

COMMONWEALTH OF MASSACHUSETTS
HEALTH POLICY COMMISSION



TECHNICAL APPENDIX A1
PROFILE OF MASSACHUSETTS

ADDENDUM TO 2013 COST TRENDS REPORT

Table of Contents

Summary	1
1 Adjustments for demographic factors	2
1.1 Age adjustments	2
1.2 Coverage and access	2
1.3 Input costs	2
2 Commission estimates of 2009-2012 health care expenditure growth	3
2.1 Medicare estimates.....	3
2.2 MassHealth estimates.....	3
2.3 Commercial estimates.....	3
2.4 Estimate of statewide trend.....	4
3 Understanding effects of enrollment shifts on statewide growth rates	4
4 Three factor decomposition of the growth in claims-based medical expenditures 2009-2011 ...	5

Summary

In Chapter 1, certain analyses required in-depth calculation methodologies and further explanation which are shared in this document. These include:

1. Adjustments for demographic factors
2. Commission estimates of 2009-2012 health care expenditure growth
3. Understanding effects of enrollment shifts on statewide growth rates
4. Three factor decomposition of the growth in claims-based medical expenditures 2009-2011

1 Adjustments for demographic factors

In Chapter 1, we quantify three demographic measures which account for differences in spending between Massachusetts and the United States. The three factors quantified are age, coverage and access, and input costs. This follows standard practice in the literature.¹ In total, these three factors contributed 15.9 percentage points of the 36 percent difference in per capita spending. For all calculations, we used per capita spending measures and 2009 data unless otherwise marked.

1.1 Age adjustments

To calculate the age effect, we began with data from the Medical Expenditures Panel Survey (MEPS) which estimates per capita spending by age groups. We also used the American Community Survey (ACS) 1-year estimate from the US Census Bureau for equivalent age grouping breakdowns for Massachusetts and the United States. We then calculated the difference between the weighted per capita spending values for Massachusetts and the United States. In total, we estimated spending was 3.1% higher in Massachusetts due to the older population than the United States.

We did a similar adjustment for hospital admissions using the MEPS estimate of admissions per age group. A comparable adjustment was performed with National Nursing Home Survey (NNHS) data to estimate the difference in nursing home residency rates contributed by age profile.

1.2 Coverage and access

In a 2003 paper, Hadley and Holahan found that on average an insured individual spent 86-98% more than an uninsured individual each year.² We weighted the different full-year spending estimates for private and public individuals based on the American Community Survey, and compared it to the full-year uninsured spending estimate. We then weighted the difference in coverage between uninsured and insured in Massachusetts and the United States. In total, we estimated spending was 5.7% higher in Massachusetts due to the broader coverage and access.

1.3 Input costs

To measure the variation due to input, we looked the Centers for Medicare & Medicaid Services (CMS) Geographic Pricing Cost Index (GPCI). The GPCI is used to adjust for local geographic differences in the cost of operating a physician practice relative to the national average. The fifth update to the GPCI was calculated in 2009, which we used. The components of GPCI are:

- Work GPCI, which reflects the relative cost difference in physician wage between a locality and the national average
- Physician Expense GPCI, which reflects the difference in office space rent and staff wages
- Malpractice GPCI, which reflects the difference in local malpractice insurance premiums.

These figures are combined into a composite GPCI through weighting with the Medicare Economic Index. The composite GPCI reported for Massachusetts includes the metropolitan Boston (1.13) and the rest of Massachusetts (1.04) localities. To combine these, we took an

average weighted by the population of each area. In total, we found a 7.1% difference from the United States.

2 Commission estimates of 2009-2012 health care expenditure growth

To date, limited data have been published on all-payer statewide expenditure growth in Massachusetts. CHIA's total medical expense (TME) reports have focused on the commercial market, and the first calculation of total health care expenditures (THCE) will be published in the autumn of 2014.

In this report, we have relied on estimates of aggregate statewide spending from CMS. The National Health Expenditure Accounts estimate personal health care expenditures by state historically, although the most recent state-level estimates published are for spending through 2009. To estimate personal health care expenditure growth in Massachusetts in more recent years, we compiled an estimate based on Medicare expenditure data received from CMS, Medicaid expenditure data from MassHealth, and CHIA's published estimates of TME.

