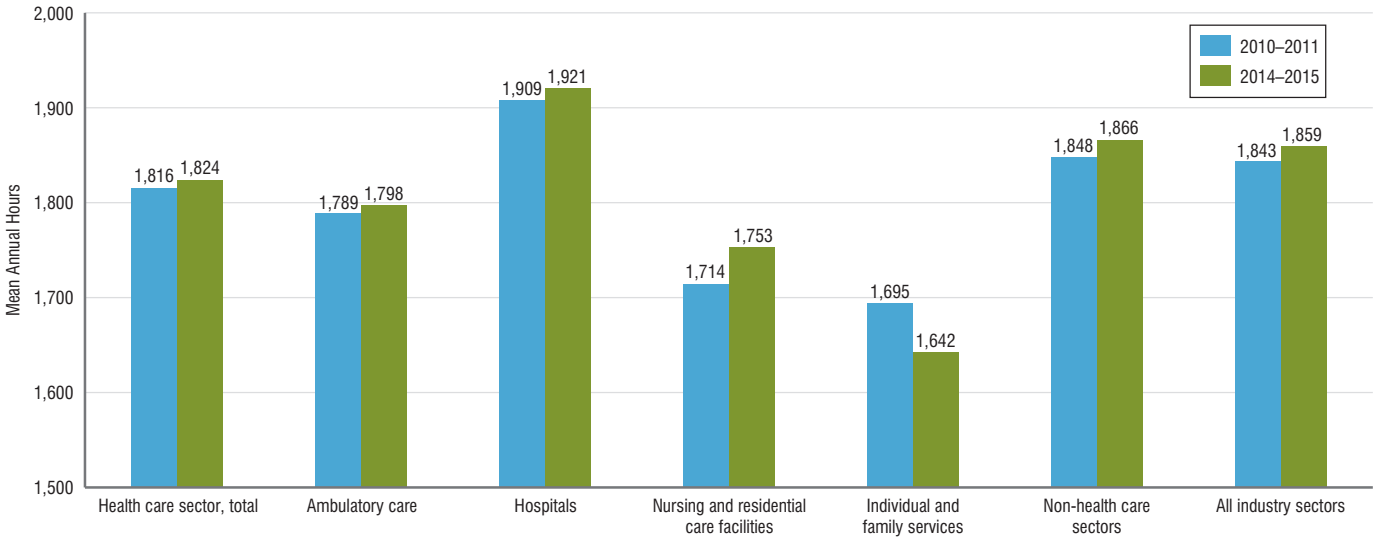
Full-time employment

Another frequently used measure of employment intensity is the share of the workforce engaged in full-time employment, defined as a workweek of 35 hours or more. An examination of the proportion of workers with a full-time workweek can shed light on the extent to which the industry provides its workers with full-time employment opportunities and the extent to which workers take those opportunities.

Between 2010–2011 and 2014–2015, the share of the workforce employed full-time increased in both health care and non-health care across the state. Within health care, this share increased in ambulatory care and hospitals (+0.6 and +0.3 percentage points, respectively), remained unchanged in nursing and residential care, and declined in individual and family services (-1.7 percentage points).

In 2014–2015, more than 70% of health care workers were employed for 35

Figure 4.22. Mean annual hours of employment, health care and non-health care, 2010–2011 and 2014–2015 averages



Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

hours or more, 6 percentage points less than the rate of full-time employment outside health care (76%). Full-time employment was considerably more prevalent in hospitals (76%) than in ambulatory care (68%), individual and family services (66%), and nursing and residential care facilities (65%).

Full-time and year-round employment

Weekly hours of employment measures employment intensity during a week but not patterns over a longer time period, such as an entire year. The ACS PUMS data files provide information on the number of weeks in a year during which workers were employed. Using data on weekly work hours and annual workweeks, we produced a measure of employment intensity during the year: full-time and year-round employment. Year-round employment is defined as employment for 40 or more weeks per year, and workers are considered employed full-time and year-round if they worked 35 or more weekly hours and 40 or more weeks per year.

Our analysis of weekly work hours and annual workweeks among workers in health care and non-health care and in each health care subsector found similar trends of increase in the percentage of workers engaged in full-time, year-round work. Three out of four subsectors saw an increase in the share of the workforce engaged in full-time and year-round work. The exception was individual and family services, which saw a 2-percentage-point decline, from nearly 64% in 2010–2011 to 62% in 2014–2015.

Our comparison of full-time, year-round employment in 2014–2015 across industries found that health care workers were less likely to work in full-time, year-round jobs than their counterparts outside of health care (67% versus 72%). Within health care, the hospital workforce was most likely to engage in full-time and year-round employment (73%), while workers in the remaining three subsectors were considerably less likely to do so (64% in ambulatory care and 62% both in nursing and residential care and in individual and family services).

Table 4.32. Mean Annual Earnings of the Workforce, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages (2015 Dollars)

	2010–11	2014–15	Absolute Difference	Relative Difference
Health care sector, total	59,848	60,598	750	1.3%
Ambulatory care	65,886	66,720	834	1.3%
Hospitals	69,367	71,895	2,527	3.6%
Nursing and residential care facilities	36,423	36,318	–105	–0.3%
Individual and family services	37,980	37,286	–694	–1.8%
Non–health care sectors	57,615	59,127	1,513	2.6%
All industry sectors	**57,941**	**59,347**	**1,406**	**2.4%**

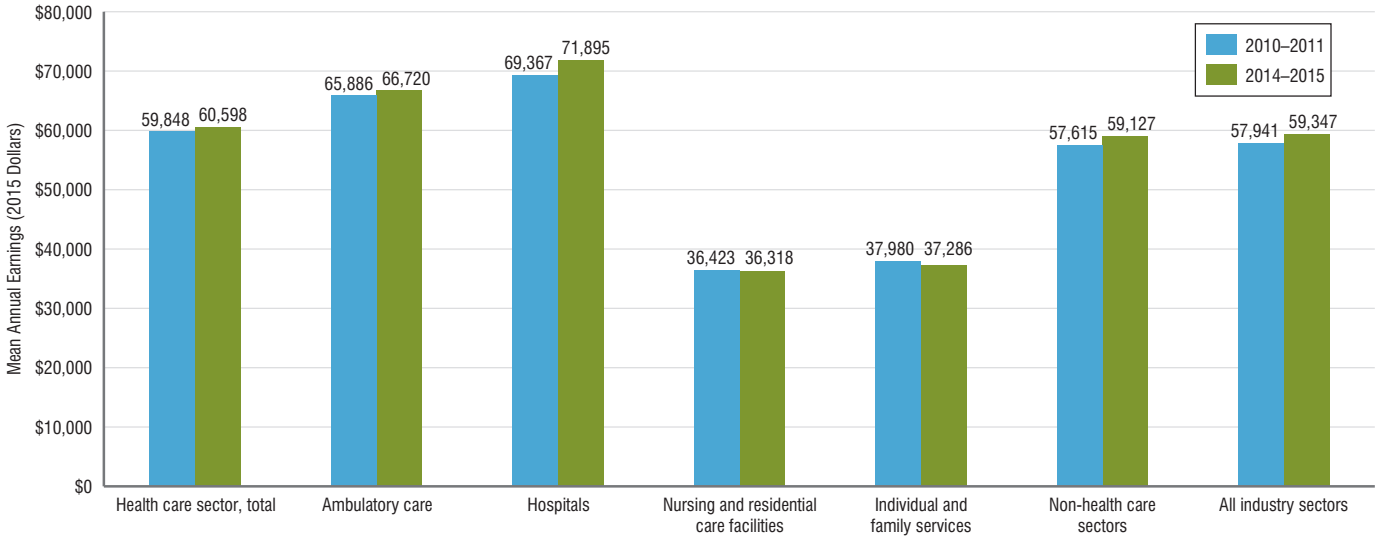
Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files; tabulations by Center for Labor Markets and Policy, Drexel University

Annual hours of work

Another gauge of employment intensity measures the actual hours of employment per year. Annual hours of employment are computed from information on weekly hours and annual weeks.[26] For example an individual employed for 35 hours per week for the entire year (52 weeks) would have worked for 1,820 hours during the year (35 hours times 52 weeks).

On average, health care workers were employed for 1,824 hours during the year in 2014–2015, up from 1,816 hours in 2010–2011. Over this four-year span, the mean annual hours of employment increased in three of four subsectors—ambulatory care, hospitals, and nursing and residential care—and declined in individual and family services from 1,695 hours in 2010–2011 to 1,642 hours in 2014–2015.

Figure 4.23. Mean annual earnings of the workforce, health care and non-health care, 2010–2011 and 2014–2015 averages (2015 dollars)



Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

In 2014–2015, the mean annual hours of health care workers (1,824) was smaller than that of workers in non-health care (1,866). Hospital workers had the highest mean annual hours, 1,921, which exceeded the mean for all health care and non-health care workers. The mean annual hours for employees in ambulatory care was 1,798, which was 123 hours less than their hospital counterparts. Workers in the remaining two subsectors were employed even less intensively during the year: 1,753 mean annual hours in nursing and residential care and just 1,642 hours in individual and family services.

In summary, we found that on every measure examined—mean weekly hours, full-time employment, full-time and year-round employment, and mean annual hours of employment—workers in both health care and non-health care saw an increase in their employment intensity between 2010–2011 and 2014–2015, although health care workers were employed less intensively according to all four measures. Employment intensity increased in all but one health care subsector, individual and family services, for which employment intensity decreased on each measure.

EARNINGS OF HEALTH CARE WORKERS

Using combined data files from the ACS PUMS, we produced real (inflation-adjusted) mean annual earnings (measured in 2015 dollars) of the health care and non-health care workforces for 2010–2011 and 2014–2015. We also analyzed the change in real mean annual earnings that occurred over the four years between these two periods.

Mean annual earnings of workers in health care and non-health care sectors

In 2014–2015, the mean annual earnings of health care workers was $60,600, up 1.3% ($750) from $59,850 in 2010–2011. Mean annual earnings for non-health care workers rose twice as quickly (up 2.6%) to $59,100 from $57,600.

Mean annual earnings increased for workers in hospitals (up $2,500, or 3.6%) and ambulatory care (up $800 or 1.3%), and they declined for workers in nursing and residential care (down $105, or 0.3%) and in individual and family services (down nearly $700, or 1.8%).

In 2014–2015, hospital workers had the highest mean annual earnings ($71,900), nearly 19% higher than the mean annual salary of $60,600 among all health care workers. Mean earnings for ambulatory care ($66,700) was also 10% higher than the sector average. Workers in nursing and residential care had mean annual earnings of just $36,300, a little over half of what the average hospital worker made. For individual and family services, workers averaged $37,300, $1,000 more than nursing and residential care workers but still substantially lower than hospital and ambulatory care workers.

Underlying these variances are the subsectors' different occupational staffing patterns. Hospitals and ambulatory care have higher shares of workers in high-level diagnostic and treatment occupations (such as physicians and registered nurses), whereas nursing and residential care facilities employ more workers in lower-level health care support occupations (such as certified nursing assistants, home health aides, and other occupational aides and assistants and orderlies) and low-level personal care and service occupations (such as personal care aides).

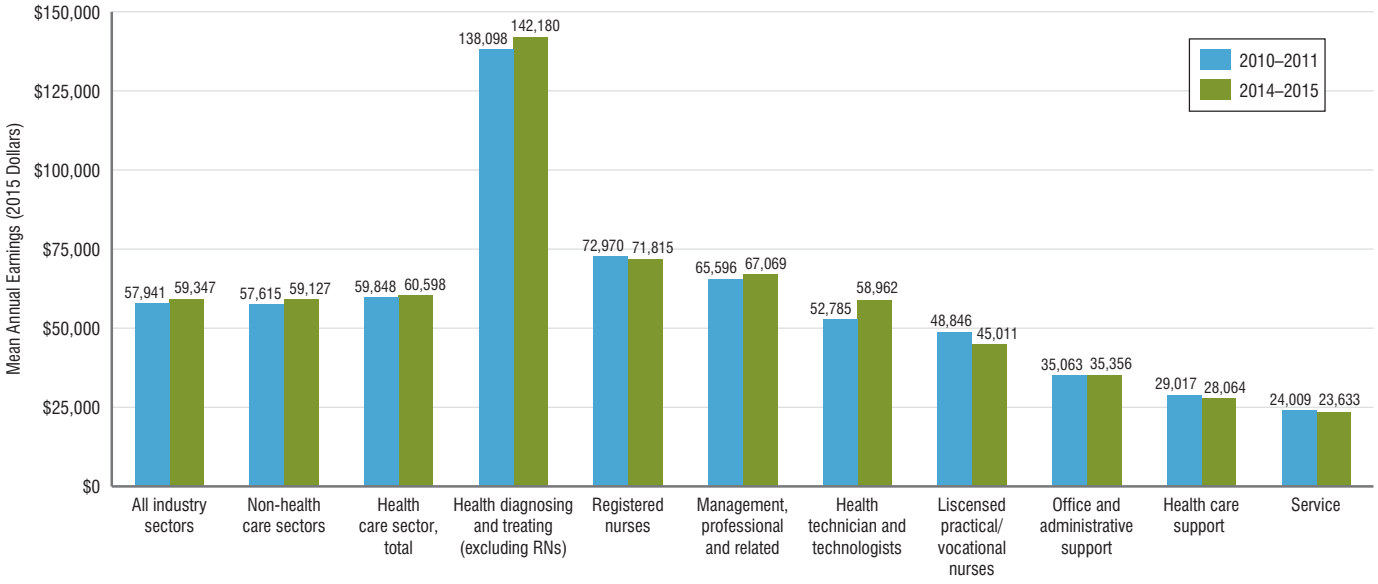
Within individual and family services, many workers hold managerial and non-health professional occupations, with over half holding a bachelor's degree or higher. However, their mean earnings are only slightly higher than those of nursing and residential care workers. These lower earnings could be due to the subsector's composition of mainly lower-salaried

Table 4.33. Mean Annual Earnings of the Health Care Workforce by Occupation, 2010–2011 and 2014–2015 Averages (2015 Dollars)

	2010–11	2014–15	Absolute Difference	Relative Difference
Health diagnosing and treating practitioner, excluding RN	138,098	142,180	4,082	3.0%
Registered nurses	72,970	71,815	–1,154	–1.6%
Licensed practical/vocational nurses	48,846	45,011	–3,835	–7.9%
Health technicians and technologists	52,785	58,962	6,177	11.7%
Healthcare support	29,017	28,064	–954	–3.3%
Management, professional, and related	65,596	67,069	1,472	2.2%
Service	24,009	23,633	–376	–1.6%
Office and administrative support	35,063	35,356	294	0.8%
Natural resources, construction, and maintenance	54,709	54,218	–491	–0.9%
Production, transportation, and material moving	31,105	29,842	–1,263	–4.1%
Health care sector, total	59,848	60,598	750	1.3%
Non–health care sectors	57,615	59,127	1,513	2.6%
All industries	**57,941**	**59,347**	**1,406**	**2.4%**

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Figure 4.24. Mean annual earnings of the health care sector workforce by occupation, 2010–2011 and 2014–2015 averages (2015 dollars)



Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

community and social service occupations, such as counselors and social workers. And as noted in previous sections, the lower employment intensity of workers in individual and family services also underlies the lower annual earnings of the workforce in this subsector.

From 2010–2011 to 2014–2015, the share of individual and family services workers holding service occupations (mainly personal care aides) increased sharply from 16% to 23%, while the share of management occupations declined from 63% to 52%. A large majority of the increase in service positions came from the sharp rise in personal care aides, which has low earnings.[27] Moreover, this shift contributed to the subsector's overall earnings decline.

The gaps among mean annual earnings of workers across the four health care subsectors widened between 2010–2011 and 2014–2015.

- Earnings increased in the two subsectors that already had higher earn-

Table 4.34. Annual Earnings of Workers at Selected Earnings Distribution Percentiles, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages (2015 Dollars)

Percentiles of the Earnings Distribution	2010–2011	2014–2015	Absolute Change	Relative Change
	Health Care Sector			
10	11,802	11,515	–287	–2.4%
20	21,458	20,192	–1,265	–5.9%
50 (Median)	42,916	41,653	–1,263	–2.9%
80	80,467	80,101	–365	–0.5%
90	109,504	111,058	1,554	1.4%
Mean	59,848	60,598	750	1.3%
	Non-Health Care Sectors			
10	6,570	6,708	138	2.1%
20	15,450	15,019	–431	–2.8%
50 (Median)	42,916	42,202	–713	–1.7%
80	82,347	85,107	2,760	3.4%
90	112,789	120,145	7,355	6.5%
Mean	57,615	59,127	1,513	2.6%

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Table 4.35. Ratio of Annual Earnings at Selected Earnings Percentiles, Health Care and Non-Health Care, 2010–2011 and 2014–2015 Averages

Selected Earnings Percentiles	Ratio of Annual Earnings 2010–2011	Ratio of Annual Earnings 2014–2015	Absolute Change
	Health Care Sector		
90/10	9.3	9.6	+0.3
90/20	5.1	5.5	+0.4
90/50	2.6	2.7	+0.1
80/10	6.8	7.0	+0.2
80/20	3.7	4.0	+0.3
80/50	1.9	1.9	0.0
	Non-Health Care Sectors		
90/10	17.2	17.9	+0.7
90/20	7.3	8.0	+0.7
90/50	2.6	2.8	+0.2
80/10	12.5	12.7	+0.2
80/20	5.3	5.7	+0.4
80/50	1.9	2.0	+0.1

Source: 2010, 2011, 2014, and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

ings in 2010–2011 (hospitals and ambulatory care).

- Earnings declined in the two subsectors with lower earnings (nursing and residential care, individual and family services).
- Hospital workers' mean annual earnings ($69,400) were 91% more than those of workers in nursing and residential care ($36,400), a gap of $33,000. By 2014–2015, this gap had increased to $35,600, as hospital workers' earnings ($71,900) were 98% higher than those of workers in nursing and residential care ($36,300).

Mean annual earnings of health care workers by occupation

A wide range of occupations can be found in health care: physicians, managers, and registered nurses; health technicians, technologists, and administrative staff; support workers (aides, assistants, and orderlies); service workers (home care workers and personal care aides); and blue-collar workers. We examined the real (inflation-adjusted) mean annual earnings of 10 health care occupations for 2010–2011 and 2014–2015, along with the absolute and relative change in those earnings over the four-year period.

Mean annual earnings for health care increased by 1.3%, while earnings for non-health care workers increased twice as quickly at 2.6% growth. Earnings went up for health care workers in only 4 of 10 occupations: health diagnosing and treating practitioners, excluding RNs, (3% growth, or $4,000), health technicians and technologists (12%, or $6,200), managerial occupations (2.2% or $1,500), and office and administrative workers (0.8%, or $300).

Earnings of workers in the remaining six health care occupations declined.

- Earnings among licensed practical nurses (LPNs) fell the most, from $48,800 to $45,000, a decline of $3,800, or nearly 8%.
- Earnings of RNs declined from nearly $73,000 to $71,800, a decline in annual earnings of nearly $1,200, or 1.6%.
- Other decreases were seen in the health care support occupations, including the fast-growing home health aide position (-3.3%) and the service occupations, including the fast-growing personal care aide position (-1.6%).

As shown in Figure 4.24, the mean earnings for health diagnosing and treating practitioners (excluding RNs) were higher than for the remaining nine occupations ($142,200 per year in 2014–2015). The second-highest earnings were among RNs ($71,800 per year in 2014–2015). Workers in management and professional occupations (excluding health professional occupations, such as diagnosing and treating practitioners) earned $67,100. Fourth highest in earnings were technicians and technologists ($59,000), followed by LPNs ($45,000) and clerical workers ($35,400). The health care support and service occupations had the lowest salaries, earning $28,000 and $23,600, respectively.

Distribution of annual earnings in health care and non-health care sectors

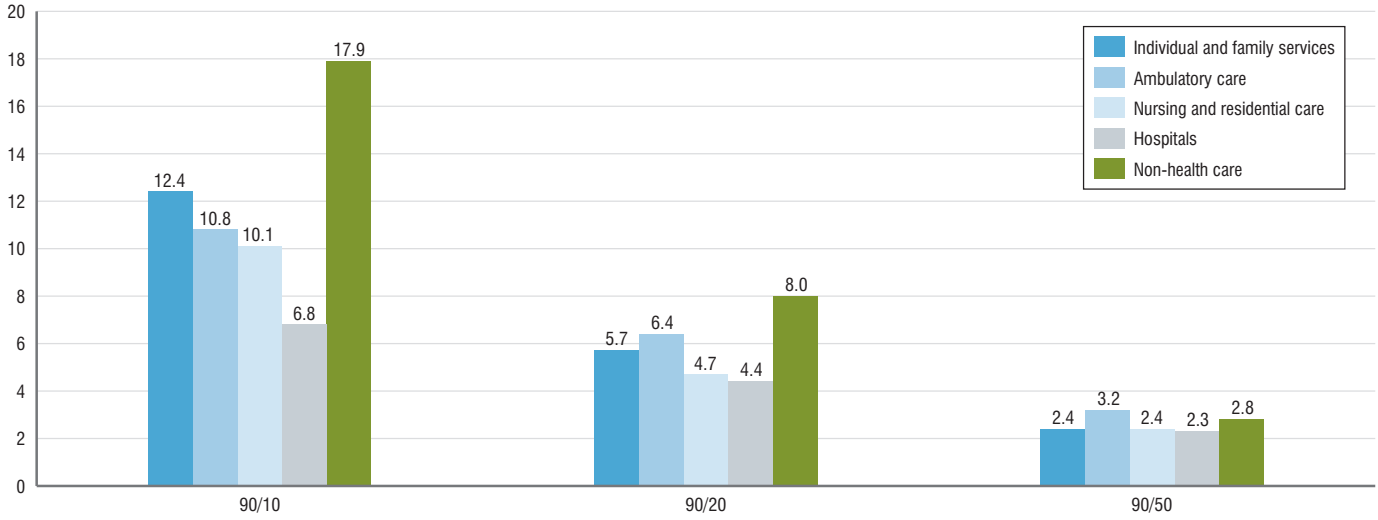
Thus far, we have found that most of the increases in mean annual earnings occurred in high-wage occupations, while workers in low-wage occupations saw a decline in earnings. Furthermore, employment in health care has shifted from hospitals and nursing homes to outpatient care, residential care, and home care, resulting in increased employment in the lower-wage health care support and service occupations, such as home health

Table 4.36. Annual Earnings and Ratio of Annual Earnings of Workers at Selected Earnings Distribution Percentiles within Health Care Subsectors, 2010–2011 and 2014–2015 Averages (2015 Dollars)

Percentiles of Earnings Distribution	Ambulatory Care		Hospitals		Nursing and Residential Care Facilities		Individual and Family Services	
	Annual Earnings							
	2010–2011	2014–2015	2010–2011	2014–2015	2010–2011	2014–2015	2010–2011	2014–2015
10	10,950	12,015	19,312	18,523	7,510	7,009	7,510	5,807
20	21,458	20,192	30,041	28,836	15,771	15,019	13,411	12,620
50	41,612	40,385	54,752	55,529	30,661	30,038	34,332	30,289
90	128,747	130,164	120,454	126,202	67,892	70,673	66,797	72,091
	Ratio of Earnings							
	2010–2011	2014–2015	2010–2011	2014–2015	2010–2011	2014–2015	2010–2011	2014–2015
90/10	11.8	10.8	6.2	6.8	9.0	10.1	8.9	12.4
90/20	6.0	6.4	4.0	4.4	4.3	4.7	5.0	5.7
90/50	3.1	3.2	2.2	2.3	2.2	2.4	1.9	2.4

Source: 2010, 2011, 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

Figure 4.25. Ratio of annual earnings at different points along the earnings distribution, health care subsectors and non-health care sectors, 2014–2015 averages



Source: 2014 and 2015 American Community Survey Public Use Microdata Sample (PUMS) data files, tabulations by Center for Labor Markets and Policy, Drexel University

aides and personal care aides. These shifts have led to an increase in the inequality of the earnings distribution in health care.

The distribution of earnings in Table 4.34 provides clearer insight. The percentiles indicate the percentage of workers who earn the corresponding income or less, examining the 10th, 20th, 50th, 80th, and 90th percentiles along the earnings distribution in 2010–2011 and 2014–2015. For example, the 10th percentile shows that 10% of health care workers earned less than $11,515 per year in 2014–2015.

The mean annual earnings of health care workers declined at the 10th, 20th, 50th, and 80th percentiles but increased at the 90th percentile. Health care workers at the 10th percentile and 20th percentile saw their earnings decline, respectively, by 2.4% and 6%. Health care workers at the 50th percentile (median), saw their earnings decline by nearly 3%, while workers at the 80th percentile suffered an earnings loss of 0.5%. At the 90th percentile, only 10% of the health care workforce earned more, as earnings rose by 1.4%.

These trends reveal an increase in health care earnings inequality. Earnings in non-health care industries followed a similar trend, declining at the bottom and rising at the top of the earnings distribution.

Table 4.35 presents the ratio of earnings at different levels of the earnings distribution for health care and non-health care workers in 2010–2011 and 2014–2015, which can help us to measure the level and change in earnings inequality. As with the percentiles in Table 4.34, here we see an increase in earnings inequality over time for both health care and non-health care.

- For health care workers, the annual earnings at the 90th percentile were 9.6 times higher than the annual earnings of workers at the 10th percentile in 2014–2015, up from 9.3 times higher in 2010–2011. Put another way, for every $1 earned by a worker at the 10th percentile, a worker at the 90th percentile earned $9.60.
- The 90th- to 20th-percentile annual earnings ratio increased from 5.1 in 2010–2011 to 5.5 in 2014–2015.
- The 90th percentile earnings were also 2.7 times higher than median earnings (50th percentile) in 2014–2015, an increase from 2.6 times higher in 2010–2011.
- Annual earnings gaps were also sizable relative to the 80th percentile, where earnings were 7 times higher than the 10th percentile, 4 times higher than the 20th percentile, and 1.9 times higher than median earnings.
- The ratio of annual earnings in health care at the 80th percentile relative to the 10th and 20th percentile increased between 2010–2011 and 2014–2015, indicating an increase in earnings inequality.

While earnings inequality in health care was quite high and had increased between 2010–2011 and 2014–2015, it was still considerably lower than the earnings inequality in the state's non-health care sectors. Here, the 90/10 ratio of earnings was 17.9 in 2014–2015, up from 17.2 in 2010–2011. The annual earnings ratio in the non-health care industries of the state was higher than in the health care sector at every level of the earnings distribution in 2014–2015.

Although the state's health care sector continues to have much less inequality in its earnings distribution than non-health care sectors, earnings inequality in health care did get worse between 2010–2011 and 2014–2015. Part of this change is attributable to the shift in services (away from hospitals and ambulatory care and toward residential care, outpatient care, and home care), the corresponding shift toward lower-wage occupations, and the suppression of wages at the bottom of the earnings distribution.

Earnings inequality rose in all four health care subsectors:

- In individual and family services, the 90/10 ratio of annual earnings rose sharply, 12.4 times higher—up from 8.9 times higher in 2010–2011.
- In the nursing and residential care, the 90/10 annual earnings ratio also increased (9.0 to 10.1).
- The hospital subsector's 90/10 ratio increased (6.2 to 6.8) as well.
- This was not the case in ambulatory care, however, which saw increases both at the 90th percentile and the 10th percentile; the net effect was a decline in the 90/10 annual earnings ratio from 11.8 in 2010–2011 to 10.8 in 2014–2015.

The ratios of annual earnings at the 90th percentile relative to the earnings at the 20th percentile and the 50th percentile (median) increased among workers across all four subsectors.

A comparison of the earnings gaps in each of the four subsectors presented in Figure 4.25 reveals that, in 2014–2015, individual and family services had the largest 90/10 percentile annual earnings ratio; the annual earnings at the 90th percentile ($72,100) was 12.4 times higher than the annual earnings at the 10th percentile ($5,800). The 90/10 ratio was 10.8 in ambulatory care, 10.1 in nursing and residential care facilities, and 6.8 in hospitals. The gap between the 90th and 10th percentile annual earnings in non-health care was larger than that in each health care subsector.

On each of the income distribution measures presented above, earnings inequality in health care and non-health care increased between 2010–2011 and 2014–2015. Within health care, inequality in the distribution of earnings increased in all four subsectors. However, even after increasing over the past four years, the earnings inequality among health care workers was considerably lower than that among non-health care workers.

Summary of Findings

1. Before 2008, led by strong gains in medical/surgical hospitals and residential mental health facilities, inpatient health organizations were the dominant source of new job creation in health care. However, after 2008, the role of inpatient organizations as a source of job growth in health care was greatly diminished. Employment levels in home health care agencies began to increase dramatically in 2008 and employment levels in the services to the elderly and disabled subgroup also continued their extraordinary expansion. The shift of job creation from inpatient to outpatient providers accelerated between 2012 and 2015.

2. Large reductions in the share of job growth in the state's general medical/surgical hospitals after 2008, combined with rapid growth in the share of new jobs created by home health care agencies and providers of care to the elderly and disabled, has resulted in an important change in the nature of work in health care and associated wages. The most important sources of new health care jobs in recent years have been in subgroups paying below-average wages.

3. About 1 in 10 new jobs created in Massachusetts over the next 10 years will be in the low-wage, low-skill occupations of home health aide, PCAs, and community health worker/social service occupations.

4. The practice of regularly hiring RNs at the associate degree level has declined. Slower employment growth in hospitals and substantial employment declines in nursing homes have reduced the demand for RNs relative to the pre-2008 period. In response, many colleges are now offering programs to help nurses with associate degrees earn bachelor's degrees to compete more effectively in the labor market.

5. From 2010–2011 to 2014–2015, the health care workforce in Massachusetts increased from 473,600 to 522,000, an increase of 48,400 or 10%. Although the workforce grew across all race-ethnicity groups, the rates of growth varied widely. The White workforce grew by just 3% or 11,200 workers, while the African American workforce, representing the second largest group in health care, increased by one-third or 16,400 workers. The number of Latino workers increased sharply from 35,000 workers in 2010–2011 to 49,500 in 2015–2016, an increase of 14,500 workers or 41%. The state's Asian workforce grew by 23%, adding about 5,000 workers.

6. Most of the increases in mean annual earnings in health care occurred in high-wage occupations, while workers in low-wage occupations saw a decline in earnings. Furthermore, employment in health care has shifted from hospitals and nursing homes to outpatient care and home care, resulting in increased employment in the lower-wage health care support and service occupations, such as home health aides and personal care aides. These shifts have led to an increase in the inequality of the earnings distribution in health care. While earnings inequality in health care was quite high and had increased between 2010–2011 and 2014–2015, it was still considerably lower than earnings inequality across the state's non-health care sectors.

Conclusion

The research on workforce trends, as well as the authors' experience with the training undertaken through Health Care Workforce Transformation Fund grants, show that the health care industry is in the process of transforming care delivery systems and shifting focus from inpatient to outpatient settings. From a workforce perspective, this transformation includes training the existing workforce to continuously improve systems, upgrading staff in positions that are being re-designed and deployed differently, and raising the requirements for skills and credentials in positions like nursing.

Like many other industries, the health care job market has experienced job polarization–growth in highly skilled jobs that require a bachelor's degree or higher and in low-skilled jobs that require little or no certification. Looking at educational attainment trends, the most significant growth has been among workers with a bachelor's degree or higher. Nursing is perhaps the best example of this trend, as providers are increasingly pushing associate's degree nurses to earn their bachelor's degree and as entry-level hiring has shifted to a strong preference for bachelor's degrees. As a result, the number and share of BSNs has increased.

The health care workforce is predominantly female. African Americans and Latinos make up a larger share of the workforce in health care than in non-health care industries. This means that changes affecting the health care industry in the state will have a disproportionate effect on these groups of workers.

There have been declines among workers with less than a high school diploma and an associate's degree and less than average growth among workers with a high school diploma and some college but no degree. There are a number of policy implications associated with this trend. First, postsecondary institutions need to understand the changing hiring requirements for health care jobs. Second, the decreasing number of middle-skill jobs makes it more challenging to find jobs that pay average or above average wages while not requiring a bachelor's degree. This trend also creates more challenges in designing upward mobility pathways for low-skill workers.

Health care providers are redesigning delivery systems to allow workers to work at the top of their licenses and to increase efficiencies and quality. Health care providers are training their workforce to look for continuous improvement opportunities and to increasingly work in teams. This has led to a re-examination of how certain positions are being used in the health care setting. Medical assistants, for example, are being used to manage the flow of patient care and follow up with patients to increase adherence to treatment regimens. Community health workers are being used to extend patient care into the homes and communities of patients with a goal of managing care in the community setting. Health care providers are experimenting with deploying their employees in both of these job titles and as a result, the necessary skills, knowledge, and behaviors are shifting. Postsecondary institutions will need to follow these shifts closely to ensure that they are preparing individuals to meet the hiring requirements of providers.

Home health aides and personal care assistants are two direct care positions that are rapidly growing. These caregivers are being deployed to keep elderly and disabled people out of inpatient institutions and in their homes. Wages for home health aides and personal care assistants have not grown since 2004. These positions, along with certified nursing assistants, require similar knowledge, skills, abilities, and behaviors and very little or no certification. The positions are highly substitutable and increasingly compete for workers with other low-skilled jobs that require similar knowledge, skills, abilities, and behaviors. Workers in these occupations will shift positions and employers for small increases in compensation. Employers of home health aides and personal care assistants face challenges in filling jobs that will likely increase in the foreseeable future. Third-party reimbursement rates have constrained the ability of agencies to respond to this supply challenge by raising wages. As the minimum wage has increased, this challenge has become more acute.

Given the constraint on wages, one way of attracting employees to direct care work is to provide upward mobility opportunities for entry-level workers. There is some evidence, for example, that licensed practical nurses or vocational nurses are once again in demand. The challenges to providing these opportunities include funds to pay for education and certification, time available for training workers who may be working multiple jobs, and basic skills deficits. Designing pathways, developing innovative educational delivery systems, and subsidizing the costs of training may be worth pursuing to determine if upward mobility pathways result in increased interest in entry-level jobs and improved wages and working conditions for workers in the industry.

Endnotes

1 Paul Harrington and Neeta Fogg, *Healthcare Employment Expansion in the Context of Long Term Economic Turbulence: The Massachusetts Experience,* Center for Labor Markets and Policy, Drexel University, Philadelphia, October, 2011.

2 This 2016 annual average employment data is estimated by using nine months of actual employment data plus an estimate of employment for the fourth quarter in 2016. This fourth quarter estimate uses relevant Current Employment Statistics historical survey data for those time periods in Massachusetts to produce an average employment measure.

3 Payroll employment is a measure of the number of people who are paid as employees by non-farm business establishments and units of government. Hereafter, the word employment refers to these workers.

4 For a detailed discussion of the changing role of "at home" patient care services, see: *Special Topics Report: Selected Health Care Support and Direct Care Occupations in Massachusetts*, prepared by Commonwealth Corporation and the Center for Labor Markets and Policy, Drexel University for the Commonwealth of Massachusetts Office of the State Auditor, September 2016.

5 For a discussion on defining the health care sector, see: *Health Care Employment, Structure, and Trends in Massachusetts*, Chapter 224 Baseline Study, Prepared by Commonwealth Corporation and the Center for Labor Markets and Policy, Drexel University, July 2014.

6 We examine the supply responses by the state's colleges and universities in a subsequent section of this chapter.

7 Recent demonstrations by disability rights activists in Massachusetts highlight the close connection between services to the elderly and disabled and other parts of the health care system, particularly nursing homes: "Disabled Community Protests New Personal Care Attendant Mandates, *New England Cable News Network,* November 2, 2016.

8 For a description of the MassHealth Personal Care Attendant Program, see: The Personal Care Attendant Quality Home Care Workforce Council. (n.d.). *2014 Performance Review Report to the Governor and the General Court.* Retrieved from http://www.mass.gov/pca/docs/annual-review-report-2014.pdf

9 These workers were excluded from all aggregate industry employment measures, health and social assistance sector employment measures, individual and family services employment measures, and services to the elderly and disabled employment counts until January 2013. At that time all measures were revised upward to reflect the addition of these PCA positions, causing sizable changes in employment levels. For a detailed discussion of the revisions, see U.S. Bureau of Labor Statistics. (n.d.) *CES-National Benchmark Article: BLS Establishment Survey National Estimates Revised to Incorporate March 2013 Benchmarks*.

10 It is only possible to make this adjustment at the statewide level. No reliable sub-state adjustment is possible.

11 For an examination of changes in the nature of work in the state's health care delivery system, see: *Special Topics Report*, September 2016, ibid.

12 See: *Special Topics Report*, September 2016, ibid.

13 The reverse process can result in large labor surpluses as demand in a high-skill occupation falls but completions in the related field of study continue to rise as students complete their course of study. For a discussion of this cobweb effect, see: Harrington, P., & Knoll, L. (2014). Labor market imbalances in the computer science field of study: the dot.com boom and bust in U.S. computer science labor markets. Special Report. Office of the Provost, Drexel University.

14 Massachusetts does not conduct a systematic job opening and labor turnover study.

15 *Special Topics Report*, September 2016, op. cit.

16 Employers we interviewed thought the incidence of participation in public assistance programs among their direct care workers was substantially higher than the levels we found in our analysis. We discuss more about why our estimate is likely conservative in: *Special Topics Report*, September 2016, ibid.

17 Alexander, G.D. (2013, February). Statement of Gary D. Alexander, Secretary of Public Welfare, Commonwealth of Pennsylvania before the Senate Budget Committee, United States Senate.

18 As we observed in a prior section, very small shares of workers employed in these occupations receive public assistance payments in cash. Most of their benefits are in the form of in-kind subsidies, which, unlike cash assistance, have very restricted uses.

19 Burtless, G. (2015, July). Does the government subsidize low-wage employers? Brookings Institution, Real Clear Markets.

20 Beginning in fall 2016, MassHealth began phasing in an overtime management policy for personal care attendants. The policy caps the number of hours an individual PCA can work to 40 hours per week or, with some exceptions, to 60 hours per week. Clients requiring more hours will need to utilize more than one PCA. For more information, see http://www.mass.gov/eohhs/consumer/insurance/masshealth-member-info/pca

21 For more information about the data used in this section, see Appendix A: American Community Survey Public Use Microdata Files in "Characteristics of Workers and Jobs in the Massachusetts Health Care Industry," Chapter 224 Workforce Impact Study, Prepared by Commonwealth Corporation and Center for Labor Markets and Policy for the Commonwealth of MA Office of the State Auditor, December 2016.

22 Foreign-born individuals include those who were born outside the U.S. or in one of its outlying areas. The foreign-born population includes legally permanent residents, refugees, temporary residents such as students or workers with temporary visas, and undocumented workers. The American Community Survey identifies foreign-born individuals but does not identify their visa status or whether they are undocumented.

23 For a detailed discussion of the skill requirements in these direct care occupations in the health care sector, see *Special Topics Report*, September 2016, ibid.

24 *Special Topics Report*, September 2016, ibid.

25 Ibid.

26 Beginning in 2008, the Census Bureau changed the format for reporting annual weeks of employment in the American Community Survey Public Use Microdata Sample data files. Data on annual weeks of employment that were provided in a continuous format prior to the 2008 ACS are now (in the 2008 ACS PUMS and after) provided in a range format using the following ranges: 50 to 52 weeks, 48 to 49 weeks, 40 to 47 weeks, 27 to 39 weeks, 14 to 26 weeks, and less than 14 weeks. So, if a respondent was employed for 20 weeks during a given year, ACS PUMS data files prior to 2008 would report annual weeks for this respondent as 20 weeks, whereas ACS PUMS data files for 2008 and thereafter would report this as a range (14 to 26 weeks). For 2010–2011 and 2014–2015 ACS data, we used the linear interpolation method to compute annual weeks of work for each respondent by using the midpoint estimates of each range of annual weeks to represent the annual weeks of work. For example, for the range 14–26 weeks, we use the midpoint of 20 for annual weeks of work to calculate annual hours of employment for respondents that fall into this range. These midpoint estimates were used along with weekly hours to estimate annual hours of employment.

27 *Special Topics Report*, September 2016, ibid.

CHAPTER 5

Public Health: Reducing Preventable Health Conditions, Improving Employee Wellness, and Reducing Racial/Ethnic Health Disparities

Section 5.i:
Introduction

This chapter examines the impact of Chapter 224 on public health in the Commonwealth. State governments are responsible for establishing public health programs, monitoring the spread of infectious disease, and providing health information to residents; these investments help create conditions in which all residents can maintain good health.

The Massachusetts legislature charged the Office of the State Auditor (OSA) with analyzing the effects of Chapter 224 on public health, including the prevalence of preventable health conditions and employee wellness (which are focal points of the law), along with racial/ethnic health disparities (which are not).

- Section 5.1 explores **preventable health conditions** via longitudinal statistical measures regarding chronic disease, prevention, and screening. Topics include the prevalence of infectious disease and chronic conditions, key lifestyle risk factors, and screening and mortality for several cancers.

- Section 5.2 reviews **two of the law's initiatives to extend care into the community and to improve wellness programs** (including programs administered by employers) via data provided by the Massachusetts Department of Public Health (DPH). The initiatives are as follows:
  - The **Prevention and Wellness Trust Fund** has provided awards to nine grantee partnerships across the Commonwealth that are working to reduce preventable health conditions, increase healthy behaviors, and/or address health disparities. The fund has also supported employers in their adoption of workplace-based wellness programs.[1]
  - The **Massachusetts Wellness Tax Credit Incentive** offers a tax credit[2] to firms with 200 or fewer employees that implement a certified wellness program.[3]

- Section 5.3 presents a comprehensive analysis of **racial/ethnic disparities**. It contains longitudinal statistics regarding health engagement and outcomes related to the following topics: access to care, key risk factors, infant health, cancer screening and mortality, infectious diseases, and chronic conditions.

A NOTE ABOUT THE DATA

OSA used both quantitative and qualitative components to conduct its longitudinal analysis.

Quantitative data sources include:

- MassHealth (the Commonwealth's Medicaid program)
- Commercial/private insurance claims from the Massachusetts All Payer Claims Database (APCD)[4]
- DPH, including the Behavioral Risk Factor Surveillance System (BRFSS),[5] an annual health survey that collects self-reported data on health conditions and risk factors
- Mortality data from the Centers for Disease Control and Prevention (CDC)
- An algorithm from the RAND Corporation that allowed OSA to impute population-level race/ethnicity from APCD data. OSA obtained this algorithm with financial assistance from the Center for Health Information and Analysis.

Qualitative data are presented through quotes drawn from in-depth, semi-structured interviews that OSA conducted with public health policymakers, advocates, and other stakeholders.

Section 5.1:
Reducing Preventable Health Conditions

This section contains statistical measures regarding:

- Cancer screening
- Cancer mortality
- Prevention and morbidity/mortality from conditions other than cancer, including:
  - Infectious disease (including HIV/AIDS and hepatitis C)
  - Chronic conditions (including overweight/obesity and diabetes)
  - Stroke prevalence and falls among older adults

The section also addresses key lifestyle risk factors, including cholesterol, blood pressure, and access to dental care.

A NOTE ABOUT THE DATA

Data sources in this section include MassHealth and commercial/private insurance claims from the APCD. Results for the MassHealth and commercial/private populations are representative of their cohorts only and not of the entire population.

Interpretation of two measures—screenings for cervical cancer and colorectal cancer—should be viewed with particular caution. Data sources for these measures required a look back at claims preceding 2011 (from APCD 5.0). Due to the lack of retrospective data points, commercial population rates are underestimated, and odds ratios and prevalence figures may not reflect increases.

Other data sources include:

- The BRFSS.[1] Some data are presented as they appear in the BRFSS report, while OSA performed statistical analysis to present other data.
- Infectious disease surveillance reports published by DPH (e.g., hepatitis C, measure 5.1.7).
- CDC mortality data on heart disease and stroke.

INTRODUCTION

Chronic disease—including heart disease, cancer, and diabetes—is responsible for seven of every 10 deaths in the U.S.[2] and is often preventable. Major contributors to these diseases are lack of exercise, poor nutrition, tobacco use, and alcohol overconsumption,[3] as well as uncontrolled high blood pressure (HBP), uncontrolled high LDL cholesterol, and sodium overconsumption.[4] The large burden of chronic disease, along with other health system[5] and social factors,[6] help explain why the U.S. ranks 34th in the world in life expectancy, behind many other industrialized nations.[7]

The extension of access to health insurance, while important, has been insufficient to reduce the prevalence of chronic disease.[8,9] Americans use preventive care services at about half the recommended rate. Avoiding and managing preventable conditions is a major challenge for all health care stakeholders: Patients must navigate among health care institutions better suited for treating disease than preventing it. Insurance companies must determine which kinds of preventive care patients should receive and how to ensure they obtain it. Governments must make room for increased spending on health programs already strained by increases in chronic conditions. And providers must keep tabs on changes to practice guidelines, payment structures, paperwork, and recommended interventions.

"There is an academic literature now growing that evidences that if you can spend more on [primary care and prevention], there's overall system savings because we end up using less specialty and hospital care."

— DR. PAUL HATTIS, TUFTS UNIVERSITY SCHOOL OF MEDICINE

Improving access to preventive care is a major focus of Chapter 224. First, the law created the Prevention and Wellness Trust Fund—explained in Chapter 5.3—to provide grants for prevention-focused programming.[10] Second, the law encourages the adoption of alternative payment methodologies, which give providers incentives to invest in preventive care.[11] Third, in an effort to expand availability of primary care, Chapter 224 invests in primary care provider training and loosens scope-of-practice regulations for physician assistants and nurse practitioners.[12]

Increased health spending threatens to "crowd out" government investment in social service spending that advances population health. Analyzing data from 2000 to 2009, Bradley, et al., found that states with a higher ratio of social service spending to health spending[13] had significantly better outcomes on seven crucial measures: adult obesity; asthma; days with activity limitations; mentally unhealthy days; and mortality rates for heart attack, lung cancer, and type 2 diabetes.[14] These results highlight the importance of the social determinants of health.[15] Massachusetts, however, spent a smaller share of its GDP on social services and a larger share on health spending than most other states, according to the Bradley analysis. (The analysis did not account for premium subsidies provided through the Massachusetts Health Connector).[16]

Figure 5.1.1 shows select leading causes of death in Massachusetts,[17] many of which can be influenced through prevention activities. Cancer is the leading cause, but this is not reflected because the OSA analyzed only deaths attributable to certain cancers. (See Note 1 following Figure 5.1.1.) Heart disease is the other major leading cause of death, followed by injuries, stroke, and influenza/pneumonia.

"You need to create the incentive through [patients'] future premiums to be a better consumer and to get healthier."

— JON HURST, PRESIDENT, RETAILERS ASSOCIATION OF MASSACHUSETTS

Cancer Screening

BREAST CANCER SCREENING

Background

Nationally, breast cancer is the most common cancer in women.[18] In Massachusetts, breast cancer is the second-leading cause of cancer-related death.[19] The Commonwealth had a higher incidence of breast cancer—137.2 cases per 100,000 women—than the U.S. (123.7 cases per 100,000) in 2013.[20] This high incidence may be due to rigorous screening resulting in greater detection of early-stage cases, rather than a significantly higher rate of breast cancer.

Indeed, early detection of breast cancer is essential to treatment, and a combination of regular clinical breast exams and annual mammography are the best methods. The American Cancer Society recommends that women receive an annual mammogram beginning at age 40.[21]

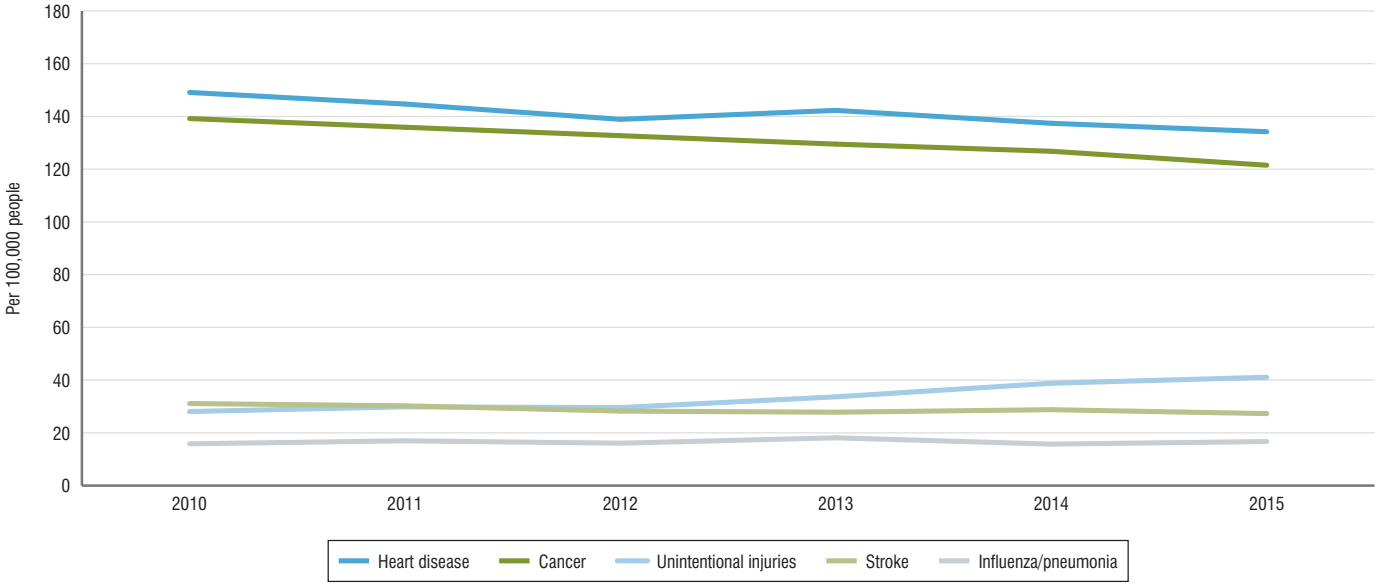
Since 2006, Massachusetts has mandated that annual mammography screenings be provided with no copayment to women aged 40 and older. Women aged 35 to 39 are also entitled to one mammogram with no copayment.[22] Massachusetts primary care providers consistently exceeded the national 90th percentile on recommended screenings for breast cancer.[23]

Massachusetts trend, 2012–2015

Figure 5.1.2 presents the percentage of women aged 35 to 39 and 40 and older in Massachusetts who say they had a mammogram and a clinical breast exam in the past two years. In 2014, 82.1% of women aged 40 and older had a mammogram and 83.6% had a clinical breast exam in the past two years, significantly less than in 2012.

Figure 5.1.3 shows the 2015 percentage of women aged 50 to 74 with commercial insurance who had a mammogram in the past 27 months (87.6%) versus those with MassHealth coverage (62.2%). Women of both insurance types were more likely to have had a mammogram in the past 27 months in

Figure 5.1.1. Leading causes of death in Massachusetts



Note 1: Includes cancer of the bladder, brain, breast (females only), bronchus, colon, cervix (females only), esophagus, kidney, lung, ovary (females only), pancreas, prostate (males only), skin, stomach, trachea, and uterus (females only); also includes Hodgkin's and non-Hodgkin's lymphoma, leukemia, and multiple myeloma.
Note 2: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

2015 than in 2012; women with commercial insurance were 54% more likely, whereas those with MassHealth coverage were 18% more likely.

Between 2012 and 2015, women with commercial insurance were significantly more likely than women with MassHealth to have had a mammogram in the past 27 months (average rate over the 4-year period: 86.0% commercial; 58.3% MassHealth). The gap between these two groups did not change significantly from 2012 to 2015.

CERVICAL CANCER SCREENING

Background

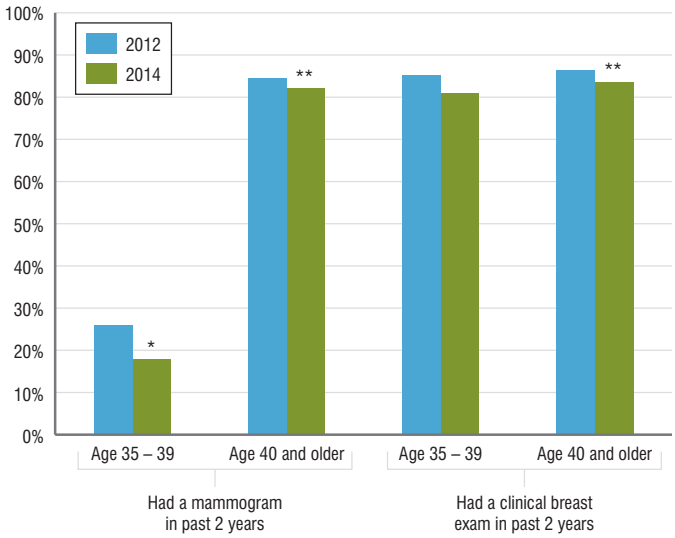
The U.S. Preventive Services Task Force (USPSTF) recommends that women aged 21 to 65 receive a Pap smear to screen for cervical cancer every three years.[25] While 4,210 women died of cervical cancer in the U.S. in 2010, the death rate has decreased due to widespread screening.[26] Access to screening has been aided by the Patient Protection and Affordable Care Act (ACA), which eliminated patient cost-sharing for evidence-based prevention visits.[27]

Massachusetts trend, 2012–2015

Figure 5.1.4 shows the share of adult women who reported having a Pap smear in the past three years. In 2014, Pap smear rates were highest among women aged 25 to 34 (89.1%), 35 to 44 (89.9%), and 45 to 54 (88.7%), suggesting that USPSTF's recommendation is being heeded. However, the share of women aged 18 to 24 and 65 or older who received a Pap smear in the past three years significantly declined in 2014, compared to 2012.

