

# List of exhibits in 2015 Cost Trends Report

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- Exhibit 8.1:** Hospital use in Massachusetts and the U.S., 2014

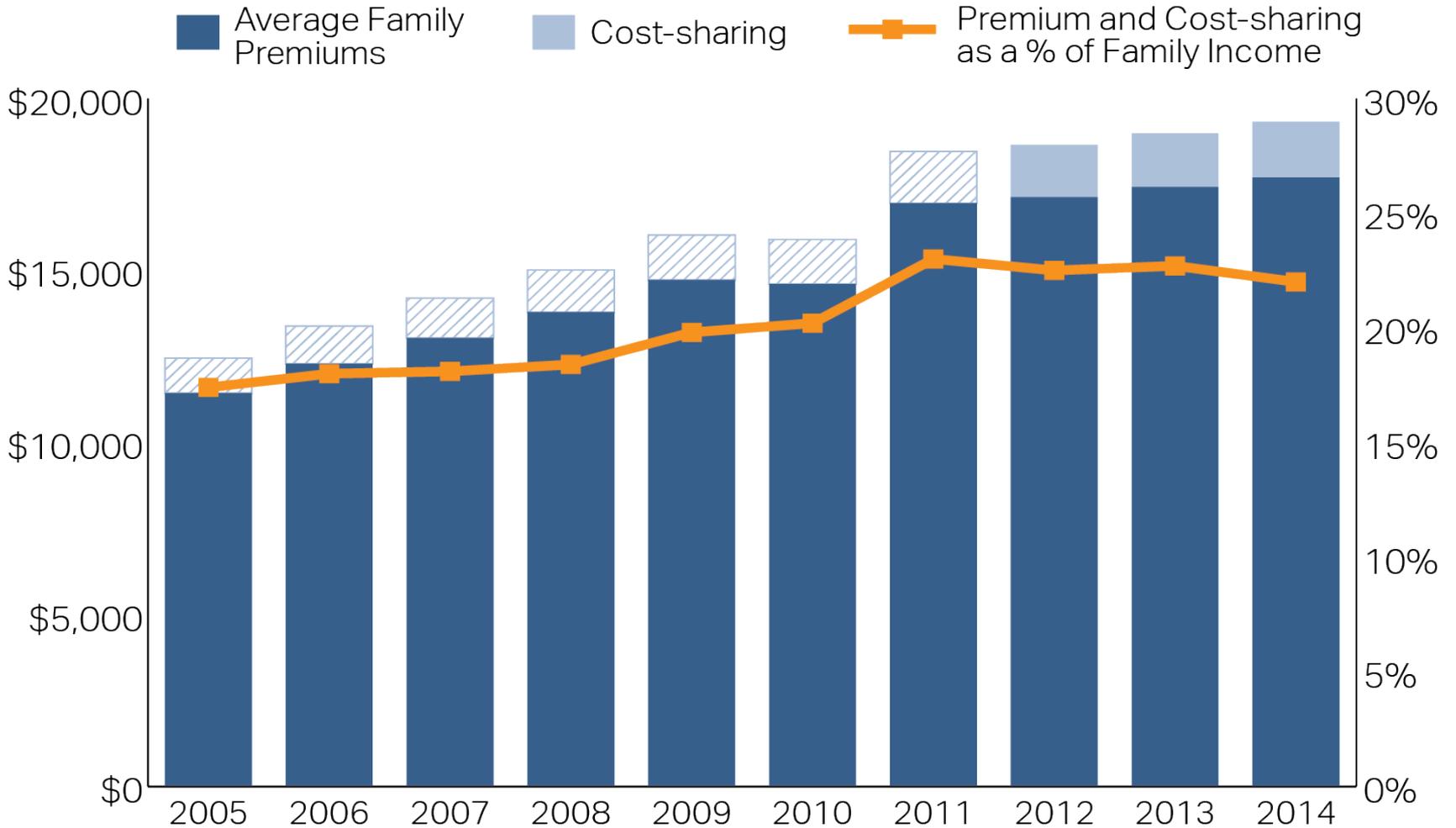
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# Exhibit 1.1: Family premiums, cost-sharing, and family income in Massachusetts, 2005-2014