2.1 Medicare estimates

CMS provided data to the Commission on Medicare Fee-For-Service expenditures from 2009 to 2012 for Massachusetts residents, as well as enrollment figures for both fee-for-service and managed care beneficiaries. We estimated per beneficiary expenditures for these beneficiaries by summing medical expenditures and pharmacy expenditures and dividing by the total number of Medicare Fee-For-Service beneficiaries enrolled in either Part A or Part B.

Aggregate Medicare expenditures were estimated by multiplying this estimate of per beneficiary expenditures by total Massachusetts Medicare enrollment (across fee-for-service and managed care beneficiaries).

2.2 MassHealth estimates

MassHealth provided various data to the Commission used in our estimates: enrollment by year for FY2009 to FY2013; total claims expenditures for fee-for-service beneficiaries and total capitated payments with dates of service in each of those years; and total supplemental payments for each year through FY2012. Supplemental payments for FY2013 have not yet been finalized, but are expected to be approximately in line with the levels paid in FY2012.

For each fiscal year, total expenditures were estimated as the sum of claims expenditures, capitated payments, and supplemental payments. Calendar-year expenditures were estimated by averaging fiscal-year expenditures, and a similar calculation was performed to estimate calendar-year enrollment. (For example, CY2009 spending was estimated as the average of FY2008 and FY2009 spending.) Per capita expenditures were calculated for each calendar year by dividing total expenditures by enrollment.

2.3 Commercial estimates

For the commercial market, we developed per member expenditure estimates based on CHIA's TME reports and we estimated enrollment based on the American Community Survey's one-year

estimates of insurance status, including all types of insurance status that included private coverage but no public coverage (categories included: “with employer-provided health insurance only”; “with direct purchase health insurance only”; “with employer-provided and direct purchase coverage”; and “Other private only combinations”).

We used CHIA’s 2012 PMPM spending estimate to obtain per member spending in 2012. Per member spending in 2011 was estimated by dividing our 2012 per member spending estimate by CHIA’s 2011-2012 TME growth estimate, and a similar calculation was performed to estimate 2010 and 2009 per member spending.

We estimated aggregate expenditures in the commercial market by multiplying our per member spending estimate by our estimate of commercial enrollment.

2.4 Estimate of statewide trend

To estimate statewide per capita health expenditures each year, we summed estimates of aggregate expenditures for Medicare, MassHealth, and commercial populations and divided by the American Community Survey’s one-year estimates of state population. Growth rates were calculated based on the yearly change in estimated per capita health care expenditures.

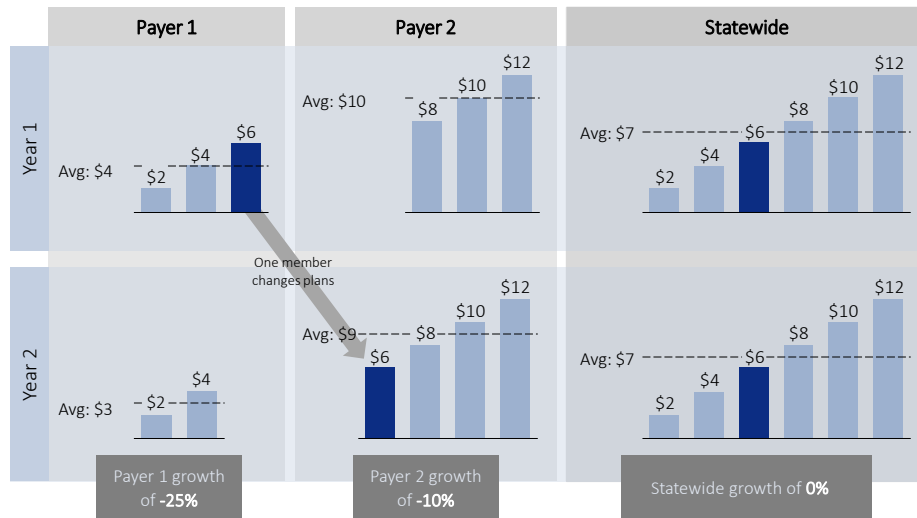
3 Understanding effects of enrollment shifts on statewide growth rates

From our estimates of health care spending growth from 2009 to 2012, statewide per capita growth in personal health care expenditures was 3.2 percent, while the per member spending for each of the Medicare, Medicaid, and commercial populations grew by no more than 3.0 percent. Examining shifts in enrollment between payers year-to-year is important, as trends observed in averages within subsets of the state may differ from the trends seen for the state as a whole.