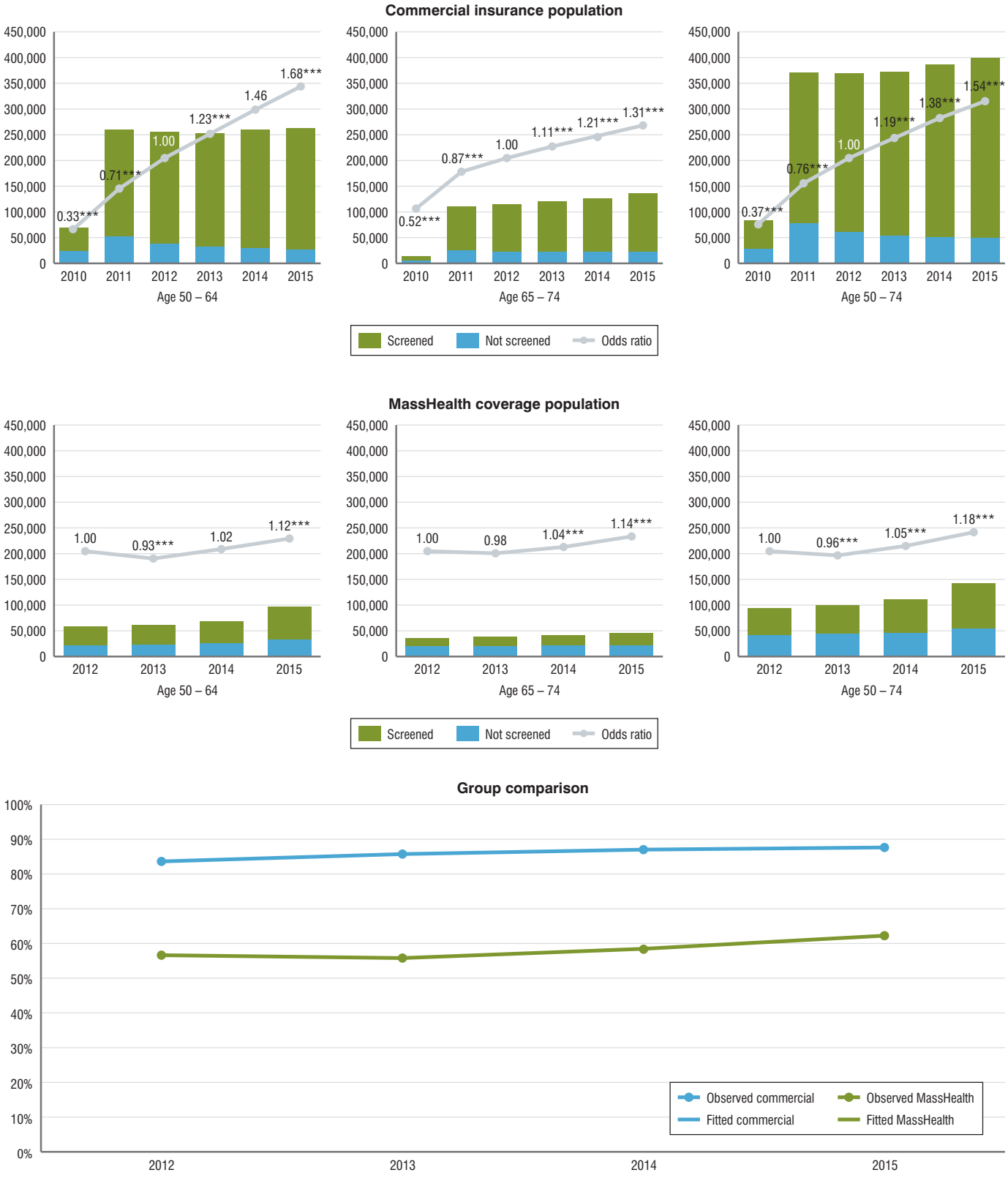
As displayed in Figure 5.1.5, in 2015, 80.3% of women (aged 21 to 64) with

Figure 5.1.2. Breast cancer screening in the past two years



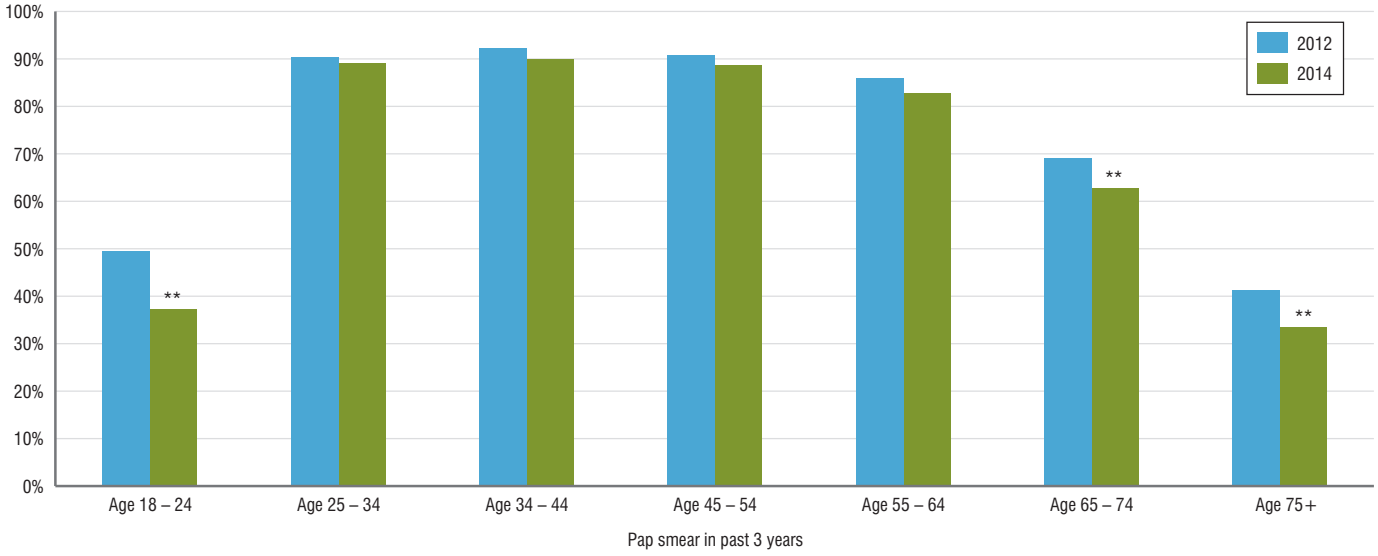
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of Behavioral Risk Factor Surveillance System (BRFSS) data provided by DPH.

Figure 5.1.3. Received a mammogram in past 27 months, aged 50–74 (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: "Observed" points are taken from actual data. The "fitted" line is the trend estimated by a statistical model.
Note 3: Generalized Estimation Equations were used for the longitudinal data from 2012 to 2015. Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth data.

Figure 5.1.4. Pap smear in the past three years (adult women)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

commercial insurance had a recent screening in line with the guidelines,[28] compared with 53.5% of those covered by MassHealth. However, because the 2012 commercial insurance population prevalence was underestimated due to insufficient APCD data, the group comparison and odds ratios should be interpreted cautiously. Women with MassHealth coverage were 5% less likely to meet cervical cancer screening guidelines in 2015 than in 2012.

COLORECTAL CANCER SCREENING

Background

USPSTF recommends screening for colorectal cancer using a high-sensitivity fecal occult blood test (FOBT), a sigmoidoscopy, or a colonoscopy for patients aged 50 to 75.[30] In 2010, the national screening rate was 64.5%.[31] However, overuse of colonoscopy is a documented phenomenon and a public health concern, since it can result in overexposure to potential harms and fewer available appointments for patients with an evidence-based need for testing.[32]

Massachusetts PCPs have consistently exceeded the national 90th percentile on recommended screenings for colorectal cancer.[33] Practices may be able to increase screening by emulating the approach of Mount Auburn Medical Associates in Watertown, which has a 93% screening rate among its panel. The practice used its database to determine which of its patients aged 50 to 80 had not received recommended screening, aggressively reached out to those who needed it, and facilitated appointments.[34]

MASSACHUSETTS TREND, 2010–2015

Figure 5.1.6 presents the percentage of adults over 50 who had a colonoscopy in the past five years or a FOBT in the past two years. The share of adults receiving a colonoscopy or FOBT declined after 2011. In 2014, 58.8% of adults received colonoscopy in the past five years and 13.8% received a FOBT in the past two years.

Figure 5.1.7 shows the percentage of members aged 50 to 75 who had FOBT in the past year, flexible sigmoidoscopy in the past five years, or colonoscopy in the past 10 years. Screening rates from 2010 to 2015 were underestimated due to insufficient APCD and MassHealth data, so the group comparison and odds ratios should be interpreted cautiously.

PROSTATE CANCER SCREENING

Background

Prostate cancer is the second leading cause of male cancer deaths in Massachusetts. Risk can be managed through the control of lifestyle factors and the early detection of abnormalities.[36] Older age, family history, being African American, and obesity are all risk factors.[37] Compared to other cancers, prostate cancer has low mortality with a 98.9% five-year relative survival rate.[38] In 2013, Massachusetts' prostate cancer incidence rate was lower than the U.S. rate.[39]

One common screening method is the prostate-specific antigen (PSA) blood test.[40] The USPSTF does not generally recommend PSA screening for men aged 50 to 69, and recommends against it for men aged 70 and older, due to serious potential harms, such as overdiagnosis, overtreatment, and treatment complications.[41] Moreover, actors within Massachusetts are leading efforts to develop effective imaging tools for early detection.[42]

Massachusetts trend, 2011–2014

Figure 5.1.8 presents the percentage of men aged 50 and older who had a PSA test in the past year: 40.0% in 2014, marking a decline from 2011.

Figure 5.1.5. Cervical cancer screening, women aged 21–64 (commercial, MassHealth, and group comparison)

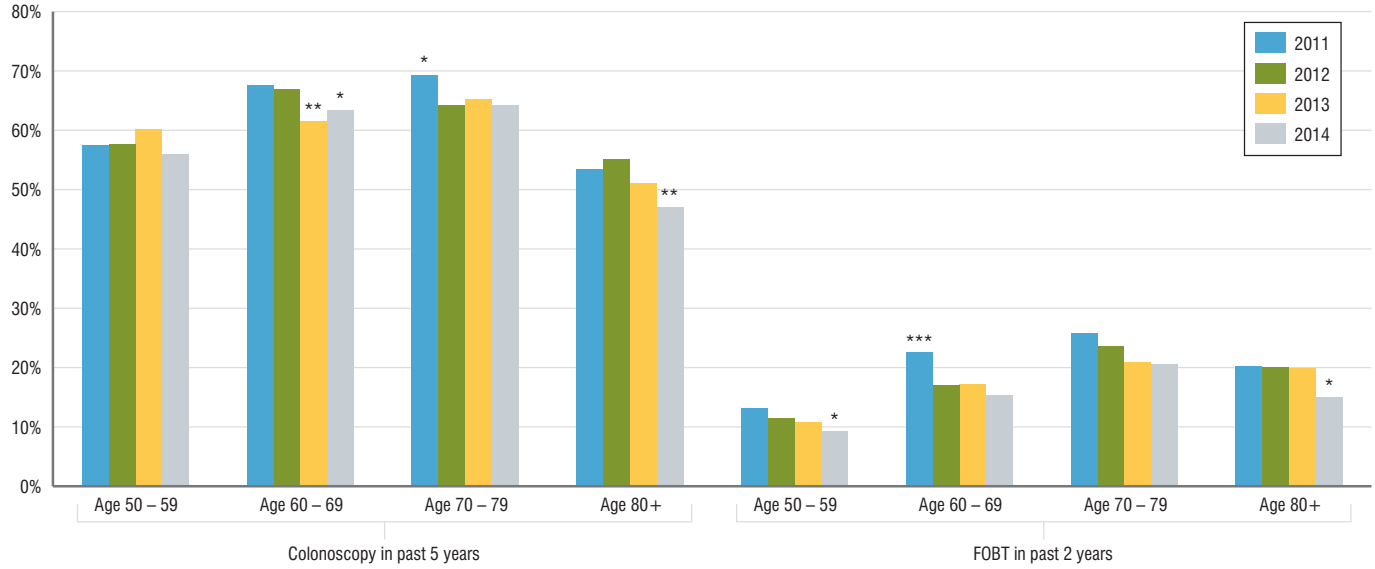
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2012 to 2015. Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth data.

Cancer Mortality

In 2014, the U.S. cancer death rate reached its lowest level since 1991.[43] Still, cancer is the leading cause of death in 22 states, including Massachusetts, due in part to the significant national decrease in heart disease, the previous leading cause of death. However, incidence and death rates are increasing for some kinds of cancer. From 1991 to 2014, the U.S. cancer mortality rate declined 31% among men and 21% among women; overall incidence and mortality rates are still higher among men.[44]

Though improvements in some lifestyle factors and advances in treatment have helped reduce cancer mortality, there are countervailing factors. For example, cancer drugs are among the highest-cost pharmaceuticals (per use), and expanded cost-sharing has increased the financial burden on patients, including the insured, who in some cases forgo necessary care.[45] Additionally, increases in sedentary lifestyle and obesity—along with smoking rates that remain high in certain subpopulations—stress the need

Figure 5.1.6. In line with colon screening guidelines, aged 50 and older



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

to continue to manage lifestyle factors that drive cancer risk.

The Commonwealth's 2012–2016 Comprehensive Cancer Prevention and Control Plan features objectives on prevention, advocacy and community engagement, and early detection and screening, among other topic areas.[46] Objectives include: reducing smoking by adults insured through MassHealth, pregnant adults, and children; increasing use of hospice care for patients at the end of life; increasing enrollment in clinical trials; and increasing various screening rates.[47]

Figure 5.1.9 presents the death rates of some of the most prevalent cancers in Massachusetts. Among these, lung cancer[48] had the highest mortality rate, and cervical cancer had the lowest.

BREAST CANCER MORTALITY

Background

Breast cancer is the most common cancer among U.S. women.[49] Though it is many times more common in women, breast cancer can also affect men.[50] About one in eight women will be diagnosed with breast cancer at some point in their lifetime.[51]

More treatment options are available when the cancer is discovered at the localized (stage 1) phase, before it can spread to other parts of the body.[52] Nationally, the five-year relative survival rate[53] for localized breast cancer is 98.8%, and 61.4% of breast cancers are diagnosed at this stage.[54]

Though Massachusetts has one of the highest breast cancer rates in the U.S. (due in part to widespread screening), the Commonwealth has the sixth-lowest breast cancer death rate.[55] Still, the cancer is the second-leading cause of cancer death among Massachusetts women.[56]

Massachusetts trend, 2010–2015

Figure 5.1.10 demonstrates there was no significant change in the breast cancer death rate from 2010 to 2015 .

CERVICAL CANCER MORTALITY

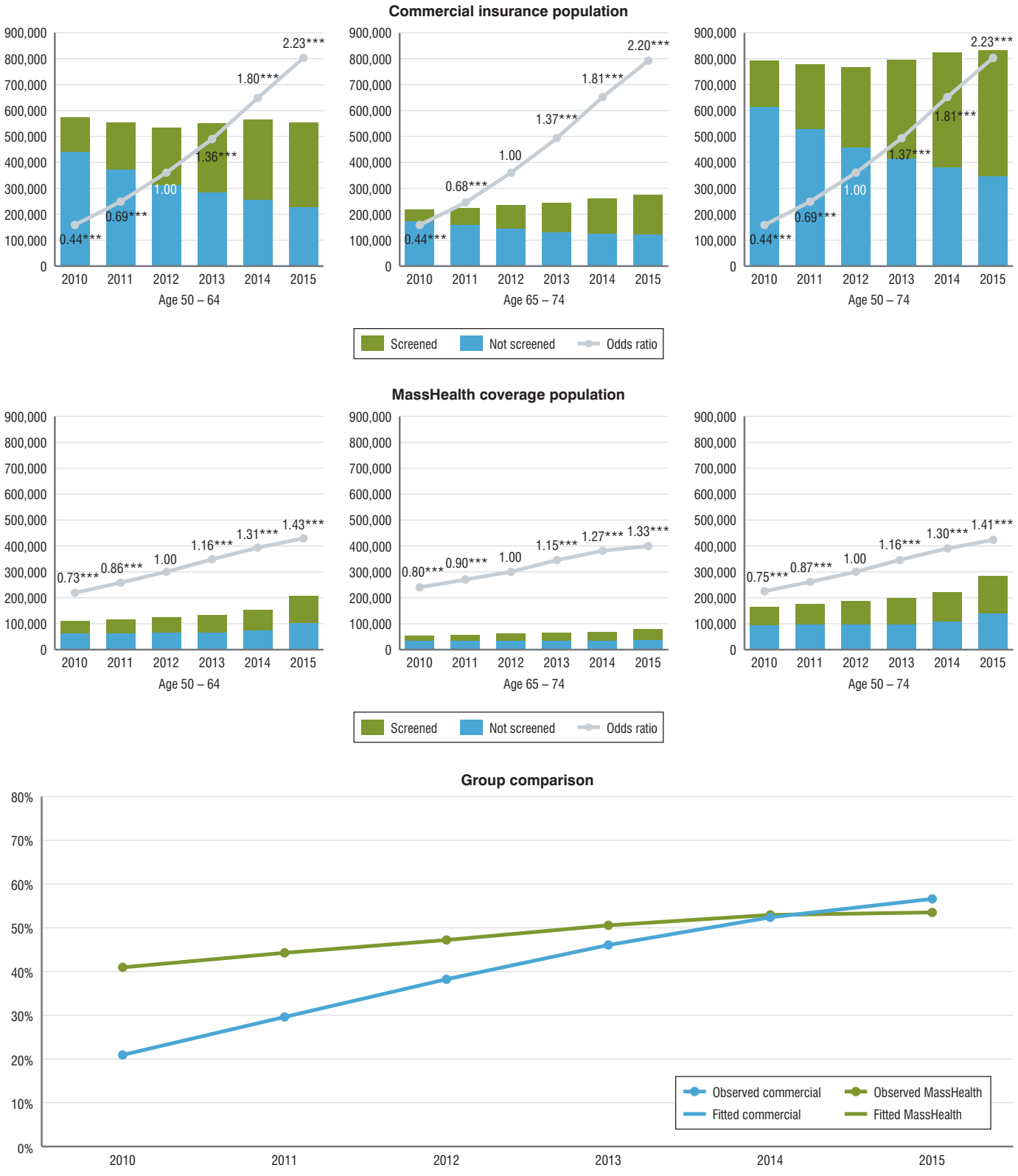
Background

Cervical cancer rates and related deaths have fallen among all races/ethnicities since 1999.[57] The cancer occurs only in women. Once one of the most prevalent cancers, cervical cancer now ranks 21st in frequency in the U.S.[58] Massachusetts has the fourth-lowest cervical cancer rate and the lowest death rate in the country.[59] It is important to note that traditional cervical cancer death rates may be underestimates due to the statistical practice of retaining women who have had radical hysterectomies in the population-at-risk denominator.[60]

About 0.6% of women will be diagnosed with cervical cancer in their lifetime, and the median age of diagnosis is 49.[61] This cancer has a relatively low death rate.[62] Precancerous lesions found by Pap smears can be treated before they develop into cancer. About 46% of patients are diagnosed with cancer in the localized (stage 1) phase, when the relative survival rate is 91.3% after five years.[63]

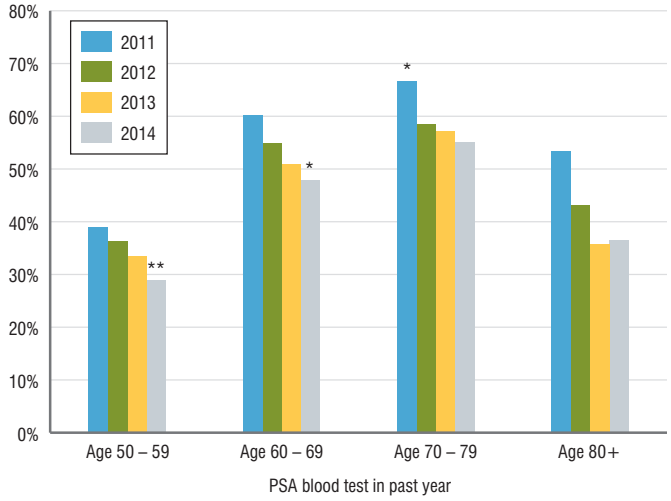
A randomized, controlled trial found that supplementing a chemotherapy regiment with bevacizumab, a drug that slows the growth of new blood vessels, is associated with increased overall survival and response to chemotherapy.[64] The human papillomavirus (HPV) vaccine also has contributed to the reduction in cervical cancer deaths. HPV is the most common STI in the U.S.,[65] and the vaccine covers specific types of HPV responsible for about 73% of associated cancers.[66] In January, representatives of all 69 National Cancer Institute-designated cancer centers endorsed new guidelines recommending giving 11-to-14-year olds two shots at least six months apart.[67]

Figure 5.1.7. Received appropriate colorectal cancer screening, aged 50–75 (commercial, MassHealth, and group comparison)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Generalized Estimation Equations were used for the longitudinal data from 2010 to 2015. Chow test was used for group comparison.
Source: OSA analysis of APCD and MassHealth data.

Figure 5.1.8. PSA blood test in the past year (aged 50 and older)



Note 1: Statistically significant difference from 2012: *$p < .05$, **$p < .01$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Massachusetts trend, 2010–2015

As shown in Figure 5.1.11, there was no significant change from 2010 to 2015 in the cervical cancer death rate.

COLORECTAL CANCER MORTALITY

Background

Colorectal cancer (CRC) is cancer that begins in the colon or rectum. Nationwide, men are at slightly greater risk than women.[68] CRC is the third-most common cancer in Massachusetts,[69] which has the country's 19th-lowest CRC rate and the ninth-lowest death rate.[70]

Nationally, patients diagnosed with CRC have a five-year relative survival rate of 65.1%.[71] About 4.4% of men and women will be diagnosed with CRC in their lifetime. Of the 39% of people with CRC who are diagnosed when the cancer is localized, the relative survival rate is 90.1% after five years. Colonoscopy screening increases the chances of early detection and reduces the risk of death.[72]

About 65% of CRC risk is attributed to the following lifestyle and environmental factors: obesity; a diet high in fat, calories, or red meat; tobacco or alcohol use; and low exposure to calcium, fish oils, vitamin D, or selenium.[73] Among women with CRC, moderated alcohol intake and low intake of sugar-sweetened beverages may be associated with improved odds of survival.[74]

Massachusetts trend, 2010–2015

As shown in Figure 5.1.12, there was no significant difference in deaths from CRC between men and women and no significant change overall from 2010 to 2015.

LUNG CANCER MORTALITY

Background

Lung and bronchus cancer, which is highly associated with smoking, is the leading cause of cancer death and the second-most common cancer in Massachusetts for males and females.[75] Nationwide, lung cancer risk is higher among men than women.[76] A review of other data shows the following:

- USPSTF recommends an annual CAT scan (CT) to screen for lung cancer in adults aged 55 to 80 who have a history of smoking.[77] The National Lung Screening Trial—which offered free CTs to high-risk patients aged 50 and older who smoked the equivalent of a pack a day for at least 20 years—demonstrated a significant mortality improvement for participants.[78]

- A review of nine trials (with a total of 453,965 participants) by Cochrane Collaboration found that early screening using chest X-ray or sputum testing does not reduce mortality. Additionally, the review found that though CT screening may be useful among those with high risk, it also yields many false positives; therefore, more research is needed to judge the CT's overall utility.[79]

- Among women with early-stage, non-small-cell lung cancer (the only definitive treatment for which is surgery), people with disabilities were significantly less likely than those without to undergo surgery and more likely to die from the disease.[80]

Massachusetts trend, 2010–2015

Figure 5.1.13 presents the lung cancer death rate. Females have significantly lower rates than males, and there was no significant change to the rate from 2010 to 2015.

PROSTATE CANCER MORTALITY

Background

Prostate cancer, which occurs only in males, is the most common cancer among Massachusetts men and the second-leading cause of cancer death.[81] Massachusetts has the country's third-lowest prostate cancer rate and 18th-lowest death rate.[82] Other research findings include:

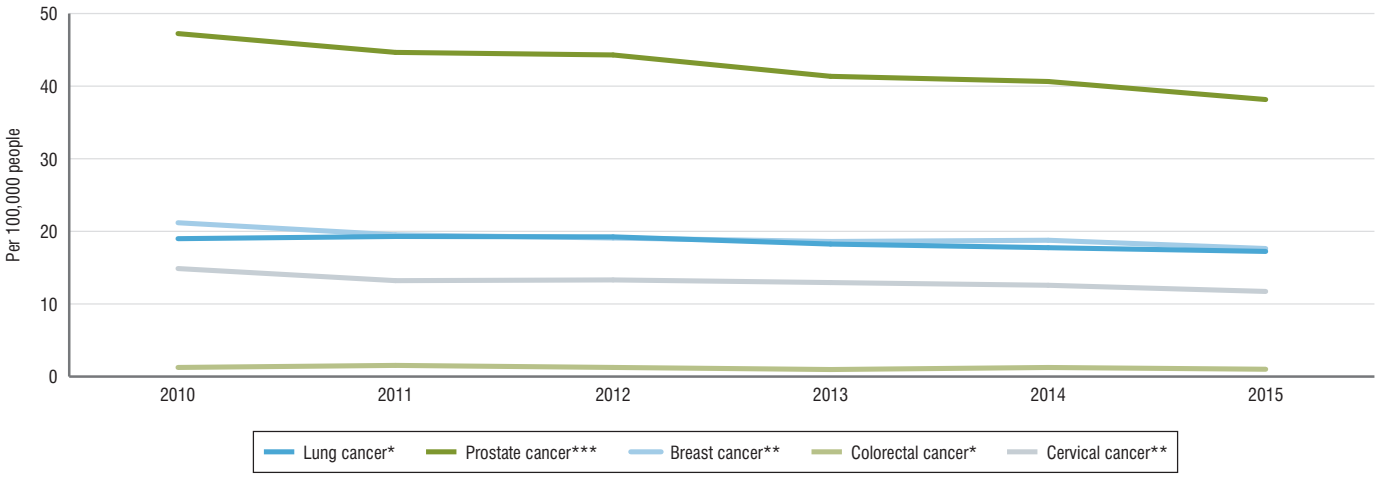
Risk increases with age: the median age of diagnosis is 66.[83] Prostate cancer mortality is relatively low compared to its incidence: among men diagnosed with cancer that is localized (phase 1) or regional (spread to the lymph nodes), relative survival after five years is 100%.[84] Ten years following diagnosis, outcomes still are relatively positive and equal among various treatment options.[85]

One concern in prostate care is the overdiagnosis of low-risk tumors and subsequent overtreatment. Treatment has potential side effects (especially for older patients), so it is crucial that patients receive aggressive treatment only when necessary.[86]

A review of diet and lifestyle factors found that not smoking, maintaining healthy weight, and regular vigorous exercise are associated with slower prostate cancer progression.[87]

Massachusetts trend, 2010–2015

Figure 5.1.9. Cancer mortality rate in Massachusetts



Note 1: *Rate among all residents. **Rate among female residents. ***Rate among male residents.
Note 2: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

Figure 5.1.14 demonstrates no significant change to the prostate cancer death rate from 2010 to 2015.

"[We] need bigger state investment in community-wide prevention, in public health, in community health workers, and things like that to keep people healthy in the first place."

— BRIAN ROSMAN, DIRECTOR OF POLICY AND GOVERNMENT RELATIONS, HEALTH CARE FOR ALL

Prevention and Morbidity/ Mortality from Other Conditions

ASTHMA

Background

The control of asthma and prevention of asthma-related hospitalizations are supported by patients' asthma education, living in clean and well-maintained housing, understanding medications, and access to coordinated care.[88] On the other hand, low household income, air pollution (including tobacco smoke), run-down housing (including pests and mold), high levels of stress, and other social factors all contribute to asthma risk.[89]

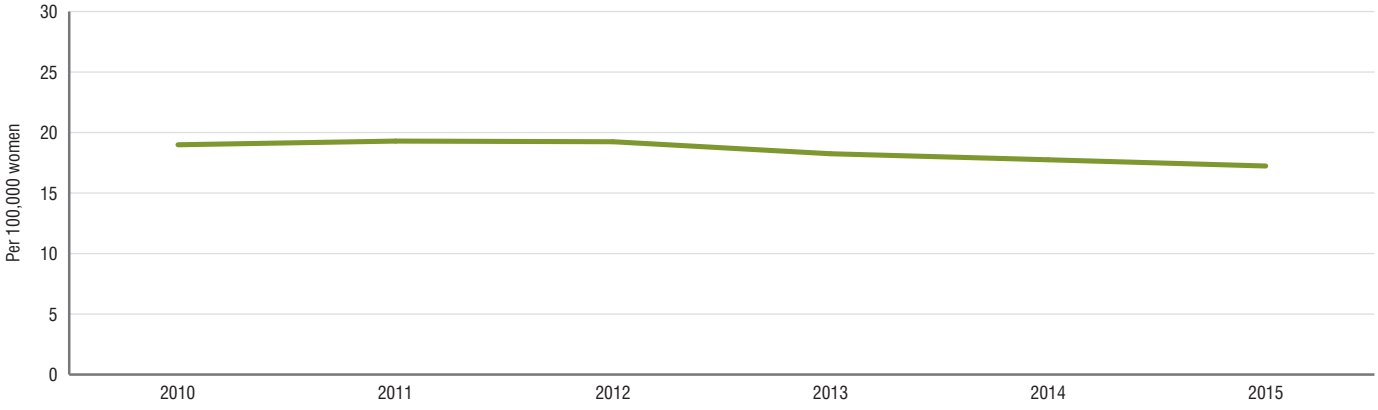
Asthma is on the rise nationally: 7.4% of adults had it in 2014,[90] and 3,630 people died of it in 2013.[91] In 2010, there were 439,435 inpatient discharges for asthma.[92] Massachusetts was one of only seven states with an adult prevalence of at least 11% in 2013.[93] Adults aged 65 and older and non-Whites were disproportionately affected.[94]

Asthma among children is a serious contributor to morbidity. In 2010, the Commonwealth had 179 hospital admissions for asthma treatment per 100,000 children, the sixth highest in the U.S.[95] Additionally, 37.8% of Massachusetts children with asthma missed school or daycare in the past year because of the condition, according to 2006–2007 data.[96] Asthma is the leading cause of school absenteeism in the U.S.[97]

Massachusetts trend, 2011–2015

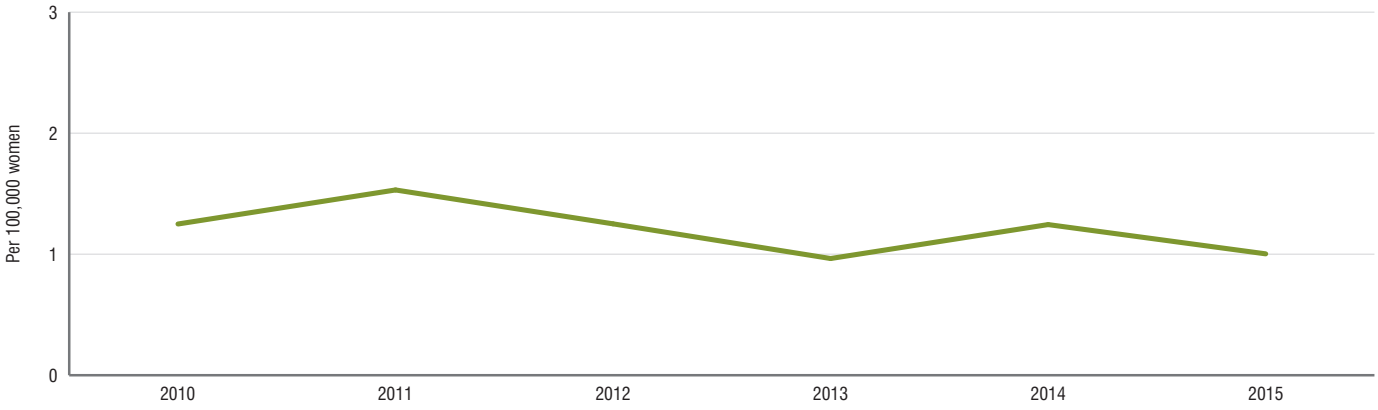
Figure 5.1.15 presents the percentage of adults reporting ever having or currently having asthma. (Asthma symptoms that present in childhood can disappear with age.[98]) In 2015, 15.6% of Massachusetts adults said they had asthma sometime in their lives, while 10.3% currently had asthma. Women were 45.4% more likely than men to have asthma in their lifetime and 83.5% more likely to currently have asthma. From 2011 to 2015, there was no

Figure 5.1.10. Breast cancer mortality rate in Massachusetts



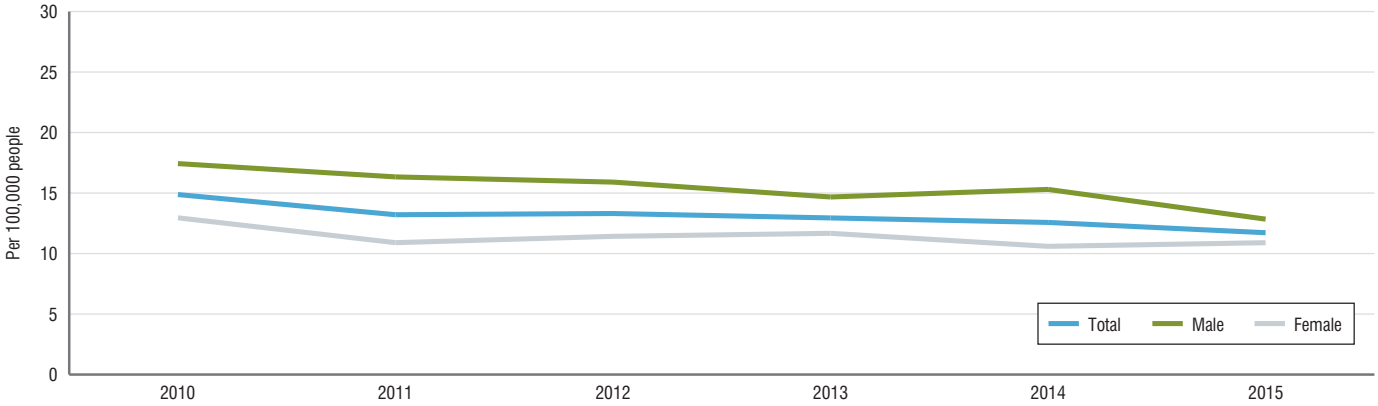
Note 1: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Note 2: For this measure, OSA used data Vintage 2015 bridged-race postcensal estimates for analysis.
Source: OSA analysis of data provided by DPH.

Figure 5.1.11. Cervical cancer mortality rate in Massachusetts



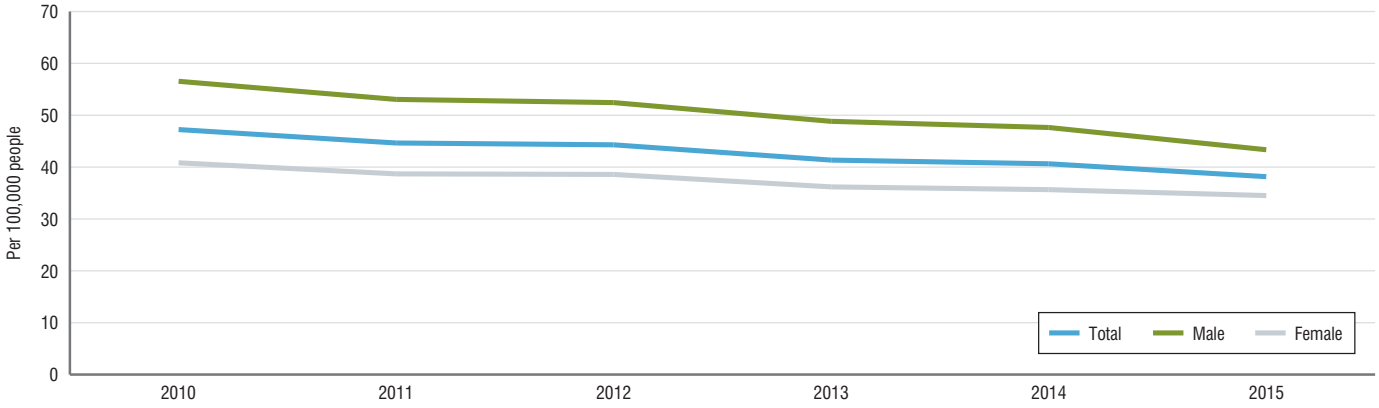
Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

Figure 5.1.12. Colorectal cancer mortality rate in Massachusetts



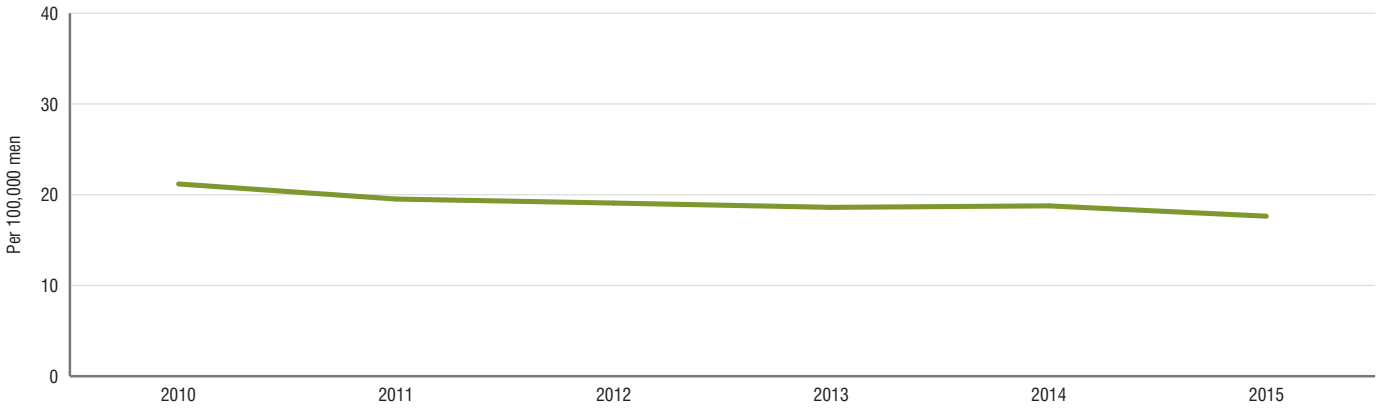
Note 1: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Note 2: For this measure, OSA used data Vintage 2015 bridged-race postcensal estimates for analysis.
Source: OSA analysis of data provided by DPH.

Figure 5.1.13. Lung cancer mortality rate in Massachusetts



Note 1: Includes cancer of the trachea and bronchus.
Note 2: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Note 3: For this measure, OSA used data Vintage 2015 bridged-race postcensal estimates for analysis.
Source: OSA analysis of data provided by DPH.

Figure 5.1.14. Prostate cancer mortality rate in Massachusetts



Note 1: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Note 2: For this measure, OSA used data Vintage 2015 bridged-race postcensal estimates for analysis.
Source: OSA analysis of data provided by DPH.

significant increase or decrease in the current asthma rate among men or women. The risk of ever having and currently having asthma significantly decreased with age, as shown in Figure 5.1.16.

"We're calling for the Accountable Care Organization standards [that] the Health Policy Commission is developing to have a broader focus on population health and prevention and the social determinants of health."

— ALYSSA VANGELI, SENIOR HEALTH POLICY MANAGER, HEALTH CARE FOR ALL

ORAL HEALTH

Background

Tooth decay and periodontal (gum) disease are two major threats to oral health. About 90% of adults aged 20 to 64 have had at least one cavity,[99] and 47% of adults over 30 have had periodontal disease.[100] Periodontal diseases are associated with cardiovascular disease[101] and poor pregnancy outcomes,[102] among other conditions. People with poorly controlled diabetes have enhanced risk for teeth and gum problems due to their high blood-sugar levels.[103]

For low-income adults, access to affordable dental care is a challenge,[104] as follows:

- The ACA did not guarantee dental coverage for adults,[105] resulting in a wide range of coverage for Medicaid-eligible adults among the states.
- The Massachusetts health care reform law (Chapter 58 of the Acts of 2006) increased dental care use by 2.9 percentage points through 2010 among Massachusetts adults aged 18 to 64.[106] However, subsequent cuts

in benefits and an increase in the number of patients visiting the emergency department (ED) for dental problems.[107]

- MassHealth, which has more than 800,000 adult beneficiaries, covers only cleanings, fillings, extractions, and full dentures.[108] Therefore, beneficiaries may choose to defer uncovered dental care, which can lead to more serious health conditions, even death.[109]
- Medicare explicitly excludes dental care from coverage, so older adults (especially those with low incomes) also face barriers to accessing oral health care.[110]
- In the 2015 American Dental Association Health Policy Institute survey, 28% of Massachusetts respondents reported experiencing mouth and/or tooth pain (vs. 41% nationally), and 55% cited cost as a reason for not visiting the dentist more often (vs. 59% nationally).[111] According to an analysis of 2014 national data, more people reported financial barriers to receiving dental care than any other type of health care.[112]

One way to expand access for underserved populations[113] and improve population oral health outcomes[114] is to allow midlevel oral health providers such as dental therapists to offer preventive and restorative treatment. However, dental therapists are not widely used in the U.S.[115]

MASSACHUSETTS TREND, 2011–2014

Figure 5.1.17 shows two measures of oral health: the share of adults who have been to a dentist or a dental clinic in the past year and who have six or more teeth missing. Controlling for household income, there were no significant changes in dental visits, but more people had six or more missing

Figure 5.1.15. Asthma prevalence (Massachusetts adults, by gender)

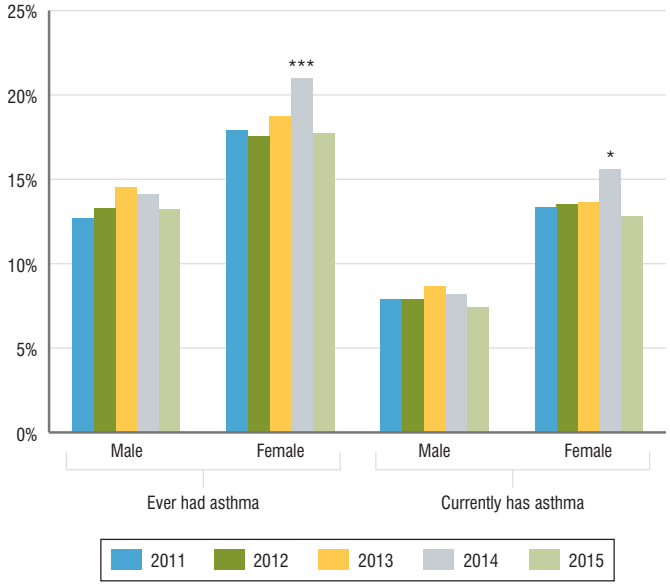
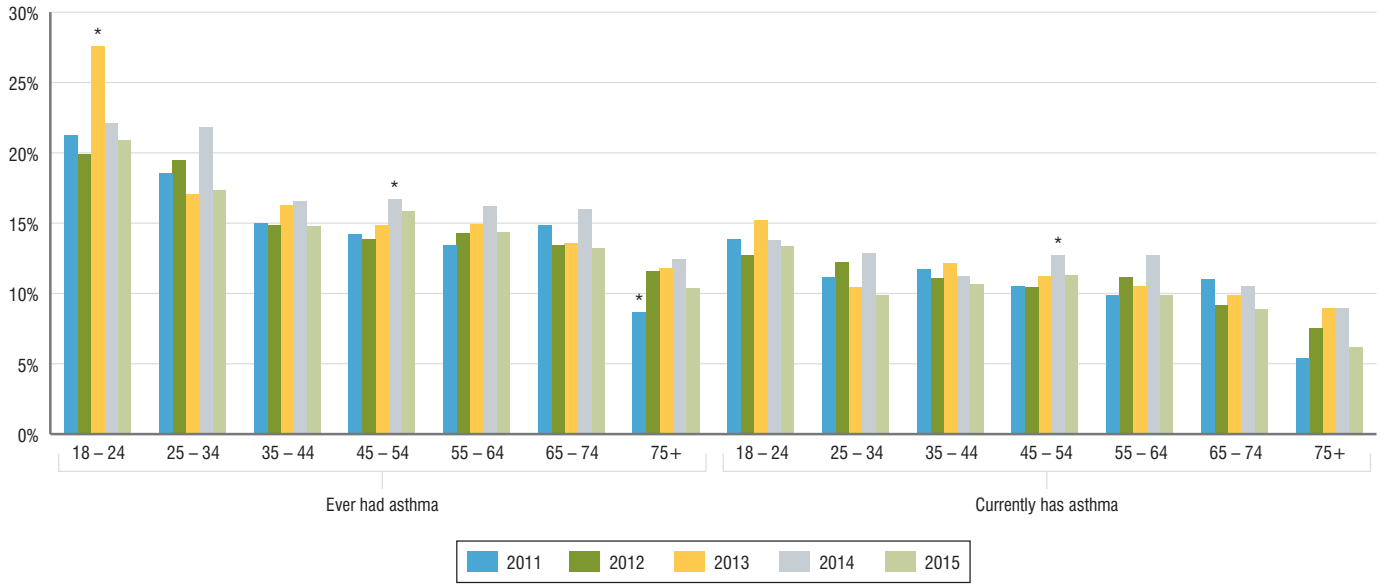


Figure 5.1.16. Asthma prevalence (Massachusetts adults, by age)

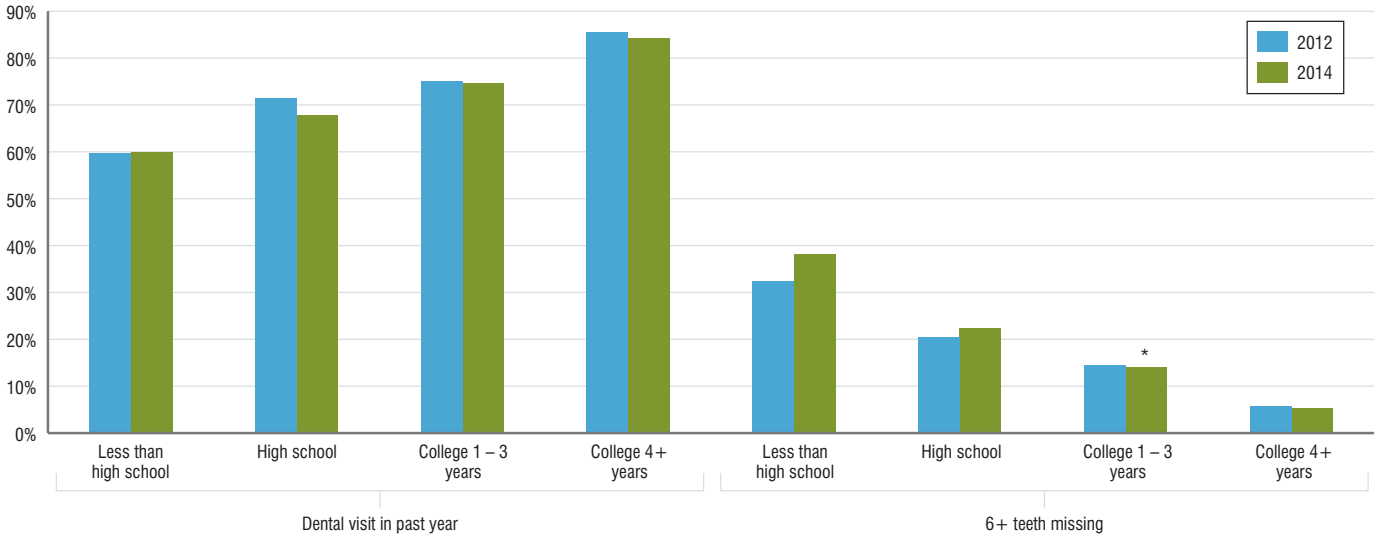


Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.17. Oral health by household income (Massachusetts adults)

Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Reflects household income (regardless of number of people in the household).
Note 3: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.18. Oral health by education level (Massachusetts adults)

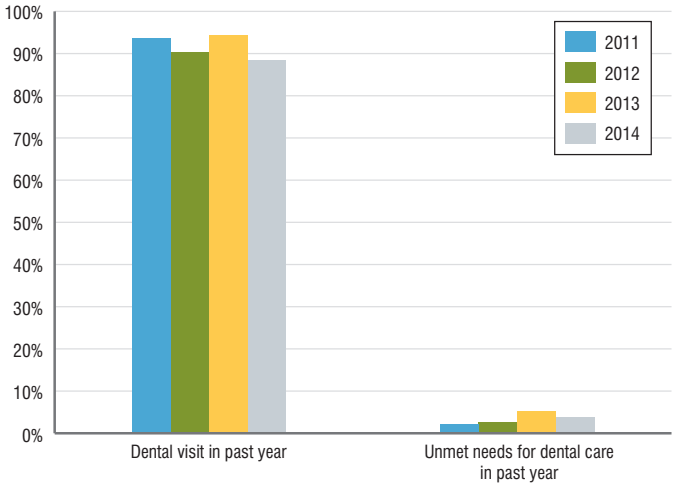


Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

teeth in 2014 than in 2012. Wealthier adults were significantly more likely to have a dental visit and less likely to have teeth missing.

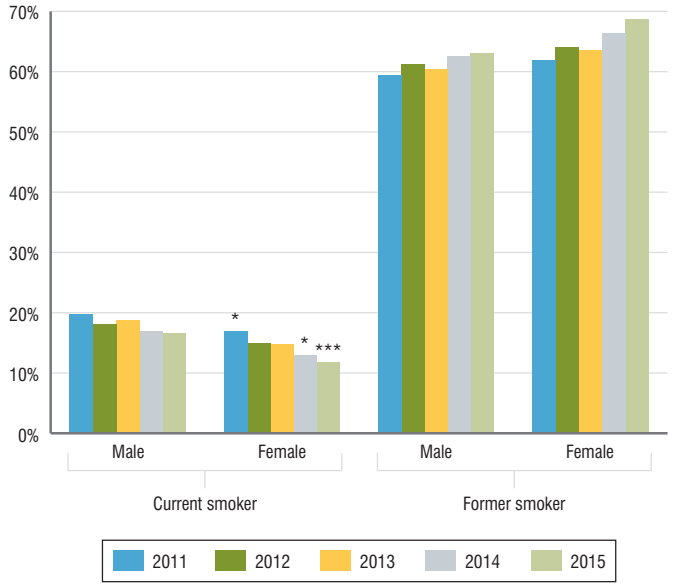
Figure 5.1.18 shows that adults with higher education levels were more likely to have had a dental visit and less likely to have missing teeth. Figure 5.1.19 shows the share of children who visited a dentist in the past year (88.5% in 2014) and the share who did not receive needed dental care due to cost (3.8%). From 2011 to 2014, there was no significant change in child visit rates or unmet need.

Figure 5.1.19. Access to oral health care (Massachusetts children)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.20. Smoking rates, current and former (Massachusetts adults)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

SMOKING

Background

Cigarette smoking among adults has declined significantly in recent decades, although the first increase since 1973 in total cigarette consumption over a previous year occurred in 2015.[116] In addition, the use of other tobacco products has been increasing.[117] In 2013–2014, overall prevalence of any tobacco use on "some days" or "every day" was 21.3%, including 17% who smoked cigarettes.[118]

Massachusetts adults have a lower smoking rate (14.7% in 2014) than most other states,[119] but some sub-populations—including individuals with a mental illness or low socio-economic status—have higher smoking rates than the general population.[120] People with commercial health insurance, household income of at least $75,000, or a college degree are less likely to smoke.[121]

In 2015, 9.3% of U.S. high school students said they had smoked cigarettes in the past 30 days, a decrease from 15.8% in 2011.[122] Among Massachusetts high-schoolers, current cigarette use declined from 21% in 2005 to 11% in 2013.[123] However, cigarette use is higher among high school students who perceive themselves as overweight (36%), have considered suicide (32%), or are identified as lesbian, gay, bisexual, and transgender (LGBT) (35%).[124]

Massachusetts trend, 2011–2015

Figure 5.1.20 presents smoking rates among Massachusetts adults. In 2015, 14.0% of adults were current smokers and 65.8% were former smokers. Smoking rates declined significantly among both men and women from 2011 to 2015, while the share of women former smokers increased significantly.

Figure 5.1.21 shows six groups with high smoking prevalence, including people with poor mental health, MassHealth members, and LGBT adults. Smoking rates declined in five of these six groups from 2011 to 2015, yet each group still had a smoking prevalence higher than the general population.

CHOLESTEROL (SCREENING AND DIAGNOSIS)

Background

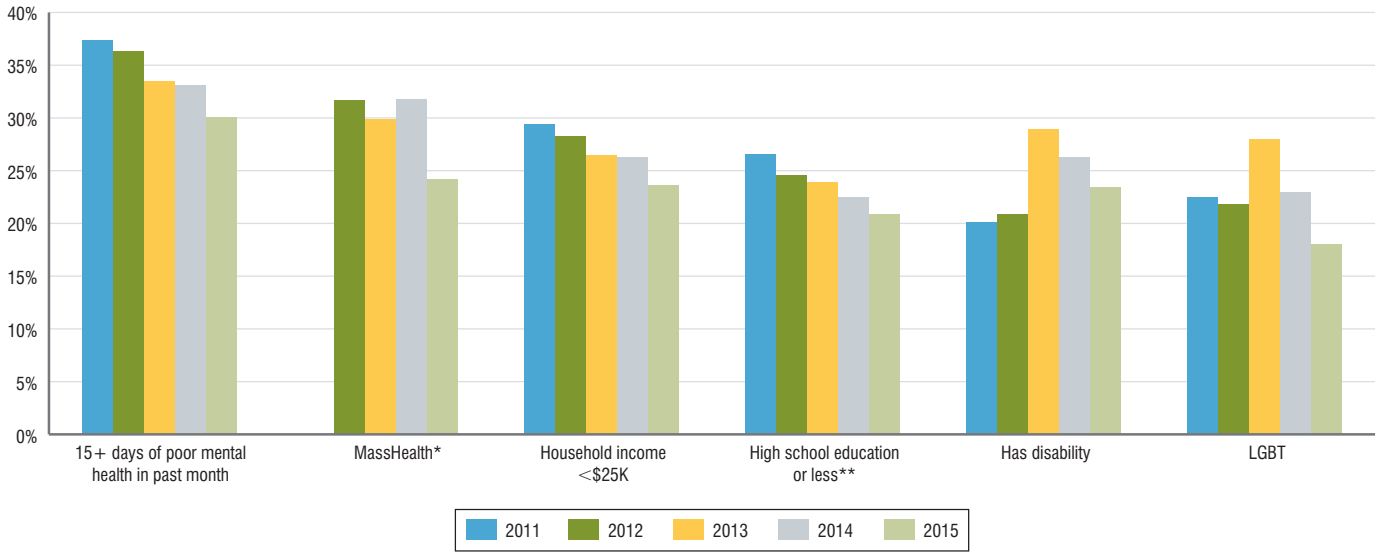
From 2011 to 2014, 27.8% of U.S. adults aged 20 and over had high-serum total cholesterol (i.e., greater than or equal to 240 mg/dL),[125] about the same rate as 2003 to 2006.[126] The research shows:

- High cholesterol increases one's risk of heart disease and stroke[127] and often can be managed with medication (such as statins) and diet changes.[128]
- Animal products high in saturated fat—including cheese, fatty meats, and dairy—contribute to high cholesterol, while fiber and foods with so-called healthy fats (monounsaturated or polyunsaturated fat) combat it.[129]
- Two new cholesterol drugs[130] have list prices of more than $14,000 a year,[131] although drug trial data have yet to render a verdict on their effectiveness.[132] As of April 2016, sales were low, but, if sales pick up, the drugs could significantly increase pharmaceutical spending.[133]

Massachusetts trend, 2011–2015

Figure 5.1.22 depicts the percentage of adults who said they had a cholesterol test in the past five years and the percentage ever told they had high cholesterol. In 2015, 83.5% of Massachusetts adults had a cholesterol test in the past five years; 34.6% of those adults were ever told by a health professional that they had high cholesterol. Men were 23.6% less likely than

Figure 5.1.21. Smoking rates, high-risk populations (Massachusetts adults)



Note 1: *MassHealth: aged 18–64; no data for 2011.
Note 2: **High school education or less: aged 25+.
Source: DPH

women to have a cholesterol test and 30.2% more likely to ever have been told they have high cholesterol. No significant change in cholesterol testing and high cholesterol for both males and females was seen from 2011 to 2015.

HIGH BLOOD PRESSURE

Background

About one-third of U.S. adults have HBP; of these, only 52% have their HBP under control.[134] Because HBP (which increases risk of heart disease and stroke) is often not accompanied by symptoms, many people do not know they have it, which makes regular screening essential.[135]

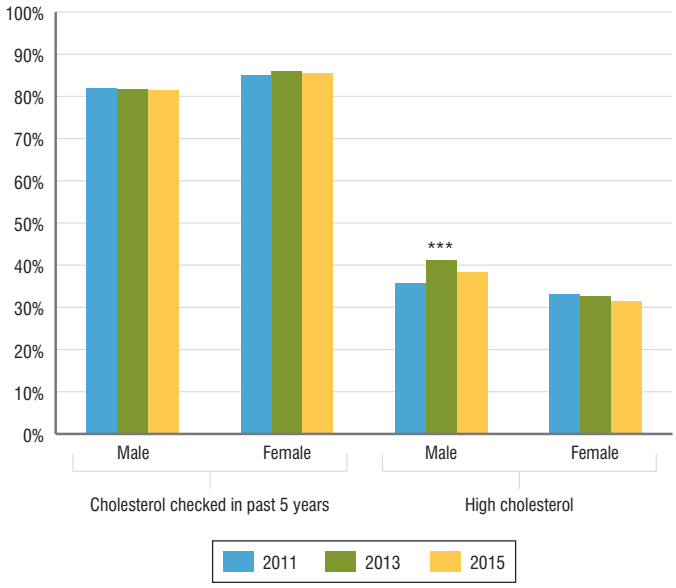
Key risk factors for HBP include family history, age (risk increases with age), African American race,[136] diabetes,[137] high sodium consumption, low potassium consumption, obesity, tobacco use, and alcohol overconsumption.[138]

Medications including diuretics, beta blockers, and angiotensin-converting enzyme inhibitors stop or slow some bodily functions that cause HBP.[139] Strategies such as refilling all of a patient's medications at one pharmacy can help increase adherence to medication therapy, especially among patients with poorer baseline adherence.[140] A review by the Cochrane Collaboration found that, despite the benefits for some patients, antihypertensive drugs have not been shown to reduce morbidity or mortality in randomized controlled trials in adults with mild HBP (systolic BP 140-159 mmHg and/or diastolic BP 90-99 mmHg).[141]

Massachusetts trend, 2011–2015

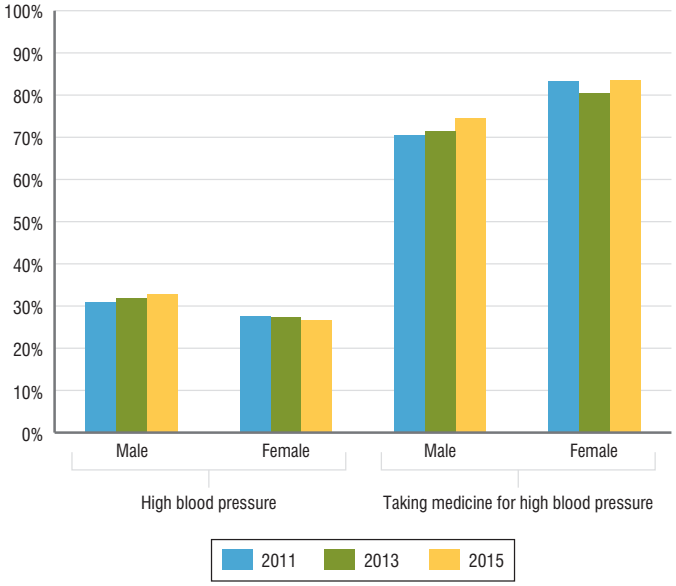
Figure 5.1.23 shows the percentage of adults told they had HBP and the percentage taking medication for it. In 2015, 29.6% of Massachusetts adults had been told they had HBP, and, of this group, 78.9% took

Figure 5.1.22. Cholesterol screening and high cholesterol awareness in lifetime (Massachusetts adults)



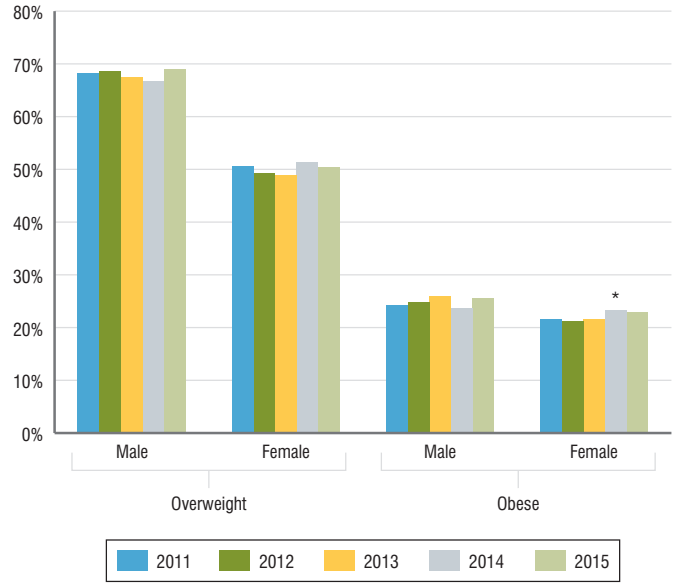
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.23. HBP prevalence and medication for HBP (Massachusetts adults)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.24. Overweight and obesity (Massachusetts adults)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

medication to treat it. Men were 25.1% more likely than women to report HBP but were 44.5% less likely to take medication. From 2011 to 2015, there was no significant change in HBP and HBP medication for both men and women.

OVERWEIGHT AND OBESITY

Background

Overweight (having a body mass index greater than 25) and obesity (BMI greater than 30) are among the nation's biggest drivers of health care costs and chronic disease, including heart disease, stroke, and diabetes. [142] In 2012,[143] Massachusetts had the third-lowest state obesity rate, according to the CDC.[144]

Diet is an essential factor for maintaining a clinically normal weight. A smaller share of U.S. residents had poor diets in 2012 (46% of Americans) than in 1999 (56%), as judged by American Heart Association criteria.[145] However, this improvement was much larger among adults >299% FPL (declining from 50% to 36%) than among those <130% FPL (from 68% to 61%).[146]

Limited access to affordable, healthy food in many communities (areas known as "food deserts") has fueled the obesity epidemic, as follows:

- A 2011 report found that Massachusetts ranks 47th in the nation for supermarkets with fresh food per capita, with cities including Boston, Springfield, and Brockton facing shortages, and Lowell and Fitchburg facing severe shortages.[147]

- Households reliant on public transit often face significant obstacles to accessing fresh food. In Springfield, as reported in the regional newspaper Valley Advocate: "for many residents of Mason Square, a full week's grocery shopping—picking up fresh fruits and vegetables, stopping by the butcher, buying some fresh bread, eggs, or pasta—means taking two buses to get to the [supermarket] across the river in West Springfield and cramming seven days' worth of food into [the bus authority's] per-passenger limit of three bags before taking another two buses home."[148]

- Food deserts are also present in rural areas, such as parts of Worcester County, where 27 towns have no food stores, and five others have very limited availability of healthy foods.[149]

- Groups such as the Institute for Child, Youth, and Family Policy have explored food deserts in the context a broader set of neighborhood-level opportunities, or lack thereof. They have found deprivation associated with public health issues, including obesity.[150]

Regular exercise helps to maintain weight loss and protects against overweight and obesity.[151] The CDC recommends completing 150 minutes of moderate aerobic activity,[152] 75 minutes of vigorous aerobic activity,[153] or a mix of the two weekly.[154]

Massachusetts trend, 2011–2015

Figure 5.1.24 presents trends for overweight and obesity. In 2015, 59.6% of Massachusetts adults were overweight, including 24.2% of adults who were obese; 40.4% of adults were neither overweight nor obese.[155] Men are

more likely to be overweight and obese, and obesity among women increased significantly from 2011 to 2015.

Figure 5.1.25 shows that, since 2011, overweight and obesity have increased among high school students in Massachusetts.

DIABETES

Background

Diabetes refers to a group of diseases in which the body has problems with the functioning and/or production of insulin, leading to high blood sugar levels.[156] Complications from diabetes include ketoacidosis,[157] HBP, stroke, kidney disease, and feet problems (such as neuropathy and poor circulation).[158] Diabetes is an important cause of hospitalizations and death.[159]

The CDC estimated that 21 million people had diagnosed diabetes and an additional 8.1 million had undiagnosed diabetes in the U.S. in 2012.[160] The prevalence of this condition has increased significantly over the past two decades,[161] although the rate of increase has varied widely among counties in the U.S.[162]

Massachusetts has also seen a significant increase in diabetes, though the Commonwealth has lower rates than the national average.[163] For example, in 2014, 8.8% of Massachusetts adults had diabetes, compared to the national median of 9.1%.[164] In Massachusetts, diabetes is more common among men than women.

Massachusetts trend, 2010–2015

Figure 5.1.26 shows the share of non-diabetic adults who had a high-blood-sugar or diabetes test in the last three years (55.1% in 2014). Men were 22.2% less likely to be tested than women, although, in the gender-specific trend test, the number of men tested increased significantly from 2011 to 2014.

Figure 5.1.27 shows the percentage of adults ever diagnosed with pre-diabetes (7.3% in 2014) or diabetes (9.0% in 2015). Men were 20.1% more likely to report being diagnosed than women. Men had a significant increase in pre-diabetes from 2011 to 2014 and diabetes from 2011 to 2015.[165] Risk of pre-diabetes and diabetes significantly increased with age (Figure 5.1.28).

Figure 5.1.29 presents the diabetes death rate against three measures: underlying cause, contributing cause, and the sum of the two ("diabetes-related"). Females were less likely than men to have a death related to diabetes according to all three measures. In the trend test, there was no significant change in the death rate from 2010 to 2015.

HEART DISEASE

Background

Diseases of the heart and blood vessels (cardiovascular diseases) are the leading cause of death in the U.S.[166] Risk factors include HBP, high cholesterol, and diabetes (which has become more prevalent),[167] age, and family history.[168] Heart disease can be managed with lifestyle changes, medication to reduce HBP and/or cholesterol, and sometimes surgery.[169]

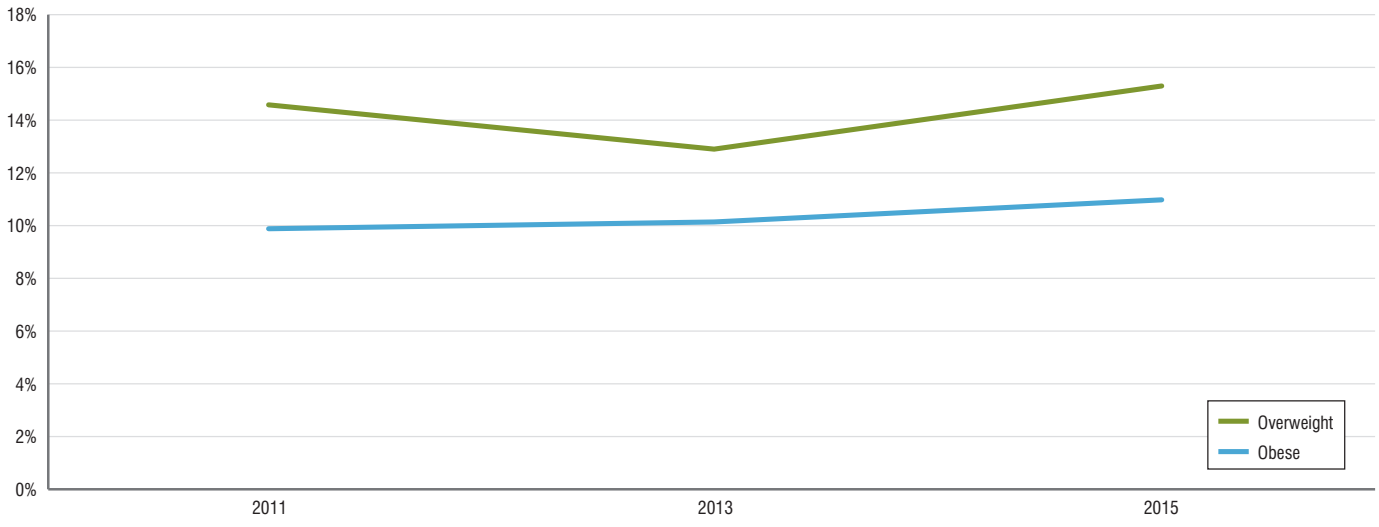
In 2013, Massachusetts ranked 47th in heart disease deaths per capita,[170] which stands to reason given Bay State adults have lower smoking and overweight/obesity rates, and higher aerobic exercise and health coverage rates, than the U.S. overall.[171]

Among the traditional Medicare population, Massachusetts hospitals performed similarly to or better than the nation on 30-day mortality following heart failure and heart attack from 2013 to 2015.[172]

Massachusetts trend, 2010–2015

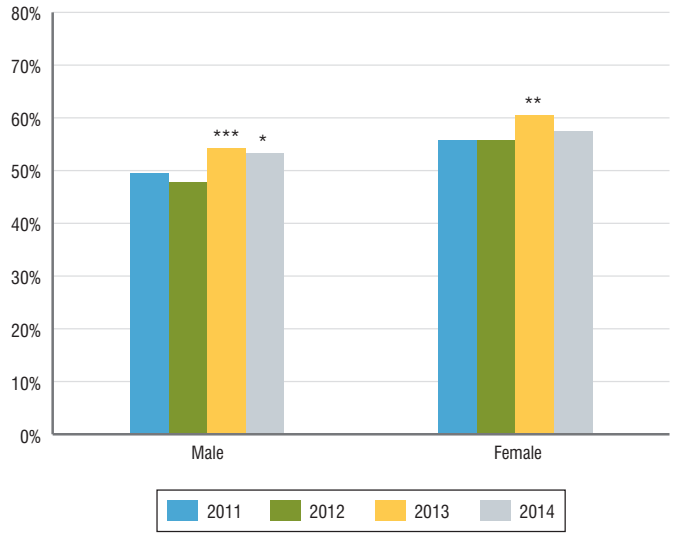
Figure 5.1.30 shows the share of adults aged 35 and older who said they ever had a heart attack, known as myocardial infarction (5.7% in 2015), or either angina or coronary heart disease (CHD). Men were twice as likely as women to have a heart attack and 84% more likely to have angina or CHD. From 2011 to 2015, there was no significant change in all measures for both

Figure 5.1.25. Overweight and obesity (Massachusetts high school students)



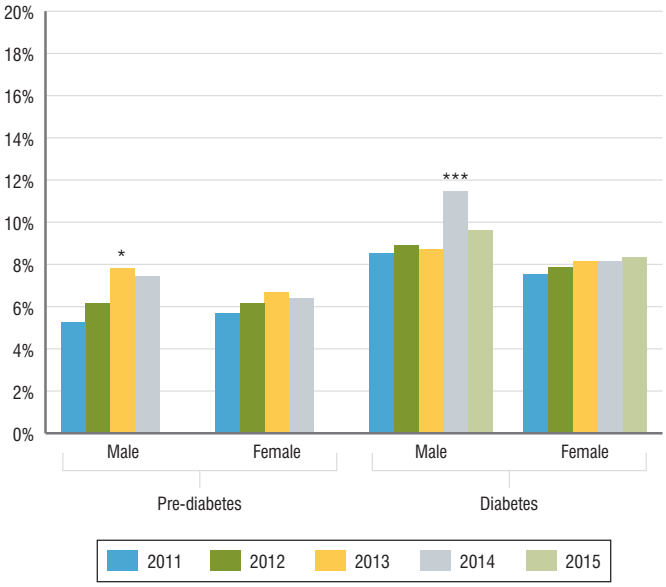
Source: CDC. Youth Risk Behavior Surveillance System (YRBSS). Retrieved July 11, 2016, from http://nccd.cdc.gov/youthonline/App/Results.aspx?LID=MA

Figure 5.1.26. Tested for diabetes in the last 3 years (Massachusetts adults)



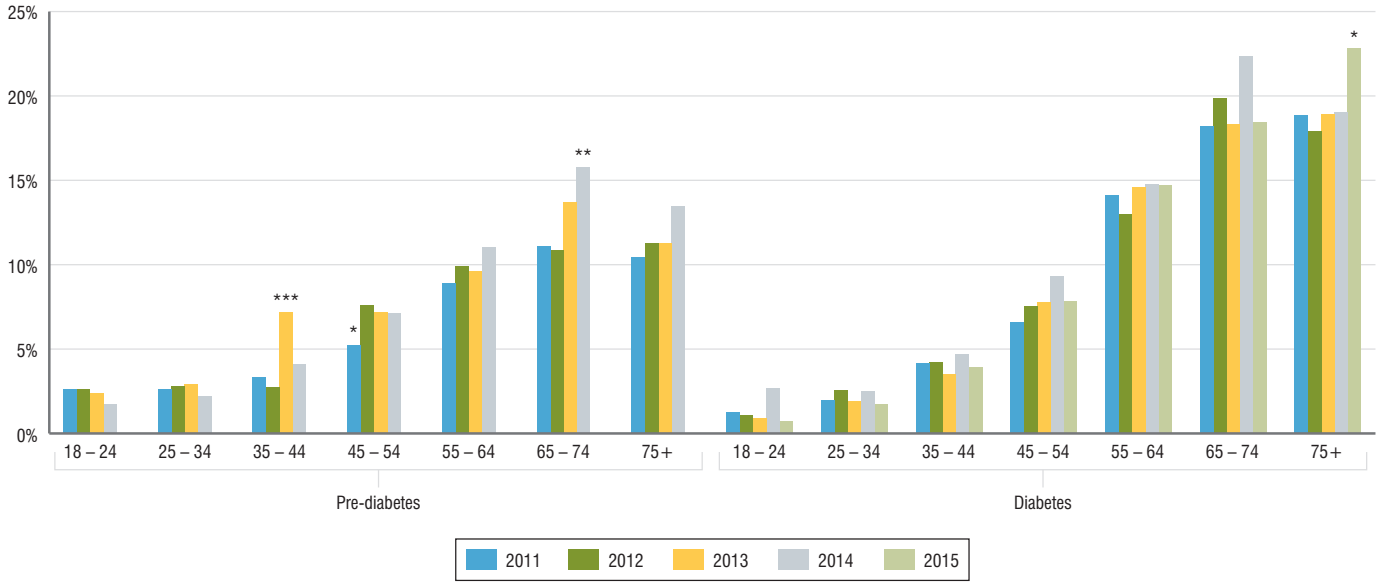
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.27. Diabetes prevalence by gender (Massachusetts adults)



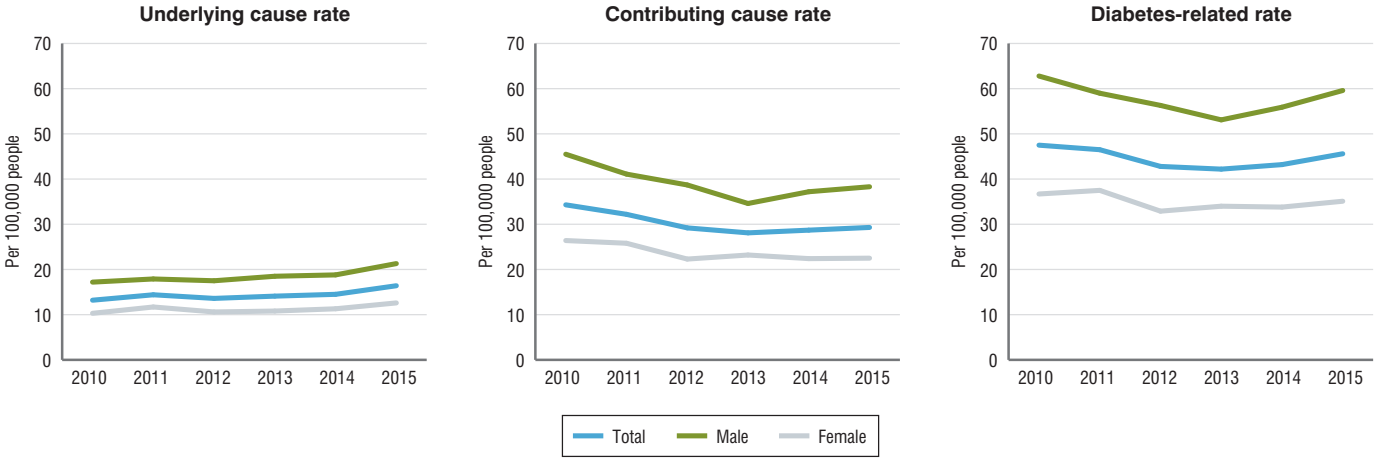
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.28. Diabetes prevalence by age (Massachusetts adults)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.29. Diabetes death rate in Massachusetts



Note 1: Diabetes-related rate combines the underlying and contributing cause rates.
Note 2: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

genders. The risk of having a heart attack, angina, or coronary heart disease significantly increased with age (see Figure 5.1.31).

Figure 5.1.32 presents the heart-disease death rate. Females had significantly lower rates, and there was no significant change from 2010 to 2015.

"The inability to integrate care in an efficient way ... can impact the cost of care. Meaning, if care is integrated well, and prevention is taken seriously, costs have a better chance of being contained."

— MATT SELIG, EXECUTIVE DIRECTOR, HEALTH LAW ADVOCATES

STROKE

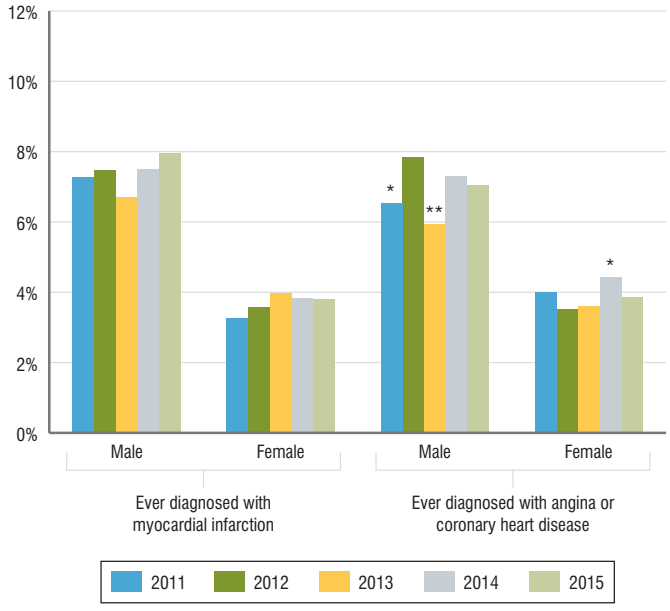
Background

Stroke, the fifth-leading cause of death in the U.S., occurs when the brain's blood supply is blocked or when a blood vessel in the brain ruptures.[173] Age is the most significant risk factor for stroke.[174] Other risk factors include family history; being male, African American, Latino, or Native American;[175] and having HBP, cholesterol, or diabetes.[176] Environmental and lifestyle factors such as air pollution,[177] tobacco use, poor diet, physical inactivity, obesity, and alcohol overconsumption increase risk of stroke.[178]

In 2013–2014, 2.5% of U.S. adults had a stroke in the last year, a slight increase from 2.2% in 1999–2000.[179] (This may be partially attributable to population aging.) However, the stroke death rate declined from 60.9-per-100,000 in 2000 to 36.5-per-100,000 in 2014.[180]

Among the traditional Medicare population, Massachusetts hospitals performed similarly to or better than the nation on 30-day mortality rates following a stroke from 2013 to 2015.[181]

Figure 5.1.30. Heart disease by gender (Massachusetts adults)

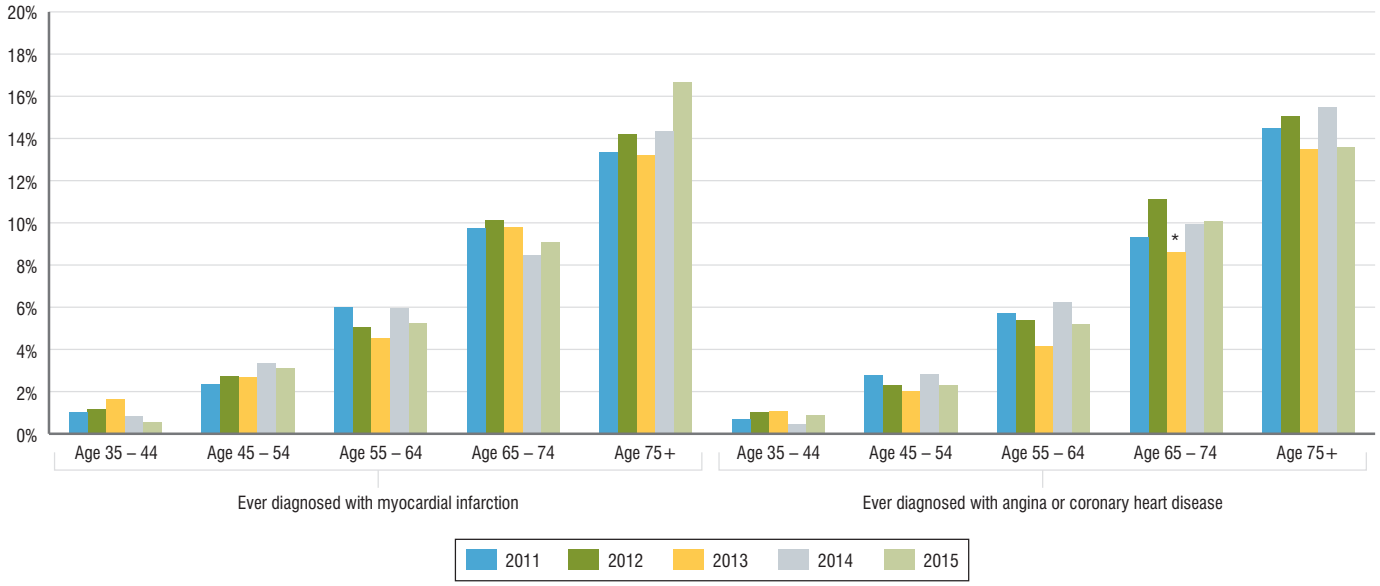


Massachusetts trend, 2011–2015

Figure 5.1.33 presents the percentage of adults aged 35 and older who say they ever had a stroke (3.3% in 2015). Men were 23.9% more likely than women, and there was no significant change in prevalence for men or women from 2011 to 2015. The risk of having a stroke significantly increased with age, as shown in Figure 5.1.34.

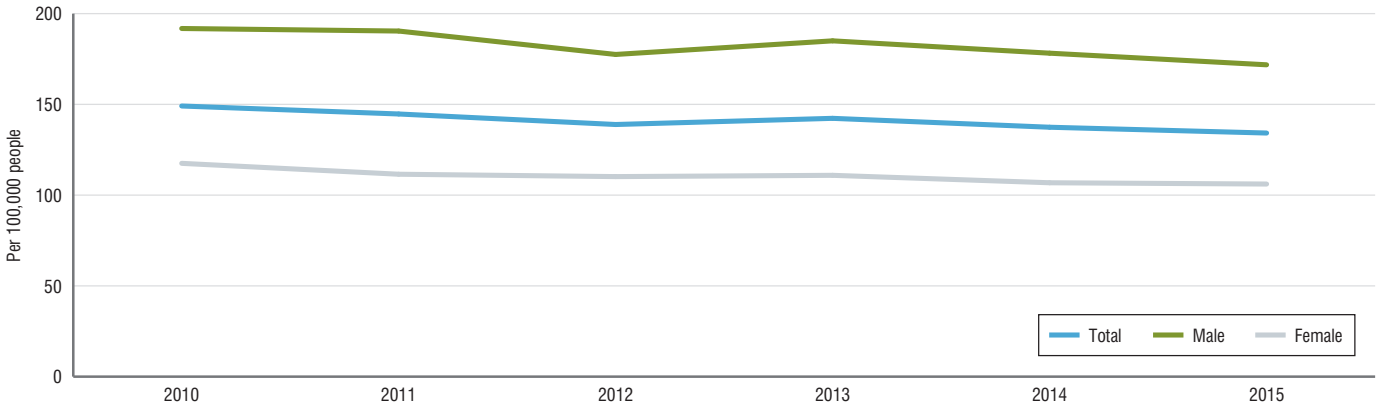
As shown in Figure 5.1.35, the stroke death rate did not change significantly among males or females from 2010 to 2015.

Figure 5.1.31. Heart disease by age (Massachusetts adults)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.32. Heart disease rate in Massachusetts



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

FALLS AMONG ADULTS AGED 65+

Background

Falls are a major source of morbidity among older adults. Nationwide, 2.8 million older adults are treated in EDs for fall injuries each year,[182] and one in five falls results in a serious injury, such as head trauma or a broken bone. In Massachusetts, falls are the leading cause of injuries and injury-related deaths among the elderly;[183] 26% of older adults reported falling in the past year, and, of those, 38% were injured (2012).[184] To reduce their risk, older adults should have their eyes checked, clear their floors of clutter, and do exercises that improve strength and balance, among other strategies.[185]

Two risk factors for falls—taking multiple medications and adverse drug interactions/events (ADIs)[186] put older adults at particular risk because they are more likely than younger people to have multiple disorders or illnesses (comorbidity) and take multiple medications.[187] Moreover, prescribing guidelines are often derived from results of clinical trials that do not include older, frail, and comorbid people, which makes it difficult to

predict how older adults may react to medications.[188] Most ADIs among older people involve an over-the-counter medication, particularly pain or sleep medicines.[189]

One way for providers to reduce older patients' risk of ADIs is to prescribe only drugs that are necessary, at the lowest effective doses, and to discontinue drug therapies that are ineffective.[190] This requires determining accurate lists of patients' drugs—a process known as medication reconciliation[191]—a care coordination activity currently lacking in many patients' care. Medication reconciliation can reduce the risk of medication errors and improve patient-provider and provider-provider communication.[192]

Massachusetts trend, 2012–2014

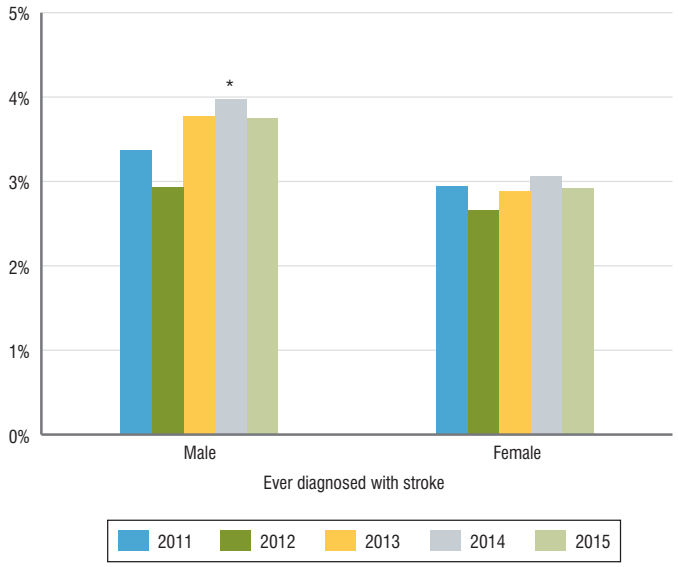
Figure 5.1.36 shows the share of adults aged 65 and older who reported falling and who were injured in a fall in the past year. There was no significant difference in the number of falls between men and women. However, women had higher risk of being injured, perhaps because they live longer and are more likely to develop osteoporosis. Controlling for gender, there was a significant increase in reported falls from 2012 to 2014 (not shown in figure).

SYPHILIS, GONORRHEA, AND CHLAMYDIA

Background

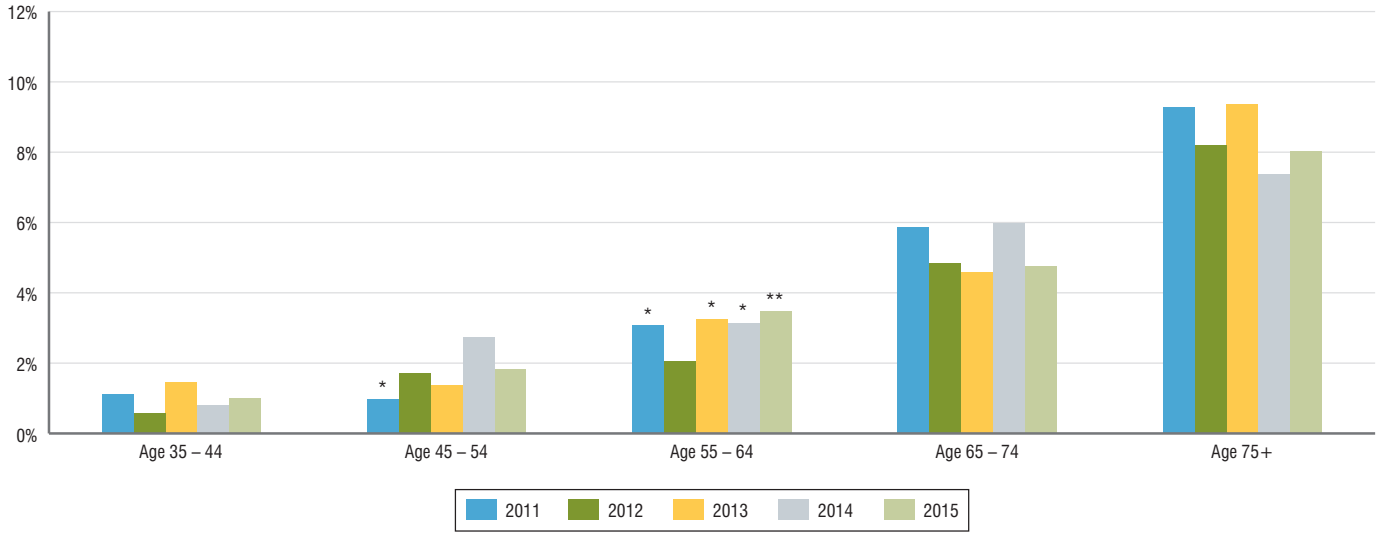
In Massachusetts, the DPH collects data and tracks trends on sexually transmitted infections (STIs), such as syphilis, gonorrhea, and chlamydia. Syphilis tends to occur in older adults, while gonorrhea and chlamydia are reported mostly in teenagers and young adults.[193] In 2012, 67% of reported chlamydia cases and 42% of reported gonorrhea cases were diagnosed in people aged 15 to 24.[194] Of these STIs, chlamydia is by far the most common both nationally[195] and in Massachusetts.

Figure 5.1.33. Stroke by gender (Massachusetts adults)



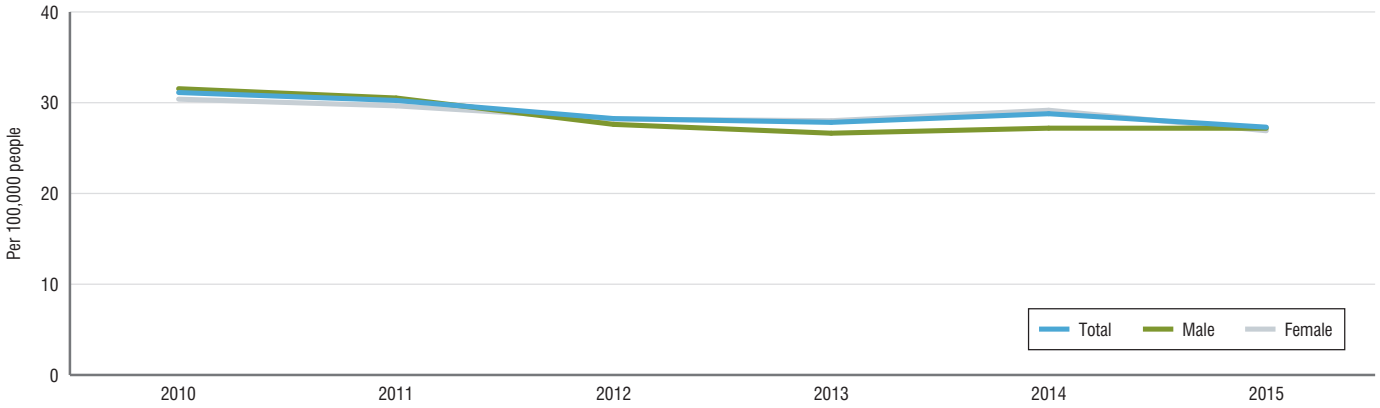
Note 1: Statistically significant difference from 2012: *$p<.05$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.34. Stroke by age (Massachusetts adults)



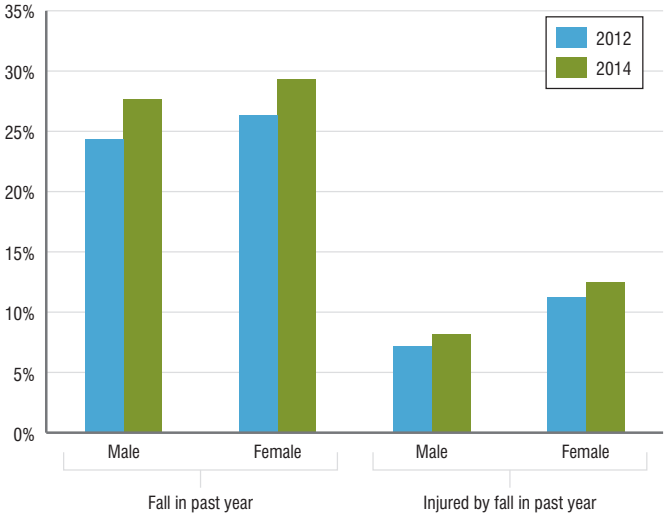
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.35. Stroke death rate in Massachusetts



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

Figure 5.1.36. Fell in past year and injured in fall in past year (Massachusetts, aged 65 and older)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

- **Infectious syphilis:** In Massachusetts, the incidence rate rose from 2006 to 2013.[196] It fell in 2014, the first year DPH used new surveillance and data collection methods, so the decline should be interpreted with caution.[197] Although rare overall, infectious syphilis is at epidemic levels among men who have sex with men (MSM);[198] about two-thirds of cases in 2014 were reported in MSM.[199] Risk is much higher among men, although the female infection rate rose 150% from 2005 to 2014.[200] Massachusetts had the 24th-highest syphilis rate in the U.S., though lower than the overall national rate, according to CDC data.[201]

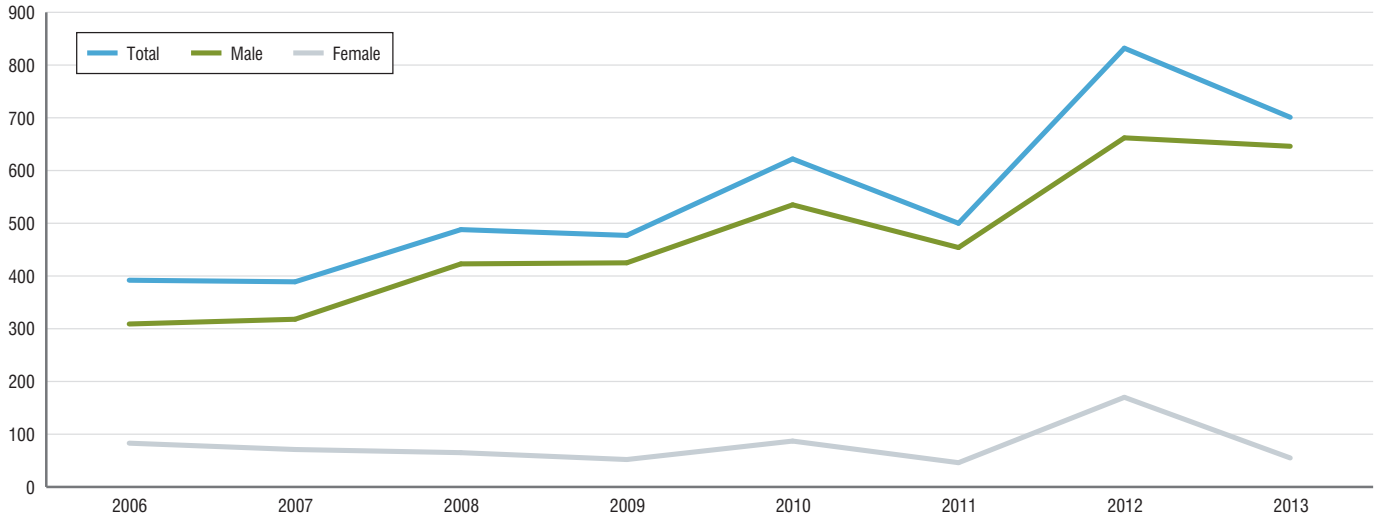
- **Gonorrhea:** In 2014, Massachusetts had the 11th-lowest prevalence rate in the country.[202] Infections were clustered in urban areas, with the highest rates in Boston, Brockton, Chelsea, Provincetown, and Taunton.[203]

- **Chlamydia:** Massachusetts has the fifth-lowest rate in the country. The five cities with the highest incidence rates are Boston, Chelsea, Lawrence, Provincetown, and Springfield.[204] Women have much a much higher incidence of chlamydia than men, reflecting the higher level of screening among women.[205]

Social factors—including higher poverty and incarceration rates, fewer educational and employment opportunities, lack of access to health providers close to home, and community stigma toward homosexuality—may contribute to health illiteracy and keep those who have contracted STIs from seeking medical care.[206] Unfortunately, Massachusetts still suffers from a shortfall of Disease Intervention Specialists (outreach workers responsible for finding and counseling people with STIs and their contacts), despite interesting sector adjustments in the wake of severe FY 2008 budget cuts that led to the elimination of DPH's direct provision of STD clinical services.[207]

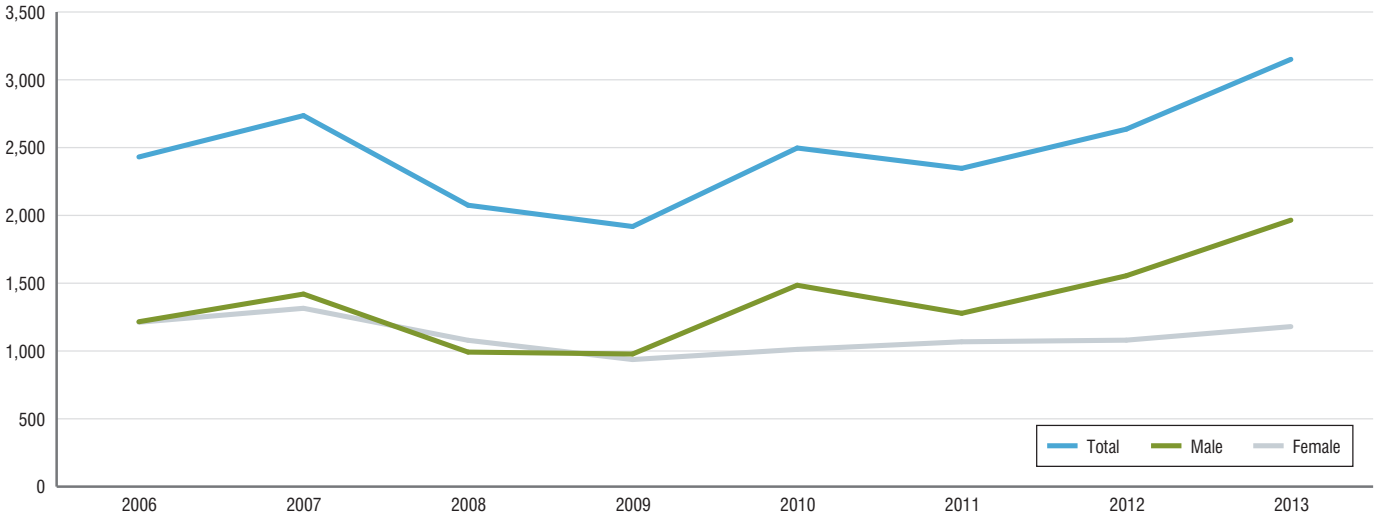
Finally, a high share of teenagers engage in risky sexual behavior that can result in STIs.[208] For example, 57.7% of sexually active high-school students in Massachusetts reported in 2013 not using a condom the last time they had intercourse.[209]

Figure 5.1.37. Reported cases of syphilis (Massachusetts adults)



Source: DPH Massachusetts STD, HIV/AIDS, and viral hepatitis surveillance reports. Retrieved from http://www.mass.gov/eohhs/gov/departments/dph/programs/id/hivaids-surveillance/surveillance/public-health-cdc-hivaids-surveillance-std-report.html

Figure 5.1.38. Reported cases of gonorrhea (Massachusetts adults)



Source: DPH Massachusetts STD, HIV/AIDS, and viral hepatitis surveillance reports

Massachusetts trend, 2005–2014

The prevalence of reported syphilis cases in Massachusetts rose from 500 in 2011 to 701 cases in 2013, an increase of 19.5% among women and 42.3% among men. (See Figure 5.1.37.)

Cases of gonorrhea rose 10.5% over the same period, up 34.3% among women and 53.8% among men. (See Figure 5.1.38.)

Cases of chlamydia increased 4.4% from 2011 to 2014, rising 2% among women and 5.6% among men from 2011 to 2013. (See Figure 5.1.39.) The incidence rate was 357.9 cases per 100,000 in 2013, up 2.8% from 2011. (See Figure 5.1.40.)

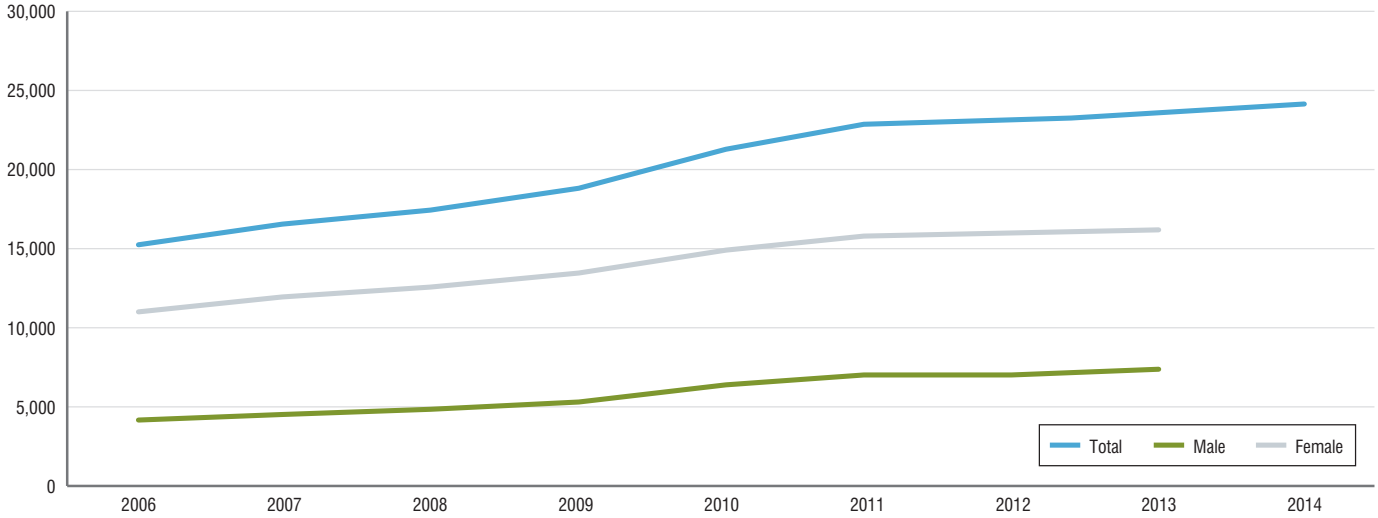
HIV/AIDS

Background

Over 1.2 million people are living with HIV/AIDS in the U.S.[210] Nationally, new HIV diagnoses declined 9% from 2010 to 2014,[211] although an estimated 12.5% of HIV-positive people do not know their status.[212]

In Massachusetts, deaths among people with HIV/AIDS decreased from 416 in 2001 to 188 in 2013.[213] In the Commonwealth, new diagnoses have steadily declined, dropping to 629 in 2014.[214] Male-to-male sex remains the most common exposure to HIV, and non-White groups continue to be disproportionately affected.[215] At the end of 2015, 20,272 people (14,439 men

Figure 5.1.39. Reported cases of chlamydia (Massachusetts adults)



Note: Cases-by-gender data not available for 2014. Data for 2014 should be interpreted with caution because DPH converted to a new surveillance system in the middle of the year.
Source: DPH Massachusetts STD, HIV/AIDS, and viral hepatitis surveillance reports.

and 5,833 women) were living with HIV/AIDS in the Commonwealth.[216] In 2014, 76% of people with HIV/AIDS were engaged in HIV care,[217] up from 61% in 2013.[218]

Among people engaged in care and retained in care, 84% and 87%, respectively, were virally suppressed.[219] Viral suppression (when antiretroviral therapy reduces a person's HIV RNA viral load to an undetectable level) is important not only for people living with HIV/AIDS (giving them a better chance for good health and a longer life) but also for the broader community, since these patients are less likely to transmit HIV to others.[220] Unfortunately, only 30% of individuals nationwide have suppressed the virus.[221] Females had higher rates of engagement and retention than males, but their viral suppression rates were lower.[222]

In 2001, MassHealth expanded to cover low-income people with HIV. In 2006, access to care was expanded even further as more residents obtained health insurance. In addition to considerable spending by MassHealth on HIV/AIDs, in FY2016, DPH spent about $33.1 million on HIV/AIDS prevention and treatment.[223]

Massachusetts trend, 2000–2015

As shown in Figure 5.1.41, the number of people in Massachusetts living with HIV/AIDS has risen steadily since 2000, due in part to fewer people dying from HIV/AIDS.