For example, if the highest cost patients from a payer with relatively low-cost patients were to move to another payer with relatively high-cost patients, the migration of the patients could reduce per member spending for the first payer, and also reduce per member spending for the second payer, if the patient’s spending were below the second payer’s average (Figure A1.1). Reasons for these types of enrollment shifts include, but are not limited to, the aging of the population, expansion of public payer coverage, and shifts to public payers during a recession.

Figure A1.1: Accounting for shifts in payer mix is important when tracking statewide growth (illustrative example)

Per member per year spending



In Massachusetts, these enrollment shifts are occurring, and they mean that the payer-specific growth rates do not fully represent the statewide growth rate. For example, if each payer had achieved a per member growth rate of 3.6 percent annually with the actual enrollment trends from 2009 to 2012, the statewide growth would have been 4.8 percent annually over that time period.

4 Three factor decomposition of the growth in claims-based medical expenditures 2009-2011

We and the Lewin group used the all-payer claims database to deconstruct trends in health care spending into three component parts:

- Change in the burden of illness or risk level of the population,
- Change in the quantity of services used, adjusted for risk
- Change in the price paid

Table A1.1 below expands on how these concepts were defined and implemented using data from the APCD. The sample consisted of claims for the state’s three largest commercial payers - - Blue Cross Blue Shield of Massachusetts (BCBS), Harvard Pilgrim Health Care (HPHC), and Tufts Health Plan (THP) -- and Medicare Fee-For-Service.ⁱ [1] Our analyses incorporated claims-based medical expenditures but not drug spending or payments made outside the claims system. See **Technical Appendix B2** for more information on the methods used to generate the analytic file.

ⁱ The three commercial payers we focus on -- BCBS, HPHC, and THP -- represent nearly 80 percent of the commercial market. Medicare claims analyses do not include expenditures by Medicare Advantage plans.

Table A1.1: Definition of Concepts in Three Factor Decomposition of the Growth in Spending 2009-2011

Term	Definition
Observed spending	Total spending on covered services.
Normalized spending (Standardized \$)	A standardized measure of spending that does not vary by payer, provider, or time period. In effect, a measure of the quantity of services. This measure is calculated by re-pricing all services using a standard fee schedule.
Relative price paid	A composite price measure that complements normalized spending and reflects price variation due to differences among payers, providers, and time periods. This measure is calculated as: (Spending for all services at prices paid) / (Spending for all services priced using a standard fee schedule). As a result, total observed spending = normalized spending * relative price paid.
Patient risk score	A measure of a patient's expected need for health care services due to demographic and clinical characteristics.

Table A1.2 contains our findings. Consistent with data from other sources, this analysis indicates that changes in price paid were the main driver of the growth in commercial spending between 2009 and 2011.

Table A1.2: Three-Factor Decomposition of the Growth in Spending

Contribution to rate of change in claims-based expenditures (excluding pharmacy spending), 2009-2011

Measure		Commercial	Medicare
Observed spending	ob	3.6%	2.0%
Normalized spending	n	-1.9%	1.3%
<i>Three factor decomposition of growth in observed spending</i>			
Risk	r	-1.3%	0.3%
Normalized spending adjusted for risk (quantity adjusted for risk)	$[(1+n)/(1+r)] - 1$	-0.6%	1.0%
Relative price paid	$[(1+ob)/(1+n)] - 1$	5.6%	0.6%

Notes: Total observed spending = risk * normalized spending adjusted for risk * relative price paid

$$(1+ob) = (1+r) * (1+n)/(1+r) * (1+ob)/(1+n)$$

With: ob=change in observed spending, n= change in normalized spending, r=change in risk score

All changes are measured in nominal terms. During the study period, the rate of inflation based on the US GDP deflator was 1.8 percent per year. Readers may not be able to reproduce results due to rounding.

Source: All-Payer Claims Database; The Lewin Group; HPC analysis. See Technical Appendix B4 for additional details on the Lewin trend analysis.

REFERENCES

¹ Smith S, Newhouse JP, and Freeland MS. Income, Insurance, and Technology: Why Does Health Spending Outpace Economic Growth? *Health Affairs*. 2009; 28(5):1276-1284.

² Hadley J, Holahan J. How Much Medical Care Do The Uninsured Use, And Who Pays For It? *Health Affairs*, 2003: W3-66–W3-81.