As shown in Figure 5.1.42, new HIV/AIDS infections fell 22% from 2005 to 2010 and 9% from 2011 to 2014. Three men were infected for every woman infected in 2014.

Figure 5.1.43 presents the share of Massachusetts adults aged 18 to 64 who reported ever being tested for HIV (45.0% in 2015) and the share who had been tested in the past year (10.1%). Men were 17% less likely to ever be tested than women. From 2011 to 2015, there was no significant change in HIV testing for men or women.

HEPATITIS C

Background

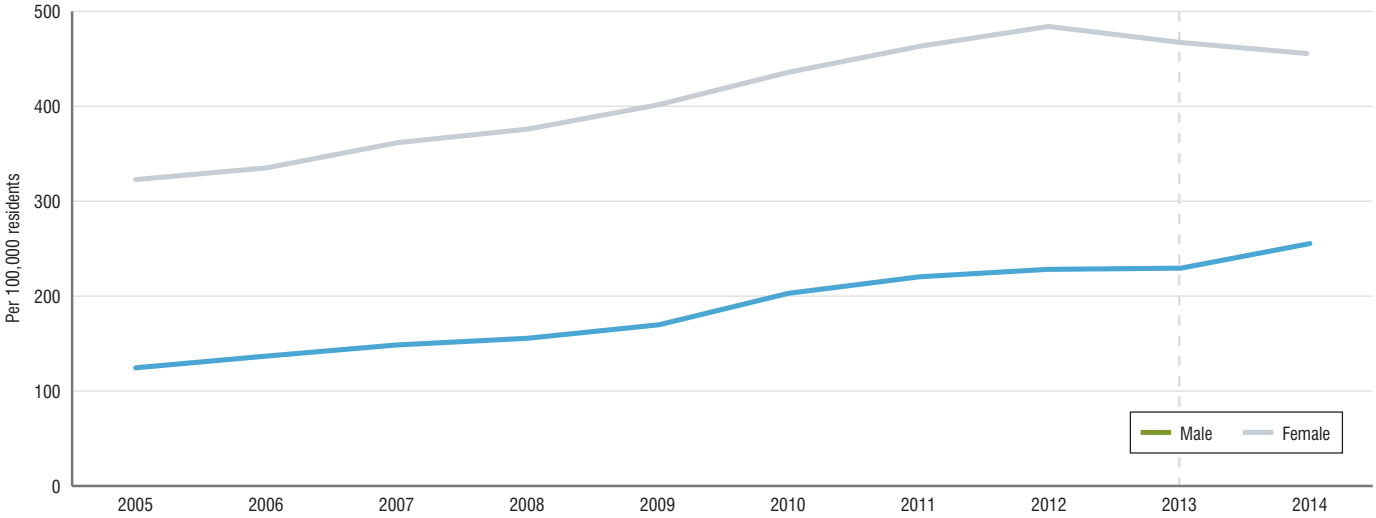
Hepatitis C virus is a blood-borne infection currently most typically acquired by sharing equipment to inject drugs.[224] It can be either a short-term illness (i.e., acute) or develop into a chronic condition with potentially severe health impacts, including cirrhosis, liver cancer, and death.[225] There were 2,194 acute cases (from 40 states) and 162,863 "past or present" cases (from 34 states) reported to the CDC in 2014.[226] A more robust indicator of the size and distribution of the current epidemic are probable and confirmed new cases of chronic hepatitis C (versus acute cases). In Massachusetts, such cases were distributed around a peak incidence rate at 45 years of age in 2002, but 2014 saw a different infection pattern with two peaks for those 25 and 55 years of age.[227] Currently, DPH sees 8,000 to 9,000 probable and confirmed new chronic cases annually.

There is no vaccine for hepatitis C, but medications like Sovaldi, one of a class of medications used to treat hepatitis C, are used to effectively vanquish the virus about 95% of the time.[228] However, this course of treatment can cost about $64,600 (after rebates),[229] and various payers (including some in Massachusetts) have been criticized for restricting access to the drugs by requiring that patients have severe liver damage or abstain from drugs and alcohol for 6 to 12 months.[230,231] As of April 2016, about half of the nation's Medicaid programs covered hepatitis C medications like Sovaldi only if the patient had stopped using drugs and alcohol, out of fear that patients could become infected again or that their liver health will worsen.[232] In August 2016, MassHealth made these drugs available to all enrollees,[233] while Medicaid programs in nine other states also lifted restrictions.[234]

Massachusetts trend, 2007–2014

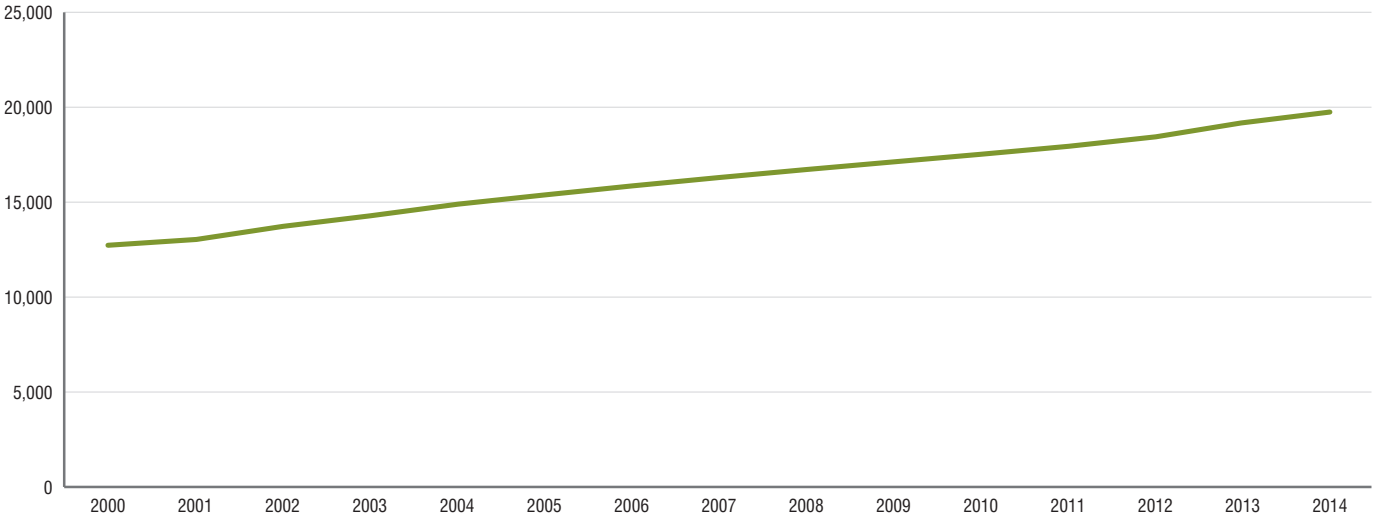
The incidence rate for probable and confirmed new acute cases of hepatitis C rose from 111.6-per-100,000 Massachusetts residents to 127.2, as shown in Figure 5.1.44.

Figure 5.1.40. Chlamydia (Massachusetts, aged 15 and older)



Note: Data for 2014 should be interpreted with caution because DPH converted to a new surveillance system in the middle of the year (denoted by dashed line).
Source: DPH, Bureau of Infectious Disease. (2015, December). STD, HIV/AIDS and viral hepatitis surveillance report 2014. Retrieved from http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2014.pdf

Figure 5.1.41. Current HIV/AIDS cases (Massachusetts)



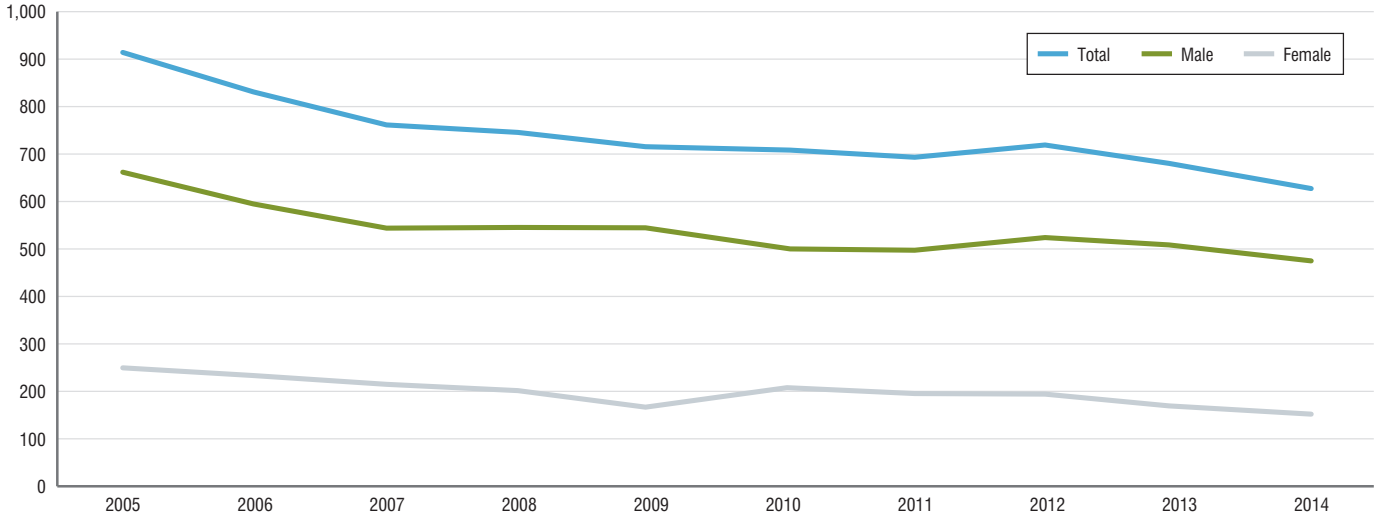
Source: DPH, MassCHIP, HIV/AIDS Surveillance Program, 2000–2014 (Retrieved November 20, 2015).

TUBERCULOSIS

Background

Tuberculosis (TB), an airborne mycobacteria, is the leading infectious disease killer in the world.[235] At least 13 million people nationally and 300,000 in Massachusetts are living with TB infection, which is generally subclinical but serves as the key reservoir for the active, deadly stage of TB.[236] In 2015, there were 9,563 confirmed active TB cases in the U.S. This represented the first increase in 23 years for number of occurrences,[237] although the incidence rate only leveled off due to population growth.[238] The growing number of cases has raised concern for a national outbreak due to neglect of public health infrastructure, as was seen in the late 1980s and early 1990s.[239,240] The threat posed by this disease is even more alarming due to the severely drug-resistant strains proliferating domestically and internationally.

Figure 5.1.42. New cases of HIV/AIDS infection (Massachusetts)



Source: DPH. (2016, March). The Massachusetts HIV/AIDS epidemic at a glance—detailed data tables and technical notes. Retrieved from http://www.mass.gov/eohhs/docs/dph/aids/2016-profiles/epidemic-glance-data.pdf

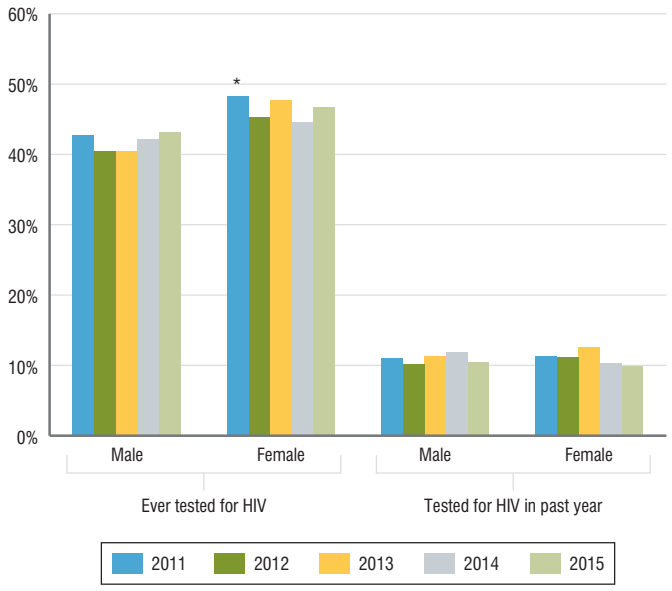
The incidence of active TB cases in Massachusetts has generally declined since 2000 except for increases in 2004 and 2008.[241,242] Despite this progress, however, cases of late are more complicated and one in four cases are resistant to at least one medicine. Because delayed diagnosis can expose more people to the infection, time to diagnosis is another growing concern.[243]

In light of these issues, experts have pressed for increasing, rather than decreasing, investment.[244, 245] Losses of nurses focusing on TB, community health workers, and clinical education staff have reduced capacity to fight TB, particularly in locating newly infected persons and in prevention activities such as screening, testing, and treating those with TB infection and at high risk of progressing to active TB disease.

Massachusetts trend, 2009–2015

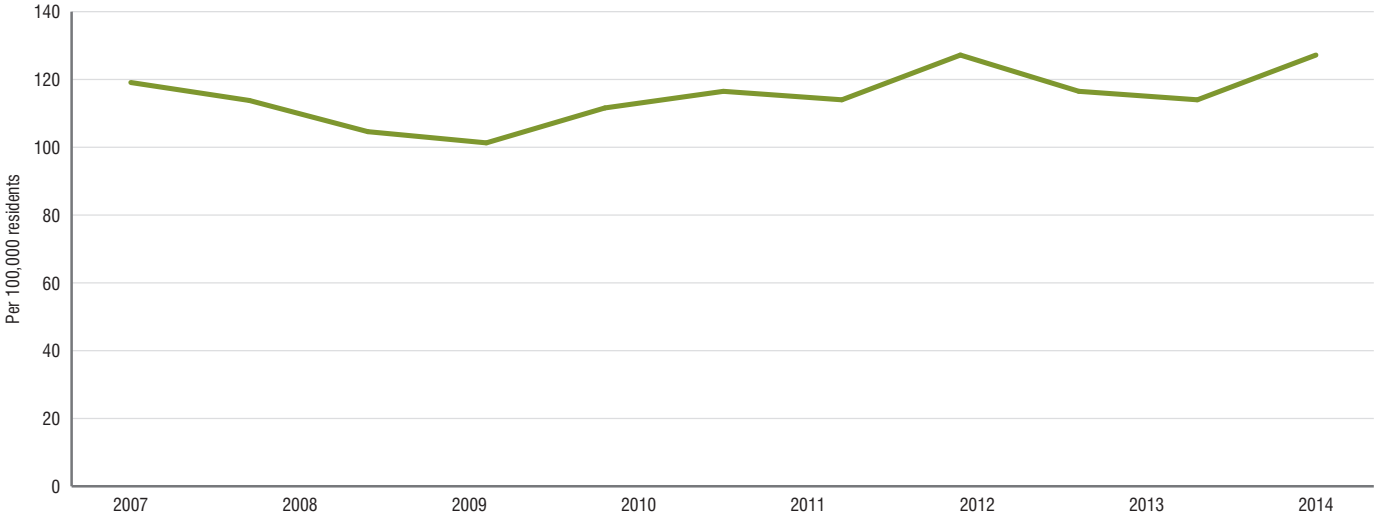
As shown in figure 5.1.45, TB cases in Massachusetts among U.S.-born citizens have fallen sharply since 2009, while cases among residents born outside the U.S. have fallen only slightly (and the number is much higher).

Figure 5.1.43. HIV testing by gender (Massachusetts, aged 18–64)



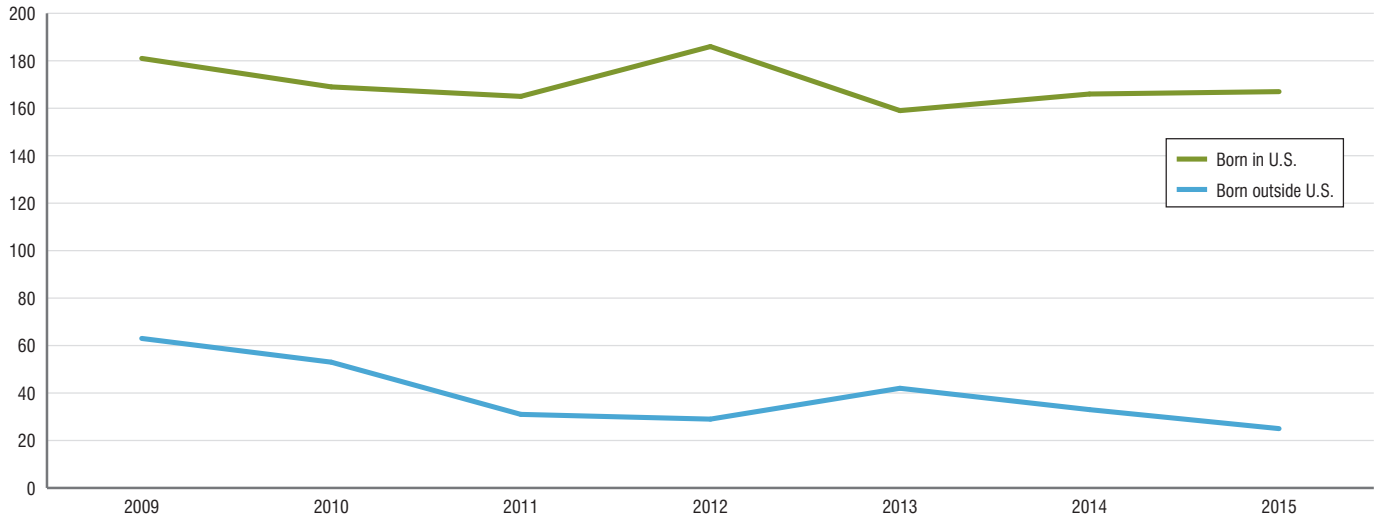
Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.1.44. Probable/confirmed new cases of acute hepatitis C (Massachusetts)



Note: Because CDC changed the definition of acute hepatitis C in 2012, it was difficult to obtain laboratory test results that year, which added cases to 2013 and 2014. The definition was revised again in 2016, which will impact future evaluations: https://wwwn.cdc.gov/nndss/conditions/hepatitis-c-chronic/case-definition/2016/.
Source: Osinski, A., Onofrey, S., Soliva, S., et al. (2016, March). Bureau of Infectious Disease and Laboratory Sciences Hepatitis C virus infection 2015 surveillance report. Retrieved July 12, 2016, from http://www.mass.gov/eohhs/docs/dph/cdc/reporting/surveillance-report-hepatitis-c.pdf

Figure 5.1.45. Reported active tuberculosis cases (Massachusetts)



Source: DPH Bureau of Infectious Disease and Laboratory Sciences, Division of Global Populations and Infectious Disease Prevention, 2009–2015.

Section 5.2:

Prevention and Wellness Programs

OVERVIEW

Chapter 224 created several prevention and wellness initiatives as part of its cost containment efforts, with the goal to improve community health and wellness by supporting new programming in the community. This section highlights two such initiatives—the Prevention and Wellness Trust Fund and the Massachusetts Wellness Tax Credit Incentive—as well as workplace wellness programs in general.

The Massachusetts Department of Public Health (DPH) supports community prevention and wellness programs in the quest to reduce the prevalence of chronic disease, which is a key factor in population health and a key driver of increasing health care costs.[1] In her June 2016 testimony to the Massachusetts Legislature's Joint Committee on Public Health, DPH Commissioner Monica Bharel said the Commonwealth "will not successfully reach our goals of improving health outcomes and reducing costs, especially for those who are at risk of chronic disease, without building our public health capacity and linking it to our health care system in a coordinated way."[2]

In Massachusetts, chronic disease impacts more than half the population and is the leading cause of death and disability.[3] Further, the CDC has noted that 4 of the 10 most expensive health outcomes are related to heart disease and stroke: high blood pressure, heart attack, diabetes, and chest pain.[4]

THE PREVENTION AND WELLNESS TRUST FUND

Chapter 224 established the Prevention and Wellness Trust Fund (PWTF) as an integral part of the law's dual goals to improve health and reduce spending. The fund's $57 million budget was derived from one-time assessments on health insurers and acute hospitals with more than $1 billion in net assets and less than 50% of revenue generated by public payers.[5]

The PWTF strives to contribute to the Commonwealth meeting Chapter 224's cost growth benchmark by supporting activities that have at least one of the following goals:[6]

- Reducing the rates of the most prevalent and preventable health conditions;
- Increasing healthy behaviors;
- Increasing adoption of workplace-based wellness or health management programs that result in positive return on investment for employees and employers;
- Addressing health disparities; and
- Developing a stronger evidence base of effective prevention programming.

Increasing resources for population health efforts is essential for both fiscal and health reasons.[7] Spending on medical care has increased dramatically at a time when more research is showing that physical environment, income level, and other factors account for a greater proportion of our health than clinical services.[8,9,10]

PWTF Grantee Program

The PWTF Grantee Program is the larger of two programs created under the PWTF. The program's model contains five elements:

1) Extending care into the community;
2) Promoting sustainable change (health care system transformation);
3) Focusing on four priority conditions and evidence-based interventions;
4) Providing sufficient funding to select communities with significant burden of disease; and
5) Embedding a quality improvement framework.

EFFECTIVENESS OF INTERVENTIONS CHOSEN

DPH prioritized a set of clinical conditions with a high burden of disease in Massachusetts for the PWTF Grantee Program. Moreover, DPH staff developed a tiering system for evidence-based interventions related to these conditions and from which PWTF grantees were selected.[11]

Tier 1 clinical interventions (related to "priority conditions") were associated with three elements—direct access to data, strong evidence of clinical impact, and a high probability for positive return on investment[12]—and included the following:

- Care management for high-risk asthma patients;
- Comprehensive clinical multi-factorial fall risk assessment;
- Evidence-based diagnosis and management of hypertension; and
- The USPSTF recommendation for tobacco use screening and treatment.

Tier 2 clinical interventions (related to "optional conditions") involved similar qualifications, but had weaker evidence across one or more of the three elements among Tier 1 interventions.[13] Tier 2 included the following:

- Quality improvement and pharmacist interventions to control diabetes;
- Weight management in the primary care setting; and
- Screening, brief intervention, and referral to treatment (SBIRT) for substance use.

There were similar tiers for community-based interventions, and all interventions chosen had strong potential to affect population health within three to five years.[14] Further explanation of the prioritization process is available in the PWTF 2014 Annual Report.[15]

PWTF GRANTEES

After a period of building capacity (where electronic medical systems featured heavily), the first full year of implementation for the grantees was 2015. Nine organizations (including departments of health, hospitals and community health centers, and municipalities) were awarded PWFT grants and named organizing partners. These partners worked cooperatively with government bodies, clinical institutions, and community-based groups to ensure that care would extend into the community and to minimize poor referrals or transitions between settings of care. Together, the partnerships encompassed urban and rural communities that collectively comprised 15% of the state's population and a 23% higher disease burden than the state average, as well as a 28% higher hospitalization rate for African Americans and Latinos.[16]

The partnerships all addressed two or more of the priority conditions noted above and some addressed one or more optional conditions. Thus,

activities focused on executing evidence-based interventions, supporting effective interventions by utilizing quality improvement, and improving linkages between community and clinical efforts, with a specific focus on using electronic referrals.[17]

Harvard Catalyst performed an initial evaluation of the grantee programs' effectiveness. The following are among their early findings:

- A likely decline in the prevalence of pediatric asthma in four PWTF communities;
- An increase in controlled and treated hypertension in several PWTF communities;
- A reduction of 900 falls among older adults;
- More than 6,396 housing units with implemented smoke-free policies, and
- The establishment of community health workers (CHWs) as essential to health equity efforts.[18]

Moreover, the evaluation estimated the measured outcomes will result in approximately $2.0–$3.6 million in averted health care costs in the first 5 years, with more savings accruing over the lifetimes of people served by the grantees.[19]

Massachusetts Working on Wellness Program

A cap of 10% of PWTF funding was allocated to increase the adoption of workplace wellness programs. In 2014, DPH collaborated with the Worksite Wellness Council of Massachusetts, an organization of health-promotion professionals and business leaders, to survey 10,000 worksites to assess policies, practices, and programs that promote and protect employee well-being.[20] The survey had a response rate of 6% (621 businesses); respondents were predominantly from organizations with fewer than 100 employees, so results were weighted by distribution of worksites by employer size to ensure accurate representation from larger worksites.[21] Importantly, the survey showed that small employers were interested in developing wellness programs but needed assistance.

Following this survey, DPH launched the Massachusetts Working on Wellness (MWoW) program in August 2015. Focused on Massachusetts employers, with a special effort to recruit small businesses with less-frequently served employees, MWoW provides training, technical assistance, and seed funding for comprehensive wellness initiatives.[22] As of December 2016, MWoW had 156 actively engaged employers reaching more than 70,000 people. Half of those employers had 200 or fewer employees, and 21% of beneficiaries were among lower-wage workers.[23] Each participating employer had an internal Wellness Champion to participate in training, carry out MWoW activities, submit data for evaluation, and identify other resources for the employees.[24] Finally, an initial, independent evaluation of MWoW estimated a potential $760,000 to $4.07 million in medical care savings related to just the top three targets of funded programs (diet and nutrition, leisure-time exercise, and stress reduction).[25]

ADDITIONAL WORKPLACE WELLNESS PROGRAMS

Background

Community factors—where a person works, learns, and lives—have a significant impact on health.[26] In the U.S., most working adults aged 25 to 54 spend more time at work and doing work-related activities than any other daily activity.[27] Work-related health problems—including anxiety,[28] back disorders,[29] and carpal tunnel syndrome[30]—can increase employer health costs. Moreover, because the prevalence of chronic disease has increased in younger people, the burden of absenteeism (absence from work) and presenteeism (reduced performance while at work) has grown for employers.[31]

For these reasons, the workplace is an ideal location for wellness programs, which provide supplementary health care activities and information, encourage a healthy work environment, and promote the benefits of healthy behaviors by individual employees. Across the country, many health plans offer these programs to contain health care costs, reduce absenteeism, and increase the well-being of employees.[32]

Federally, these programs can involve "health-contingent" incentives that reduce an employee's premiums or other cost-sharing based on health status (e.g., a premium discount for meeting a blood pressure goal).[33] However, program design requires special attention to prevent unintentional increase in health disparities, and health-contingent incentives are prohibited in the MWoW program. Other common elements of wellness programs involve a wide range of activities and programming, such as health-risk surveys, discounted gym memberships, education on risky behaviors, and personalized plans to improve employee health.[34]

The Kaiser Family Foundation (KFF) and the Health Research and Annual Trust (HRET) have collected data on workplace wellness programs since 2005. According to the 2016 survey, 83% of large firms (those with at least 200 employees) and 46% of smaller firms offering health benefits offered wellness programs related to tobacco cessation, weight loss, and/or "other lifestyle or behavioral coaching."[35] Programs varied in whether they were offered as part of, or independent from, the group health plan and in their use of financial incentives and health screenings.

Program effectiveness

The federal Department of Labor contracted with the RAND Corporation to review how well workplace wellness programs achieved cost savings and health improvements.[36] In their 2013 report, the study authors found that employers strongly believed in the cost savings potential, yet most did not evaluate program impact.[37] Among employers that did collect data, findings included the following:

- Wellness programs reduced health care costs somewhat ($30 per employee per month).
- A large majority of those savings were credited to employee participation in programming for chronic-disease interventions.[38]
- Programs featuring lifestyle management (e.g., promoting exercise or nutrition) accounted for 13% of health care savings.[39]
- Behavioral changes associated with the programs were small and not clinically significant. For example, participants in fitness programs increased the number of days per week they exercise for at least 20 minutes by 0.15 days compared to nonparticipants.
- Participants in weight control programs lost an average of about one pound over the first three years compared to nonparticipants; at the end of the five-year program, 27% of participants were obese, compared to 40% of non-participants.[40] Essentially, while participant behavior changed, that change did not translate to significant outcomes.

In another study, researchers at Harvard University found that, for every dollar spent on wellness programs, employers saved about $3 in reduced

medical costs and another $3 in reduced absenteeism, though program benefits take time to accumulate.[41]

The 2015 Health and Well-being Touchstone Survey by PricewaterhouseCoopers (PwC) explored the drivers of employer interest in workplace wellness programs. The authors noted 73% of employers continue to invest in wellness programming even though employee participation was below 30% in programs without incentives.[42] As noted in Table 5.3.1, a majority of PwC survey respondents (1,150 employers in 36 industries) assessed wellness programs as somewhat effective. Quantitative metrics were used mostly to gauge the program effectiveness in mitigating health care costs; the other areas of evaluation relied heavily upon subjective judgment.[43]

Employers responding to the PwC survey did not necessarily seek to capture ROI for their wellness programs. Seven to 10 percent of respondents measured ROI for their wellness and disease management programs, 49% had insufficient information to calculate ROI, and 41% did not measure ROI.[44] Similarly, the 2014 DPH survey of Massachusetts employers found that 96% of respondents did not calculate an ROI.[45]

Wellness Tax Credit Incentive Program

Chapter 224 offers a state tax credit of 25% of the cost of implementing a certified wellness program for businesses in the Commonwealth with 200 or fewer employees. This credit, up to a maximum of $10,000 per business per year, supports workplace programs designed to improve the health and well-being of employees. The programs strive to create an environment that provides employees with specific health information, identifies and addresses the specific health needs of employees, and helps employees change risky behaviors.[46] To qualify for the tax credit and be certified by MDPH, employers must have a wellness program with eight elements, including evidence-based interventions, as follows:

- Have an annual budget;
- Appoint a designated "wellness champion" to oversee the program;
- Formally communicate to employees about the program;
- Make employees aware of their personal health risks;
- Collect data on employee interests in various wellness topics;
- Identify the top health issues and interests of employees;
- Develop programs that focus on those interests; and
- Have at least 33% of employees participating in at least one element of the program.[47]

Since 2013, 133 small businesses that received an DPH seal of approval for their wellness programs have been eligible for over $827,000 in tax credits under the Wellness Tax Credit Incentive Program.[48] DPH exceeded its goal to reserve 50% of the annual allocation to employers with 100 or fewer employees since the beginning of the program. Indeed, about 72% of these businesses had 100 or fewer employees. This response has been attributed to DPH's effort to promote workplace wellness with the smallest employers. It should be noted that DPH is unable to track what percentage of certified credits are claimed through tax filings.

Table 5.2.1. Employer Views of Wellness Program Effectiveness

Effectiveness of Wellness Programs at:	Very Effective	Somewhat Effective	Not Effective
Enhancing employee engagement, attraction, and loyalty	16%	70%	14%
Improving performance and productivity	9%	69%	22%
Mitigating health care costs	10%	71%	19%
Reinforcing corporate responsibility and image	21%	64%	15%

Source: PwC Health and Well-being Touchstone Survey, 2015

Section 5.3:
Racial/Ethnic Disparities in Health Outcomes

This section uses longitudinal procedures to present a comprehensive analysis of racial/ethnic disparities in health engagement and outcomes in the Commonwealth. Topics include:

1. Access to care (primary care utilization and oral health)
2. Cancer screening
3. Cancer mortality
4. Morbidity/mortality from other conditions, including:
   - Low birthweight and infant mortality
   - Key risk factors (including smoking and blood pressure)
   - Chronic conditions
   - Acute events (heart disease and stroke)
   - Infectious disease (including sexually transmitted infections and tuberculosis)

A NOTE ABOUT THE DATA

OSA's analysis in Chapter 5.3 draws in part from APCD commercial claims data, which are not broken down by race/ethnicity. Health statistics often lack this segmentation, which hinders efforts to understand trends within different population groups.

In light of this challenge, OSA partnered with CHIA and RAND Corporation to utilize an algorithm that imputes race/ethnicity estimates for the commercial population, as follows:

- The inputs for this algorithm are APCD claims data, patient last names, and patient ZIP codes.
- Drawing from census data, the algorithm calculates the probability of a last name matching each race/ethnicity (White, African American, Latino, and Asian) and the race/ethnicity composition of the ZIP code. These two factors combine to produce a probability estimate of an individual's race/ethnicity.
- OSA used these estimates to project population-level race/ethnicity outcomes for colorectal, breast, and cervical cancer screening.

- The estimates should be interpreted cautiously, since they do not reflect observed data and include only the APCD commercial population, which has more economic and other resources than the MassHealth population.

This section also draws data from the BRFSS survey, which provides data disaggregated by race/ethnicity;[1] MassHealth, which, in terms of race/ethnicity, is populated at about 60%; and CDC mortality and overweight/obesity data.

OVERVIEW

According to the U.S. Office of Minority Health, health disparities are a "particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage."[2] These "disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion."[3]

Despite long-standing awareness by policymakers of national disparities among racial/ethnic groups, differences persist in many health domains.[4] For example, the infant mortality rate among African Americans is more than double the rate among Whites,[5] African Americans are at least 50% more likely than Whites to die of stroke or heart disease,[6] and American Indians/Native Alaskans, African Americans, and Latinos are at higher risk of diabetes than Whites and Asians.[7] These disparities contribute to differences in longevity: Nationwide in 2014, life expectancy (at birth) was 79 years among Whites and 81.8 years among Latinos but only 75.6 years among African Americans.[8] However, average longevity does not show variations within these groups (for example, risk for different outcomes varies widely between Mexicans, Puerto Ricans, and other Latino cohorts[9]).

Social determinants of health are powerful predictors of health outcomes and help drive racial/ethnic differences.[10] Unfortunately, the inequity begins early, since the poverty rates for African American and Latino children are 38% and 30%, respectively, compared with 11% for Whites.[11] This pattern is true at the neighborhood level; 40% of African American children and 35% of Latino children live in very-low-opportunity neighborhoods, compared to only 9% of White children, according to a study by Acevedo-Garcia and colleagues.[12]

Another crucial factor contributing to health disparities is exposure to what is known as "structural violence." This concept refers to discriminatory social structures—economic, political, legal, religious, and cultural—that impede the ability of individuals, groups, and societies to reach their full potential[13] and satisfy fundamental human needs, including access to comprehensive health care and protection against injuries and physical violence.[14] The fulfillment or deprivation of these needs drives health disparities among groups.

For example, in Albuquerque, N.M., structural forces (such as racial discrimination and threat of law enforcement action based on immigration status) create fear among immigrants, thus impairing their access to needed diabetes care.[15] Moreover, limited economic activity, housing discrimination, and uneven enforcement of the criminal law have led to enhanced risk of injuries and violence among African Americans and Latinos. In Massachusetts, the homicide rate in 2014 was 10.9 per 100,000 for African Americans and 5.5 per 100,000 for Latinos, but only 0.7 per 100,000 among Whites.[16] This enhanced risk among African Americans and Latinos mirrors nationwide trends.[17] Moreover, an analysis of nationwide ED data found that, among both men and women, African Americans are almost five times more likely than Whites to go to the ED following interactions with law enforcement (including police).[18]

Though the heart of Chapter 224 does not directly address reducing racial/ethnic disparities, the Prevention and Wellness Trust Fund (which the law created) requires that payouts from the fund address health disparities or one of four other topics. Furthermore, improving health care access and quality—the main thrust of Ch. 224—is thought to be a tide that raises all boats.[19]

> "You can't call it an [All-Payer Claims Database] without MassHealth data, without psych behavioral health information, without race and ethnicity. … The [APCD's] information is still not as good as it could be, but it's getting better."
>
> **— SECRETARY MARYLOU SUDDERS, ON THE IMPORTANCE OF A BROAD-RANGING APCD**

Access to Care

ROUTINE CHECKUP IN THE PAST YEAR

Background

Nationally, 16% of men and 17% of women lack a personal primary care provider (PCP); Latinos are most likely and Whites are least likely to lack a PCP.[20,21] In Massachusetts, 8% of adult women, and 16% of adult men lack a personal PCP.[22,23] Among women in the Commonwealth, Whites are least likely to lack a PCP (6%), while Latinos and Asians/Pacific Islanders are most likely (15%).[24] Among men, Whites are least likely to lack a PCP (12%), while Latinos are most likely (30%).[25]

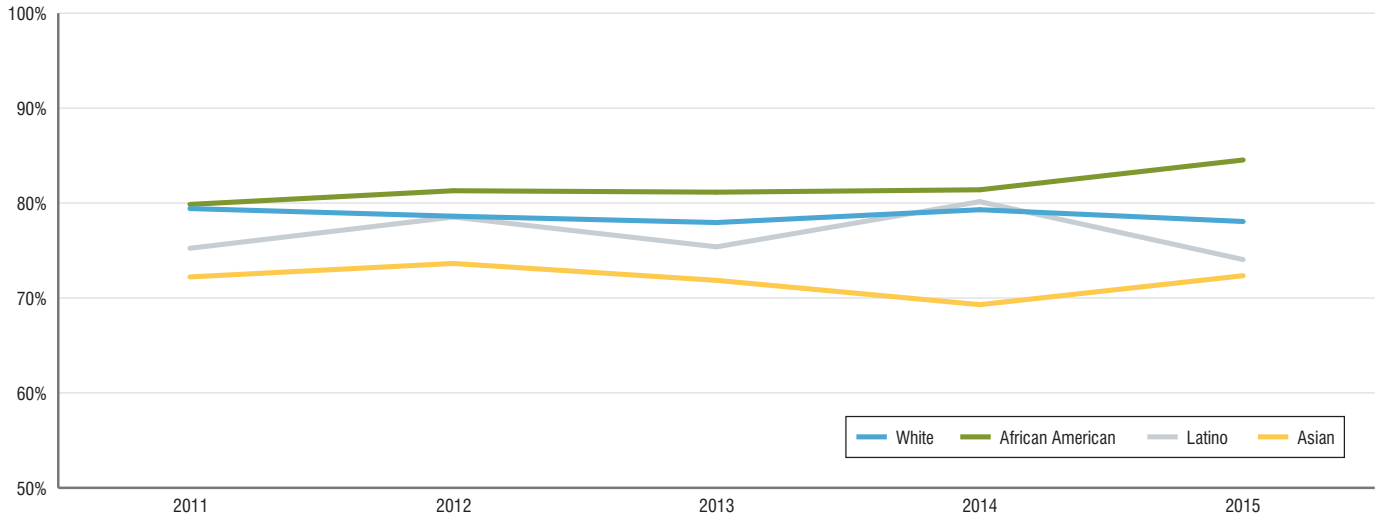
The higher uninsurance rate among non-White populations may explain some of these disparities.[26] Moreover, non-Whites are more likely to be MassHealth members, but in areas with a high number of MassHealth patients, there is often limited availability of providers, leading to a PCP shortage in many disadvantaged communities.[27]

Massachusetts trend, 2011–2015

Figure 5.3.1 presents the percentage of adults who had a routine checkup in the past year from 2011 to 2015: 78.7% among Whites, 81.7% among African Americans, 76.7% among Latinos, and 71.9% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: African Americans and Latinos were significantly more likely than Whites to have a routine checkup in the past year. In addition, looking at the average yearly change for the entire period examined, there was a

Figure 5.3.1. Routine checkup in the past year (Massachusetts adults)



Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

significant decrease among Whites and no significant increase or decrease among other races/ethnicities.

HAS A PERSONAL HEALTH CARE PROVIDER

Background

Many patients have one medical professional they consider their personal health care provider. Most often this is a primary care provider (PCP), but many patients prefer to see a specialist for their everyday health care needs, such as women's health providers[28] or gerontologists. In Massachusetts, groups less likely to have a personal health care provider include men, younger adults, adults with household income <$25,000, and adults who did not finish high school.[29]

In Massachusetts, the ease of finding a personal provider depends on where one lives, since some parts have better access to PCPs. Further, a lack of local providers accepting MassHealth, which disproportionately covers non-Whites, can limit patient options for connecting with a personal provider. In 2013, less than two-thirds of internal medicine physicians in six counties (out of 14 in Massachusetts) accepted MassHealth.[30]

Massachusetts trend, 2011–2015

Figure 5.3.2 presents the percentage of adults who say they have a personal health care provider. During this period, the average prevalence of having a personal health care provider was 91.0% among Whites, 84.5% among African Americans, 77.5% among Latinos, and 80.8% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: African Americans, Latinos, and Asians were significantly less likely than Whites to have a personal health care provider. During the period examined, there was no significant increase or decrease for all racial/ethnic groups.

"[Massachusetts ranks] very high in terms of providers willing to see Medicaid patients ... poor, uninsured patients, Black patients, brown patients. We don't have those problems that other areas have."

— DR. DAVID CUTLER, COMMISSIONER, HEALTH POLICY COMMISSION

SKIPPED NEEDED DOCTOR VISIT DUE TO COST

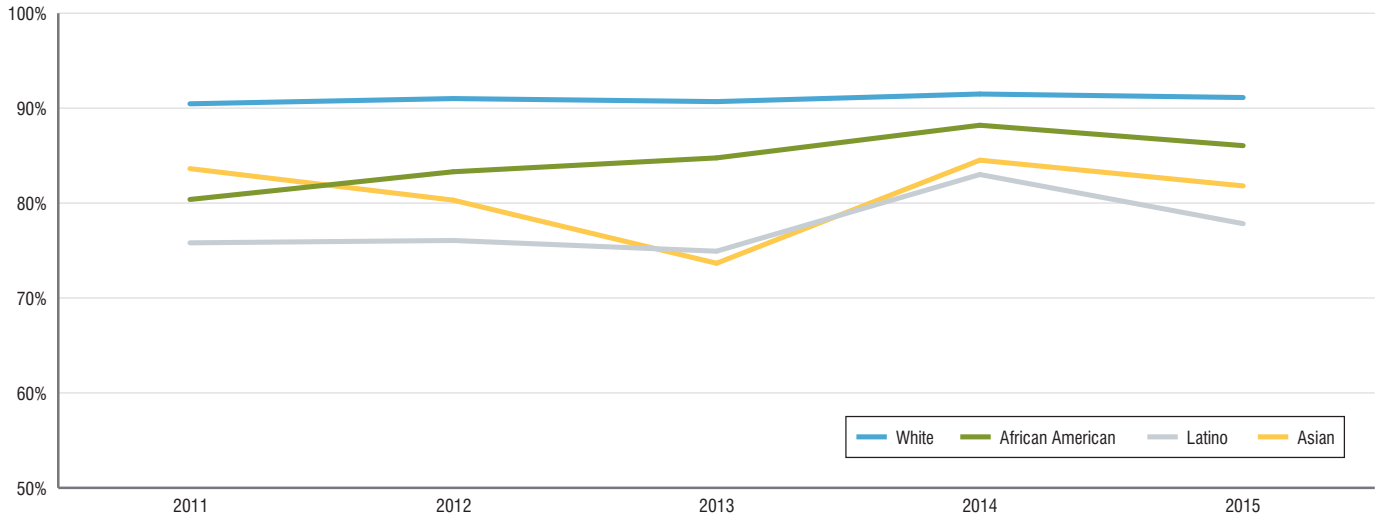
Background

Due to the ACA, the vast majority of insurance plans cover an annual preventive visit with a low or no copayment, but consumers can still face substantial out-of-pocket costs when they seek other care, including tests, scans, medications, and specialist appointments. Millions of Americans have medical debt, and a disproportionate are non-White[31] in part due to the significant gap in wealth among racial/ethnic groups, as follows:

Among families with incomes <$40,000, 40% of White respondents could pay cash for a $400-emergency expense, while only 20% of African Americans and 27% of Latinos could, according a report from the Board of Governors of the Federal Reserve reported.[32]

- Latinos and African Americans are less likely to be able to afford time-off from work or money for transportation to visit a doctor's office.[33]
- Non-Whites are "charged" more for outpatient visits: Nationwide, non-Whites spend 25% to 28% more time traveling to and waiting for ambulatory medical care than White patients.[34]

Figure 5.3.2. Has a personal health care provider (Massachusetts adults)



Note 1: Figure shows response to question "Do you have one person you think of as your personal doctor or health care provider?"
Note 2: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

Massachusetts trend, 2011–2015

Figure 5.3.3 shows the share of adults who say they skipped a doctor visit due to cost in the past year: 7.2% among Whites, 13.3% among African Americans, 20.1% among Latinos, and 6.8% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: African Americans and Latinos were significantly more likely than Whites to skip a needed visit in the past year. During the period examined, there was a significant decrease in visits skipped among Whites, and there was no significant increase or decrease among other races/ethnicities.

ORAL HEALTH

Background

Nationally, African American men are less likely than White men to see a dentist, twice as likely to have tooth decay, and less likely to survive oral cancer after five years.[35] Using a nationally representative dataset from 2002 to 2012, Horner-Johnson and colleagues found that, compared to Whites, other racial/ethnic groups (particularly people with disabilities) were less likely to receive annual dental examinations.[36] According to Medical Expenditure Panel Survey data, 51% of those with private insurance, 20% with Medicaid, and 23% with no insurance saw a dentist in the last year.[37]

In the Commonwealth, only 21% of licensed dentists billed $10,000 or more to MassHealth, which disproportionately serves non-White individuals, in FY 2013. The other four of five dentists did not accept MassHealth as payment.[38]

Interviews of parents of preschoolers in Chelsea—an inner suburb of Boston with a disproportionately large share of African refugee and Latino families—found that insurance type is a major barrier to obtaining dental care for young children.[39] Other barriers included perceived poor quality of some dental practices, limited availability of dental care for children younger than two, poor coordination of care, and lack of culturally competent care. Family-level barriers included low oral health literacy, cultural differences, limited language proficiency, and competing priorities.[40]

Massachusetts trend, 2010–2014

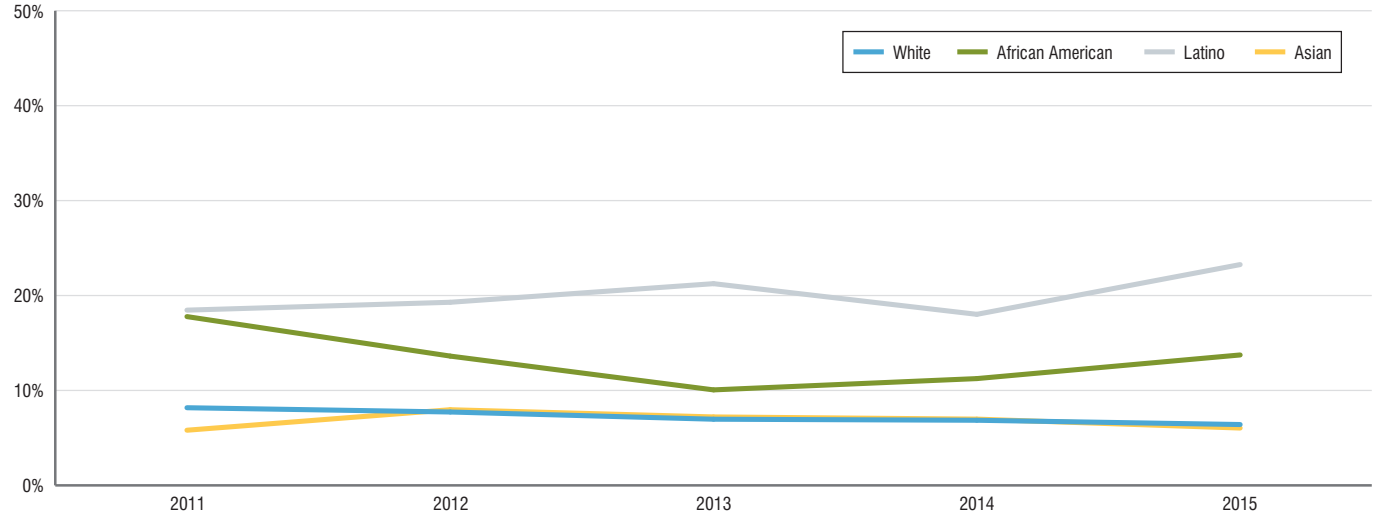
In Massachusetts, White individuals are most likely to have a dental visit each year, followed by Asians/Pacific Islanders, Latinos, and African Americans. Insurance type contributes to this disparity; MassHealth and other public insurance programs that disproportionately cover non-White patients generally have limited dental coverage compared to commercial insurance.

As shown in Figure 5.3.4, dental visit rates fell from 2010 to 2014 among Whites, African Americans, and Latinos and rose slightly among Asians/Pacific Islanders.

Figure 5.3.5 presents the percentage of adults who have at least six missing teeth due to decay or gum disease from 2012 to 2014. The average prevalence of having at least six missing teeth was 16% among Whites, 18.4% among African Americans, 15% among Latinos, and 3.1% among Asians.

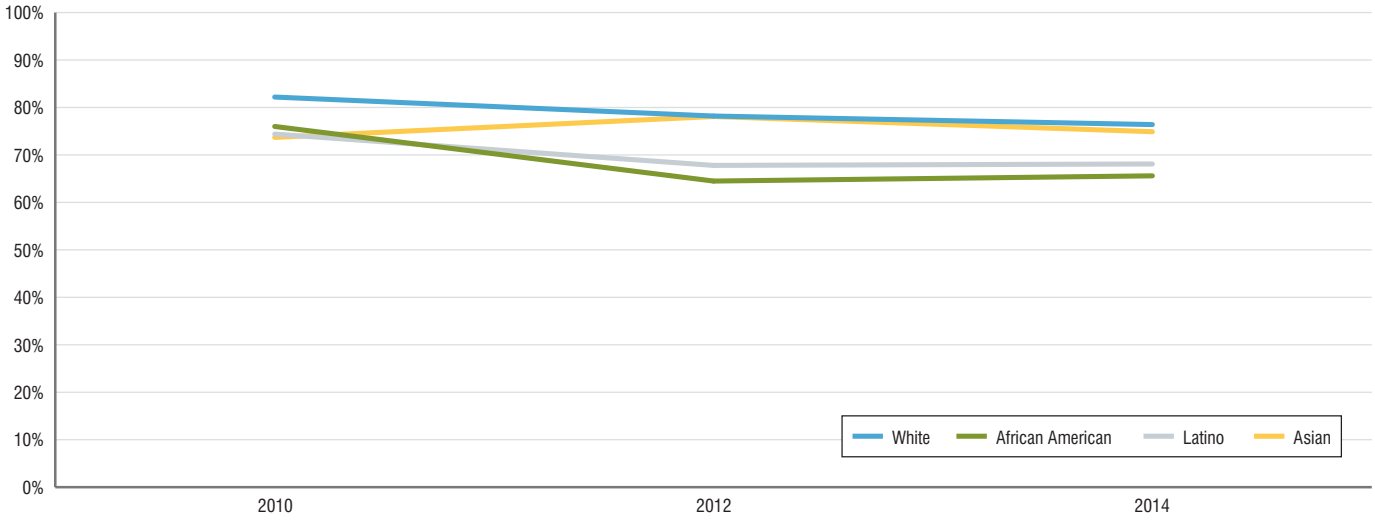
Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: African Americans were significantly more likely than other groups to have at least six missing teeth, followed by Latinos, Whites, and Asians. During the period examined, there was no significant increase or decrease in this measure among all races/ethnicities.

Figure 5.3.3. Could not see a doctor due to cost (Massachusetts adults)



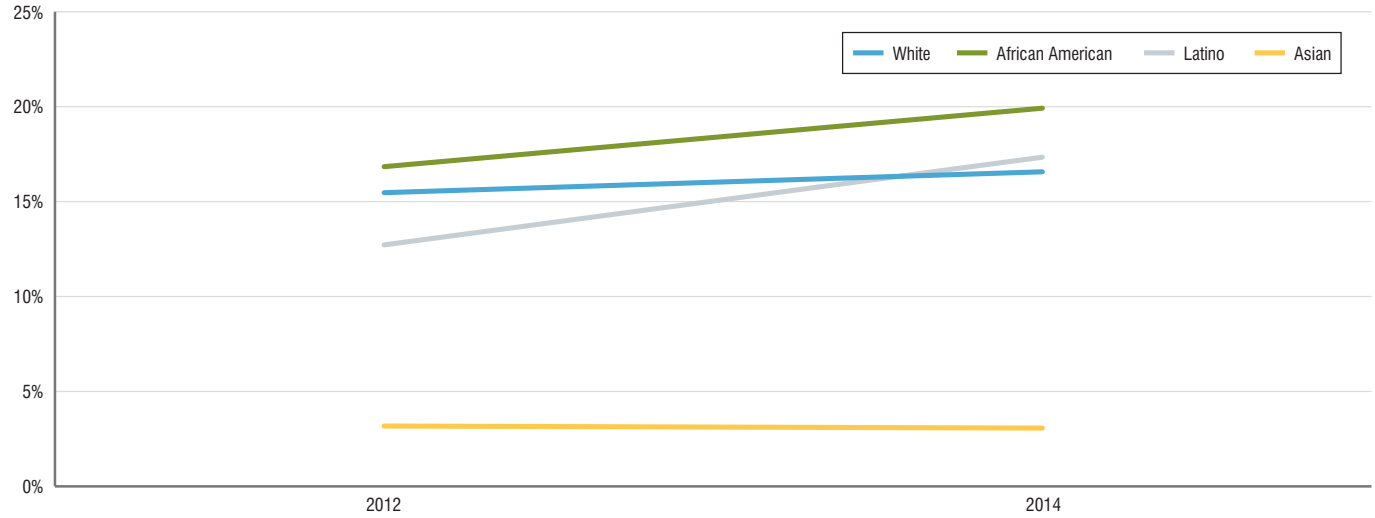
Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.4. Had dental visit within year (Massachusetts adults)



Source: DPH/BRFSS. Retrieved November 25, 2015.

Figure 5.3.5. At least six teeth missing (Massachusetts adults)



Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

Cancer Screening

Regular screening can help diagnose cancer early, raising the odds of successful treatment. Barriers to cancer screening include lack of health coverage and lack of a usual source of care.[41] Among Latinos, relatively low insurance rates pose challenges for patients seeking screening.[42] Whites are generally diagnosed at an earlier stage of cancer than non-White populations.[43]

BREAST CANCER SCREENING

Background

Nationwide in 2013, 67.1% of African American women, 66.8% of White women, 66.6% of Asian women, 62.6% of Native American/Alaska Native women, and 61.4% of Latina women had a mammogram.[44] USPSTF recommends that women aged 50 to 74 receive a mammogram every two years;[45] however, these guidelines may not accurately reflect the particular screening needs of women of color, because so few non-White women were included in the seminal research trials that support the guidelines.[46]

There are additional race/ethnicity disparities within subgroups. For example, among African Americans, multiple studies have found that Haitian women receive less breast cancer screening than English-speaking Caribbean women and other U.S.-born African Americans.[47]

The ACA and Massachusetts health care reform law[48] require that insurance cover a free mammogram with insurance coverage, yet barriers remain. In a study of Latina women in Connecticut, lower mammography rates were associated with women who had their most recent primary care appointment conducted completely in English, lacked a usual place to seek health care, and had to pay for part of a mammogram.[49]

Massachusetts trend, 2012–2015

Figure 5.3.6 presents the percentage of women aged 50 to 74 with commercial insurance who had a mammogram in the past 27 months. From 2012 to 2015, the average prevalence of having a mammogram in the past 27 months among Whites was 87.3%, among African Americans was 87.9%, among Latinas was 88.8%, and among Asians was 87.2%.

According to OSA's imputation estimate, Latinos and African Americans were significantly more likely and Asians were significantly less likely to be screened than Whites. During the period examined, all racial/ethnic groups had a significant increase in screening.

CERVICAL CANCER SCREENING

Background

The USPSTF recommends that women aged 21 to 65 receive a Pap smear to screen for cervical cancer every three years.[50] In 2013, among adult women nationwide, 75.3% of African Americans, 70.5% of Latinas, 70.1% of Native Americans/Alaska Natives, 68.7% of Whites, and 65.3% of Asians had a Pap smear within the past three years.[51]

The disparities in this category have several nuances. One national study found that, among White women, those with only female sexual partners in the past year were significantly less likely to have a Pap smear than those with only male sexual partners. (This difference was not observed among Latina women).[52] Moreover, women with no sexual partners in the last year were significantly less likely to have a Pap smear than women with only male sexual partners among White and African American women, and to a lesser extent among Latina women. Some of this disparity is attributable to lack of access to health care.[53]

Another study of 1,420 women found that Haitian women were less likely to report ever having a Pap exam than (non-Haitian) African American women of Caribbean and non-Caribbean descent.[54] According to National Health Interview Survey data, U.S.-born women are more likely than

Caribbean-born women to have had a Pap smear sometime in their lives.[55] A Massachusetts study found that African American, English-Caribbean, and Latina women had higher Pap smear rates than Haitian women.[56]

Massachusetts trend, 2012–2015

Figure 5.3.7 presents the percentage of women aged 21 to 64 with commercial insurance who were screened for cervical cancer.[57] During this period, the average prevalence of being recently screened was 83.0% among Whites, 81.4% among African Americans, 83.2% among Latinos, and 82.5% among Asians.

Compared to Whites, African Americans and Asians were significantly less likely, and Latinos were significantly more likely, to be screened. During the period examined, there was no significant change by any race/ethnicity.

COLORECTAL CANCER SCREENING

Background

In the United States, non-White individuals are more likely to develop and die from cancer, especially colorectal cancer (CRC).[58] CRC screening rates are lower among populations with lower literacy, income, and English-proficiency rates.[59] Moreover, racial/ethnic disparities in CRC screening rates have been found to vary across health systems, with African Americans most affected.[60]

USPSTF recommends screening for adults aged 50 to 75 through FOBT, sigmoidoscopy, or colonoscopy.[61] Still, 5.5% of CRCs in Whites and 10.6% in African Americans occur among those younger than 50. Other studies have found that people of Puerto Rican heritage have higher rates than those of Mexican, Cuban, Dominican, and Central/South American heritage.[62]

Possible interventions to diminish screening disparities include eliminating pre-procedure visits, assigning so-called "patient navigators" to help patients understand how to obtain a colonoscopy following a referral, and counseling patients with low health literacy on the value of screening.[63] The combination of these interventions helped New York City close racial/ethnic disparities in CRC screening. Moreover, some research has suggested that CRC screening rates improve when patients are offered screening via FOBT,[64] which is less invasive than other CRC screening methods, or when patients were shown a screening decision aid.[65]

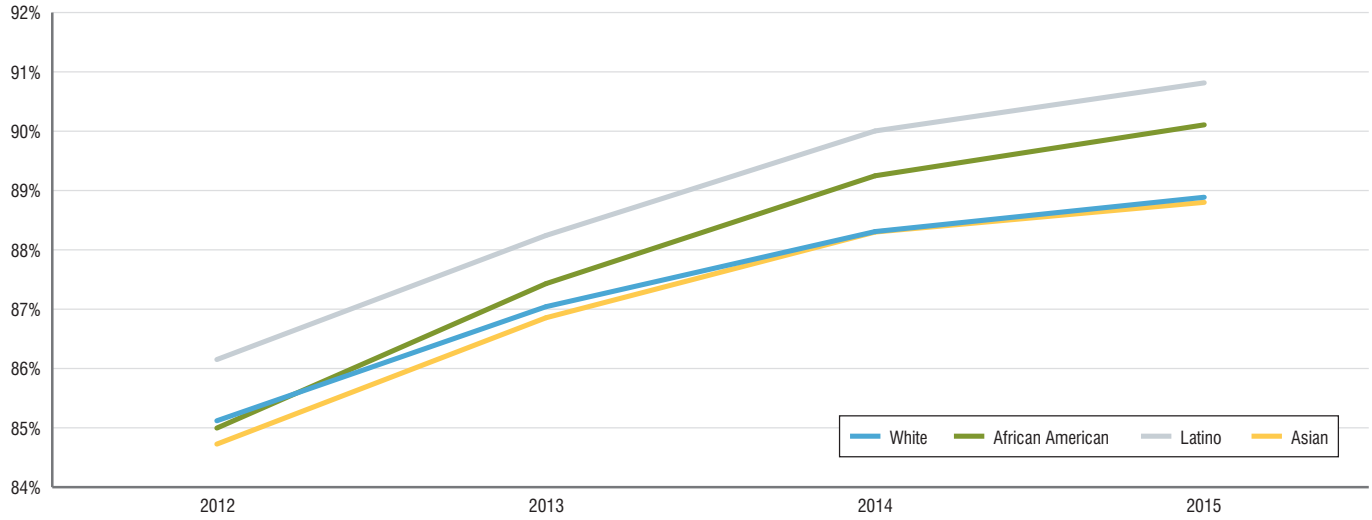
Massachusetts trend, 2011–2014

Figure 5.3.8 presents the percentage of adults aged 50 and older who reported receiving a recommended CRC screening.[66] The average prevalence of having a sigmoidoscopy/colonoscopy in the past five years was 61% among Whites, 58.4% among African Americans, 61.9% among Latinos, and 51.7% among Asians. The average prevalence of having a FOBT in the past two years was 16.4% among Whites, 15.9% among African Americans, 11.8% among Latinos, and 7.9% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: There was no significant difference in sigmoidoscopy/colonoscopy or FOBT across racial/ethnic groups. During the period examined, there was a significant decrease among Whites in sigmoidoscopy/colonoscopy in the past five years or FOBT in the past two years, but no significant increase or decrease among other races/ethnicities.

Figure 5.3.9, which reflects data from medical claims using imputation estimates, presents the percentage of the commercially insured (aged 50 to 75) who had a FOBT in the past year, flexible sigmoidoscopy in the past five years, or colonoscopy in the past 10 years. Screening rates from 2010 to

Figure 5.3.6. Breast cancer screening, estimated (Massachusetts, aged 50–74, commercial)



Note 1: This figure reflects imputation estimates rather than observed data. Additionally, only the commercial insurance population (which is wealthier than the MassHealth population) is represented. Interpret with caution.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis using RAND Corporation methodology and APCD data.

2015 were underestimated due to insufficient APCD data, so results should be interpreted cautiously. It appears that screening rates increased substantially from 2010–2015.

The contradictory findings for Whites (which show a screening decline in Figure 5.3.8 and an increase in Figure 5.3.9) reflect differing results from two data sources with differing methodology. The discrepancy may be due to the difference in age range and population between the sources (general population aged 50 and older for the BRFSS survey versus commercial enrollees aged 50 to 75 for the medical claims data).

PROSTATE CANCER SCREENING

Background

A common method of screening for prostate cancer is the prostate-specific antigen (PSA) blood test.[67] However, the USPSTF does not generally recommend PSA screening for men 5aged 50 to 69, and recommends against it for men aged 70 and older, due to serious potential harms, e.g., overdiagnosis, overtreatment, and treatment complications.[68]

Compared to White men, African American men have a much higher rate of prostate cancer mortality yet are less likely to be screened.[69] Routine screening and early detection can help improve outcomes for patients.[70] Low screening rates among African American men may be due to racial/ethnic differences in inadequate access to health care, socioeconomic status, inadequate knowledge of prostate cancer, fear of what screening may find, distrust of providers, and aversion to digital rectal exams.[71] Some experts have argued that separate screening guidelines should be issued for African Americans due to their high risk.[72]

Among Latinos, the perception that certain prostate screening procedures are "unmasculine" may contribute to their hesitation to be screened.[73]

Massachusetts trend, 2011–2014

Figure 5.3.10 presents the percentage of men aged 50 and older who had a PSA test in the past year: 46.7% among Whites, 39.9% among African Americans, and 34.5% among Latinos.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: Latinos were significantly less likely than Whites to have a PSA blood test in the past year. During the period examined, there was a significant decrease in past-year PSA testing among Whites. There was no significant increase or decrease among other races/ethnicities.

Cancer Mortality

Cancer is the leading cause of death in Massachusetts.[74] The share of Massachusetts adults who had ever been diagnosed with cancer increased from 10.9% in 2011 to 11.6% in 2015, as shown in Figure 5.3.11. This climb may be at least partially attributable to the aging of the state population—cancer risk rises with age—since the percentage of residents aged 65 and older increased from 13.8% in 2010 to 15.4% in 2015.[75]

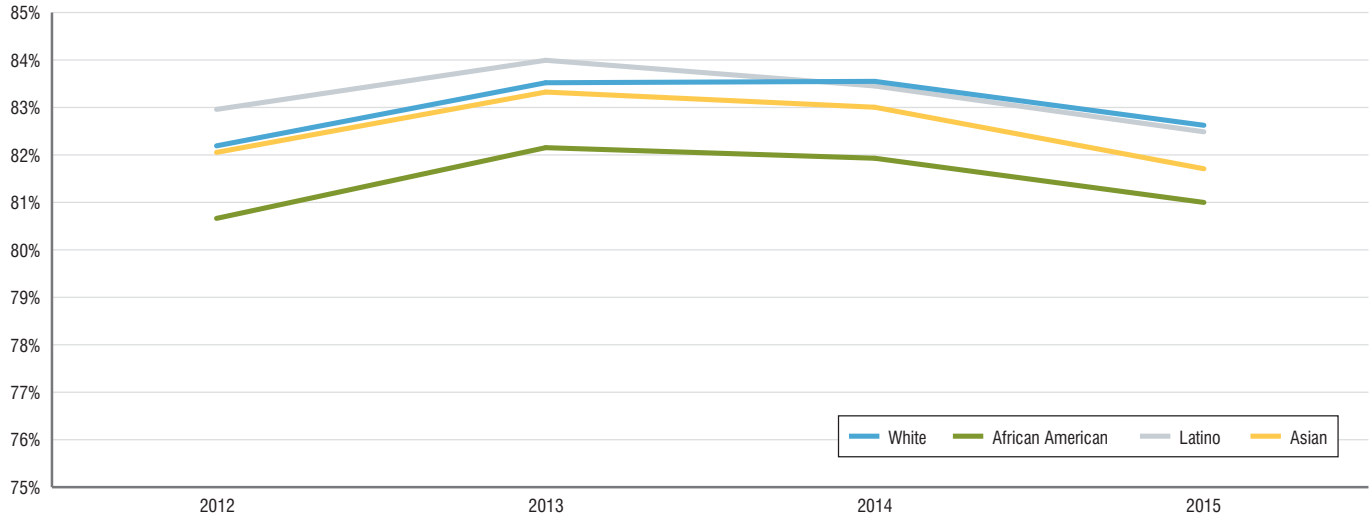
In Massachusetts, cancer rates are highest among Whites, though African Americans have poorer cancer survival rates.[76] Moreover, Whites have the highest rate of cancer death, though the rate declined among all race/ethnicities from 2011 to 2015, as shown in Figure 5.3.12.

BREAST CANCER MORTALITY

Background

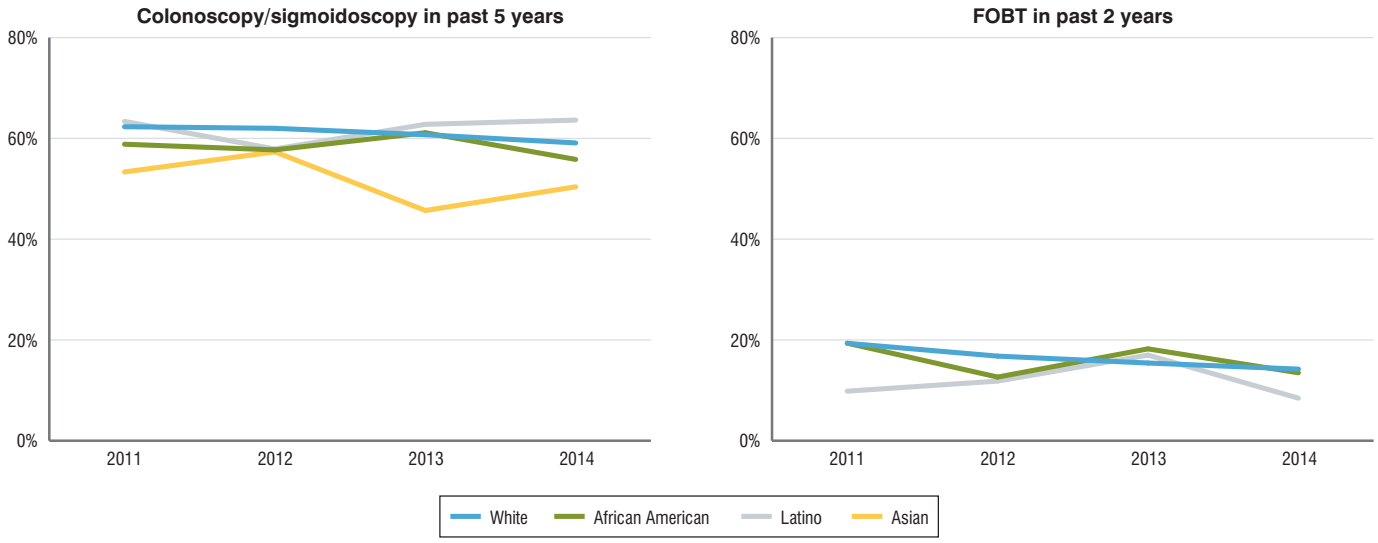
Breast cancer is the second leading cause of cancer deaths among women in Massachusetts.[77] Nationwide, female breast cancer risk is highest among Whites, second-highest among African Americans, lowest among

Figure 5.3.7. Cervical cancer screening, estimated (Massachusetts, aged 21–64, commercial)



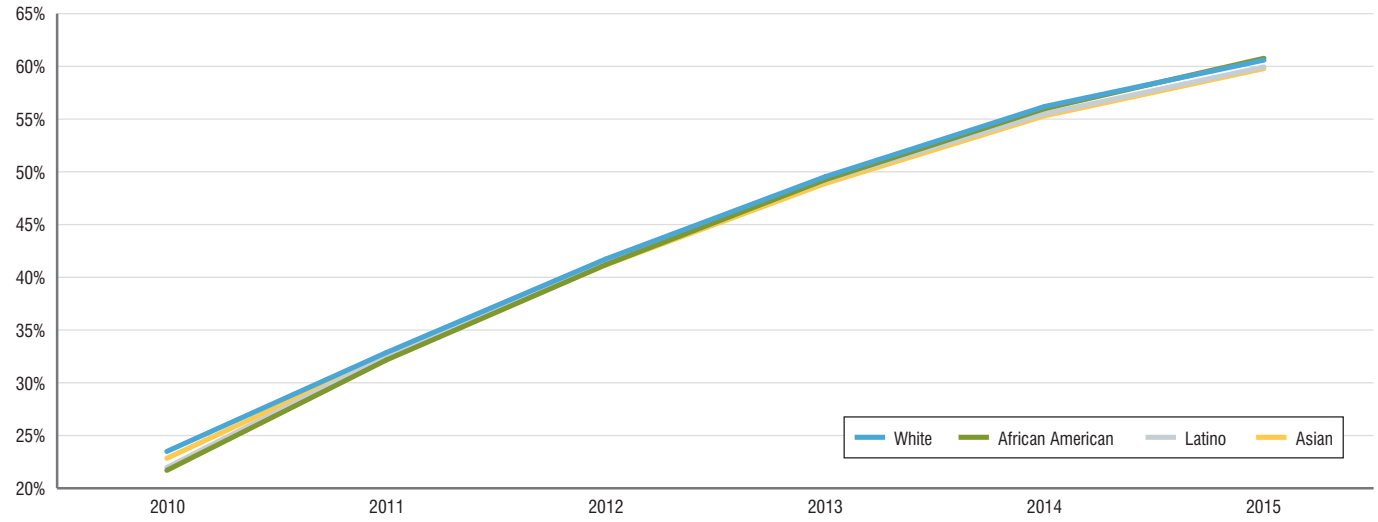
Note 1: This figure reflects imputation estimates rather than observed data. Additionally, only the commercial insurance population (which is wealthier than the MassHealth population) is represented. Interpret with caution.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis using RAND Corporation methodology and APCD data.

Figure 5.3.8. In line with colon screening guidelines, by test type (Massachusetts, aged 50 and older)



Note 1: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Note 2: Insufficient data for Asians for FOBT.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.9. Appropriate colorectal cancer screening, estimated (Massachusetts, aged 50–75, commercial)

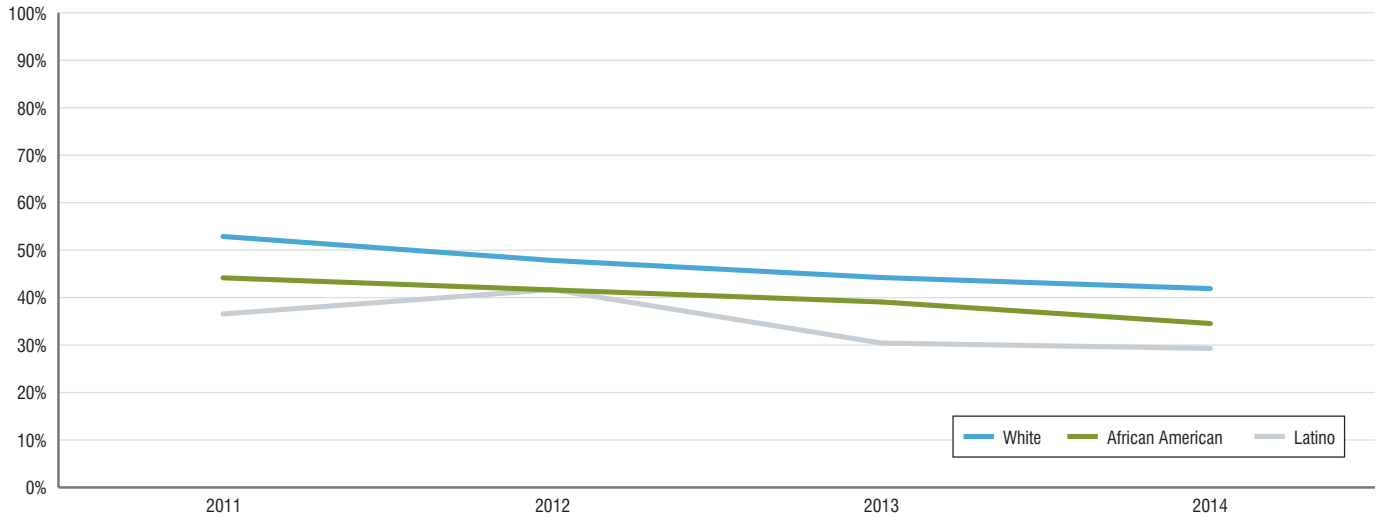


Note 1: This figure reflects imputation estimates rather than observed data. Additionally, only the commercial insurance population (which is wealthier than the MassHealth population) is represented. Interpret with caution.
Note 2: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis using RAND Corporation methodology and APCD data.

American Indians/Alaska Natives, and second-lowest among Latinos.[78] Risk of death is highest among African American women and lowest among Asians/Pacific Islander women.[79]

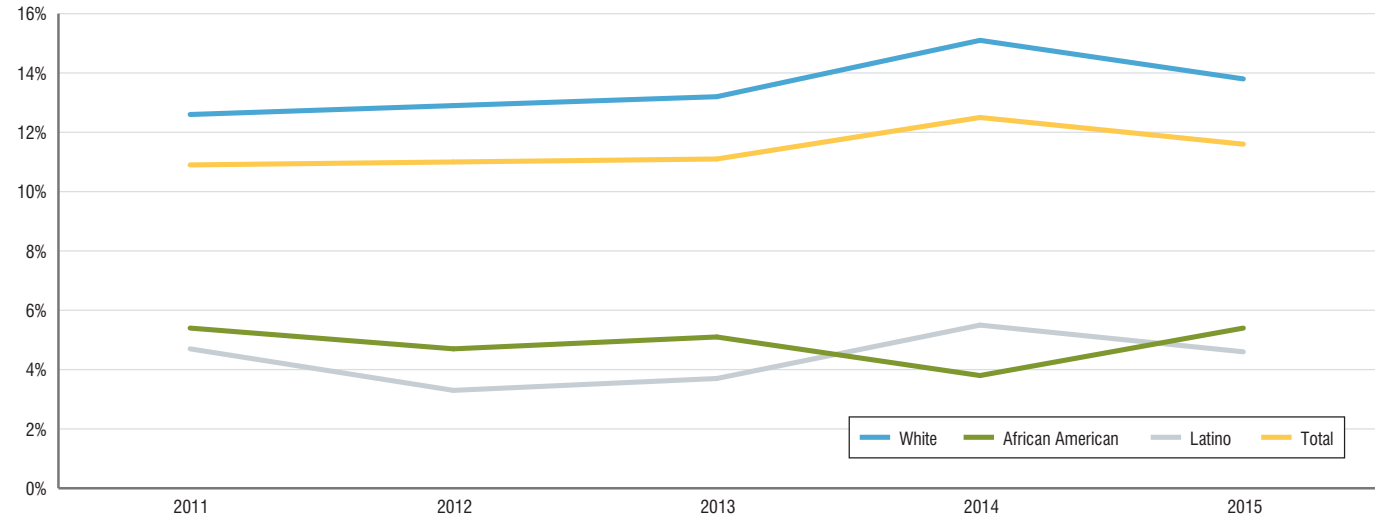
In African American women, 8% of breast cancers are diagnosed at an advanced stage, compared to 5% in White women.[80] Differences in utilization of and access to care may explain this disparity. Among women with mammograms that revealed an abnormality, White women were more likely than African American women to receive a timely follow-up, which is critical to the success of subsequent interventions.[81] Compared to White women, African American women may be more likely to have a longer delay from diagnosis to treatment, to cease treatment before the end of an intervention, and to refuse treatment.[82] Tumor characteristics unique to African

Figure 5.3.10. PSA blood test in the past year (Massachusetts men, aged 50 and older)



Note 1: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Note 2: Insufficient data for Asians.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.11. Ever diagnosed with cancer (Massachusetts adults)



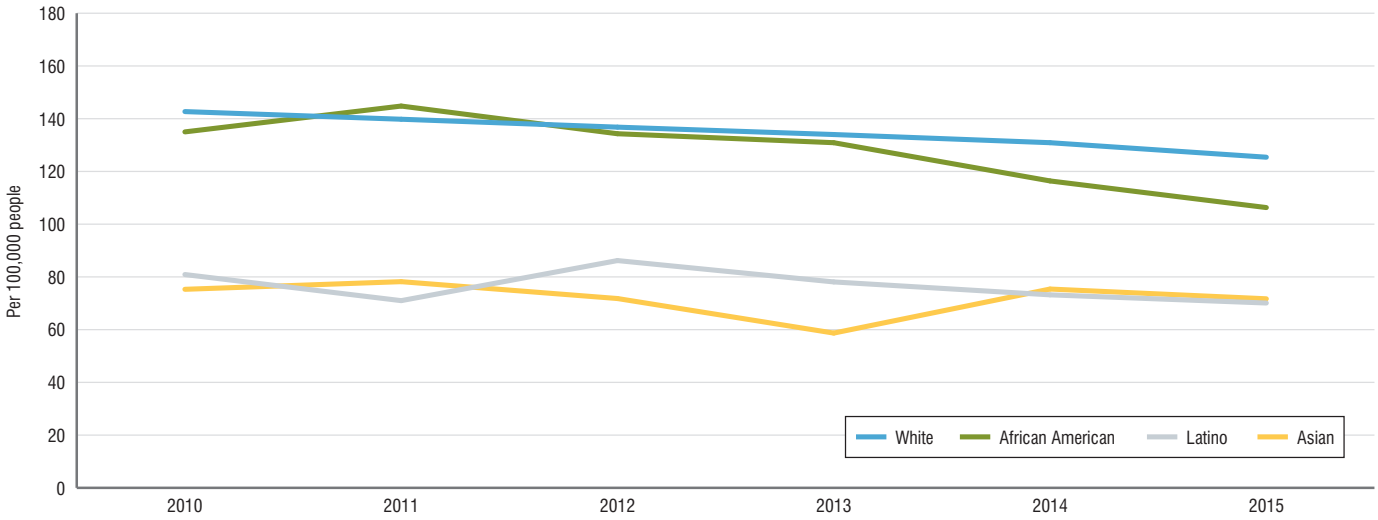
Note: Asian prevalence is omitted due to insufficient data.
Source: BRFSS data provided by DPH.

American patients may also contribute to the mortality disparity.[83]

Massachusetts trend, 2010–2015

Figure 5.3.13 presents the breast cancer death rate. During this period, the average breast cancer mortality in the past year (per 100,000 women) was 19.1 among Whites, 20 among African Americans, 10.1 among Latinos, and 8.2 among Asians. Latinos and Asians were significantly less likely than Whites and African Americans to die from breast cancer. During the period examined, there was no significant change in the death rate among any racial/ethnic group.

Figure 5.3.12. Death rate from selected cancers (Massachusetts adults)



Note 1: Includes cancer of the bladder, brain, breast (females only), bronchus, cervix (females only), colon, esophagus, kidney, lung, ovary (females only), pancreas, prostate (males only), skin, stomach, trachea, and uterus (females only); also includes Hodgkin's and non-Hodgkin's lymphoma, leukemia, and multiple myeloma.
Note 2: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

CERVICAL CANCER MORTALITY

Background

Nationally, the risk of cervical cancer—which affects only women—was highest among Latinos, second-highest among African Americans, and lowest among Asians/Pacific Islanders in 2013.[84] Other research shows:

- Incidence and death rates have fallen among all races/ethnicities since 1999, and risk of death is relatively low compared to other cancers.[85]
- Risk of death is highest among African Americans and lowest among Asians/Pacific Islanders.[86]
- A recent study corrected for the prevalence of hysterectomy and found the cervical cancer mortality rate for African American women was 10.1 rather than 5.7 per 100,000, from 2000 to 2012.[87] That is more than double the corrected mortality rate for white women (i.e., 4.7 per 100,000).[88]
- Nationally, among African American women, cervical cancer mortality declined more quickly in metropolitan areas than non-metropolitan areas.[89] Across all racial/ethnic groups, survival rates were significantly lower in non-metropolitan areas, particularly among African Americans.[90]

The human papillomavirus (HPV) vaccine reduces the risk of infection by HPV, which causes cervical and several other types of cancer. Therefore, the vaccine reduces the prevalence and mortality of these cancers. Nationwide in 2014, 63% of females and 50% of males aged 13 to 17 had received at least one dose of the HPV vaccine,[91] yet only 42% of females and 28% of males received the recommended three doses.[92] During 2008 to 2012, the vaccine reduced HPV prevalence in girls aged 14 to 19 by almost two-thirds, from 11.5% to 4.3%.[93]

In Massachusetts, 73.5% of females and 63% of males received at least one HPV vaccine dose, respectively, while 52.8% of females and 35.2% of males completed the vaccine course of three doses.[94]

African American women sometimes face challenges obtaining follow-up care after an abnormal Pap smear, attributable in part to lack of insurance and confusion about changing screening guidelines.[95]

Massachusetts trend, 2010–2015

Figure 5.3.14 presents the cervical cancer death rate. During this period, the average cervical cancer mortality in the past year (per 100,000 women) was 1.1 among Whites, 2.0 among African Americans, 1.8 among Latinos, and 1.0 among Asians. There was neither a significant difference between racial/ethnic groups, nor a significant change in the death rate among any group over time.

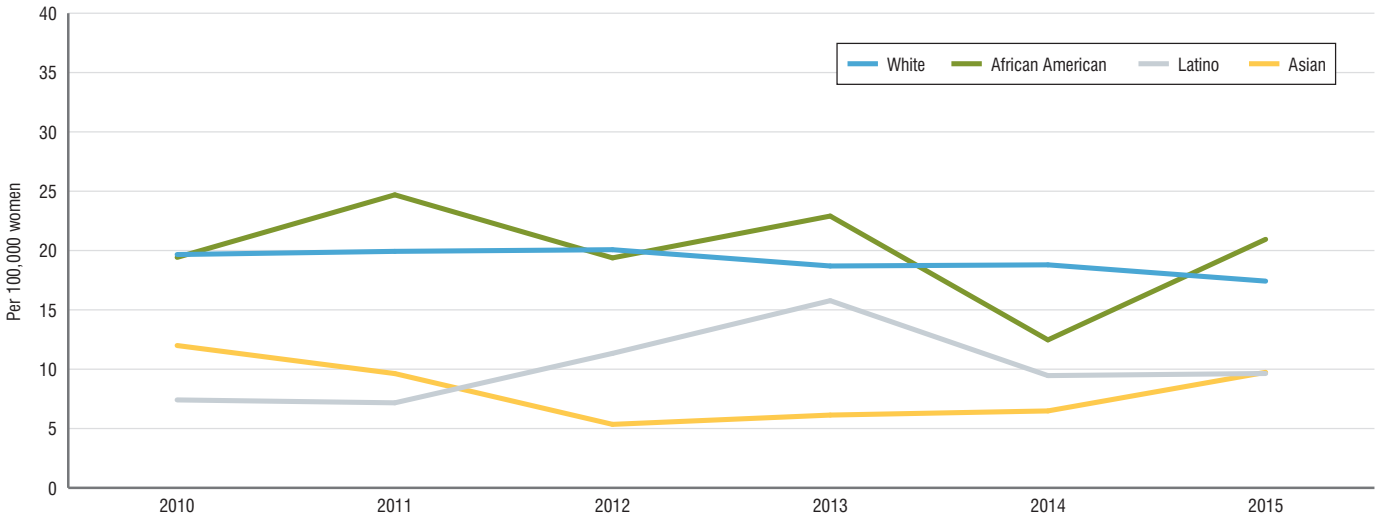
COLORECTAL CANCER MORTALITY

Background

Nationwide, the risks of getting and dying from CRC are highest among African Americans and lowest among Asians/Pacific Islanders.[96] Being unaware of risk factors, like family history, can put patients at risk of not catching CRC early. For example, African Americans and Latinos with a family history of CRC are least likely (among all people with such histories) to undergo screening.[97] Additionally, African Americans are less likely than Whites to accurately recall their paternal history of cancer and to inform relatives about the discovery of polyps.

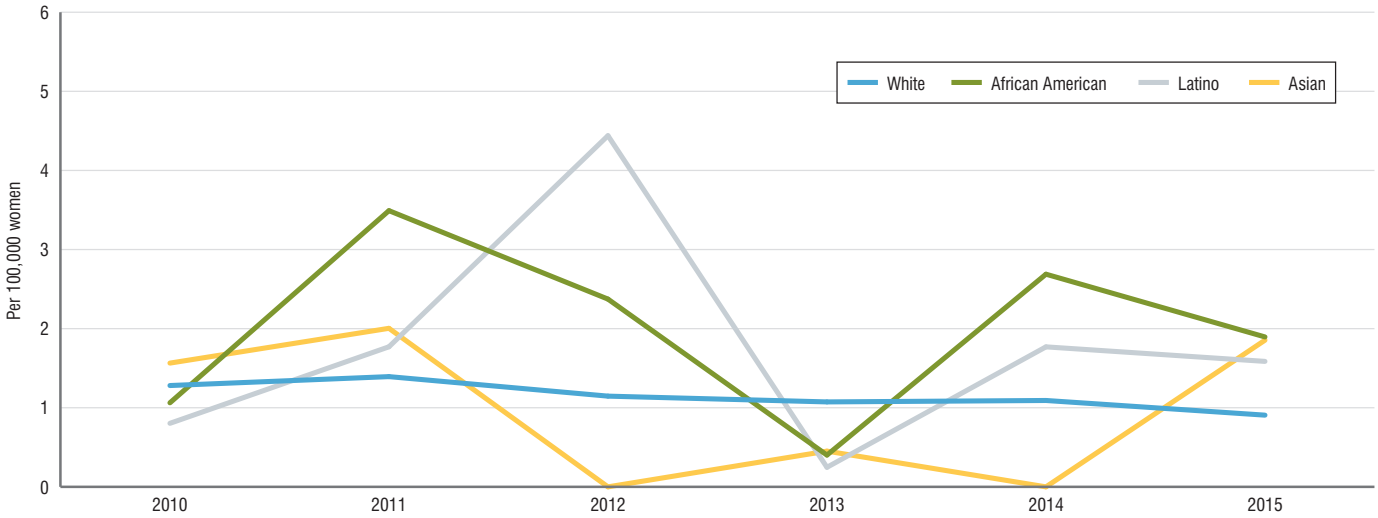
Lack of timely follow-up to an abnormal screening test also drives mortality risk. A study using 2010–2012 data found that only 68% patients with a positive FOBT or fecal immunochemical test received timely follow-up, with slightly higher follow-up rates for Latinos compared with Whites.[98]

Figure 5.3.13. Breast cancer mortality (Massachusetts)



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by the National Center for Health Statistics. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

Figure 5.3.14. Cervical cancer mortality (Massachusetts)

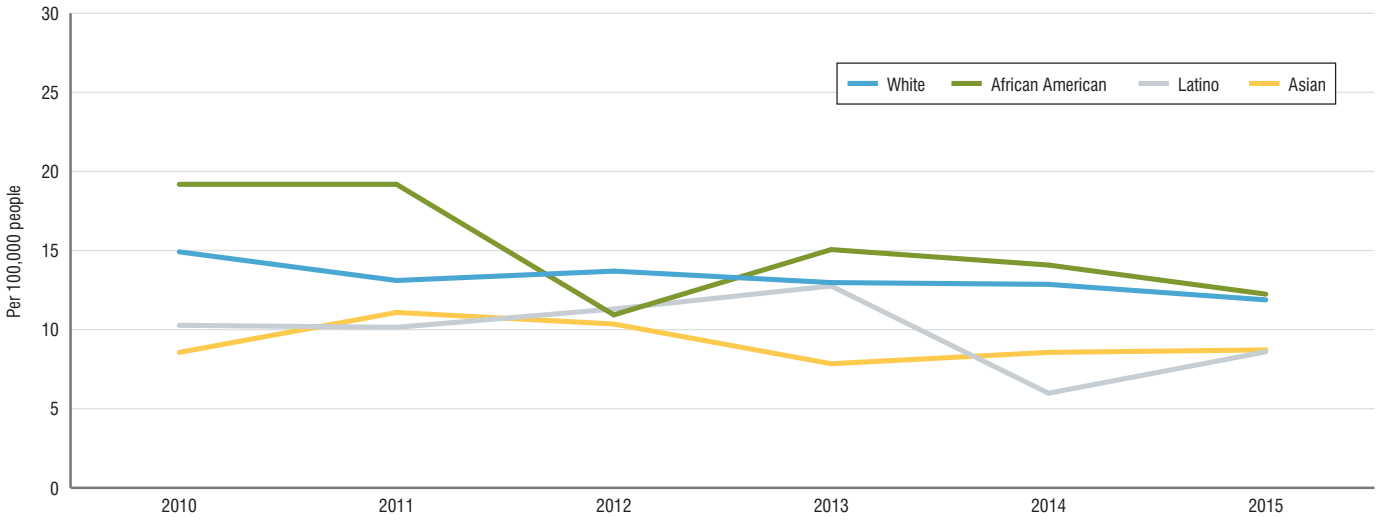


Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS.
Source: OSA analysis of data provided by DPH.

Massachusetts trend, 2010–2015

Figure 5.3.15 presents CRC death rates per 100,000 people. The average colorectal cancer mortality in the past year was 13.2 among Whites, 15.1 among African Americans, 9.8 among Latinos, and 9.2 among Asians. Asians were significantly less likely than Whites to die from CRC. During the period examined, there was no significant increase or decrease in the death rate among any racial/ethnic group.

Figure 5.3.15. Colorectal cancer mortality (Massachusetts)



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS.
Source: OSA analysis of data provided by DPH.

LUNG CANCER MORTALITY

Background

Lung and bronchus cancer, which is highly associated with smoking, is the leading cause of cancer death in the U.S.[99] Nationwide, lung cancer risk is highest among African Americans, second-highest among Whites, and lowest among Latinos.[100] Risk of death is highest among African Americans and lowest among Latinos.[101] However, risk of death is lower among African American women than White women, which reflects higher smoking rates among White women.[102]

Part of the disparity between African American and White outcomes may be attributable to the fact that Whites are more likely than non-Whites to receive such advice about smoking cessation from their providers.[103] There is also disparity in treatment: among patients with inoperable stage 1 non-small cell lung cancer, African Americans and Latinos are significantly less likely than Whites to undergo radiation therapy.[104]

Massachusetts trend, 2010–2015

Figure 5.3.16 presents the lung cancer death rate per 100,000 people. From 2010 to 2015, the average lung cancer mortality in the past year was 44.9 among Whites, 34.9 among African Americans, 16.9 among Latinos, and 26.4 among Asians.

Latinos, Asians, and African Americans were significantly less likely than Whites to die from lung cancer. During the period examined, there was no significant increase or decrease in the death rate among any racial/ethnic group.

PROSTATE CANCER MORTALITY

Background

Prostate cancer occurs only in men and has relatively low mortality rates compared to other cancers.[105] Nationwide, cancer risk is highest among African Americans, second-highest among Whites, and lowest among Asians/Pacific Islanders.[106] Risk of death is highest (by a large margin) among African Americans and lowest among Asians/Pacific Islanders.[107]

Worldwide, African American men and Jamaican men of African descent have the highest prostate cancer incidence.[108] A 2012 study found 76% of the mortality gap between African American and White men was explained by this higher prostate cancer rate; however, 24% of the gap was due to delay in diagnosis.[109]

Among men with localized high-risk prostate cancer, African Americans were significantly less likely than Whites to receive definitive therapy (a treatment plan designed to eradicate cancer, possibly incorporating multiple interventions), according to a national study.[110] This disparity was particularly pronounced among people with low incomes: African American men in the bottom income quintile had the highest prostate cancer mortality.[111]

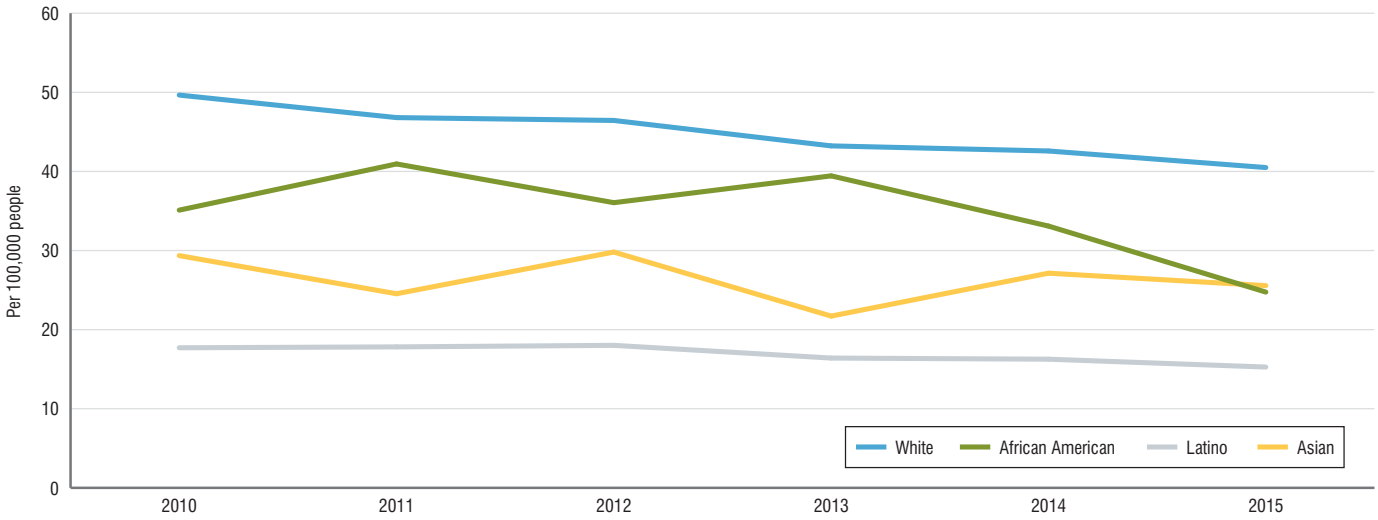
Family history of prostate cancer is associated with increased prostate cancer risk and mortality among White men undergoing PSA screening.[112]

Massachusetts trend, 2010–2015

Prostate cancer is the second leading cause of cancer death among men in Massachusetts.[113] Figure 5.3.17 presents the average prostate cancer mortality rate in the past year per 100,000 people: 18.8 among Whites, 38.1 among African Americans, 16.3 among Latinos, and 7.0 among Asians.

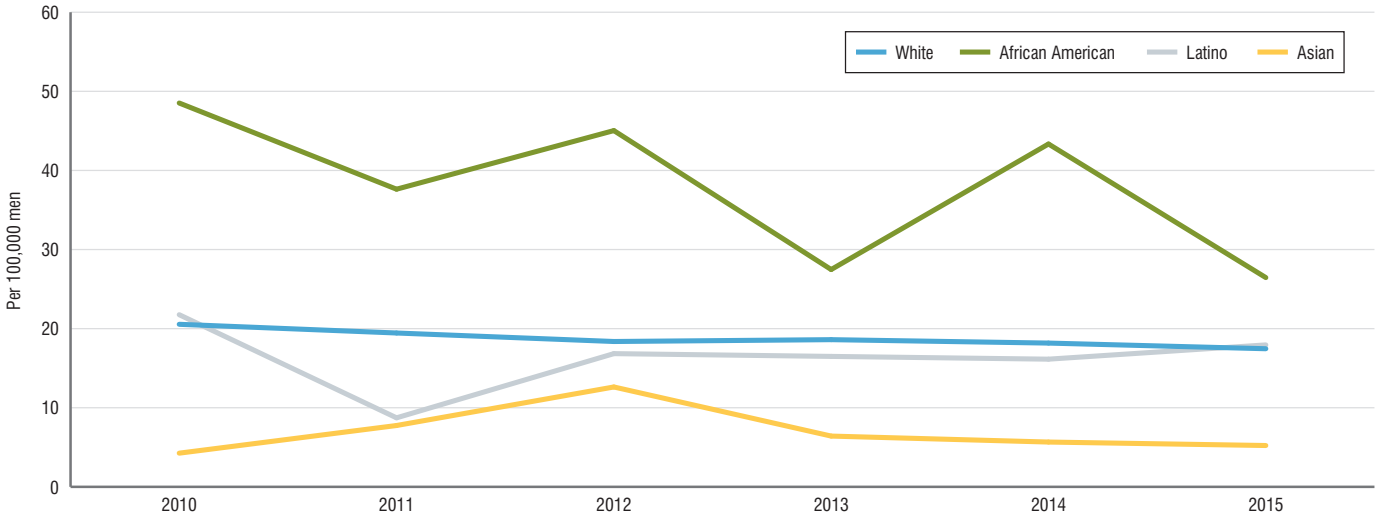
African Americans were significantly more likely, and Asians were significantly less likely, to die from prostate cancer than Whites. During the period examined, there was a significant decrease in the death rate among African Americans. There was no significant change in the death rate among other races/ethnicities.

Figure 5.3.16. Lung cancer mortality (Massachusetts)



Note 1: Includes cancer of the trachea and bronchus.
Note 2: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by the National Center for Health Statistics. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

Figure 5.3.17. Prostate cancer mortality rate (Massachusetts)



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by the National Center for Health Statistics. Exact logistic regression and Firth's penalized likelihood approach were used for rare events.
Source: OSA analysis of data provided by DPH.

Morbidity/Mortality from Other Conditions

LOW BIRTHWEIGHT

Background

The lower an infant's birthweight, the higher the risk of infant mortality.[114] Low birthweight is defined by the CDC as less than 5 pounds, 8 ounces.[115]

Unfortunately, the national trend is toward lighter infants.[116] Nationally, from 2014 to 2015, low-weight births increased to 8.07% of all births. The rate was steady for Whites (6.93%), while increasing from 13.17% to 13.33% for African American infants and from 7.05% to 7.20% for Latinos.[117] In Massachusetts, low birthweight among African American infants has been trending about six percentage points better than their national counterparts but around two percentage points worse than Whites in the Commonwealth.

Massachusetts trend, 2010–2015

Figure 5.3.18 presents the percentage of infants with low birthweight. Female babies were 25.9% more likely to have low birthweight than male babies. African American, Latino, and Asian babies were significantly more likely to have low birthweights than Whites. During the period examined, there was no significant increase or decrease in the prevalence of low birthweight among any racial/ethnic group.

INFANT MORTALITY

Background

In 2014, the U.S. infant mortality rate (IMR) reached an all-time low of 5.821 deaths per 1,000 babies born.[118] That year, the leading causes of infant death were congenital malformations, low birthweight, maternal complications, sudden infant death syndrome, and unintentional injuries.[119] Nationally, infant mortality is about twice as high among African Americans than among Whites and Latinos.[120]

Favorable early evidence from Oregon's implementation of Coordinated Care Organizations showed success in reducing disparities by insurance type in the use of prenatal care, providing hope that reforms to care delivery can improve outcomes.[121]

Early elective deliveries (induced or cesarean birth prior to 39 weeks gestation for non-medical reasons) and cesarean section births are associated with risks to mothers and infants. Massachusetts hospitals have shown some improvement on this front of late. Among 36 hospitals reporting data in 2015, 23 had no early elective deliveries, and 15 had cesarean sections rates of less than 24%, up from 10 hospitals in 2014.[122]

Massachusetts trend, 2010–2015

Massachusetts has the lowest IMR rate in the U.S.—30% lower than the national rate in 2013.[123] Although the Commonwealth's average IMR has decreased over time, racial/ethnic disparities persist.

Figure 5.3.19 presents infant deaths per 1,000 births. Females had a significantly lower IMR than males. African Americans and Latinos had a significantly higher IMR than Whites, while Asian males had a significantly lower IMR than White males.

ASTHMA

Background

Asthma can be controlled, and many asthma-related hospitalizations can be prevented, when families receive asthma education, live in clean and well-maintained housing, understand medications, and have access to coordinated care.[124] Social factors—including low household income, air pollution (including tobacco smoke), run-down housing (including pests and mold), and high levels of stress—contribute to asthma risk.[125] Among low-income children, and non-Whites in particular, asthma rates remain disproportionately high.[126]

Treatment disparities may exacerbate the underlying risk, as suggested in a 2015 study of ED visits from adults with asthma. The researchers found that, even though (non-Latino) African Americans have a relatively high risk of severe chronic asthma, they are no more likely than other groups to use inhalation corticosteroids or to see an asthma specialist prior to making an asthma-related ED visit.[127] On the other hand, another study by Silber and colleagues found little difference in length of stay or intensive care use between children with Medicaid vs. non-Medicaid coverage when admitted to the hospital for asthma.[128]

In Massachusetts, African American and Latino residents had asthma-related hospitalization and ED visit rates much higher than the state average from 2010 to 2012.[129] This mirrors national trends,[130] where the hospital inpatient-discharge rates for White and African American asthma patients were 8.7 and 29.9 per 10,000 population, respectively.[131]

Parents of non-White children may have lower expectations for controlling asthma than parents of White children. Among members of Neighborhood Health Plan and Harvard Vanguard Medical Associates in Massachusetts, 89% of parents of White children thought their children "could be symptom-free most of the time," compared to only 84% of parents of African American children and 75% of parents of Latino children.[132] The same survey found that 43% of parents of Latino children and 44% of parents of African American children believed their children "should have no emergency department visits or hospitalizations for asthma," compared to 55% of parents of White children[133]

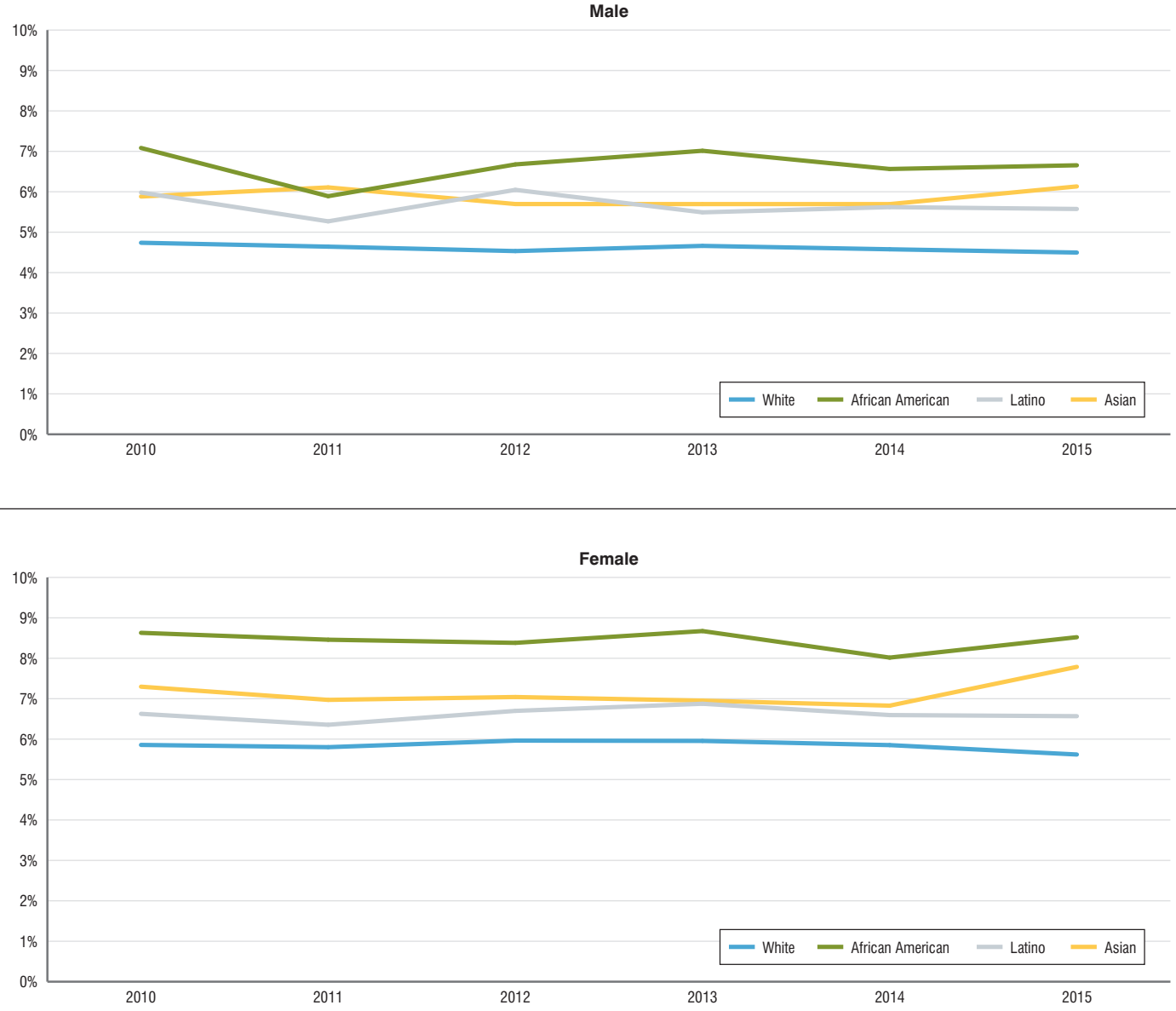
The Commonwealth has had some success in addressing asthma disparities. The Boston Children's Hospital Community Asthma Initiative, for example, coordinates home visits and case management in low-income Boston neighborhoods. The initiative yielded substantial reductions in hospitalizations and ED visits among African American and Latino patients.[134]

Massachusetts trend, 2011–2015

Figure 5.3.20 shows asthma trends by race/ethnicity. From 2011 to 2015, the average prevalence of having ever asthma was 16.0% among Whites, 17.2% among African Americans, 20.3% among Latinos, and 9.8% among Asians; the average prevalence of currently having asthma was 11.0% among Whites, 12.5% among African Americans, 13.4% among Latinos, and 5.3% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: Latinos were significantly more likely, and Asians were significantly less likely, than Whites to ever have had asthma and to currently have asthma. During the period examined, ever having asthma increased significantly among Whites and current asthma increased significantly among African Americans.

Figure 5.3.18. Low birthweight by race/ethnicity (Massachusetts)



Note: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of birth data provided by DPH.

SMOKING

Background

The use of tobacco products varies, especially by race/ethnicity and socio-economic status. Nationally, 21.3% of Whites reported some or daily use of any tobacco product in 2013–2014. In contrast, 32.6% of Native American Indians/Native Alaskans and Hawaiians/Pacific Islanders and 25.1% of African Americans reported tobacco use.[135]

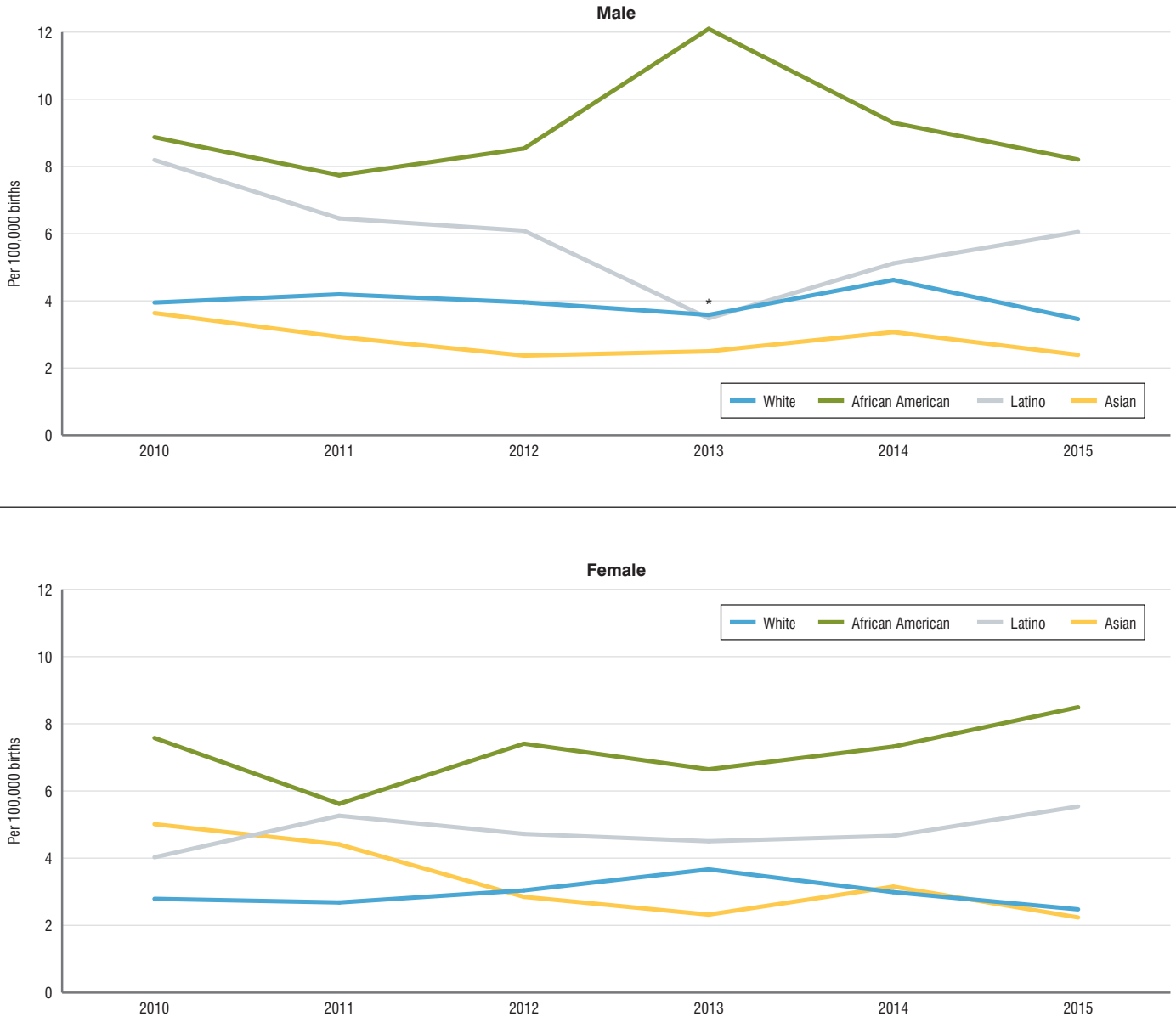
In Massachusetts, Latinos have higher smoking rates than Whites.[136] In addition, a 2013 study found that, similar to national disparities, 7% of White middle school students reported trying a cigarette at some point, compared to 10.3% of African American students and 15.8% of Latino students.[137]

Massachusetts trend, 2011–2015

Figure 5.3.21 displays the percentage of adults who said they are current or former smokers. The average prevalence of current smokers was 16.4% among Whites, 18.3% among African Americans, 15.9% among Latinos, and 7.4% among Asians; the average prevalence of former smokers was 65.5% among Whites, 44.8% among African Americans, 50.2% among Latinos, and 54.6% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age,

Figure 5.3.19. Infant mortality (Massachusetts)



Note 1: Statistically significant difference from 2012: *$p<.05$, **$p<.01$, ***$p<.001$.
Note 2: Infant mortality measures deaths between birth and the first birthday.
Note 3: Logistic regression was used to estimate the probability of a dichotomous outcome.
Source: OSA analysis of data provided by DPH.

and year: Latinos and Asians were significantly less likely than Whites to be current smokers.[138] However, African Americans and Latinos were significantly less likely than Whites to successfully quit smoking, suggesting a disparity in access to cessation supports. From 2011–2015, smoking declined among each race/ethnicity.

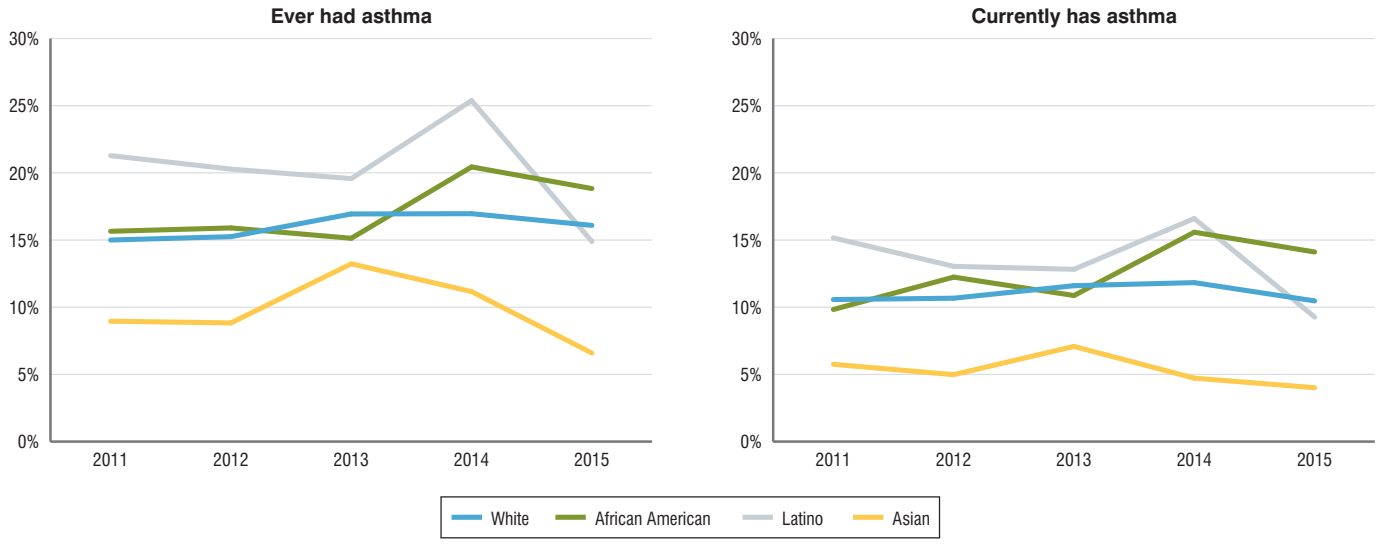
HIGH BLOOD PRESSURE

Background

Nationwide, African Americans have the highest risk of HBP.[139] A 2000–2011 prospective study of 4,702 African Americans and cardio health found that only 18.8% had ideal blood pressure.[140]

Lifestyle and social factors help shape HBP risk. Obesity, an important HBP risk factor, is more common in African Americans than in Whites, especially among women.[141] In addition, a systematic review of 15 articles

Figure 5.3.20. Asthma (Massachusetts adults)



Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

found that, among African Americans, racial discrimination was associated with increased risk of developing and difficulty controlling HBP.[142]

Racial/ethnic disparities in blood pressure can start early in life. Latino boys have higher blood pressure than White boys, and normal-weight African American boys have higher blood pressure than normal-weight White boys.[143]

From 2010 to 2012, a mobile medical clinic called the "Family Van" helped reduce blood pressure and risk of heart attack and stroke among patients in its service area, six low-income Boston neighborhoods. Over the three years, 5,900 patients made 10,509 visits to the van and received blood pressure screening and counseling.[144] Patients found to have HBP during their first visit benefitted from average reductions of 10.7 mmHg and 6.2 mmHg in systolic and diastolic blood pressure, respectively, measured at follow-up visits.[145]

Massachusetts trend, 2011–2015

Figure 5.3.22 presents the percentage of adults who had been told that they had HBP and, if so, whether they were taking medication to treat it. The average prevalence of ever having HBP was 30.3% among Whites, 36.3% among African Americans, 24.9% among Latinos, and 13.9% among Asians.

After controlling for gender, age and year (not shown in figure), African Americans and Latinos were significantly more likely and Asians were significantly less likely to be told that they had HBP. During the period examined, there was no significant change among any racial/ethnic group.

From 2011 to 2015, the average prevalence of adults who had HBP and were taking medication was 78.7% among Whites, 75.1% among African Americans, 67.5% among Latinos, and 62.3% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: the rate of people with HBP taking medication was not significantly different among different racial/ethnic groups. During the period examined, there was no significant increase or decrease in taking medicine for HBP among any racial/ethnic group.

OVERWEIGHT AND OBESITY

Background

In Massachusetts and nationwide, Latinos and African Americans have higher rates of overweight and obesity[146] than Whites, while Asians have the lowest rates. This is also true for high school students.

Among high-schoolers, obesity is higher in males among Whites, African Americans, and Latinos.[147] Moreover, among Whites, male high school students are more than twice as likely as females to be obese, though this disparity is less dramatic among Latinos and African Americans.[148]

While this racial disparity has multiple causes, a commonly cited factor is a lack of exercise opportunities in the places where African Americans and Latinos live. A study examining neighborhood poverty and racial/ethnic demographics in Boston found that African American neighborhoods were less likely than White neighborhoods to have recreational open spaces.[149] A separate study among Boston youth concluded that African Americans were the least likely race/ethnicity to have used open spaces recently.[150]

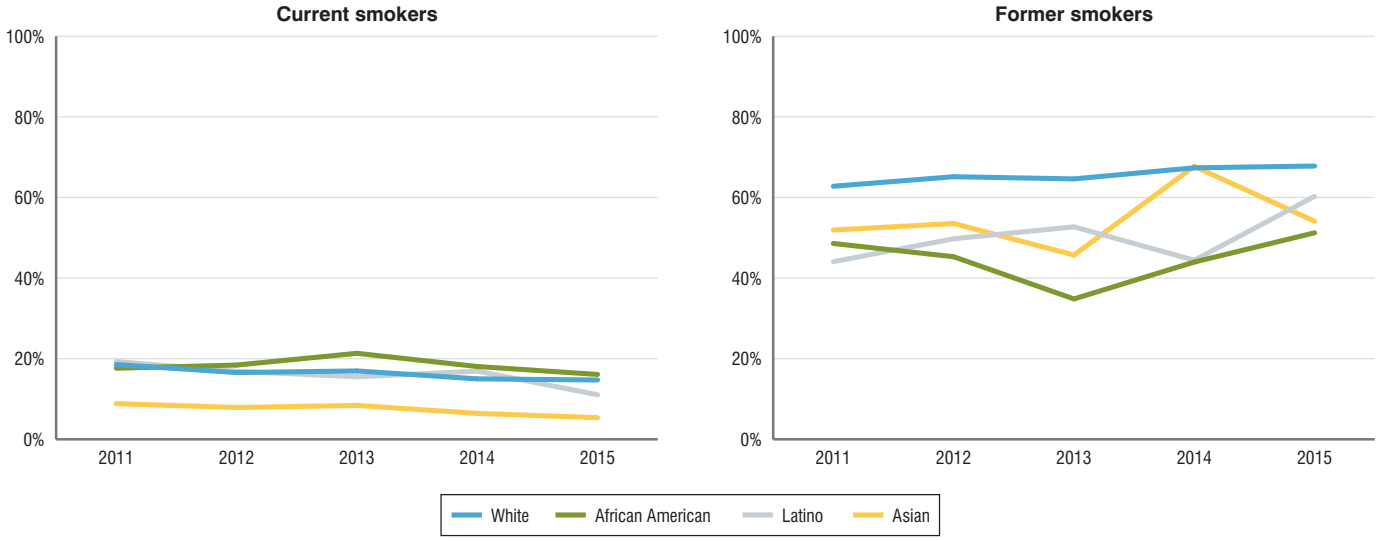
Massachusetts trend, 2001–2015

Figures 5.3.23 and 5.3.24 show overweight/obesity among high school students by race/ethnicity.

Figure 5.3.25 shows the prevalence of adult overweight and obesity. From 2011 to 2015, the average prevalence of overweight was 59% among Whites, 70.2% among African Americans, 66.8% among Latinos, and 34.2% among Asians. The average prevalence of obesity was 22.8% among Whites, 34.5% among African Americans, 31.7% among Latinos, and 6.7% among Asians.

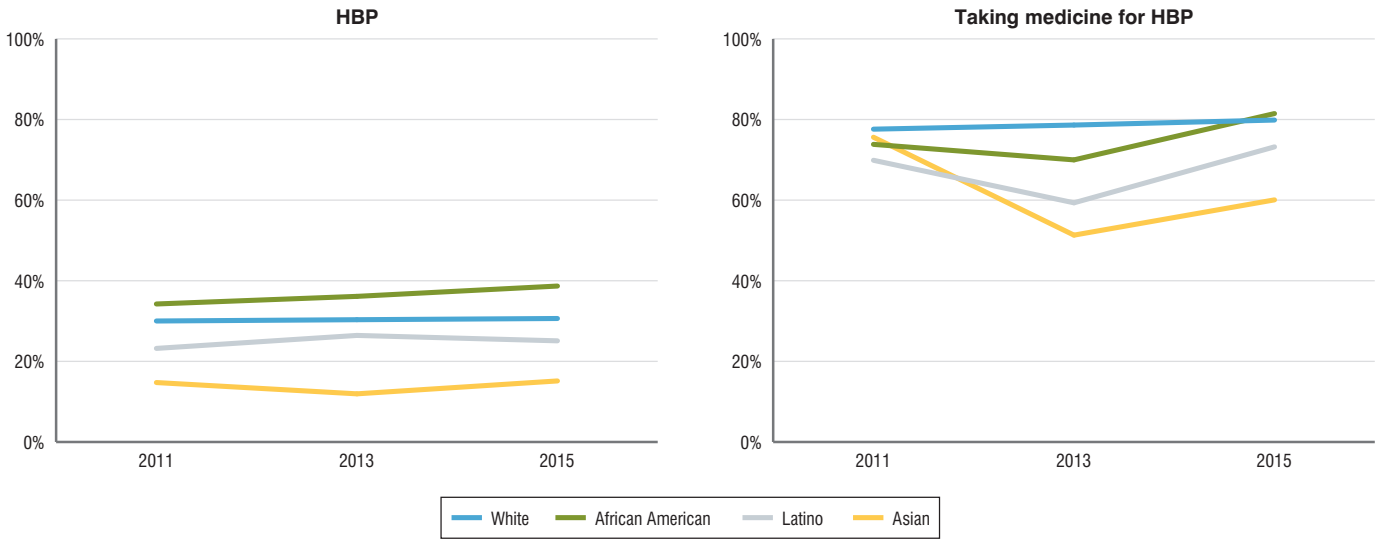
Not shown in the figure is OSA's analysis, which controlled for gender,

Figure 5.3.21. Smoking rates (Massachusetts adults)



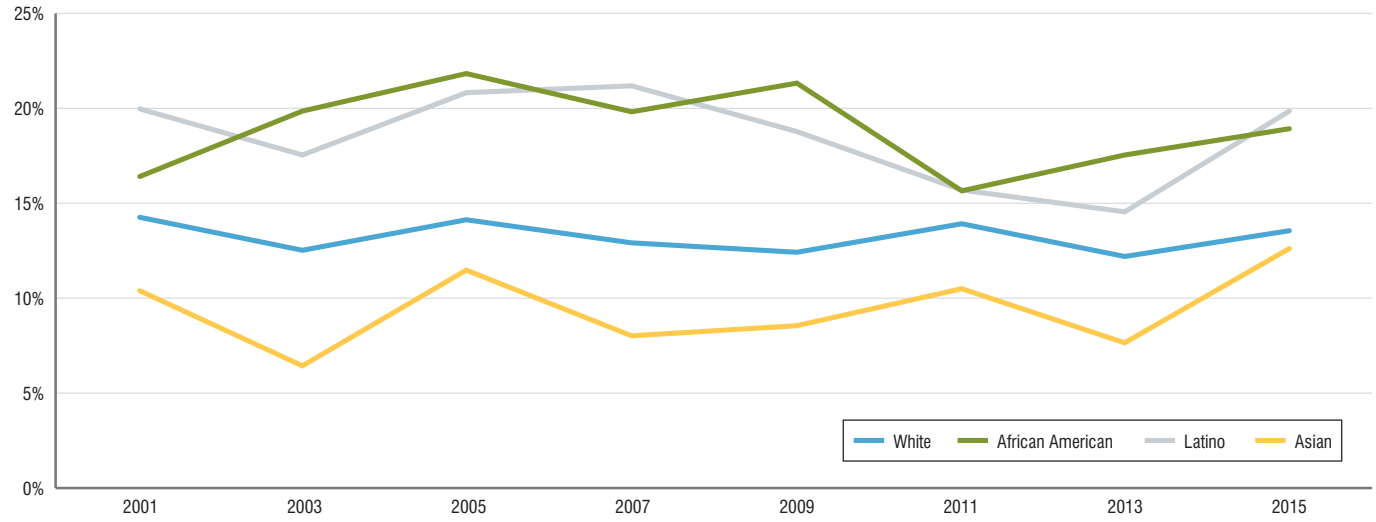
Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.22. HBP awareness and taking blood pressure medication (Massachusetts adults)



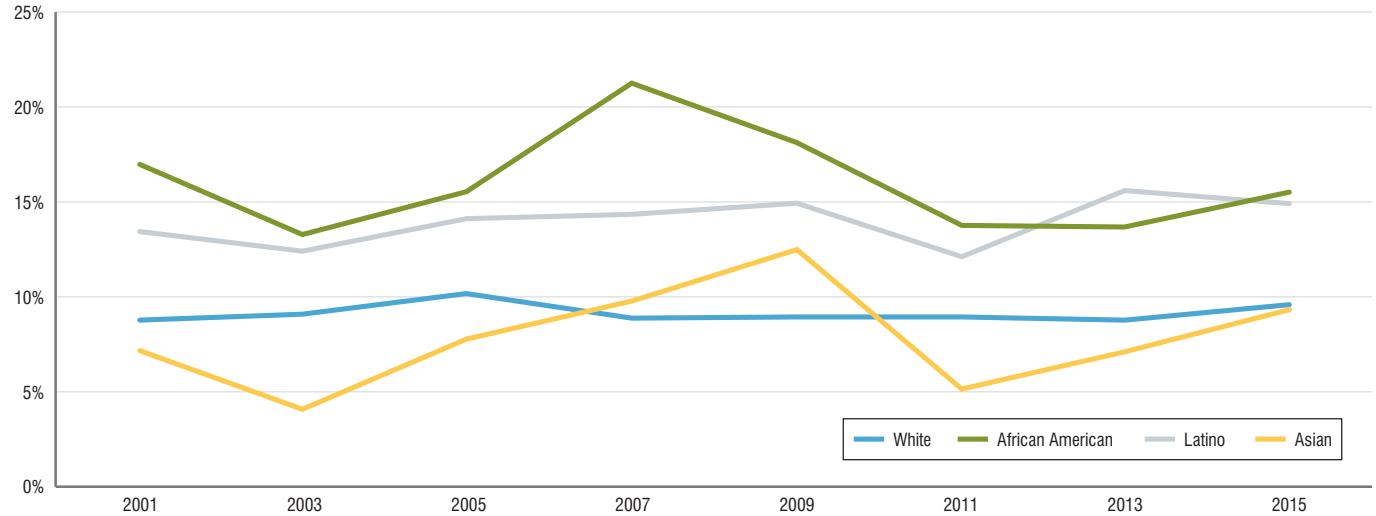
Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.23. Overweight rates (Massachusetts high school students)



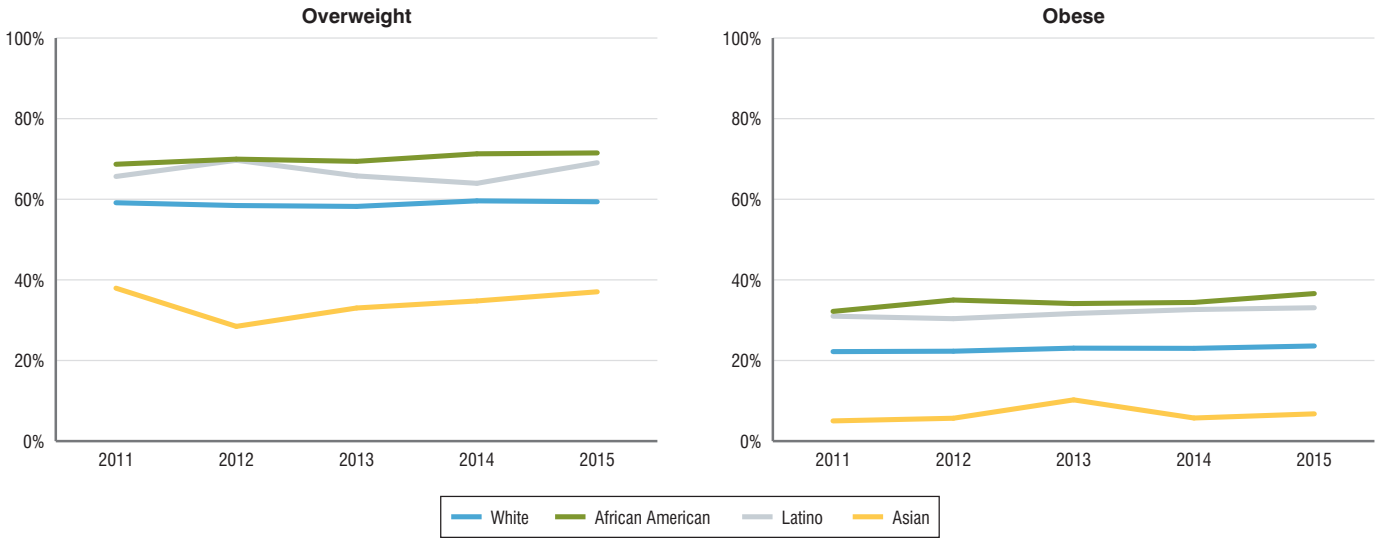
Source: CDC. Youth Risk Behavior Surveillance System (YRBSS). Retrieved from http://nccd.cdc.gov/youthonline/App/Results.aspx?LID=MA

Figure 5.3.24. Obesity rates (Massachusetts high school students)



Source: CDC. YRBSS. Retrieved from http://nccd.cdc.gov/youthonline/App/Results.aspx?LID=MA

Figure 5.3.25. Overweight and obesity rates (Massachusetts adults)



Note: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Source: OSA analysis of BRFSS data provided by DPH.

age, and year: African Americans and Latinos had significantly higher overweight/obesity levels than Whites, while Asians had significantly lower levels. During the period examined, there was no significant increase or decrease in overweight and obesity among any racial/ethnic group.

DIABETES

Background

Nationally, half of all adults have either diabetes or prediabetes,[151] and the highest percentages of diagnosed diabetes are among American Indians/Native Alaskans (15.9%), African Americans (13.2%), and Latinos (12.8%).[152] A recent study using national data from 1999 to 2012 found a threefold difference between the lowest and highest total diabetes prevalence by county.[153] Moreover, compared to the White population, African Americans and Latinos report inconsistent access to diabetes care and barriers to obtaining health insurance (though that may change for many in the wake of ACA).[154]

In Massachusetts, Whites have had a slightly lower prevalence than the state average since 2011. Rates among African Americans and Latinos have been higher than the state average, mirroring national trends.[155,156]

Analysis of data from the Boston Area Community Health Survey found that socioeconomic factors account for about half of the disparities for type 2 diabetes between Latinos and Whites and between African Americans and Whites.[157] Social networks may also play an important role: According to a retrospective analysis of the Framingham Offspring Study, type 2 diabetes and obesity in social contacts, especially spouses and siblings, was associated with an individual's risk of developing type 2 diabetes (even after accounting for family history).[158] Clinical elements and limited access to care may also contribute to disparities. Conversely, ancestral genetic factors play almost no role in these disparities.[159]

Massachusetts trend, 2011-2015

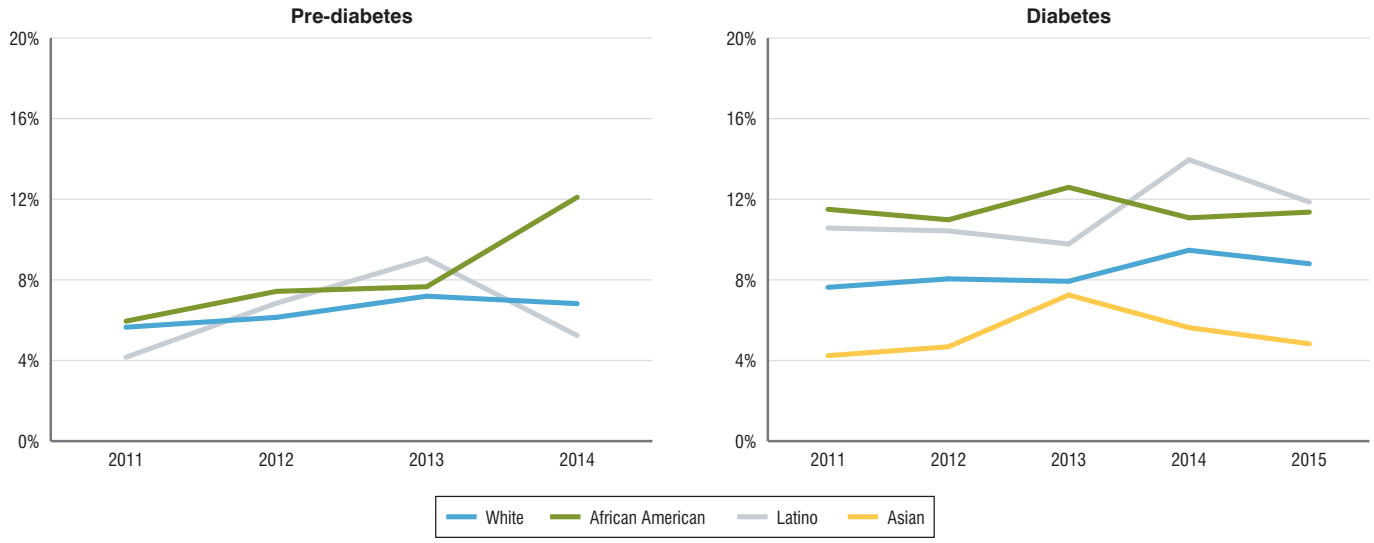
Figure 5.3.26 presents the percentage of adults who reported that a doctor had ever told them they had pre-diabetes or diabetes. The average prevalence of ever being diagnosed with pre-diabetes was 6.5% among Whites, 8.3% among African Americans, 6.3% among Latinos, and 3.7% among Asians. The average prevalence of ever being diagnosed with diabetes was 8.4% among Whites, 11.5% among African Americans, 11.3% among Latinos, and 5.3% among Asians.

Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: African Americans and Latinos were significantly more likely than Whites to be diagnosed with pre-diabetes or diabetes. During the period examined, there was a significant increase in pre-diabetes among Whites and African Americans; there was a significant increase in diabetes among Whites.

"Why aren't more hospital systems engaged in what I would call real care coordination to help patients? Particularly ... physical health, behavioral health, and social determinants of health?"

—MARYLOU SUDDERS,
MASS. SECRETARY OF HEALTH AND HUMAN SERVICES

Figure 5.3.26. Diabetes prevalence (Massachusetts adults)



Note 1: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Note 2: Pre-diabetes 2015 data not available due to a survey methodology change. There also was insufficient data for pre-diabetes for Asians.

HEART DISEASE

Background

Heart disease encompasses a range of conditions, including heart defects present since birth, coronary heart disease (CHD), and heart rhythm problems (arrhythmias).[160] Risk factors include discrimination,[161] age, being male, family history of heart disease, and smoking.[162]

Nationwide, African Americans have a higher risk than Whites of developing CHD[163] and also have the highest CHD mortality rate.[164] At high risk of fatal CHD are 8% of White men, 18% of African American men, 2% of White women, and 8% of African American women.[165] There was some decrease in CHD from 2001 to 2012 among African Americans without other risk factors, such as diabetes.[166] The CDC reported on disparities among Latinos in the U.S.; for example, Puerto Rican adults are most likely to report two or more chronic conditions such as heart disease.[167]

Another contributing factor to these higher CHD mortality rates is the disparity in distribution of economic and clinical resources. For example, lower coronary revascularization rates among African Americans and Latinos persisted in Massachusetts even after Chapter 58 reform.[168]

Massachusetts trend, 2010–2015

Figure 5.3.27 shows the share of adults aged 35 and older who say they have had a myocardial infarction (heart attack) and angina (chest pain) or CHD.

- During this period, the average prevalence of ever having a heart attack was 5.6% among Whites and 5.3% among African Americans and Latinos; for angina or CHD, the shares were 5.5% among Whites, 3.6% among African Americans, and 4.9% among Latinos.
- Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: Latinos were significantly more likely than Whites to have ever had a heart attack, angina, or CHD. During the period examined, there was no significant increase or decrease in heart disease among any racial/ethnic group.

Figure 5.3.28 presents the heart disease death rate.

- The average heart disease mortality was 154.4 among Whites, 144.6 among African Americans, 84 among Latinos, and 61.3 among Asians.
- Latinos and Asians were significantly less likely to die due to heart disease than Whites. During the period examined, the death rate among African Americans decreased significantly. There was no significant change among other races/ethnicities.

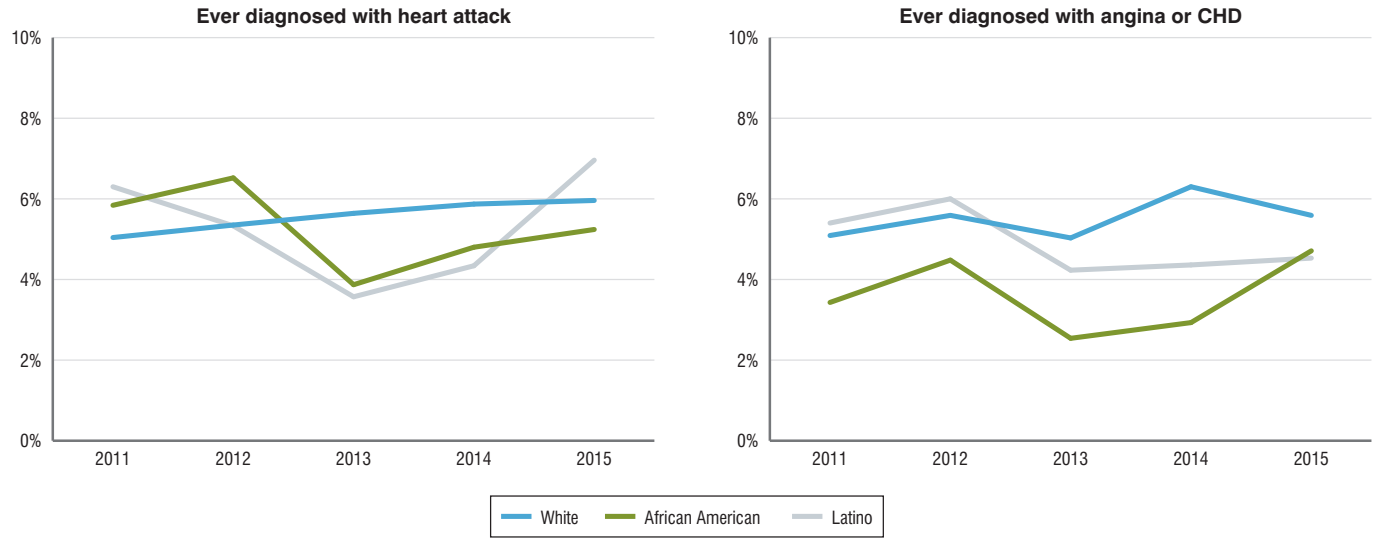
STROKE

Background

Researchers have observed substantial stroke disparities by race/ethnicity and gender. The research shows that in the U.S.:

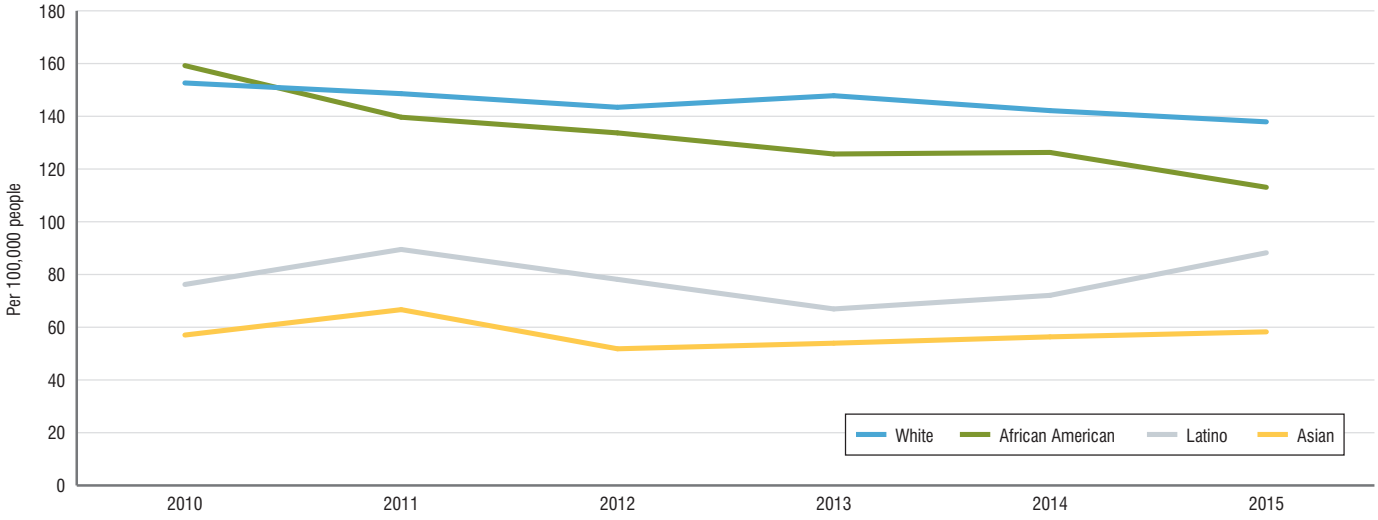
- African Americans experience the highest stroke-mortality rates.[169] They are also more likely to have risk factors associated with stroke, including HBP,[170] diagnosed-but-uncontrolled HBP,[171] limited access to health care,[172] and lack of various social determinants of health.[173]
- Post-stroke health and life-task independence is lower among non-Whites than Whites.[174]
- Compared to Whites, African Americans and Latinos have higher rates of two other risk factors for stroke: hyperlipidemia and high levels of blood lipids.[175]
- Nationwide, Latinos have stroke risk between that of African Americans and Whites.[176] African Americans and Latinos also have a higher risk than Whites of recurrent stroke, which is more likely to lead to disability and death.
- Additionally, there are racial/ethnic disparities in ED care immediately following a stroke. The faster a stroke patient reaches the ED, the likelier she will survive and recover well. Overall, 58.6% of stroke patients

Figure 5.3.27. Heart disease prevalence (Massachusetts aged 35 and older)



Note 1: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Note 2: Insufficient data for Asians.
Source: OSA analysis of BRFSS provided by DPH.

Figure 5.3.28. Heart disease deaths (Massachusetts)



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS.
Source: OSA analysis of data provided by DPH.

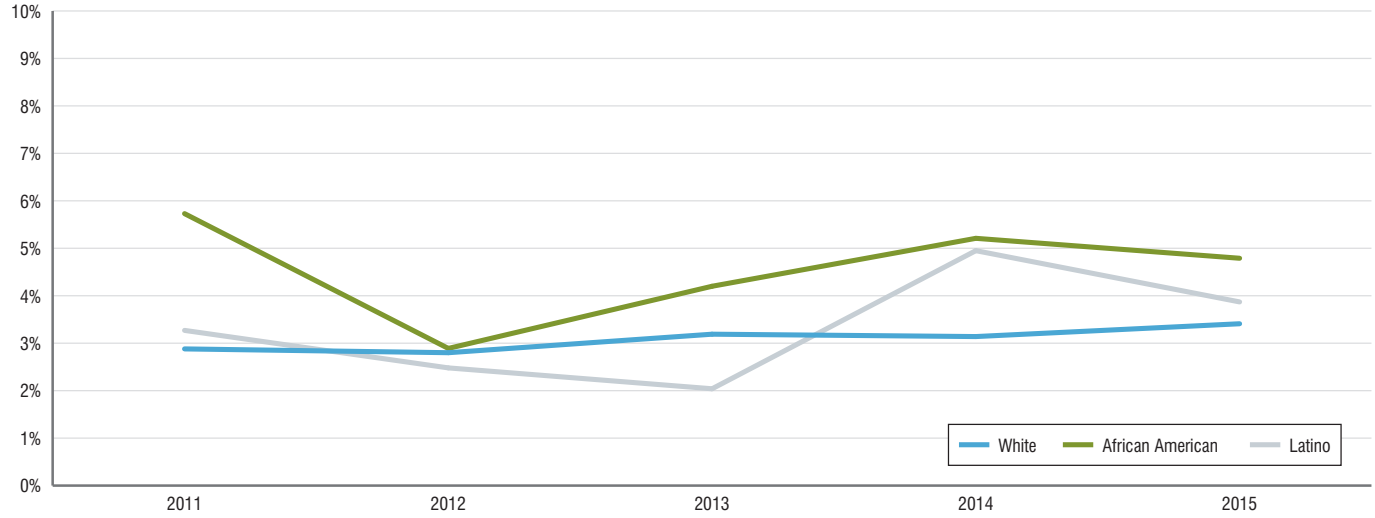
are taken to the ED by emergency services (often the fastest way to reach the ED), but smaller shares of Latinos and Asians arrive at the hospital this way. Further, African American women are less likely to use emergency services transportation than White women.[177]

Massachusetts trend, 2010–2015

Figure 5.3.29 shows the share of adults aged 35 and older who have had a stroke.

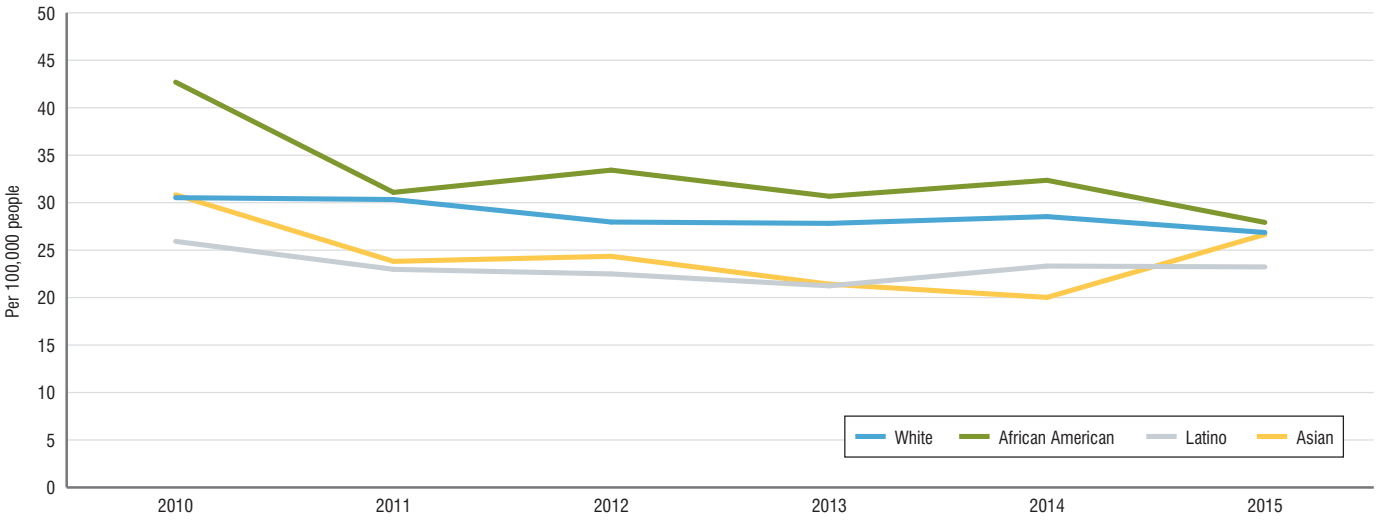
- During this period, the average prevalence of having had a stroke was 3.1% among Whites, 4.6% among African Americans, and 3.3% among Latinos.

Figure 5.3.29. Ever diagnosed with a stroke (Massachusetts aged 35 and older)



Note 1: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Note 2: Insufficient data for Asians.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.30. Stroke death rate (Massachusetts)



Note: Rates are per 100,000 age-adjusted to the 2000 U.S. Standard Population. Age-adjusted rates were calculated by using the 2010 bridged-race population estimates file and the 2015 bridged-race postcensal estimates file, which are produced by NCHS.
Source: OSA analysis of data provided by DPH.

- Not shown in the figure is OSA's analysis, which controlled for gender, age, and year: African Americans and Latinos were significantly more likely to ever have had a stroke than Whites. During the period examined, there was no significant increase or decrease in stroke prevalence among any racial/ethnic group.

Figure 5.3.30 presents death rates due to stroke.

- The average stroke mortality was 31% among Whites, 36.1% among African Americans, 24.2% among Latinos, and 26.9% among Asians.
- There was no significant difference in death rate between racial/ethnic groups, nor any significant change to rates among any race/ethnicity from 2010 to 2015.

HIV/AIDS

Background

Nationally, African Americans and Latinos have higher incidences of HIV/AIDS than Whites, and HIV/AIDS is more prevalent in men than women.[178] Other research shows:

- In 2014, African Americans and Latinos made up 12% and 17% of the U.S. population, but 44% and 23% of HIV diagnoses, respectively.[179]
- Also in 2014, the greatest number of new diagnoses were among African American men who have sex with men (11,201). The greatest gap in new diagnoses was between African American, heterosexual women (4,654) and White, heterosexual women (1,115).
- Following diagnosis, Latinos have the longest delays obtaining treatment, followed by African Americans and then by Whites.[180] Discriminatory views among medical providers may result in inferior treatment for non-Whites.[181]
- All groups experienced a decrease in AIDS-related mortality rates from 2010 through 2014; the highest rate was still among African Americans at 17.5 per 100,000 people.[182]

Massachusetts suffers from similar trends, as follows:

- African Americans were diagnosed with HIV at 10 times the rate of Whites, and Latinos were diagnosed at 6 times the rate of Whites, according to age-adjusted rates of HIV diagnosis from 2000 to 2013.[183]
- A higher share of White people living with HIV/AIDS were virally suppressed (69%) than African Americans and Latinos (63% and 60%, respectively).[184,185]
- Immigration status may impact screening, and, in turn, viral suppression; a study of 45 U.S. border communities found that people born outside the U.S. are most likely to delay HIV testing.[186]

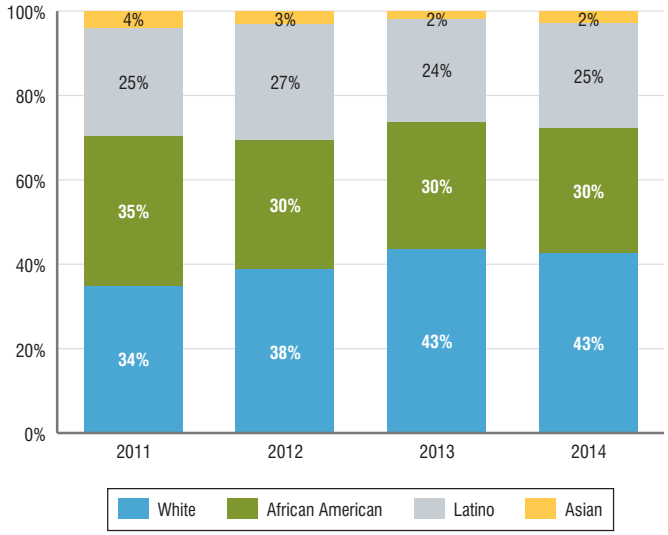
Massachusetts trend, 2011–2015

Figure 5.3.31 shows the breakdown of diagnosed HIV/AIDS cases by race/ethnicity. Whites account for 76% of the Massachusetts population[187] but only 43% of HIV/AIDS infections (Asians are similarly underrepresented.) Conversely, African Americans (8.4% of the population[188]) account for 30% of cases, and Latinos (11.2% of the population[189]) account for 25% of cases.

Figure 5.3.32 presents the percentages of adults aged 18 to 64 who have ever been tested for HIV and who were tested in the past year. During this period, the average prevalence of ever being tested was 41.1% among Whites, 66% among African Americans, 59.9% among Latinos, and 31.4% among Asians; the average prevalence of being tested in the past year was 8.6% among Whites, 25.2% among African Americans, 21.6% among Latinos, and 7.6% among Asians.

After controlling for gender, age, and year (not shown in figure), African Americans and Latinos were significantly more likely to have ever been tested and tested in the last year than Whites; Asians were significantly less likely to have ever been tested. During the period examined, there was no significant increase or decrease to HIV testing among any racial/ethnic group.

Figure 5.3.31. HIV/AIDS cases by race/ethnicity (Massachusetts)



Source: DPH. (2016). STD & HIV/AIDS surveillance report. Retrieved April 11, 2016, from http://www.mass.gov/eohhs/gov/departments/dph/programs/id/hivaids-surveillance/surveillance/public-health-cdc-hivaids-surveillance-std-report.html

TUBERCULOSIS

Background

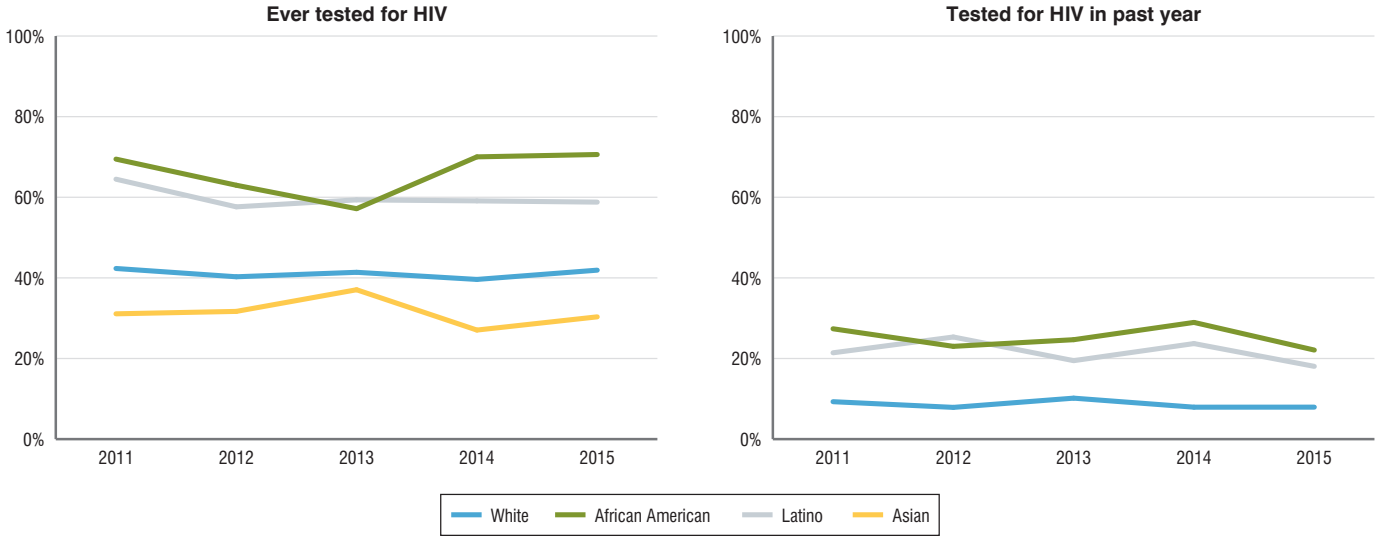
Tuberculosis (TB), the leading infectious killer in the world, lives at the crossroads of health disparities.[190] TB is endemic in most regions of the world, so U.S. residents born outside the U.S. suffer from incidence rates 13 times higher than native-born residents. Nationally, 66% of active cases are among those born outside the U.S.,[191] while in Massachusetts that proportion is 87%.[192] Asians accounted for 44% of TB cases in 2010 among those born outside of the U.S.[193] Other key risk factors include substance use, HIV co-infection, and homelessness.

The most recent national report shows persistently higher rates of TB among non-Whites.[194] U.S.-born Whites had an incidence rate of 0.5 cases per 100,000 population, compared to U.S.-born African Americans at 3.3 and Latinos at 1.8. Incidence rates overall in 2015 were as follows: Whites (3.4), Asians (28.2), African Americans (22.8),[195] and Latinos (10.3).[196]

Massachusetts trend, 2006–2015

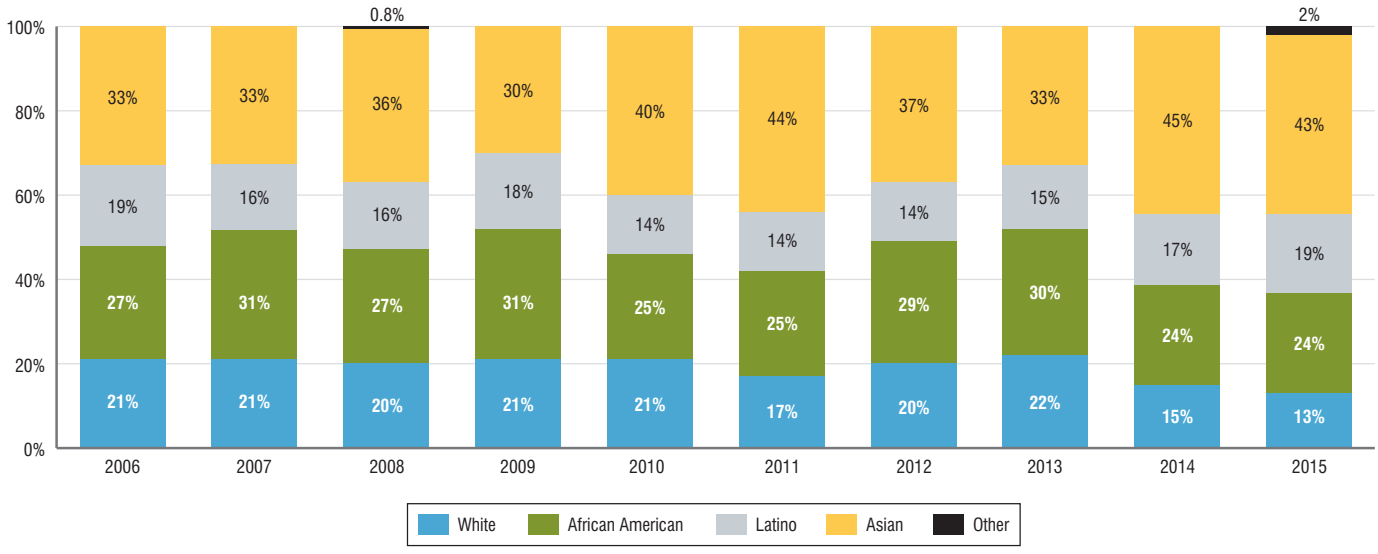
Figure 5.3.33 shows a similar pattern among racial/ethnic groups at the state level. According to the DPH annual TB summary from 2015, Asians had 50.8 times, African Americans had 23.2 times, and Latinos had 12.6 times the relative risk of being diagnosed with TB compared to White residents.[197] The greatest disparity (i.e., between Asians and Whites) is largely due to high TB rates in country of origin and extended travel to countries with endemic TB.

Figure 5.3.32. HIV testing (Massachusetts, aged 18–64)



Note 1: BRFSS data was analyzed using complex sampling procedures. Logistic regression was used to estimate the probability of a dichotomous outcome. Models were adjusted for gender and age.
Note 2: Insufficient data for HIV test in the past year for Asians.
Source: OSA analysis of BRFSS data provided by DPH.

Figure 5.3.33. Reported Massachusetts TB cases by race/ethnicity



Source: DPH Bureau of Infectious Disease and Laboratory Sciences, Division of Global Populations and Infectious Disease Prevention, 2006–2015.

Summary of Findings

5.1: REDUCING PREVENTABLE HEALTH CONDITIONS

Cancer screening and mortality

BASED ON CLAIMS DATA FROM APCD AND MASSHEALTH

- Women aged 50 and older were more likely to have had a mammogram in the past 27 months from 2012 to 2015 for both those with commercial coverage and MassHealth coverage. The gap between these two coverage groups did not change significantly during this time.
- Limited data suggested women covered by MassHealth were less likely to have had appropriate screenings from 2012 to 2015.
- Findings also indicate an increasing trend in the percentage of both MassHealth and commercially covered adults, aged 50 to 75, with appropriate colorectal cancer screening since 2012.

BASED ON DATA FROM BRFSS

- Among women aged 18 to 24, there was a significant decrease from 2012 to 2014 in the percentage who had a Pap smear in the past three years.
- Among men older than 50, 40.0% had a PSA blood test in the past year in 2014, and the rate significantly declined among those aged 50 to 69. However, these findings should be interpreted with caution since new guidelines are underway.

BASED ON OTHER DATA FROM DPH

- Death rates from breast, cervical, colorectal, lung, or prostate cancer did not change significantly from 2010 to 2015. Females had significantly lower rates of lung cancer deaths.

Prevention and Morbidity/Mortality from other conditions

BASED ON DATA FROM USPSTF

- In 2010, the Commonwealth had 179 hospital admissions per 100,000 children for asthma treatment, the sixth highest in the U.S.

BASED ON DATA FROM BRFSS

- Asthma rates were generally stable among adults from 2012 to 2015, with around 15% ever having asthma.
- Between 2012 and 2014, there was no change in the share of adults with a dental visit in the past year, but more people had 6 missing teeth; individuals with more education or wealth were more likely to have visited a dentist and less likely to have 6 missing teeth.
- In 2013, 3.5% of Massachusetts children had unmet dental needs, more than in 2012. There is concern this will turn into a significant trend if child dental benefits via CHIP/MassHealth are repealed or allowed to expire.
- The percentage of Massachusetts adults smoking declined significantly between 2011 and 2015, ending at 14%.
- From 2011 to 2015, neither cholesterol screening nor the percentage of people told they have high cholesterol (35% in 2015) changed significantly.
- The percentage of people told they have high blood pressure (HBP) (30% in 2015) did not change significantly from 2011 to 2015. Men were more likely than women to be told they have HBP, but women were more likely to be taking medication to treat it.
- In 2015, 59.6% of Massachusetts adults were overweight, 24.2% were obese, and 40.4% were neither overweight nor obese. While men were more likely to be overweight and obese, there was a significant increase from 2011 to 2015 in obesity among women.
- In 2014, 7.3% of adults reported a doctor had ever told them they had pre-diabetes. In 2015, 9.0% reported a doctor had ever told them they had diabetes. Men had a significant increase in pre-diabetes from 2011 to 2014 and diabetes from 2011 to 2015. The risk of pre-diabetes and diabetes significantly increased with age.
- The rate of heart attack among adults aged 35 and older was 5.6% in 2015. Men were twice as likely as women to have had a heart attack and 84% more likely to have angina or CHD (from 2011 to 2015). Risk increased with age, but the overall rate did not change significantly during this period.
- From 2011 to 2015, men were 23.9% more likely than women to ever have a stroke, and there was no significant change in prevalence for men or women. The risk of having a stroke significantly increased with age.
- Nearly 30% of adults aged 65 and older had a fall in 2014, and the rates were similar for men and women. Women had a higher likelihood of being injured by a fall, despite similar fall rates among men and women.
- Among adults aged 18 to 64, 45% reported ever being tested for HIV in 2015, while 10.1% reported having been tested in the past year. Men were 17% less likely than women to ever be tested, and there was no significant difference in testing rates between 2012 and 2015.

BASED ON DATA FROM DPH

- Certain vulnerable groups (e.g., individuals with a mental health condition or low socio-economic status) had much higher smoking rates than the general population, although they were also experiencing a downward trend.
- There was no significant change in the diabetes death rate from 2010 to 2015. Women had a significantly lower rate than men.
- There was no significant change in the heart-disease death rate from 2010 to 2015.
- The stroke-related death rate did not change among either men or women from 2010 to 2015.
- Controlling for gender, there was a significant increase in reported falls from 2012 to 2014 among adults 65 years and older.
- From 2011 to 2013, the prevalence of reported syphilis cases in Massachusetts rose from 500 to 701, including an increase of 19.5% among women and 42.3% among men. Over that period, reported cases of gonorrhea rose 10.5% overall. From 2011 to 2014, reported cases of chlamydia rose 4.4%.
- New HIV/AIDS infections fell 22% from 2005 to 2010 and 9% from 2011 to 2014.

- Hepatitis C cases have increased since 2012 with 8,000 to 9,000 probable and confirmed new chronic cases diagnosed annually. Some of this increase is linked to injection-drug usage.

5.2: PREVENTION AND WELLNESS PROGRAMS

- The Prevention and Wellness Trust Fund (PWTF) Grantee Program supported nine partnerships, each consisting of a clinical organization, a community-based organization, and at least one municipality. The partnerships addressed at least two priority conditions (pediatric asthma, hypertension, falls in older adults, or tobacco use) and one optional condition (diabetes, obesity, or substance use).
- The PWTF Grantee Program has increased systemic capacity by creating 148 new jobs and extending care into communities. In addition, preliminary evaluations show declining pediatric asthma in four PWTF communities, improvements in hypertension control in several PWTF communities, 900 fewer falls among older adults, and an estimated $2.0–$3.6 million in health care cost savings in the first five years.
- The PWTF-funded Massachusetts Working on Wellness Program supported 156 employers and 70,000 employees. Among those employees, 21% were lower-wage earners. Initial estimates indicate $0.76–$4.07 million in potential medical care savings for the top three PWTF interventions: diet and nutrition, leisure-time exercise, and stress reduction.
- The effectiveness of workplace wellness programs has not been rigorously evaluated, although initial studies show small health gains and some health cost savings for employers. Moreover, a majority of the surveyed employers believe these programs were at least somewhat effective. No longitudinal data specific to post-Chapter 224 programs were available.
- Since 2013, 133 small businesses have been certified to receive more than $827,000 in tax credits via the Wellness Tax Credit Initiative, which was created by Chapter 224. Most of these businesses (72%) had fewer than 100 employees, surpassing the goal of 50%.

5.3: RACIAL/ETHNIC DISPARITIES IN HEALTH OUTCOMES

Access to Care

BASED ON DATA FROM BRFSS

- From 2011 to 2015, African Americans and Latinos were more likely than Whites to skip a needed doctor visit due to cost by 6 and 13 percentage points, respectively; only Whites had a significant improvement over this period.
- From 2010 to 2014, dental visit rates fell among Whites, African Americans, and Latinos and rose slightly among Asians/Pacific Islanders. African Americans had the lowest rate of annual dental visits and the highest prevalence of six or more missing teeth.

Cancer screening and Mortality

BASED ON CLAIMS DATA FROM APCD

- All racial/ethnic groups with commercial insurance had a significant increase in breast cancer screening from 2012 to 2015; the imputed data suggest Latinas were most likely to have screening, contrasting to the national overall trend, where they were least likely. Data for those with MassHealth and other non-commercial insurance were not available.
- Among those with commercial insurance, African Americans and Asians were less likely than Whites to be screened for cervical cancer, and no group had a significant change in screening rates, from 2012 to 2015.
- Incomplete data for the commercially-insured suggested increased trends in appropriate colorectal screening among all racial/ethnic groups, adults aged 50 to 75, from 2010 to 2015.

BASED ON DATA FROM BRFSS

- Latinos were less likely than Whites to have a PSA test to screen for prostate cancer. Whites were the only group with a significant decrease in screenings from 2011 to 2014, possibly in response to the changes in USPSTF recommendations.
- In general, Whites had higher rates of ever being diagnosed with cancer, from 2011 to 2015.

BASED ON DATA FROM DPH

- Whites had the highest rate of cancer death, though limited data suggest the rate declined among all race/ethnicities from 2011 to 2015. (Cancer deaths are tied to cancer of the bladder, brain, breast, bronchus, colon, cervix, esophagus, kidney, lung, ovary, pancreas, prostate, skin, stomach, trachea, and uterus, as well as to Hodgkin's and non-Hodgkin's lymphoma, leukemia, and multiple myeloma.)
- From 2010 to 2015, there was no statistically significant change in the breast cancer death rate among any racial/ethnic group. Latinos and Asians were significantly less likely than Whites and African Americans to die from breast cancer.
- There was neither a statistically significant difference between racial/ethnic groups nor a significant change in the cervical death rate from 2010 to 2015.
- From 2010 to 2015, Asians were less likely to die of colorectal cancer than Whites, and there was no significant change to the colorectal death rate among any group.
- Latinos, Asians, and African Americans were significantly less likely than Whites to die from lung cancer. No racial/ethnic group experienced a significant change in death rate from 2010 to 2015.
- From 2010 to 2015, African Americans were significantly more likely, and Asians were significantly less likely, than Whites to die from prostate cancer. However, African Americans were the only group that saw a significant decrease in the death rate.

Morbidity/mortality from other conditions

BASED ON DATA FROM DPH

- African Americans, Latinos, and Asians were more likely to have low birthweights than Whites. From 2010 to 2015, there was no significant change in the prevalence of low birthweight, in contrast to the national trend of reduced birthweights.
- African Americans and Latinos had a significantly higher infant mortality rate than Whites from 2010 to 2015. Massachusetts had the lowest infant mortality rate in the nation in 2013.
- From 2010 to 2015, Latinos and Asians were less likely to die from coronary heart disease (CHD) than Whites. However, only African

Americans had a significant decrease in CHD-related deaths.

- There was no significant difference in stroke-related death rate between racial/ethnic groups, nor any significant change over time among any group from 2010 to 2015.
- Whites accounted for 76% of the Massachusetts population but only 43% of HIV/AIDS infections, while Asians were similarly underrepresented. In contrast, African Americans accounted for only 8.4% of the population but 30% of HIV/AIDS infections, while Latinos (11.2% of the population) accounted for 25% of cases.
- Asians had 50.8 times, African Americans had 23.2 times, and Latinos had 12.6 times the relative risk of being diagnosed with tuberculosis compared to White residents in 2015.

BASED ON DATA FROM BRFSS

- Latinos were more likely, and Asians were less likely, to have asthma than Whites from 2011 to 2015. Whites experienced a significantly greater likelihood of ever having asthma and African Americans had a significantly increased likelihood of current asthma.
- Latinos and Asians were significantly less likely than Whites to be current smokers. However, African Americans and Latinos were significantly less likely than Whites to successfully quit smoking, suggesting a disparity in access to cessation supports. From 2011 to 2015, smoking declined among each race/ethnicity.
- From 2011 to 2015, African Americans and Latinos were more likely, and Asians were less likely, to be told they HBP than Whites. No group had a significant change in HBP notification or in taking medicine for HBP.
- African American and Latino adults had significantly higher overweight/obesity levels than Whites, while Asians had significantly lower levels. During the period examined, there was no significant change in overweight or obesity among any racial/ethnic group.
- From 2011 to 2015, African Americans and Latinos were more likely than Whites to have ever been told they had pre-diabetes or diabetes. During this period, the rate of pre-diabetes increased significantly among Whites and African Americans, while the rate for diabetes increased significantly for Whites only.
- From 2011 to 2015, Latinos were more likely than Whites to have ever had a heart attack, angina, or coronary heart disease (CHD). However, no group had a significant change in heart disease.
- Among adults aged 35 and older, African Americans and Latinos were more likely to ever have had a stroke than Whites, and no group saw a significant change in the rate of stroke (2011 to 2015).
- From 2011 to 2015, African Americans and Latinos were significantly more likely to have ever been tested for HIV/AIDS and to have been tested in the last year than Whites. Asians were significantly less likely to have ever been tested. During this period, there was no significant increase or decrease to HIV testing among any racial/ethnic group.

Conclusion

OSA's analysis of population health in Massachusetts, shows some positive trends along with many areas of stasis that should be cause for concern.

Although cancer screenings and overall cancer deaths improved, individual cancer death rates did not change significantly. The level of morbidity/mortality related to many non-cancer outcomes increased, though important improvements occurred in the smoking rate and the impact of HIV/AIDS. Asians overwhelmingly had the most positive set of indicators and improving trends for three measures. African Americans had the worst set of indicators, although there were improvements in four measures. These findings show Massachusetts has a lot of room for improving population health, a major goal of Chapter 224. There are additional positive indicators coming from the prevention and wellness programs created under Chapter 224, though increased investment in public health systems is needed to capitalize on and to scale those initiatives.

REDUCING PREVENTABLE HEALTH CONDITIONS

Despite improvements for some types of cancer screening, the prevalence of (non-cancer) morbidity/mortality generally increased or plateaued. Mammography rates improved for women aged 50 and older, and colorectal screening increased among adults aged 50 to 75 (among both those with commercial coverage and MassHealth coverage).

However, among women aged 18 to 24 and women covered by MassHealth, cervical-screening rates decreased. Death rates from breast, cervical, colorectal, lung, and prostate cancer did not change significantly. Breast cancer remained, the deadliest cancer by far, and cervical cancer was the least deadly. Men had a higher risk of death than women from lung cancer.

In general, the prevalence of morbidity/mortality due to conditions other than cancer increased or held steady. Indeed, rates went up for the following measures: obesity among women, pre-diabetes and diabetes among men, and falls among people aged 64 and older. The prevalence of adults with at least six missing teeth also rose. Moreover, the hepatitis C rate increased, as did reported cases of syphilis, gonorrhea, chlamydia, and drug-resistant tuberculosis.

Among children, the share with unmet dental needs increased, and the rate of hospital admission for asthma treatment was high. Among adults, there was no change in the prevalence of high cholesterol, stroke, high blood pressure, and heart conditions (heart attack, angina, and coronary heart disease), nor with the death rates associated with diabetes, stroke, and heart disease. (The Commonwealth ranked 47th in heart disease death rate in 2013). However, there were declines in the adult-smoking rate, the rate of new HIV/AIDS infections, and HIV/AIDS deaths. Moreover, many of these measures were based on self-reported survey data and do not capture key insights into morbidity/mortality, e.g., having hypertension under control is considered a more important indicator of population health than basic hypertension prevalence.

PREVENTION AND WELLNESS PROGRAMS

Massachusetts launched more prevention and wellness programs during the period studied. Since 2013, two Chapter 224 programs, the Wellness Tax Credit and the Working on Wellness program, have provided financial and technical assistance to hundreds of organizations. Additionally, the newly created Prevention and Wellness Trust Fund (PWTF) Grantee Program supported nine community partnerships addressing priority health needs (such as pediatric asthma and hypertension). An initial evaluation of the grantee program was positive, finding a decline in prevalence of pediatric asthma in four PWTF communities, an increase in controlled and treated hypertension, a reduction of 900 falls among older adults, and an estimated $2.0–3.6 million in averted health care costs in the first five years. Moreover, the grantees increased their systemic capacity to extend care into their communities.

RACIAL/ETHNIC DISPARITIES IN HEALTH OUTCOMES

There were enough data to compare rates among four racial/ethnic groups for 37 indicators related to health care access, cancer screening/mortality, and morbidity/mortality from other conditions. Asians had the best result for 23 measures, compared to Whites (8), Latinos (6), and African Americans (2). African Americans had the worst results for 20 of the measures, compared to Latinos (7), Asians (7), and Whites (2).

Some of the differences among groups were relatively small, but five disparities were especially large. Specifically, 1 in 5 Latinos reported skipping needed care due to cost; prostate cancer mortality among African American men was 38 deaths per 100,000 people, compared to the next highest rate (White men) with 19 deaths per 100,000; infant mortality for African Americans was more than twice that for Whites; African Americans represented about 8.4% of the population but 30% of HIV/AIDS diagnoses; and Asians had 50.8 times the relative risk of being diagnosed with tuberculosis compared to Whites.

Data allowed OSA to conduct trends tests for 28 of the measures. Sixteen showed no significant change, either positive or negative.

- African Americans had five positive trends: breast cancer screening (among women aged 50 to 74 with commercial coverage), as well as cancer deaths, prostate cancer deaths, current smokers, and heart disease deaths (all adults). The three negative trends were percentage with a dental visit in the last year, currently with asthma, and prevalence of pre-diabetes.
- Whites had four positive trends: fewer skipped visits due to cost, breast cancer screening (among women aged 50 to 74 with commercial coverage), fewer overall cancer deaths, and fewer current smokers. Five negative trends were for routine checkup in the past year, a dental visit in the past year, ever having asthma, pre-diabetes, and diabetes.
- Latinos experienced three positive trends: breast cancer screening (among women aged 50 to 74 with commercial coverage), overall cancer deaths, and current smokers. The one negative trend: dental visit in the past year.
- Asians had no negative trends and four positive trends: breast cancer screening (among women ages 50 to 74 with commercial coverage), overall cancer deaths, a dental visit in the past year, and current smokers.

It is important to note: Due to data limitations and diversity within the four racial/ethnic groups, future studies could produce different, even counter-trending findings than those measured in this report.

Endnotes

SECTION 5.i

1 Massachusetts Executive Office of Health and Human Services. (2016). The prevention and wellness trust fund. Retrieved October 7, 2016, from mass.gov/eohhs/gov/departments/dph/programs/community-health/prevention-and-wellness-fund

2 Up to 25% of the cost of implementing the program; maximum credit of $10,000 per year.

3 Massachusetts Executive Office of Health and Human Services. (2016). Massachusetts wellness tax credit. Retrieved October 7, 2016, from mass.gov/eohhs/consumer/wellness/health-promotion/massachusetts-wellness-tax-credit.html

4 Measures based on APCD data should not be directly compared to measures based on other data sources. In numerous instances in sections 5.1 and 5.3 (e.g., breast cancer screening in 5.1), APCD data are used alongside other data (e.g. MassHealth) to provide a fuller picture of data trends. As with all data sources, APCD has limitations. For example, the population covered by the health plans captured in the APCD have higher socioeconomic status and are more likely to be White. Additionally, under OSA's APCD analysis, data from only the top three insurers were used (these insurers accounted for 63.2% of the market and are considered representative of the commercial population).

5 BRFSS is a collaboration between the Centers for Disease Control and Prevention (CDC) and the Massachusetts Department of Public Health (DPH), which provided the Office of the State Auditor (OSA) with raw BRFSS data. Measures based on BRFSS data should not be compared directly to measures based on other data sources (e.g. claims data), which may involve different methodologies and populations. In numerous instances in sections 5.1 and 5.3 (e.g. stroke in 5.1), BRFSS data are presented alongside other DPH data to provide a fuller picture of data trends. BRFSS data are collected using telephone surveys of patients. Such self-reported data, which are subject to limitations of patient knowledge, are best suited for answering simpler questions.

SECTION 5.1

1 A collaboration between the CDC and DPH, which provided OSA raw BRFSS data.

2 CDC. (2013, June). Preventive health care. Retrieved September 27, 2016, from cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/preventivehealth.html

3 U.S. Department of Health & Human Services. (2016, February). Chronic disease overview. Retrieved from http://www.cdc.gov/chronicdisease/overview

4 Ibid.

5For example: Stryjewski, T., Zhang, F., Eliott, D., et al. (2014). Effect of Massachusetts health reform on chronic disease outcomes. *Health Services Research,* 49(Suppl 2), 2086–2103.

6 For example: Bradley, E., Canavan, M., Rogan, E., et al. (2016). Variation in health outcomes: the role of spending on social services, public health, and health care, 2000–09. *Health Affairs*. 35(5), 760–768.

7 Wahowiak, L. (2015, July). US life expectancy at high, but lags behind many countries: working to make US healthiest nation. Retrieved from http://thenationshealth.aphapublications.org/content/45/5/1.4.full

8 Stryjewski, T., Zhang, F., Eliott, D., et al. (2014.) Effect of Massachusetts health reform on chronic disease outcomes. *Health Services Research. 49*(Suppl 2), 2086–2103.

9 Okoro, C., Dhingra, S., Coates, R., et al. (2014). Effects of Massachusetts health reform on the use of clinical preventive services. *Journal of General Internal Medicine, 29*(9), 1287–1295.

10 The Blue Cross Blue Shield of Massachusetts Foundation. (2016, September). Chapter 224 tracking tool. Retrieved October 5, 2016, from bluecrossfoundation.org/sites/default/files/download/publication/Ch224_2016_FINAL_1.pdf

11 Ibid.

12 Ibid.

13 Calculated as the sum of social service and public health spending divided by the sum of Medicare and Medicaid spending.

14 Bradley, E., Canavan, M., Rogan, E., et al. (2016). Variation in health outcomes: the role of spending on social services, public health, and health care, 2000–09. ***Health Affairs***, ***35***(5), 760–768.

15 Examples of social determinants include the availability of safe housing, nutritious food, educational and vocational opportunity, affordable health services, and reliable transportation. Other examples include exposure to discrimination, violence, and concentrated poverty.
Source: Healthy People 2020. (2016, November). Social determinants of health. Retrieved November 3, 2016, from healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health

16 Bradley, E., Canavan, M., Rogan, E., et al. (2016). Variation in health outcomes: the role of spending on social services, public health, and health care, 2000–09. *Health Affairs, 35*(5), 760–768.

17 These causes of death were chosen to mirror the "Selected leading causes of death" table in the DPH Massachusetts Deaths 2013 report.

18 CDC. (2016, March). Breast cancer statistics. Retrieved August 14, 2014, from http://www.cdc.gov/cancer/breast/statistics/

19 DPH. (2012, December). Cancer incidence and mortality in Massachusetts: 2005–2009, p. 22. Retrieved August 15, 2014, from http://www.mass.gov/eohhs/docs/dph/cancer/registry-state-wide-05-09-report.pdf

20 CDC. *United States cancer statistics,* 2012. Retrieved April 26, 2016, from https://nccd.cdc.gov/uscs/cancersbystateandregion.aspx

21 Smith, R., Brooks, D., Cokkinides, V., et al. (2013, March–April). Cancer screening in the United States, 2013: a review of current American Cancer Society guidelines, and new guidance on cervical cancer screening and lung cancer screening. *CA: A Cancer Journal for Clinicians, 63*(2): 88–89. Retrieved August 15, 2014, from http://onlinelibrary.wiley.com/doi/10.3322/caac.21174/pdf

22 MGL ch. 175 § 47G

23 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

24 Age: Women aged 52–74 years as of December 31 of the measurement year. Continuous enrollment: October 1 two years prior to the measurement year through December 31 of the measurement year. Allowable gap: no more than 45 days for each full calendar year of continuous enrollment. No gaps in enrollment are allowed from October 1 two years prior to the measurement year through December 31 two years prior to the measurement year. Anchor date: December 31 of the measurement year.

25 U.S. Preventive Services Task Force. (2016, September). Final update summary: cervical cancer screening. Retrieved August 31, 2016, from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/cervical-cancer-screening

26 U.S. Preventive Services Task Force. (2016, September). Final update summary: cervical cancer screening. Retrieved August 31, 2016, from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/cervical-cancer-screening

27 U.S. Department of Health & Human Services. (2013, June). Affordable Care Act rules on expanding access to preventive services for women. Retrieved from http://www.hhs.gov/healthcare/facts-and-features/fact-sheets/aca-rules-on-expanding-access-to-preventive-services-for-women

28 Women aged 21–64 who had cervical cytology performed within three years or women aged 30–64 who had cervical cytology/human papillomavirus co-testing performed within five years.

29 Age: Women aged 24–64 years as of December 31 of the measurement year. Continuous enrollment: The measurement year and the two years prior to the measurement year. Allowable gap: no more than 45 days during each year of continuous enrollment. Anchor date: December 31 of the measurement year.

30 CDC. (2014, February 26). Colorectal cancer screening guidelines. Retrieved December 8, 2015, from http://www.cdc.gov/cancer/colorectal/basic_info/screening/guidelines.htm

31 Joseph, D., King, J., Miller, J., et al. (2012). Prevalence of colorectal cancer screening among adults—behavioral risk factor surveillance system, United States, 2010. *Morbidity and Mortality Weekly Report, 61(*Suppl), 51–56.

32 Morgan, D., Dhruva, S., Wright, S., et al. (2016). Update on medical overuse: A systematic review.

JAMA Internal Medicine.

33 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

34 Betsy Lehman Center for Patient Safety. (2016, June). How to boost your patients' cancer screening rates to near 100 percent. Retrieved July 15, 2016, from http://www.betsylehmancenterma.gov/news/how-to-boost-your-patients-cancer-screening-rates-to-near-100-percent

35 Age: 51 to 75 years as of December 31 of the measurement year. Continuous enrollment: The measurement year and the year prior to the measurement year. Allowable gap: no more than 45 days during each year of continuous enrollment. Anchor date: December 31 of the measurement year.

36 Commonwealth of Massachusetts. (2014, September). Prostate cancer awareness month in Massachusetts. Retrieved from blog.mass.gov/blog/health/prostate-cancer-awareness-month-in-massachusetts

37 Mayo Clinic. (2015, March). Prostate cancer. Retrieved from www.mayoclinic.org/diseases-conditions/prostate-cancer/basics/risk-factors/con-20029597

38 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: prostate cancer. Retrieved Sept. 20, 2016 from http://seer.cancer.gov/statfacts/html/prost.html

39 CDC. (2016, July). Prostate cancer rates by state. Retrieved from https://www.cdc.gov/cancer/prostate/statistics/state.htm

40 PSA is a substance made by the prostate. A higher level of PSA in the blood may indicate cancer. Source: CDC. (2013, December). Prostate cancer: what screening tests are there? Retrieved August 15, 2014, from http://www.cdc.gov/cancer/prostate/basic_info/screening.htm

41 U.S. Preventive Services Task Force. (2017, April). Draft recommendation statement, prostate cancer: screening. Retrieved August 31, 2016, from uspreventiveservicestaskforce.org/Page/Document/draft-recommendation-statement/prostate-cancer-screening1

42 AdMeTech Foundation. (2014, July). Mission. Retrieved August 31, 2016, from http://www.admetech.org/about-us
Siegel, R., Miller, K., & Jemal, A. (2017). Cancer statistics, 2017. *CA: a cancer journal for clinicians, 67*(1), 7–30.

43 Ibid.

44 Dusetzina, S. (2016). Share of specialty drugs in commercial plans nearly quadrupled, 2003–14. *Health Affairs, 35*(7), 1241–1246.

45 Executive Office of Health and Human Services. (2012, January). The 2012–2016 Massachusetts cancer plan. Retrieved September 20, 2016, from ftp://ftp.cdc.gov/pub/Publications/Cancer/ccc/massachusetts_ccc_plan_2012_2016.pdf

46 Ibid.

47 Includes cancer of the trachea and bronchus.

48 Other than skin cancer, but basal cell skin cancers are very common (thousands per year) and are removed in a dermatologist's office. CDC. (2016, July). Breast cancer. Retrieved September 20, 2016, from https://www.cdc.gov/cancer/breast

49 CDC, National Center for Health Statistics. Underlying cause of death 1999–2014 on CDC WONDER online database, released 2015. Retrieved September 20, 2016, from http://wonder.cdc.gov/ucd-icd10.html

50 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: female breast cancer. Retrieved September 20, 2016, from seer.cancer.gov/statfacts/html/breast.html

51 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: female breast cancer. Retrieved Sept. 20, 2016 from seer.cancer.gov/statfacts/html/breast.html

52 Relative survival is the percentage of people who are alive five years following diagnosis who would be expected to be alive after other possible causes of death are taken into account. Source: National Cancer Institute. (2016, March). Measures of cancer survival. Retrieved September 20, 2016, from surveillance.cancer.gov/survival/measures.html

53 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: female breast cancer. Retrieved Sept. 20, 2016 from seer.cancer.gov/statfacts/html/breast.html

54 CDC. (2016, July). Breast cancer rates by state. Retrieved September 20, 2016, from https://www.cdc.gov/cancer/breast/statistics/state.htm

55 DPH. (2016). Massachusetts cancer statistics. Retrieved September 20, 2016, from www.mass.gov/eohhs/gov/departments/dph/programs/community-health/cancer-age/massachusetts-cancer-statistics.html

56 CDC. (2016, June). Cervical cancer rates by race and ethnicity. Retrieved September 20, 2016, from www.cdc.gov/cancer/cervical/statistics/race.htm

57 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: cervix uteri cancer. Retrieved Sept. 20, 2016 from http://seer.cancer.gov/statfacts/html/cervix.html

58 CDC. (2016, July). Cervical cancer rates by state. Retrieved September 21, 2016, from www.cdc.gov/cancer/cervical/statistics/state.htm

59 Beavis, A., Gravitt, P., & Rositch, A. (2017, January 23). Hysterectomy-corrected cervical cancer mortality rates reveal a larger racial disparity in the United States. *Cancer*.

60 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: cervix uteri cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/cervix.html

61 National Institutes of Health. (2013, March). Cervical cancer. Retrieved Sept. 20, 2016 from https://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=76

62 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: cervix uteri cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/cervix.html

63 Tewari, K., Sill, M., Long III, J., et al. (2014). Improved survival with bevacizumab in advanced cervical cancer. *New England Journal of Medicine, 370*(8), 734–743.

64 Other Sexually Transmitted Diseases. (2015, November 17). Retrieved December 3, 2015, from http://www.cdc.gov/std/stats14/other.htm#hpv

65 Viens, L., Henley, S., Watson, M., et al. (2016). Human papillomavirus-associated cancers - United States, 2008–2012. *Morbidity and Mortality Weekly Report MMWR, 65*(26), 661–666.

66 Bankhead, C. (2017, January 11). Cancer centers back HPV vaccine. *MedPage Today*. Retrieved January 11, 2017, from medpagetoday.com/hematologyoncology/cervicalcancer/62450

67 CDC, National Center for Health Statistics. Underlying cause of death 1999–2014 on CDC WONDER online database, released 2015. Retrieved September 20, 2016, from http://wonder.cdc.gov/ucd-icd10.html

68 DPH. (2016). Massachusetts cancer statistics. Retrieved September 20, 2016, from www.mass.gov/eohhs/gov/departments/dph/programs/community-health/cancer-age/massachusetts-cancer-statistics.html

69 CDC. (2016, July).

70 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: colon and rectum cancer. Retrieved Sept. 20, 2016 from http://seer.cancer.gov/statfacts/html/colorect.html

71 Doubeni, C., Jambaulikar, G., Fouayzi, H., et al. (2012). Neighborhood socioeconomic status and use of colonoscopy in an insured population–a retrospective cohort study. *PLOS ONE, 7*(5), e36392.

72 American Cancer Society. (2016, February). ACS guidelines on nutrition and physical activity for cancer prevention. Retrieved September 22, 2016, from www.cancer.org/healthy/eathealthygetactive/acsguidelinesonnutritionphysicalactivityforcancerprevention/acs-guidelines-on-nutrition-and-physical-activity-for-cancer-prevention-common-questions

73 Fung, T., Kashambwa, R., Sato, K., et al. (2014). Post diagnosis diet quality and colorectal cancer survival in women. *PLOS ONE, 9*(12), e115377.

74 DPH. (2016). Massachusetts cancer statistics. Retrieved September 20, 2016, from www.mass.gov/eohhs/gov/departments/dph/programs/community-health/cancer-age/massachusetts-cancer-statistics.html

75 CDC, National Center for Health Statistics. Underlying cause of death 1999–2014 on CDC WONDER online database, released 2015. Retrieved Sept. 20, 2016 from http://wonder.cdc.gov/ucd-icd10.html

76 U.S. Preventive Services Task Force. (2013, December). Lung cancer: screening. Retrieved from https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/lung-cancer-screening

77 McKee, B., McKee, A., Flacke, S. et al. (2013). Initial experience with a free, high-volume,

low-dose CT lung cancer screening program. *Journal of the American College of Radiology, 10*(8), 586–592.

78 Manser, R., Lethaby, A., Irving, L., et al. (2013). Screening for lung cancer. *The Cochrane Library.*

79 Iezzoni, L. (2011). Eliminating health and health care disparities among the growing population of people with disabilities. *Health Affairs, 30*(10), 1947–1954.

80 DPH. (2016). Massachusetts cancer statistics. Retrieved September 20, 2016, from www.mass.gov/eohhs/gov/departments/dph/programs/community-health/cancer-age/massachusetts-cancer-statistics.html

81 CDC. (2016, July). Prostate cancer rates by state. Retrieved September 20, 2016, from cdc.gov/cancer/prostate/statistics/state.htm

82 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: prostate cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/prost.html

83 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: prostate cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/prost.html

84 Hamdy, F., Donovan, J., Lane, J., et al. (2016, September 14). 10-year outcomes after monitoring, surgery, or radiotherapy for localized prostate cancer. *New England Journal of Medicine*. [Epub ahead of print].

85 Loeb, S., Bjurlin, M., Nicholson, J., et al. (2014). Overdiagnosis and overtreatment of prostate cancer. *European Urology, 65*(6), 1046–1055.

86 Peisch, S., Van Blarigan, E., Chan, J., et al. (2016, August 12). Prostate cancer progression and mortality: a review of diet and lifestyle factors. *World Journal of Urology,* 1–8. [Epub ahead of print].

87 Woods, E. (2016). Community asthma initiative to improve health outcomes and reduce disparities among children with asthma. *Morbidity and Mortality Weekly Report* (supplements), *65*.

88 Ibid.

89 U.S. Preventive Services Task Force. (2016, March). Most recent asthma state data. Retrieved from https://www.cdc.gov/asthma/most_recent_data_states.htm.

90 CDC. (2016, June). Asthma. Retrieved Aug. 31, 2016 from http://www.cdc.gov/nchs/fastats/asthma.htm

91 CDC. (2016, March). Most recent asthma data. Retrieved Aug. 31, 2016 from http://www.cdc.gov/asthma/most_recent_data.htm

92 U.S. Preventive Services Task Force. (2016, March). Most recent asthma state data. Retrieved from https://www.cdc.gov/asthma/most_recent_data_states.htm

93 Massachusetts Department of Public Health. (2011, May.) Asthma among older adults in Massachusetts. Retrieved August 19, 2014 from p. 4 http://www.mass.gov/eohhs/docs/dph/com-health/asthma/among-older-adults.pdf

94 Health System Data Center. (2015). Retrieved December 3, 2015, from the Commonwealth Fund website: http://datacenter.commonwealthfund.org/#ind=1/sc=1

95 Massachusetts Department of Public Health. (April 2010). *Burden of asthma in Massachusetts,* p. 60–61.

96 Massachusetts Department of Public Health. (May 2009). *Strategic plan for asthma in Massachusetts 2009–2014,* p. 41. Retrieved September 30, 2014, from http://www.mass.gov/eohhs/docs/dph/com-health/asthma/state-plan.pdf

97 Mayo Clinic. (2017, February). Will my child outgrow asthma? Retrieved Feb. 15, 2017 from mayoclinic.org/diseases-conditions/childhood-asthma/expert-answers/outgrow-asthma/faq-20058116

98 CDC. (2016, August). Oral health conditions. Retrieved September 28, 2016, from www.cdc.gov/oralhealth/conditions/index.html

99 CDC. (2016, June). Periodontal disease. Retrieved September 28, 2016, from cdc.gov/oralhealth/conditions/periodontal-disease.html

100 Leng, W., Zeng, X., Kwong, J., et al. (2015, December 15). Periodontal disease and risk of coronary heart disease: An updated meta-analysis of prospective cohort studies. *International Journal of Cardiology, 201*, 469–72.

101 Siqueira, F., Cota, L., Costa, J., et al. (2007, December 1). Intrauterine growth restriction, low birth weight, and preterm birth: adverse pregnancy outcomes and their association with maternal periodontitis. *Journal of Periodontology, 78*(12), 2266–76.

102 Blue Cross & Blue Shield of Rhode Island. (2006, July). Dental care and chronic conditions. Retrieved March 29, 2016, from https://www.bcbsri.com/BCBSRIWeb/pdf/Oral_Health_and_Chronic_Conditions.pdf

103 American Dental Association. (2016). Oral health and well-being in the United States. Retrieved September 28, 2016, from ada.org/~/media/ADA/Science%20and%20Research/HPI/OralHealth-Well-Being-StateFacts/Oral-Health-Well-Being-Data-Tables.xlsx?la=en

104 Halasa, Y., Foley, M., Dellapenna, M., et al. (2015). Broken smiles: oral health and employment. Policy brief. Boston, MA: DentaQuest Foundation.

105 Nasseh, K., & Vujicic, M. (2013). Health reform in Massachusetts increased adult dental care use, particularly among the poor. *Health Affairs, 32*(9), 1639–1645.

106 Neely, M., Jones, J., Rich, S. et al. (2014, June). Effects of cuts in Medicaid on dental-related visits and costs at a safety-net hospital. *American Journal of Public Health, 104*(6), e14. See also, Quirk, S., Edraos, P., Leary, M. & O'Toole, K. (2011). Impact of cuts to Medicaid and Commonwealth Care adult dental coverage on Massachusetts community health centers. Massachusetts League of Community Health Centers, p. 3. Retrieved November 10, 2014, from http://www.massleague.org/About/DentalCutImpactReport2011.pdf

107 Health Care For All. (2015). House debates budget amendments: here's our list of priorities. Retrieved November 4, 2015, from https://www.hcfama.org/blog/house-debates-budget-amendments-heres-our-list-priorities

108 Tschampl, C., Foley, M., et al. (2015). The cost of orofacial pain. Policy brief. Boston, MA: DentaQuest Foundation.

109 Willink, A., Schoen, C., & Davis, K. (2016). Dental care and Medicare beneficiaries: access gaps, cost burdens, and policy options. *Health Affairs, 35*(12), 2241–2248.

110 American Dental Association. (2016). Oral health and well-being in the United States. Retrieved September 28, 2016, from ada.org/~/media/ADA/Science%20and%20Research/HPI/OralHealth-Well-Being-StateFacts/Oral-Health-Well-Being-Data-Tables.xlsx?la=en

111 Vujicic, M., Buchmueller, T., & Klein, R. (2016). Dental care presents the highest level of financial barriers, compared to other types of health care services. *Health Affairs, 35*(12), 2176–2182.

112 Koppelman, J., Vitzthum, K., & Simon, L. (2016). Expanding where dental therapists can practice could increase Americans' access to cost-efficient care. *Health Affairs, 35*(12), 2200–2206.

113 Langelier, M., Continelli, T., Moore, J., et al. (2016). Expanded scopes of practice for dental hygienists associated with improved oral health outcomes for adults. *Health Affairs, 35*(12), 2207–2215.

114 Koppelman, J., Vitzthum, K., & Simon, L. (2016). Expanding where dental therapists can practice could increase Americans' access to cost-efficient care. *Health Affairs, 35*(12), 2200–2206.

115 Wang T.W., Kenemer B., Tynan M.A., et al. (2016). Consumption of Combustible and Smokeless Tobacco — United States, 2000–2015. *Morbidity and Mortality Weekly Report, 65*, 1357–1363. Retrieved December 14, 2016, from: http://dx.doi.org/10.15585/mmwr.mm6548a1.

116 CDC. (2016, July). Tobacco product use among adults — United States, 2013–2014. Retrieved August 31, 2016, from https://www.cdc.gov/mmwr/volumes/65/wr/mm6527a1.htm?s_cid=mm6527a1_w

117 Ibid.

118 DPH. (2015, December). Who smokes. Retrieved August 31, 2016, from http://www.mass.gov/eohhs/docs/dph/tobacco-control/adults-who-smoke.pdf

119 Ibid.

120 Ibid.

121 CDC. (2016, April). Youth and tobacco use. Retrieved from http://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/

122 Massachusetts Department of Elementary and Secondary Education. (2014, May). Health and risk behaviors of Massachusetts youth 2013. Retrieved from p. 12 of http://www.doe.mass.edu/cnp/hprograms/yrbs/2013report.pdf

123 Department of Public Health & Department of Elementary and Secondary Education. (2013, January). Youth tobacco use in Massachusetts: survey results from 1993 to 2011. Retrieved December 23, 2014, from p. 10 of http://www.mass.gov/eohhs/docs/dph/tobacco-control/youth-tobacco-report-2011.pdf

124 Ibid

125 Because Massachusetts measures high cholesterol differently, Massachusetts and U.S. figures cannot be compared.

126 CDC. (2015). Health, United States, 2015. Retrieved from p. 204 of http://www.cdc.gov/nchs/data/hus/hus15.pdf#055

127 CDC. (2015, March). Cholesterol. Retrieved from https://www.cdc.gov/cholesterol

128 CDC. (2015, December). Preventing or managing high cholesterol: healthy living habits. Retrieved from https://www.cdc.gov/cholesterol/healthy_living.htm

129 Ibid.

130 Repatha and Praluent, which are known as PCSK9 inhibitors.

131 Silverman, E. (2016, April 7). Docs won't prescribe pricey new cholesterol meds unless they lower heart risks. Retrieved September 7, 2016, from https://www.statnews.com/pharmalot/2016/04/07/cholesterol-statin-heart-atack

132 Ibid.

133 Ibid.

134 CDC. (2016, September). High blood pressure. Retrieved from https://www.cdc.gov/bloodpressure

135 Ibid.

136 CDC. (2014, July). Family history and other characteristics that increase risk for high blood pressure. Retrieved from https://www.cdc.gov/bloodpressure/family_history.htm

137 CDC. (2014, July). Conditions that increase risk for high blood pressure. Retrieved from https://www.cdc.gov/bloodpressure/conditions.htm

138 CDC. (2014, July). Behaviors that increase risk for high blood pressure. Retrieved from https://www.cdc.gov/bloodpressure/behavior.htm

139 How is high blood pressure treated? (2015, September 10). Retrieved December 8, 2015, from National Heart, Lung, and Blood Institute's website: http://www.nhlbi.nih.gov/health/health-topics/topics/hbp/treatment

140 Doshi, J., Lim, R., Li, P., et al. (2016). A synchronized prescription refill program improved medication adherence. *Health Affairs, 35*(8), 1504–1512. Retrieved September 14, 2016, from http://content.healthaffairs.org/content/35/8/1504.full

141 Diao, D., Wright, J., Cundiff, D., et al. (2012, August 15). Pharmacotherapy for mild hypertension. *Cochrane Database of Systematic Reviews, 8*:CD006742. Retrieved September 14, 2016, from http://www.cochrane.org/CD006742/HTN_benefits-of-antihypertensive-drugs-for-mild-hypertension-are-unclear

142 CDC. (2012, September). Massachusetts: state nutrition, physical activity, and obesity profile. Retrieved August 18, 2014, from p. 1 of http://www.cdc.gov/obesity/stateprograms/fundedstates/pdf/massachusetts-state-profile.pdf
See also, National Institutes of Health. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report, 1998. Retrieved from http://www.nhlbi.nih.gov/health-pro/guidelines/current/obesity-guidelines/full-report.htm

143 Because a new methodology in the BRFSS survey was employed that year, data from 2012 cannot be compared to previous years.

144 CDC. Overweight and obesity. Retrieved August 18, 2014, from http://www.cdc.gov/obesity/data/adult.html

145 Rehm, C., Peñalvo, J., Afshin, A., et al. (2016). Dietary intake among US adults, 1999–2012. *JAMA, 315*(23), 2542–2553.

146 Rehm, C., Peñalvo, J., Afshin, A., et al. (2016). Dietary intake among US adults, 1999–2012. *JAMA, 315*(23), 2542–2553.

147 Lazar, K. (2011, March 7). Shortage of grocers plagues Mass. cities. Retrieved May 3, 2016, from http://archive.boston.com/news/local/massachusetts/articles/2011/03/07/shortage_of_grocers_plagues_mass_cities/?page=full

148 LeBoeuf, P. (2015, April 14). Food deserts in Springfield: How many buses would you take to buy groceries? Retrieved May 3, 2016, from http://www.valleyadvocate.com/2015/04/14/food-deserts-in-springfield

149 Olendzki, B., Procter-Gray, E., Wedick, N., et al. (2015). Disparities in access to healthy and unhealthy foods in central Massachusetts: implications for public health policy. *Journal of the American College of Nutrition*, *34*(2), 150–158.

150 See for example, Acevedo-Garcia D., McArdle N., Hardy E., et al. (2014). The child opportunity index: improving collaboration between community development and public health. *Health Affairs, 33*(11): 1948–1957.

151 CDC. (2015, May). Physical activity for a healthy weight. Retrieved November 17, 2016, from cdc.gov/healthyweight/physical_activity

152 Such as walking briskly or biking at a casual pace.

153 Such as jogging, running, or swimming.

154 CDC. (2015, May). Physical activity for a healthy weight. Retrieved November 17, 2016, from cdc.gov/healthyweight/physical_activity

155 Most of this group was in the clinically "normal weight" range, but a minority was underweight (BMI<18.5).

156 CDC. (2014). National diabetes statistics report, 2014. Retrieved from www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

157 Ketoacidosis occurs when ketones (acids), build up in the blood when your body doesn't have enough insulin. This is a warning sign that your diabetes is not in control or that you are sick. It usually develops slowly but it can lead to a diabetic coma or even death. Treatment usually takes place in a hospital setting, but can be prevented with checking insulin levels regularly.
Source: American Diabetes Association. (2014, March 12). *DKA (ketoacidosis) & ketones.* Retrieved September 21, 2016 from http://www.diabetes.org/living-with-diabetes/complications/ketoacidosis-dka.html

158 American Diabetes Association. Living with diabetes: complications. Retrieved September 21, 2016 from http://www.diabetes.org/living-with-diabetes/complications/

159 DPH. (2016). Diabetes statistics. Retrieved Sept. 21, 2016 from www.mass.gov/eohhs/gov/departments/dph/programs/community-health/diabetes/facts/diabetes-statistics.html

160 CDC. (2014). National diabetes statistics report, 2014. Retrieved from www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

161 Menke, A., Casagrande, S., Geiss, L., et al. (2015, September 8). Prevalence of and trends in diabetes among adults in the United States, 1988–2012. *JAMA, 314*(10), 1021–1029.

162 Dwyer-Lindgren, L., Mackenbach, J., van Lenthe, F., et al. (2016, September). Diagnosed and undiagnosed diabetes prevalence by county in the U.S., 1999–2012. *Diabetes Care, 39*(9), 1556–1562.

163 Dwyer-Lindgren, L., Mackenbach, J., van Lenthe, F., et al. (2016, September). Diagnosed and undiagnosed diabetes prevalence by county in the U.S., 1999–2012. *Diabetes Care, 39*(9), 1556–1562.

164 CDC. (2015). Diagnosed diabetes. Retrieved September 21, 2016, from gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html

165 Pre-diabetes 2015 data was not available when OSA produced this report.

166 CDC. (2016, April). Leading causes of death. Retrieved from http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm

167 CDC. (2015, August). Conditions that increase risk for heart disease. Retrieved from https://www.cdc.gov/heartdisease/conditions.htm

168 CDC. (2015, August). Family history and other characteristics that increase risk for heart disease. Retrieved from https://www.cdc.gov/heartdisease/family_history.htm

169 National Institutes of Health. (2014, April). How is heart disease treated? Retrieved from https://www.nhlbi.nih.gov/health/health-topics/topics/hdw/treatment

170 American Heart Association. (2013). Massachusetts state fact sheet. Retrieved from www.heart.org/idc/groups/heart-public/@wcm/@adv/documents/downloadable/ucm_472853.pdf

171 Ibid.

172 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved November 22, 2016, from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

173 CDC. (2016, May). Stroke. Retrieved from https://www.cdc.gov/stroke/

174 Ibid.

175 CDC. (2014, March). Family history and other characteristics that increase risk for stroke. Retrieved from http://www.cdc.gov/stroke/family_history.htm

176 CDC. (2014, March). Conditions that increase risk for stroke. Retrieved from https://www.cdc.gov/stroke/conditions.htm

177 Shah, A., Lee, K., McAllister, D., et al. (2015). Short term exposure to air pollution and stroke: Systematic review and meta-analysis, Vol. 350.

178 CDC. (2014, March). Behaviors that increase risk for stroke. Retrieved from https://www.cdc.gov/stroke/behavior.htm

179 CDC. (2015, July). Health, United States, 2015. Retrieved from p. 166 http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/cervical-cancer-screening

180 Ibid, 99.

181 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved Nov. 22, 2016 from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

182 CDC. (2016, September). Important facts about falls. Retrieved from www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html

183 Kronenberg, K. (2015, September 22). Phase 2 report: Recommendations of the Massachusetts Commission on Falls Prevention. Retrieved January 12, 2016, from p. 6 of http://www.mass.gov/eohhs/docs/dph/com-health/injury/falls-prevention-phase-2-report.pdf

184 Kronenberg, K. (2015, September 22). Phase 2 report: Recommendations of the Massachusetts Commission on Falls Prevention. Retrieved January 12, 2016, from p. 9 of http://www.mass.gov/eohhs/docs/dph/com-health/injury/falls-prevention-phase-2-report.pdf http://www.mass.gov/eohhs/docs/dph/com-health/injury/falls-prevention-phase-2-report.pdf

185 CDC. (2016, September). Important facts about falls. Retrieved from www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html

186 Maher, R., Hanlon, J., & Hajjar, E. (2014). Clinical consequences of polypharmacy in elderly. *Expert Opinion on Drug Safety, 13*(1), http://doi.org/10.1517/14740338.2013.827660

187 Davies, E., & O'Mahony, M. (2015, May 22). Adverse drug reactions in special populations - the elderly. *British Journal of Clinical Pharmacology, 80*(4), 796–807.

188 Davies, E., & O'Mahony, M. (2015, May 22). Adverse drug reactions in special populations - the elderly. *British Journal of Clinical Pharmacology, 80*(4), 796–807.

189 Stone, J., Lester, C., Aboneh, E., et al. (2016, January). A preliminary examination of over the counter medication misuse rates in older adults [Abstract]. *Research in Social and Administrative Pharmacy.*

190 Hines, L., & Murphy, J. (2011). Potentially harmful drug–drug interactions in the elderly: a review. *American Journal of Geriatric Pharmacotherapy, 9*(6), 364–377. Retrieved December 2, 2015, from http://www.ncbi.nlm.nih.gov/pubmed/22078863

191 Institute for Healthcare Improvement. (2016). Medication reconciliation to prevent adverse drug events. Retrieved June 20, 2016, from http://www.ihi.org/topics/adesmedicationreconciliation/Pages/default.aspx

192 Massachusetts Board of Registration in Medicine. (2015, January). Advisory: medication reconciliation. Retrieved June 20, 2016, from http://www.mass.gov/eohhs/docs/borim/physicians/pca-notifications/medication-reconciliation-jan-2015.pdf

193 Massachusetts Department of Public Health. (2010, April). Health of Massachusetts, p. 101. See also, Massachusetts Department of Public Health. (2013, December). Massachusetts STD, HIV/AIDS and viral hepatitis surveillance report: 2012, Retrieved August 18, 2014, from p. 9 of http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2012.pdf

194 Ibid, 16.

195 CDC. (2013, February). Incidence, prevalence, and cost of sexually transmitted infections in the United States. Retrieved from https://www.cdc.gov/std/stats/sti-estimates-fact-sheet-feb-2013.pdf

196 Massachusetts Department of Public Health. (2015, December). Massachusetts STD, HIV/AIDS and viral hepatitis surveillance report: 2014. Retrieved from http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2014.pdf

197 Massachusetts Department of Public Health. (2015, December). Massachusetts STD, HIV/AIDS and viral hepatitis surveillance report: 2014. Retrieved from http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2014.pdf

198 Massachusetts Department of Public Health. (2015, December). Massachusetts STD, HIV/AIDS and viral hepatitis surveillance report: 2014. Retrieved September 9, 2016 from p. 1 of http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2014.pdf

199 Ibid, 25.

200 Ibid, 8.

201 CDC. (2015, November). Table 26. Primary and secondary syphilis - reported cases and rates of reported cases by state, ranked by rates, United States, 2014. Retrieved November 21, 2016, from www.cdc.gov/std/stats14/tables/26.htm

202 CDC. (2015, November). Gonorrhea - reported cases and rates of reported cases by state, ranked by rates, United States, 2014. Retrieved November 21, 2016, from www.cdc.gov/std/stats14/tables/13.htm

203 Massachusetts DPH. (2015, December). *Massachusetts STD, HIV/AIDS and Viral Hepatitis Surveillance Report: 2014.* Retrieved September 9, 2016, from p. 9 of http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2014.pdf

204 Ibid.

205 Ibid.

206 Lanier, Y., & Sutton, M. (2013). Reframing the context of preventive health care services and prevention of HIV and other sexually transmitted infections for young men: new opportunities to reduce racial/ethnic sexual health disparities. *American Journal of Public Health, 103*(2), 262–269.

207 Carter, M., Hsu, K., Loosier, P., et al. (2016). Sexually transmitted disease program evolution in response to changes in the public health environment: a Massachusetts example. *Sexually Transmitted Diseases, 43*(11), 668–672.

208 CDC. (2015). Massachusetts – 2015 state health profile. Retrieved June 1, 2016, from http://www.cdc.gov/nchhstp/stateprofiles/pdf/massachusetts_profile.pdf

209 Ibid.

210 CDC. (2016, July). HIV in the United States: at a glance. Retrieved August 31, 2016, from http://www.cdc.gov/hiv/statistics/overview/ataglance.html

211 CDC. (2016, November). Diagnoses of HIV infection in the United States and dependent areas, 2015. Retrieved December 7, 2016 from cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2015-vol-27.pdf

212 CDC. (2016, July). HIV in the United States: at a glance. Retrieved August 31, 2016, from http://www.cdc.gov/hiv/statistics/overview/ataglance.html

213 DPH. (2015). The Massachusetts HIV/AIDS epidemic at a glance – detailed data; tables and technical notes. Retrieved August 31, 2016, from http://www.mass.gov/eohhs/docs/dph/aids/2015-profiles/epidemic-glance-data.pdf

214 DPH. (2016). The Massachusetts HIV/AIDS epidemic at a glance – detailed data; tables and technical notes. Retrieved December 1, 2016, from mass.gov/eohhs/docs/dph/aids/2016-profiles/epidemic-glance.pdf

215 DPH. (2015). The Massachusetts HIV/AIDS epidemic at a glance – detailed data; tables and technical notes. Retrieved Aug. 31, 2016 from http://www.mass.gov/eohhs/docs/dph/aids/2015-profiles/epidemic-glance-data.pdf

216 DPH. (2016). Massachusetts HIV/AIDS data fact sheet; who is currently living with HIV infection? Retrieved from http://www.mass.gov/eohhs/docs/dph/aids/2016-profiles/living-with-hiv.pdf

217 "Engaged in care" is defined as by CDC as having one laboratory test result (CD4 or viral load) in a one-year period. "Retained in care" is defined by CDC as having two laboratory tests, obtained at least three months apart, in a one-year period.
Source: HIV/AIDS Surveillance Program. (2014, December). Massachusetts HIV care continuum. Retrieved February 25, 2015, from p. 2 of http://www.mass.gov/eohhs/docs/dph/aids/hiv-care-continuum-factsheet.pdf

218 HIV/AIDS Surveillance Program. (2014, December). Massachusetts HIV care continuum. Retrieved February 25, 2015 from p. 1 of http://www.mass.gov/eohhs/docs/dph/aids/hiv-care-continuum-factsheet.pdf

219 Ibid.

220 U.S. Department of Health & Human Services. (2015, March). HIV/AIDS care continuum. Retrieved from https://www.aids.gov/federal-resources/policies/care-continuum

221 The most recent data from CDC is from 2013. See CDC. (2015, July). Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas—2013. Retrieved November 21, 2016, from cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillancereport_vol20_no2.pdf

222 Ibid.

223 Massachusetts Budget and Policy Center. (2016). HIV/AIDS prevention treatment and services and related programs. Retrieved August 4, 2016, from http://massbudget.org/browser/line_item.php?id=4512010300

224 CDC. (2015, May). Viral hepatitis - hepatitis C information. Retrieved Aug. 31, 2016 from http://www.cdc.gov/hepatitis/hcv/

225 CDC. (2015, May). Viral hepatitis - hepatitis C information. Retrieved Aug. 31, 2016 from http://www.cdc.gov/hepatitis/hcv/

226 CDC. (2016, June). Surveillance for viral hepatitis – United States, 2014. Retrieved Aug. 31, 2016 from http://www.cdc.gov/hepatitis/statistics/2014surveillance/commentary.htm#hepatitisC

227 Massachusetts DPH. (2015, December). Massachusetts STD, HIV/AIDS and viral hepatitis surveillance report: 2014. Retrieved August 31, 2016, from p. 16 of http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2014.pdf

228 Ollove, M. (2016, February 10). Are states obligated to provide expensive Hepatitis C drugs? Retrieved September 7, 2016, from http://khn.org/news/are-states-obligated-to-provide-expensive-hepatitis-c-drugs

229 Silverman, E. (2016, May 31). Hepatitis C drugs remain unaffordable in many countries, says WHO study. *STAT News*. Retrieved December 1, 2016, from statnews.com/pharmalot/2016/05/31/gilead-hepatitis-drug-prices-who

230 Ollove, M. (2016, February 10). Are states obligated to provide expensive Hepatitis C drugs? Retrieved September 7, 2016, from http://khn.org/news/are-states-obligated-to-provide-expensive-hepatitis-c-drugs

231 Freyer, F. (2016, April 19). Hepatitis C patients often have to get sicker before insurance will pay for drugs. *Boston Globe*. Retrieved April 26, 2016, from http://www.bostonglobe.com/metro/2016/04/18/insurers-balk-paying-for-hepatitis-drugs/M9lv0SZcMhHuw1ek3zclLL/story.htm

232 Ibid.

233 Massachusetts Executive Office of Health and Human Services. (2016, June). MassHealth implements new drug rebate program, expands access to Hep C treatment. Retrieved from http://www.mass.gov/eohhs/gov/newsroom/press-releases/eohhs/masshealth-implements-new-drug-rebate-program.html

234 Freyer, F. (2016, June 30). MassHealth to pay for hepatitis C drugs for all infected members. *Boston Globe*. Retrieved July 1, 2016, from http://www.bostonglobe.com/metro/2016/06/30/masshealth-pay-for-hepatitis-drugs-for-all-infected-members/DhQNZCf9WDZH5CM41V4vgl/story.html

235 Glaziou P., Floyd K., Weil D., et al. TB deaths rank alongside HIV deaths as top infectious killer. Int J Tuberc Lung Dis. 2016 Feb;20(2):143–4.

236 Miramontes, R., Hill, A., Yelk, R., et al. Tuberculosis infection in the United States: prevalence estimates from the National Health and Nutrition Examination Survey, 2011–2012. PLoS One. 2015 Nov 4; 10(11):e0140881.

237 Salinas, J., Mindra, G., Haddad, M., et al. Leveling of tuberculosis incidence — United States, 2013–2015. MMWR Morb Mortal Wkly Rep 2016; 65:273–278.

238 Ibid.

239 Reichman L. (1991, October). The U-shaped curve of concern. *American Review of Respiratory Disease, 144*(4):741–2.

240 Castro K., Marks S., Chen M., et al. (2016, July). Estimating tuberculosis cases and their economic costs averted in the United States over the past two decades. *International Journal of Tuberculosis and Lung Disease, 20*(7), 926–933.

241 DPH (2011). 2010 tuberculosis overview. Boston, MA.

242 Massachusetts Executive Office of Health and Human Services. (2016). Tuberculosis. Retrieved August 3, 2016, from http://www.mass.gov/eohhs/gov/departments/dph/programs/id/tb/public-health-cdc-tb-statistics.html

243 DPH. (2016, March). Summary tuberculosis statistics for the year 2015. Retrieved August 3, 2016, from mass.gov/eohhs/docs/dph/cdc/tb/summary-data-2015.pdf

244 E.g., Massachusetts Budget and Policy Center. (2016). State laboratory and communicable disease control services. Retrieved August 4, 2016, from http://massbudget.org/browser/line_item.php?c1=10&c2=717&id=4516100000&inflation=cpi&budgets=717b16b15b14b13b12b11b10b9b8b7b6#comparisons

245 Boodman, E. (2016, October 18). Night sweats, bloody cough — and a diagnosis that turned a doctor into an activist. STAT News. Retrieved February 23, 2017, from statnews.com/2016/10/18/tuberculosis-activist

SECTION 5.2

1 CDC. (2016, August). Chronic disease prevention and health promotion. Retrieved Oct. 5, 2016 from cdc.gov/chronicdisease

2 Lannan, K. (2016) *Health commissioner sees wellness fund as future of health care*. Berkshire Eagle. http://www.berkshireeagle.com/news/ci_30016260/health-commissioner-sees-wellness-fund-future-health-care

3 MDPH. (2017). Prevention and wellness trust fund annual report. Retrieved March 8, 2017, from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

4 At a Glance 2015: Workplace Health Promotion – Using the Workplace to Improve the Nation's Health. (2016). Centers for Disease Control and Prevention. http://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2015/aag-workplace-health.pdf

5 Gosline, A., & Rodman, E. (2012, September). Summary of Chapter 224 of the Acts of 2012. Blue Cross Blue Shield of Massachusetts Foundation Retrieved October 5, 2012from bluecrossmafoundation.org/sites/default/files/download/publication/Chapter%20224%20summary_1.pdf

6 MDPH. (2017). Prevention and Wellness Trust Fund annual report. Retrieved March 8, 2017, from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

7 Bradley, E., Canavan, M., Rogan, E., et al. (2016). Variation in health outcomes: the role of spending on social services, public health, and health care, 2000–09. *Health Affairs. 35*(5), 760–768.

8 MDPH. (2017). Prevention and wellness trust fund annual report. Retrieved March 8, 2017 from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

9 Accessed March 15, 2017 from: http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2014/annual-report-2014.pdf.

10 The Massachusetts Prevention and Wellness Trust Fund 2015 Legislative Report. (2016, January). Retrieved March 8, 2017 from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2016/pwtf-executive-report.pdf

11 The Massachusetts Prevention and Wellness Trust Fund 2015 Legislative Report. (2016, January).

Retrieved March 8, 2017 from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2016/pwtf-executive-report.pdf

12 The Massachusetts Prevention and Wellness Trust Fund 2015 Legislative Report. (2016, January). Retrieved March 8, 2017, from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2016/pwtf-executive-report.pdf

13 Accessed March 15, 2017 from: http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2014/annual-report-2014.pdf.

14 Massachusetts Department of Public Health. (2017). Prevention and wellness trust fund annual report. Retrieved March 8, 2017, from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

15 The Massachusetts Prevention and Wellness Trust Fund 2015 Legislative Report. (2016, January). Retrieved March 8, 2017, from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2016/pwtf-executive-report.pdf

16 MDPH. (2017). Prevention and wellness trust fund annual report. Retrieved March 8, 2017, from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

17 Ibid.

18 MDPH. (2014). Creating a culture of health: organizational approaches to promoting and protecting employee health. Results from the Massachusetts Worksite Health Improvement Survey. Retrieved from http://www.mass.gov/eohhs/docs/dph/mass-in-motion/2014-worksite-wellness-benchmarking-survey.pdf

19 MDPH. (2014). Creating a culture of health: organizational approaches to promoting and protecting employee health. Results from the Massachusetts Worksite Health Improvement Survey. Retrieved from http://www.mass.gov/eohhs/docs/dph/mass-in-motion/2014-worksite-wellness-benchmarking-survey.pdf

20 The Massachusetts Prevention and Wellness Trust Fund 2015 Legislative Report. (2016, January). Retrieved Oct. 6 from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2016/pwtf-executive-report.pdf

21 MDPH. (2017). Prevention and wellness trust fund annual report. Retrieved March 8, 2017 from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

22 MDPH. (2017). Prevention and wellness trust fund annual report. Retrieved March 8, 2017 from http://www.mass.gov/eohhs/docs/dph/com-health/prev-wellness-advisory-board/2017/pwtf-annual-report-executive-summary.pdf

23 PolicyLink. (Fall 2004). The influence of community factors on health: an annotated biboliography. Retrieved March 9, 2017 from policylink.org/sites/default/files/ANNOTATEDBIBLIOGRAPHY_FINAL.PDF

24 Bureau of Labor Statistics. American Time Use Survey (2014). http://www.bls.gov/tus/charts/

25 Muschalla, B., Heldmann, M., & Fay, D. (2013). The significance of job-anxiety in a working population. *Occupational medicine*, *63*(6), 415–421.

26 Occupational Safety and Health Administration. Back disorders and injuries. Retrieved Oct. 6, 2016 from osha.gov/dts/osta/otm/otm_vii/otm_vii_1.html#3

27 Luckhaupt, S., Dahlhamer, J., Ward, B., et al (2013). Prevalence and work-relatedness of carpal tunnel syndrome in the working population, United States, 2010 national health interview survey. *American journal of industrial medicine*, *56*(6), 615–624.

28 RAND Corporation. (2013). Workplace wellness programs study. Retrieved Oct. 6, 2016 from p. xiii dol.gov/sites/default/files/ebsa/researchers/analysis/health-and-welfare/workplacewellnessstudyfinal.pdf

29 CDC. (2013, July). The national healthy worksite program. Retrieved Oct. 6, 2016 from cdc.gov/workplacehealthpromotion/pdf/nhwp-program-overview.pdf

30 Pollitz, K. & Rae, M. (2016). Workplace Wellness Program Characteristics and Requirements. The Henry J. Kaiser Family Foundation. Retrieved from http://kff.org/private-insurance/issue-brief/workplace-wellness-programs-characteristics-and-requirements

31 The Henry J. Kaiser Family Foundation. (2014). Employer Health Benefits 2014 Annual Survey. Wellness Programs and Health Risk Assessments. Section 12. Retrieved October 6, 2016, from http://files.kff.org/attachment/ehbs-2014-section-twelve-wellness-programs-and-health-risk-assessments-section-twelve-wellness-programs-and-health-risk-assessments

32 Kaiser Family Foundation and Health Research & Educational Trust. (2016). Employer health benefits 2016 annual survey. Retrieved March 9, 2017 from kff.org/attachment/Report-Employer-Health-Benefits-2016-Annual-Survey

33 Mattke, S., Hangsheng, L., Caloyeras, J., et al. (2013). Workplace Wellness Programs Study Final Report. RAND Health. Retrieved from https://www.dol.gov/sites/default/files/ebsa/researchers/analysis/health-and-welfare/workplacewellnessstudyfinal.pdf

34 Mattke, S., Hangsheng, L., Caloyeras, J., et al. (2013). Workplace Wellness Programs Study Final Report. RAND Health. Retrieved from https://www.dol.gov/sites/default/files/ebsa/researchers/analysis/health-and-welfare/workplacewellnessstudyfinal.pdf

35 Ibid.

36 Ibid.

37 Ibid.

38 Baicker, K., Cutler, D. & Song, Z. (2010). Workplace wellness programs can generate savings. Health Affairs 29(2): 304–311.

39 PricewaterhouseCoopers. (2015, June). 2015 Health and Well-being Touchstone Survey. Retrieved Oct. 5, 2016 from pwc.com/us/en/hr-management/publications/health-well-being-touchstone-survey-2015.html

40 PricewaterhouseCoopers. (2015, June). 2015 Health and Well-being Touchstone Survey. Retrieved Oct. 5, 2016 from pwc.com/us/en/hr-management/publications/health-well-being-touchstone-survey-2015.html

41 PricewaterhouseCoopers. (2015, June). PwC's 2015 health and well-being touchstone survey. Retrieved from http://www.pwc.com/us/en/hr-management/publications/health-well-being-touchstone-survey-2015.html

42 MDPH. (2014). Creating a culture of health: organizational approaches to promoting and protecting employee health. Massachusetts worksite health improvement survey. Retrieved from http://www.mass.gov/eohhs/docs/dph/mass-in-motion/2014-worksite-wellness-benchmarking-survey.pdf

43 MDPH. (2016). Certifying a wellness program for a wellness tax credit. Retrieved from http://www.mass.gov/eohhs/docs/eohhs/wellness-tax-credit/obtaining-a-wellness-tax-credit-cert.pdf

44 Ibid.

45 MDPH. (2016). Wellness tax credit summary. Retrieved from http://www.mass.gov/eohhs/consumer/wellness/health-promotion/wellness-tax-credit-summary.html

SECTION 5.3

1 Some BRFSS survey data are presented as they appear in the BRFSS report, while OSA performed statistical analysis to present other data from the survey.

2 Office of Minority Health. (2016, March). Frequently asked questions. Retrieved October 6, 2016, from minorityhealth.hhs.gov/npa/templates/browse.aspx?lvl=1&lvlid=5

3 Ibid.

4 U.S. Department of Health and Human Services. (2011). HHS action plan to reduce racial and ethnic health disparities: A nation free of disparities in health and health care. Retrieved September 27, 2016, from http://minorityhealth.hhs.gov/assets/pdf/hhs/HHS_Plan_complete.pdf

5 Centers for Disease Control and Prevention. (2013, November). CDC health disparities and inequalities report — United States, 2013. Retrieved October 6, 2016, from cdc.gov/MMWR/pdf/other/su6203.pdf

6 Centers for Disease Control and Prevention. (2013, November). CDC health disparities and inequalities report — United States, 2013. Retrieved October 6, 2016, from cdc.gov/MMWR/pdf/other/su6203.pdf

7 CDC. (2014). National diabetes statistics report, 2014. Retrieved from www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

8 National Center for Health Statistics. (2016). Health, United States, 2015: with special feature on

racial and ethnic health disparities. Retrieved September 27, 2016, from p. 96 of http://www.cdc.gov/nchs/data/hus/hus15.pdf#015

9 Centers for Disease Control and Prevention. (2015). Hispanic health. Retrieved February 22, 2017, from http://minorityhealth.hhs.gov/assets/pdf/hhs/HHS_Plan_complete.pdf https://www.cdc.gov/vitalsigns/hispanic-health/

10 Social determinants of health. Office of Disease Prevention and Health Promotion. Retrieved September 27, 2016, from https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health

11 Pew Research Center. (2015, July). Black child poverty rate holds steady, even as other groups see declines. Retrieved October 6, 2016, from pewresearch.org/fact-tank/2015/07/14/black-child-poverty-rate-holds-steady-even-as-other-groups-see-declines

12 Acevedo-Garcia, D., McArdle, N., Hardy, E., et al (2014). The child opportunity index: improving collaboration between community development and public health. *Health Affairs*, *33*(11), 1948–1957.

13 Farmer, P., Nizeye, B., Stulac, S., et al (2006). Structural violence and clinical medicine. *PLOS Medicine*, *3*(10), e449. Retrieved October 6, 2016, from http://journals.plos.org/plosmedicine/article/asset?id=10.1371/journal.pmed.0030449.PDF

14 Farmer, P., Nizeye, B., Stulac, S., et al (2006). Structural violence and clinical medicine. *PLOS Medicine*, *3*(10), e449. Retrieved October 6, 2016, from http://journals.plos.org/plosmedicine/article/asset?id=10.1371/journal.pmed.0030449.PDF

15 Page-Reeves, J., Niforatos, J., Mishra, S., et al (2013). Health disparity and structural violence: How fear undermines health among immigrants at risk for diabetes. *Journal of Health Disparities Research and Practice*, *6*(2), 30.

16 DPH. (2015). Massachusetts violent death reporting system. Retrieved September 27, 2016, from mass.gov/eohhs/docs/dph/injury-surveillance/violentdeaths/violent-death-table-2014.pdf

17 CDC. (2014). Leading causes of death by age group, race/ethnicity males-United States, 2013. Retrieved September 27, 2016, from http://www.cdc.gov/men/lcod/2013/race_ethnicitymen2013.pdf

18 Feldman, J., Chen, J., Waterman, P., et al. (2016). Temporal trends and racial/ethnic inequalities for legal intervention injuries treated in emergency departments: US men and women age 15–34, 2001–2014. *Journal of Urban Health*, 1–11.

19 Gosline, A., & Rodman, E. (2012, September). Summary of chapter 224 of the acts of 2012. Retrieved September 15, 2016, from http://bluecrossmafoundation.org/sites/default/files/download/publication/Ch224_summary_FINAL.pdf

20 Percent of women who report having no personal doctor/health care provider, by race/ethnicity. (2016). Retrieved May 3, 2016, from http://kff.org/disparities-policy/state-indicator/no-personal-doctor/?state=ma

21 Percent of men who report having no personal doctor/health care provider, by race/ethnicity. (2016). Retrieved May 3, 2016, from http://kff.org/disparities-policy/state-indicator/percent-of-men-who-report-having-no-personal-doctorhealth-care-provider-by-raceethnicity/?state=ma

22 Percent of men who report having no personal doctor/health care provider, by race/ethnicity. (2016). Retrieved May 3, 2016, from http://kff.org/disparities-policy/state-indicator/percent-of-men-who-report-having-no-personal-doctorhealth-care-provider-by-raceethnicity/?state=ma

23 Percent of women who report having no personal doctor/health care provider, by race/ethnicity. (2016). Retrieved May 3, 2016, from http://kff.org/disparities-policy/state-indicator/no-personal-doctor/?state=ma

24 Ibid.

25 Percent of men who report having no personal doctor/health care provider, by race/ethnicity. (2016). Retrieved May 3, 2016, from http://kff.org/disparities-policy/state-indicator/percent-of-men-who-report-having-no-personal-doctorhealth-care-provider-by-raceethnicity/?state=ma

26 Long S., Skopec L., Shelto A., et al. (2016). Massachusetts health reform at ten years: great progress, but coverage gaps remain. *Health Affairs*, *35*(9), 1633–1637.

27 Karnik, K. Massachusetts Medical Society. (2014, June). Reducing health care disparities in Massachusetts. Retrieved from http://www.massmed.org/News-and-Publications/Vital-Signs/Reducing-Health-Care-Disparities-in-Massachusetts/#.V9gf500rJaR

28 Hall, K., et al. A population-based study of US women's preferred versus usual sources of reproductive health care. *American Journal of Obstetrics & Gynecology 213*(3), 352.e1–352.e14.

29 DPH. (2016, September). A profile of health among Massachusetts adults, 2015. Retrieved from p. 12 of http://www.mass.gov/eohhs/docs/dph/behavioral-risk/report-2015.pdf

30 Massachusetts Medical Society. (2013, July). 2013 MMS patient access to care study, p. 31.

31 Wiltshire J., Elder K., Kiefe C., et al. Medical debt and related financial consequences among older African American and White adults. Am J Public Health. 2016 Jun;106(6):1086–91.

32 Federal Reserve. (2016, May). Report on the economic well-being of U.S. households in 2015. Retrieved Sept. 28, 2016 from federalreserve.gov/2015-report-economic-well-being-us-households-201605.pdf

33 Ray, K., Chari, A., Engberg, J., et al. (2015). Opportunity costs of ambulatory medical care in the United States. *The American journal of managed care*, *21*(8), 567–574.

34 Ray, K., et al. Disparities in time spent seeking medical care in the United States. (2015, December). *JAMA Internal Medicine, 175*(12), 1983–1986.

35 Akintobi, T., Hoffman, L., McAllister, C. (2016). Assessing the oral health needs of African American men in low-income, urban communities. *American Journal of Men's Health*.

36 Horner-Johnson, W., Dobbertin, K., & Beilstein-Wedel, E. (2015). Disparities in dental care associated with disability and race and ethnicity. *Journal of the American Dental Association*, *146*(6), 366–374.

37 See Chart 6. American Dental Association. (2016). Oral health and well-being in the United States. Retrieved September 28, 2016, from ada.org/~/media/ADA/Science%20and%20Research/HPI/OralHealthWell-Being-StateFacts/Oral-Health-Well-Being-Data-Tables.xlsx?la=en

38 Pew Charitable Trusts. (2015). Expanding dental access in Massachusetts. Retrieved May 20, 2016, from http://www.pewtrusts.org/~/media/assets/2015/09/dental_massachusettsfactsheet2.pdf

39 Isong, I., Dantas, L., Gerard, M., et al. (2014). Oral health disparities and unmet dental needs among preschool children in Chelsea, MA: exploring mechanisms, defining solutions. *Journal of Oral Hygiene & Health*, *2*(138). Retrieved from http://doi.org/10.4172/2332-0702.1000138

40 Ibid.

41 Peipins, L., Soman, A., Berkowitz, Z. (2012). The lack of paid sick leave as a barrier to cancer screening and medical care-seeking: results from the National Health Interview Survey. *BMC public health*, *12*(1), 1.

42 DPH. (2016, September). A profile of health among Massachusetts adults, 2015. Retrieved from http://www.mass.gov/eohhs/docs/dph/behavioral-risk/report-2015.pdf

43 Executive Office of Health and Human Services. (2012, January). The 2012–2016 Massachusetts cancer plan. Retrieved Sept. 20, 2016 from ftp://ftp.cdc.gov/pub/Publications/Cancer/ccc/massachusetts_ccc_plan_2012_2016.pdf

44 National Center on Health Statistics. (2015). Health, United States, 2015. Retrieved from p. 246 http://www.cdc.gov/nchs/data/hus/hus15.pdf#070

45 U.S. Preventive Services Task Force. Final recommendation statement: breast cancer screening. Retrieved May 18, 2016, from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/breast-cancer-screening1.

46
Breast Cancer Action. (2013, November). Disparities in breast cancer. Retrieved from http://bcaction.org/site-content/uploads/2013/11/Disparities-and-Breast-Cancer-Fact-Sheet.pdf

47 Consedine, N., Tuck, N., Ragin, C. et al. (2015). Beyond the black box: a systematic review of breast, prostate, colorectal, and cervical screening among native and immigrant African-descent Caribbean populations. *Journal of Immigrant and Minority Health*, *17*(3), 905–924.

48 MGL ch. 175 § 47G

49 Jones, B., Genao, I., Nunez-Smith, M., et al (2014). Abstract B81: Access to care barriers and history of mammography screening in Hispanic/Latino women living in the northeast United States. *Cancer Epidemiology Biomarkers & Prevention*, *23* (11 Supplement), B81.

50 U.S. Preventive Services Task Force. (2016, September). Final update summary: cervical cancer screening. Retrieved August 31, 2016, from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/cervical-cancer-

screening

51 National Center for Health Statistics. (2015). Health, United States, 2015. Retrieved from p. 249 of http://www.cdc.gov/nchs/data/hus/hus15.pdf#071

52 Agénor, M., Krieger, N., Austin, S., et al (2014, September). At the intersection of sexual orientation, race/ethnicity, and cervical cancer screening: Assessing Pap test use disparities by sex of sexual partners among black, Latina, and white US women. *Social Science & Medicine*, *116*, 110–118.

53 Agénor, M., Krieger, N., Austin, S., et al (2014). At the intersection of sexual orientation, race/ethnicity, and cervical cancer screening: Assessing Pap test use disparities by sex of sexual partners among black, Latina, and white US women. *Social Science & Medicine, 116*, 110–118.

54 Consedine, N., Tuck, N., Ragin, C., et al (2015). Beyond the black box: a systematic review of breast, prostate, colorectal, and cervical screening among native and immigrant African-descent Caribbean populations. *Journal of Immigrant and Minority Health*, *17*(3), 905–924.

55 Ibid.

56 Ibid.

57 Women aged 24 to 64 who had cervical cytology performed in the last three years or women aged 30 to 64 who had cervical cytology/human papillomavirus co-testing performed in the last five years.

58 Jackson C., Oman M., Patel A., et al. (2016). Health disparities in colorectal cancer among racial and ethnic minorities in the United States. *Journal of Gastrointestinal Oncology, 7*(Suppl 1), S32–S43.

59 Brenner A., Hoffman R., McWilliams, A., et al. Colorectal cancer screening in vulnerable patients. *American Journal of Preventive Medicine*, *51*(4):454–462.

60 Burnett-Hartman, A., Mehta, S., Zheng, Y., et al. (2016). Racial/ethnic disparities in colorectal cancer screening across healthcare systems. *American Journal of Preventive Medicine,.51*(4), e107–e115.

61 U.S. Preventive Services Task Force. (2016, June). Final recommendation statement: colorectal cancer screening. Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/colorectal-cancer-screening2

62 Jackson, C., Oman, M., Patel, A., et al. Health disparities in colorectal cancer among racial and ethnic minorities in the United States. Journal of Gastrointestinal Oncology. 2016;7(Suppl 1):S32–S43.

63 Ibid.

64 Ibid.

65 Brenner, A., Hoffman, R., McWilliams, A, et al. Colorectal cancer screening in vulnerable patients. American Journal of Preventive Medicine. 2016;51(4):454–462.

66 The NCQA measure guidelines diverge from the screening guidelines on this topic.

67 PSA is a substance made by the prostate. A higher level of PSA in the blood may indicate cancer. Source: CDC. (2013, December). Prostate cancer: what screening tests are there? Retrieved August 15, 2014 from http://www.cdc.gov/cancer/prostate/basic_info/screening.htm

68 U.S. Preventive Services Task Force. (2017, April). Draft recommendation statement, prostate cancer: screening. Retrieved August 31, 2016, from uspreventiveservicestaskforce.org/Page/Document/draft-recommendation-statement/prostate-cancer-screening1

69 Reynolds, D. (2008). Prostate cancer screening in African American men: barriers and methods for improvement. *American journal of men's health*, *2*(2), 172–177.

70 Reynolds, D. (2008). Prostate cancer screening in African American men: barriers and methods for improvement. *American journal of men's health*, *2*(2), 172–177.

71 Reynolds, D. (2008). Prostate cancer screening in African American men: barriers and methods for improvement. *American journal of men's health*, *2*(2), 172–177.

72 Shenoy, D., Packianathan, S., Chen, A. et al (2016). Do African-American men need separate prostate cancer screening guidelines? *BMC urology*, *16*(1), 1.

73 Rivera-Ramos, Z., & Buki, L. (2011). I will no longer be a man! Manliness and prostate cancer screenings among Latino men. *Psychology of Men & Masculinity*, *12*(1), 13.

74 DPH. (2015, August). Massachusetts deaths 2013. Retrieved from www.mass.gov/eohhs/docs/dph/research-epi/death-data/death-report-2013.pdf

75 U.S. Department of Commerce. (2015). QuickFacts, Massachusetts. Retrieved from http://www.census.gov/quickfacts/table/PST040215/25

76 Executive Office of Health and Human Services. (2012, January). The 2012–2016 Massachusetts cancer plan. Retrieved September 20, 2016, from ftp://ftp.cdc.gov/pub/Publications/Cancer/ccc/massachusetts_ccc_plan_2012_2016.pdf

77 DPH. (2016). Massachusetts cancer statistics. Retrieved September 22, 2016, from www.mass.gov/eohhs/gov/departments/dph/programs/community-health/cancer-age/massachusetts-cancer-statistics.html

78 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: female breast cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/breast.html

79 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: female breast cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/breast.html

80 O'Keefe, E., Meltzer, J., & Bethea, T. (2015). Health disparities and cancer: racial disparities in cancer mortality in the United States, 2000–2010. *Frontiers in Public Health*, 3(51). Retrieved from http://doi.org/10.3389/fpubh.2015.00051

81 McCarthy A., Kim J., Beaber E., et al. (2016). Follow-up of abnormal breast and colorectal cancer screening by race/ethnicity. *American Journal of Preventive Medicine 51*(4), 507–512.

82 O'Keefe, E., Meltzer, J., & Bethea, T. (2015). Health disparities and cancer: racial disparities in cancer mortality in the United States, 2000–2010. *Frontiers in Public Health*, 3(51). Retrieved from http://doi.org/10.3389/fpubh.2015.00051

83 Ibid.

84 CDC. (2016, June). Cervical cancer rates by race and ethnicity. Retrieved September 20, 2016, from www.cdc.gov/cancer/cervical/statistics/race.htm

85 CDC. (2016, June). Cervical cancer rates by race and ethnicity. Retrieved Sept. 20, 2016 from www.cdc.gov/cancer/cervical/statistics/race.htm

86 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: cancer of the cervix uteri. Retrieved Sept. 20, 2016 from http://seer.cancer.gov/statfacts/html/cervix.html

87 Beavis, A., Gravitt, P., & Rositch, A. (2017). Hysterectomy-corrected cervical cancer mortality rates reveal a larger racial disparity in the United States. Cancer. 2017 Jan 23.

88 Beavis, A., Gravitt, P., & Rositch, A. (2017). Hysterectomy-corrected cervical cancer mortality rates reveal a larger racial disparity in the United States. Cancer. 2017 Jan 23.

89 Singh, G. (2012). Rural–urban trends and patterns in cervical cancer mortality, incidence, stage, and survival in the United States, 1950–2008. *Journal of Community Health*, *37*(1), 217–223.

90 Ibid.

91 Males are carriers for HPV, and so all adolescents need to be vaccinated in order to protect females from the resulting cervical cancer. See Reagan-Steiner, S., Yankey, D., Jeyarajah, J., et al. (2016). National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years — United States, 2015. *Morbidity and Mortality Weekly Report 65*, 850–858.

92 Ibid.

93 Markowitz, L., Liu, G., Hariri, S., et al. (2016, March). Prevalence of HPV after introduction of the vaccination program in the United States. *Pediatrics*, *137*(3), 1–9.

94 See Reagan-Steiner, S., Yankey, D., Jeyarajah, J., et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years — United States, 2015. MMWR Morb Mortal Wkly Rep 2016;65:850–858.

95 MacMillan, A., Gershman, S., & Christie, A., et al. (n.d.). Disparities in cervical cancer mortality among black, non-Hispanic women in Massachusetts. Massachusetts DPH. Retrieved September 22, 2016, from https://www.naaccr.org/LinkClick.aspx?fileticket=_57-IGGZz-ps=&tabid=280&mid=761http://www.ncbi.nlm.nih.gov/pubmed/26969160

96 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: colon and rectum cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/colorect.html

97 Jackson, C., Oman, M., Patel, A., et al. (2016). Health disparities in colorectal cancer among racial

and ethnic minorities in the United States. *Journal of Gastrointestinal Oncology*, *7*(Suppl 1), S32.

98 McCarthy A., Kim J., Beaber E., et al. (2016). Follow-up of abnormal breast and colorectal cancer screening by race/ethnicity. *American Journal of Preventive Medicine, 51*(4), 507–512.

99 CDC. (2016, August). Lung cancer. Retrieved September 21, 2016, from https://www.cdc.gov/cancer/lung

100 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: lung and bronchus cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/lungb.html

101 Ibid.

102 O'Keefe, E., Meltzer, J., & Bethea, T. (2015). Health disparities and cancer: racial disparities in cancer mortality in the United States, 2000–2010. *Frontiers in Public Health*, *3*(51). Retrieved from http://doi.org/10.3389/fpubh.2015.00051

103 Green, P., Guerrier-Adams, S., Okunji, P., et al (2013). African American health disparities in lung cancer. *Clinical Journal of Oncology Nursing* 17(2): 180–186.

104 Koshy, M., Malik, R., Spiotto, M., et al. (2015). Disparities in treatment of patients with inoperable stage I non–small cell lung cancer: a population-based analysis. *Journal of Thoracic Oncology*, *10*(2), 264–271.

105 Hamdy, F., Donovan, J., et al. (2016, September 14). 10-year outcomes after monitoring, surgery, or radiotherapy for localized prostate cancer. *New England Journal of Medicine,* [Epub ahead of print].

106 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: prostate cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/prost.html

107 Surveillance, Epidemiology, and End Results Program. (2016). SEER stat fact sheets: prostate cancer. Retrieved September 20, 2016, from http://seer.cancer.gov/statfacts/html/prost.html

108 O'Keefe, E., Meltzer, J., & Bethea, T. (2015). Health Disparities and Cancer: Racial Disparities in Cancer Mortality in the United States, 2000–2010. *Frontiers in Public Health*, *3*, 51. http://doi.org/10.3389/fpubh.2015.00051

109 Taksler, G., Keating, N., & Cutler, D. (2012). Explaining racial differences in prostate cancer mortality. *Cancer*, *118*(17), 4280–4289.

110 Ziehr, D., Mahal, B., Aizer, A., et al. (2015, January). Income inequality and treatment of African American men with high-risk prostate cancer. *Urologic Oncology: Seminars and Original Investigations*, *33*(1), 18–e7.

111 Ibid.

112 Liss, M., Chen, H., Hemal, S., et al. (2015). Impact of family history on prostate cancer mortality in white men undergoing prostate specific antigen based screening. *Journal of Urology*, *193*(1), 75–79.

113 Massachusetts Executive Office of Health and Human Services. (2016). Massachusetts cancer statistics. Retrieved September 22, 2016, from: http://www.mass.gov/eohhs/gov/departments/dph/programs/community-health/cancer-age/massachusetts-cancer-statistics.html

114 Matthews, T. & MacDorman, M. (2013, December). Infant mortality statistics from the 2010 period linked birth/infant death data set. *National Vital Statistics Report,* 62(8). Retrieved March 31, 2015, from p. 7 of http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_08.pdf

115 CDC. (2016, June). Births: preliminary data for 2015. Retrieved from www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_03.pdf

116 Catov, J., Lee, M., Roberts, J., et al. (2016). Race disparities and decreasing birth weight: are all babies getting smaller? *American Journal of Epidemiology*, 183 (1).

117 CDC. (2016, June). Births: preliminary data for 2015. Retrieved from www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_03.pdf

118 Murphy, S., Kochanek, K., Xu, J., et al. (2015, December). Mortality in the United States, 2014. Retrieved September 13, 2016, from http://www.cdc.gov/nchs/data/databriefs/db229.pdf

119 Murphy, S., Kochanek, K., Xu, J., et al. (2015, December). Infant mortality statistics from the 2013 period linked birth/infant death data set. Retrieved September 13, 2016, from http://www.cdc.gov/nchs/data/databriefs/db229.pdf

120 Mathews, M., MacDorman, M., Thoma, M. et al. (2015, August). Mortality in the United States, 2014. Retrieved September 13, 2016, from http://www.cdc.gov/nchs/data/databriefs/db229.pdf http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_09.pdf

121 Muoto, I., Luck, J., Yoon, J., et al. (2016). Oregon's coordinated care organizations increased timely prenatal care initiation and decreased disparities. *Health Affairs, 35*(9), 1625–1632.

122 CHIA. (2016, November). Performance of the Massachusetts health care system: focus on provider quality. Retrieved Nov. 22, 2016 from chiamass.gov/assets/docs/r/pubs/16/Quality-Report-2016.pdf

123 Kaiser Family Foundation. (2016). Infant mortality rate (deaths per 1,000 live births). Retrieved from http://kff.org/other/state-indicator/infant-death-rate/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

124 Woods, E. (2016). Community asthma initiative to improve health outcomes and reduce disparities among children with asthma. *MMWR Supplements*, *65*.

125 Ibid.

126 Sommer, S., Queenin, L., Nethersole, S., et al. (2011). Children's Hospital Boston community asthma initiative: partnerships and outcomes advance policy change. *Progress in Community Health Partnerships: Research, Education, and Action*, *5*(3), 327–335.

127 Venkat, A., Hasegawa, K., Basior, J., et al. (2015). Race/ethnicity and asthma management among adults presenting to the emergency department. *Respirology*, *20*(6), 994–997.

128 Silber, J., Rosenbaum, P., Wang, W., et al. (2016, July). Practice patterns in Medicaid and non-Medicaid asthma admissions. *Pediatrics*. e20160371.

129 J. Zotter, personal communication, December 1, 2016.

130 Venkat, A., Hasegawa, K., Basior, J., et al. (2015). Race/ethnicity and asthma management among adults presenting to the emergency department. *Respirology*, *20*(6), 994–997.

131 CDC. (2016, March). Most recent asthma data. Retrieved November 23, 2016, from http://www.cdc.gov/asthma/most_recent_data.htm

132 Wu, A., Smith, L., Bokhour, B., et al. (2008). Racial/ethnic variation in parent perceptions of asthma. *Ambulatory Pediatrics: The Official Journal of the Ambulatory Pediatric Association*, *8*(2), 93.

133 Wu, A., Smith, L., Bokhour, B., et al. (2008). Racial/ethnic variation in parent perceptions of asthma. *Ambulatory Pediatrics: The Official Journal of the Ambulatory Pediatric Association*, *8*(2), 93.

134 Woods, E. (2016). Community asthma initiative to improve health outcomes and reduce disparities among children with asthma. *MMWR Supplements*, *65*.

135 Hu, S. (2016). Tobacco product use among adults—United States, 2013–2014. *MMWR. Morbidity and Mortality Weekly Report*, *65*. Retrieved September 15, 2016, from https://www.cdc.gov/mmwr/volumes/65/wr/mm6527a1.htm?s_cid=mm6527a1_w

136 DPH. (2015, December). Who smokes. Retrieved September 15, 2016, from http://www.mass.gov/eohhs/docs/dph/tobacco-control/adults-who-smoke.pdf

137 DPH. (2014, June). Health and risk behaviors of Massachusetts youth 2013. Retrieved from p. 13 of http://www.mass.gov/eohhs/docs/dph/behavioral-risk/2013-yhs.pdf

138 Because the current smoker rate among Asians is relatively low, that the former smoker rate is also low stands to reason.

139 Risk factors for high blood pressure. (2015, September 10). Retrieved May 31, 2016, from https://www.nhlbi.nih.gov/health/health-topics/topics/hbp/atrisk

140 Ommerborn M., Blackshear C., Hickson D., et al. (2016). Ideal cardiovascular health and incident cardiovascular events. *American Journal of Preventive Medicine. 51*(4), 502–506.

141 Flack, J., Sica, D., Bakris, G., et al. (2010). Management of high blood pressure in blacks an update of the international society on hypertension in blacks consensus statement. *Hypertension, 56*(5), 780–800.

142 Cuffee, Y., Hargraves, J., & Allison, J. (2011). Exploring the association between reported discrimination and hypertension among African Americans: a systematic review. *Ethnicity & disease, 22*(4), 422–431.

143 Rosner, B., Cook, N., Portman, R., et al. (2009). Blood pressure differences by ethnic group among United States children and adolescents. *Hypertension, 54*(3), 502–508.

144 Song, Z., Hill, C., Bennet, J., et al. (2013). Mobile clinic In Massachusetts associated with cost

savings from lowering blood pressure and emergency department use. *Health Affairs (Project Hope), 32*(1), 36–44.

145 Ibid.

146 Overweight is defined as having a body mass index (BMI) greater than 25. Obesity is a BMI greater than 30.

147 CDC. (2015). Massachusetts 2015 results. Retrieved from http://nccd.cdc.gov/youthonline/App/Results.aspx?LID=MA

148 CDC. (2015). Massachusetts 2015 results. Retrieved from http://nccd.cdc.gov/youthonline/App/Results.aspx?LID=MA

149 Duncan, D., Kawachi, I., White, K., et al. (2013). The geography of recreational open space: influence of neighborhood racial composition and neighborhood poverty. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 90*(4), 618–631.

150 Duncan, D., Castro, M., Gortmaker, S., et al. (2012). Racial differences in the built environment—body mass index relationship? A geospatial analysis of adolescents in urban neighborhoods. *International Journal of Health Geographics, 11*(11).

151 Menke, A., Casagrande, S., Geiss, L., et al. (2015, September 8). Prevalence of and trends in diabetes among adults in the United States, 1988–2012. *JAMA.;314*(10), 1021–9.

152 CDC. (2014). National diabetes statistics report, 2014. Retrieved from www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

153 Interestingly, this study employed a two-stage modeling process to compensate for data limitations inherent in key datasets.
Source: Dwyer-Lindgren, L., Mackenbach, J., van Lenthe, F., et al. (2016, September). Diagnosed and undiagnosed diabetes prevalence by county in the U.S., 1999–2012. *Diabetes Care, 39*(9), 1556–1562.

154 Hu, R., Shi, L., Rane, S. (2014). Insurance, racial/ethnic, ses-related disparities in quality of care among US adults with diabetes. *Journal of Immigrant and Minority Health*, *16*(4), 565–575.

155 CDC. (2015, December 1). Age-adjusted rates of diagnosed diabetes per 100 civilian, non-institutionalized population, by race, United States, 1980–2014. Retrieved May 17, 2016, from http://www.cdc.gov/diabetes/statistics/prev/national/figbyrace.htm

156 CDC. (2015, December 1). age-adjusted rates of diagnosed diabetes per 100 civilian, non-institutionalized population, by Hispanic origin, United States, 1997–2014. Retrieved May 17, 2016, from http://www.cdc.gov/diabetes/statistics/prev/national/figbyhispanic.htm

157 Piccolo, R., Pearce, N., Araujo, A., et al. (2014). The contribution of biogeographical ancestry and socioeconomic status to racial/ethnic disparities in type 2 diabetes mellitus: results from the Boston Area Community Health Survey. *Annals of Epidemiology*, *24*(9), 648–654.

158 Raghavan, S., Pachucki, M., Chang, Y., et al. (2016). Incident type 2 diabetes risk is influenced by obesity and diabetes in social contacts: a social network analysis. *Journal of General Internal Medicine*, 1–7.

159 Ibid.

160 Heart disease. (n.d.). Retrieved May 25, 2016, from http://www.mayoclinic.org/diseases-conditions/heart-disease/basics/definition/con-20034056.

161 Brody, G., Yu, T., Mille,r G., et al. (2015, May). Discrimination, racial identity, and cytokine levels among African-American adolescents. *Journal of Adolescent Health,.56*(5), 496–501.

162 Heart disease. (n.d.). Retrieved May 25, 2016, from http://www.mayoclinic.org/diseases-conditions/heart-disease/basics/definition/con-20034056.

163 Lu, Y., Hajifathalian, K., Ezzati, M., et al. (2014). Abstract P163: Racial disparities in coronary heart disease risk among United States adults. *Circulation*, *129*(Suppl 1), AP163.

164 Mochari-Greenberger, H., and Mosca, L. Differential outcomes by race and ethnicity in patients with coronary heart disease: a contemporary review. Curr Cardiovasc Risk Rep. 2015 May; 9(5): 20.

165 Lu, Y., Hajifathalian, K., Ueda, P., et al. (2015). Abstract P351: Sick population and sick subpopulations: racial disparities in coronary heart disease risk in the United States. *Circulation*, *131* (Suppl 1), AP351.

166 Yoon S., Dillon C., Illoh K., et al. Trends in the prevalence of coronary heart disease in the U.S. American Journal of Preventive Medicine. 2016;51(4):437–445.

167 Lucas, J., Freeman, G., & Adams, P. (2016). Health of Hispanic Adults: United States, 2010–2014. *NCHS data brief*, (251), 1. Accessed Sept. 28, 2016 from: http://www.cdc.gov/nchs/data/databriefs/db251.pdf

168 Mochari-Greenberger, H. and Mosca, L. Differential outcomes by race and ethnicity in patients with coronary heart disease: a contemporary review. Curr Cardiovasc Risk Rep. 2015 May; 9(5): 20.

169 Mochari-Greenberger, H., Xian, Y., Hellkamp, A., et al. (2015). Racial/ethnic and sex differences in emergency medical services transport among hospitalized US stroke patients. *Journal of the American Heart Association: Cardiovascular and Cerebrovascular Disease, 4*(8). Retrieved from http://doi.org/10.1161/JAHA.115.002099

170 National Institutes of Health. Risk factors for high blood pressure. (2015, September 10). Retrieved May 31, 2016, from https://www.nhlbi.nih.gov/health/health-topics/topics/hbp/atrisk

171 Gutierrez, J., & Williams, O. (2014). A decade of racial and ethnic stroke disparities in the United States. *Neurology*, *82*(12), 1080–1082. Retrieved from http://doi.org/10.1212/WNL.0000000000000237

172 Mochari-Greenberger, H. and Mosca, L. (2015, May). Differential outcomes by race and ethnicity in patients with coronary heart disease: a contemporary review. *Current Cardiovascular Risk Reports, 9*(5), 20.

173 Gutierrez, J., & Williams, O. (2014). A decade of racial and ethnic stroke disparities in the United States. *Neurology*, *82*(12), 1080–1082. Retrieved from http://doi.org/10.1212/WNL.0000000000000237

174 Ibid.

175 Feldman, P., McDonald, M., Trachtenberg, M., et al. (2015). Center for stroke disparities solutions community-based care transition interventions: study protocol of a randomized controlled trial. *Trials*, *16*(1), 32.

176 Ibid.

177 Mochari-Greenberger, H., Xian, Y., Hellkamp, A., et al. (2015). Racial/ethnic and sex differences in emergency medical services transport among hospitalized US stroke patient. *Journal of the American Heart Association: Cardiovascular and Cerebrovascular Disease, 4*(8). Retrieved from http://doi.org/10.1161/JAHA.115.002099

178 CDC. (2016, June). HIV in the United States: at a glance. Retrieved from www.cdc.gov/hiv/statistics/overview/ataglance.html

179 Ibid.

180 Earnshaw, V., Bogart, L., Dovidio, J., et al. (2013). Stigma and racial/ethnic HIV disparities: moving toward resilience. *American Psychologist, 68*(4), 225–236.

181 Ibid.

182 Centers for Disease Control and Prevention. (2016, November). *HIV Surveillance Report, 2015*, *27*. Retrieved December 7, 2016, from http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html

183 DPH. (2015). The Massachusetts HIV/AIDS epidemic at a glance. Retrieved from www.mass.gov/eohhs/docs/dph/aids/2015-profiles/epidemic-glance.pdf

184 DPH. (2016, March). Massachusetts HIV care continuum. Retrieved from www.mass.gov/eohhs/docs/dph/aids/2016-profiles/hiv-care-continuum-factsheet.pdf

185 Fifty-five percent of Black (non-Latino) persons in Massachusetts who were diagnosed with HIV from 2011-2013 were not born in the US, as was 39% of the Latinos in that group. Retrieved September 7, 2016, from http://www.mass.gov/eohhs/docs/dph/aids/2015-profiles/epidemic-glance.pdf

186 Espinoza, L., Hall, H., Hu, X. (2009). Increases in HIV diagnoses at the U.S.-Mexico border, 2003–2006. *AIDS Education and Prevention, 21(*5 Suppl), 19–33.

187 U.S. Department of Commerce. (2015). QuickFacts, Massachusetts. Retrieved from http://www.census.gov/quickfacts/table/PST040215/25

188 Ibid.

189 Ibid.

190 Tschampl, C., Bernardo, J., Garvey, T., et al. The need for performance measures on testing for latent tuberculosis infection in primary care. Jt Comm J Qual Patient Saf. 2011 Jul;37(7):309–16.

191 Salinas J., Mindra G., Haddad M., et al. Leveling of tuberculosis incidence — United States, 2013–2015. MMWR Morb Mortal Wkly Rep 2016;65:273–278. http://dx.doi.org/10.15585/mmwr.mm6511a2.

192 DPH. (2016, March). Summary tuberculosis statistics for the year 2015. Retrieved Aug. 3, 2016 from mass.gov/eohhs/docs/dph/cdc/tb/summary-data-2015.pdf

193 CDC. (2014, March). Health disparities in HIV/AIDS, viral hepatitis, STDs, and TB. Retrieved December 1, 2016 from cdc.gov/nchhstp/healthdisparities/asians.html

194 Salinas, J., Mindra, G., Haddad, M., et al. Leveling of tuberculosis incidence — United States, 2013–2015. MMWR Morb Mortal Wkly Rep 2016;65:273–278. http://dx.doi.org/10.15585/mmwr.mm6511a2

195 This category includes non-Latinos born outside of the U.S. Across racial and ethnic groups, 66% of national TB cases and 87% of Massachusetts cases were in persons born outside of the U.S. in 2015.
Source: DPH. (2016, March). Summary tuberculosis statistics for the year 2015. Retrieved from www.mass.gov/eohhs/docs/dph/cdc/tb/summary-data-2015.pdf

196 Salinas J., Mindra G., Haddad M., et al. (2016). Leveling of tuberculosis incidence — United States, 2013–2015. *Morbidity and Mortality Weekly Report, 65*, 273–278. Retrieved from http://dx.doi.org/10.15585/mmwr.mm6511a2

197 DPH. (2016, March). Summary tuberculosis statistics for the year 2015. Retrieved from www.mass.gov/eohhs/docs/dph/cdc/tb/summary-data-2015.pdf

List of Figures and Tables

CHAPTER 1

HEALTH CARE COSTS, OUT-OF-POCKET COSTS, INSURANCE PREMIUMS, COSTS BORNE BY THE COMMONWEALTH, AND THE UNINSURED

CHAPTER 2

ACCESS TO HEALTH CARE SERVICES AND QUALITY OF CARE FOR CHILDREN, OLDER ADULTS, LOW-INCOME INDIVIDUALS, AND PEOPLE WITH DISABILITIES

CHAPTER 3

ACCESS TO HEALTH CARE SERVICES AND QUALITY OF CARE RELATED TO PRIMARY CARE AND BEHAVIORAL HEALTH

CHAPTER 4

THE CHANGING NATURE OF THE HEALTH CARE WORKFORCE IN MASSACHUSETTS

Figures

Tables

CHAPTER 5

PUBLIC HEALTH: REDUCING PREVENTABLE HEALTH CONDITIONS, IMPROVING EMPLOYEE WELLNESS, AND REDUCING RACIAL/ETHNIC HEALTH DISPARITIES