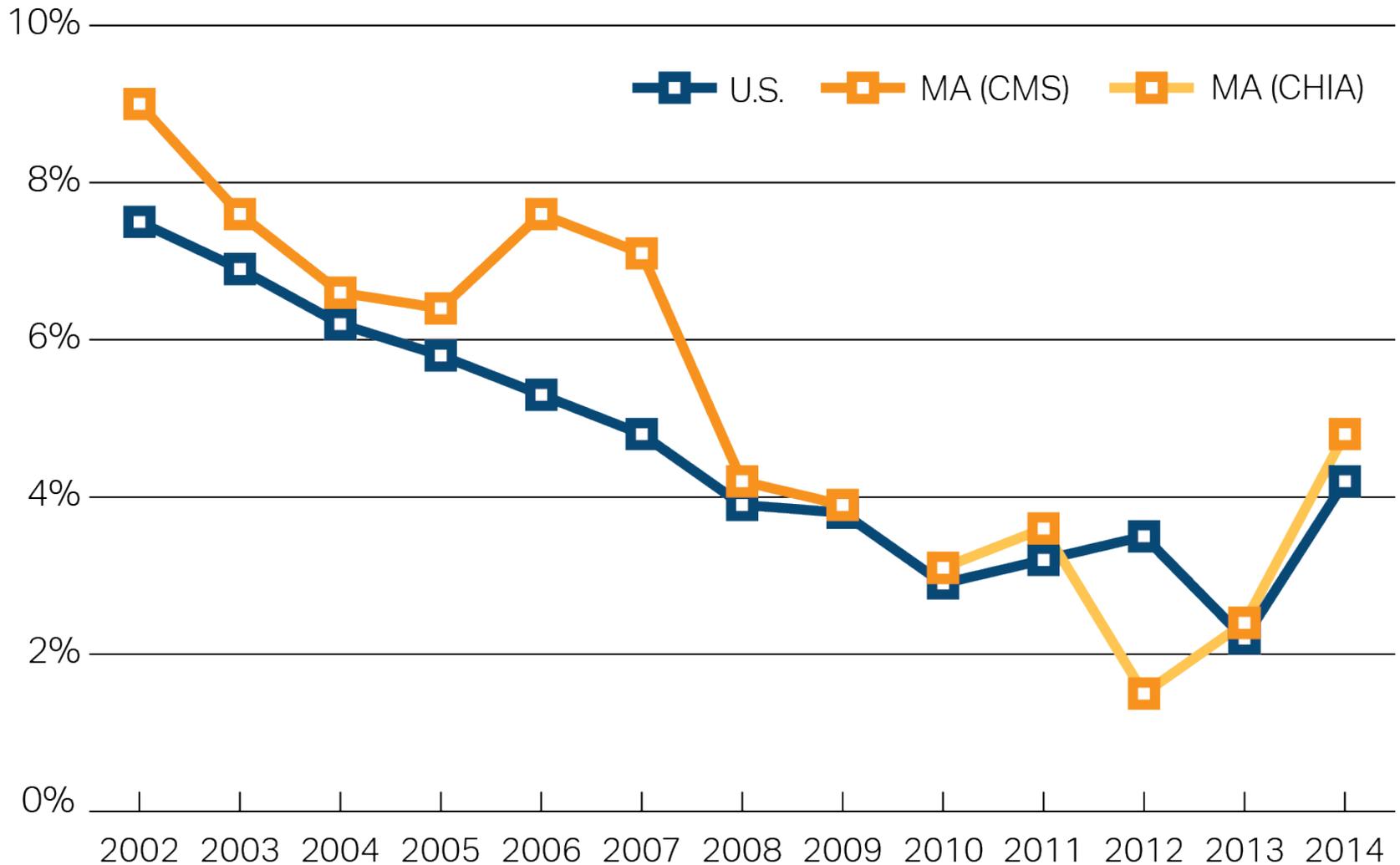
Dollars are nominal in the year shown



Note: Cost-sharing amounts are approximate from 2005-2011.

Source: American Community Survey (income), Agency for Healthcare Research and Quality (premiums) and Center for Healthcare Information and Analysis (cost-sharing)

## Exhibit 2.1: Annual growth in per-capita healthcare spending, Massachusetts and the U.S., 2002-2014

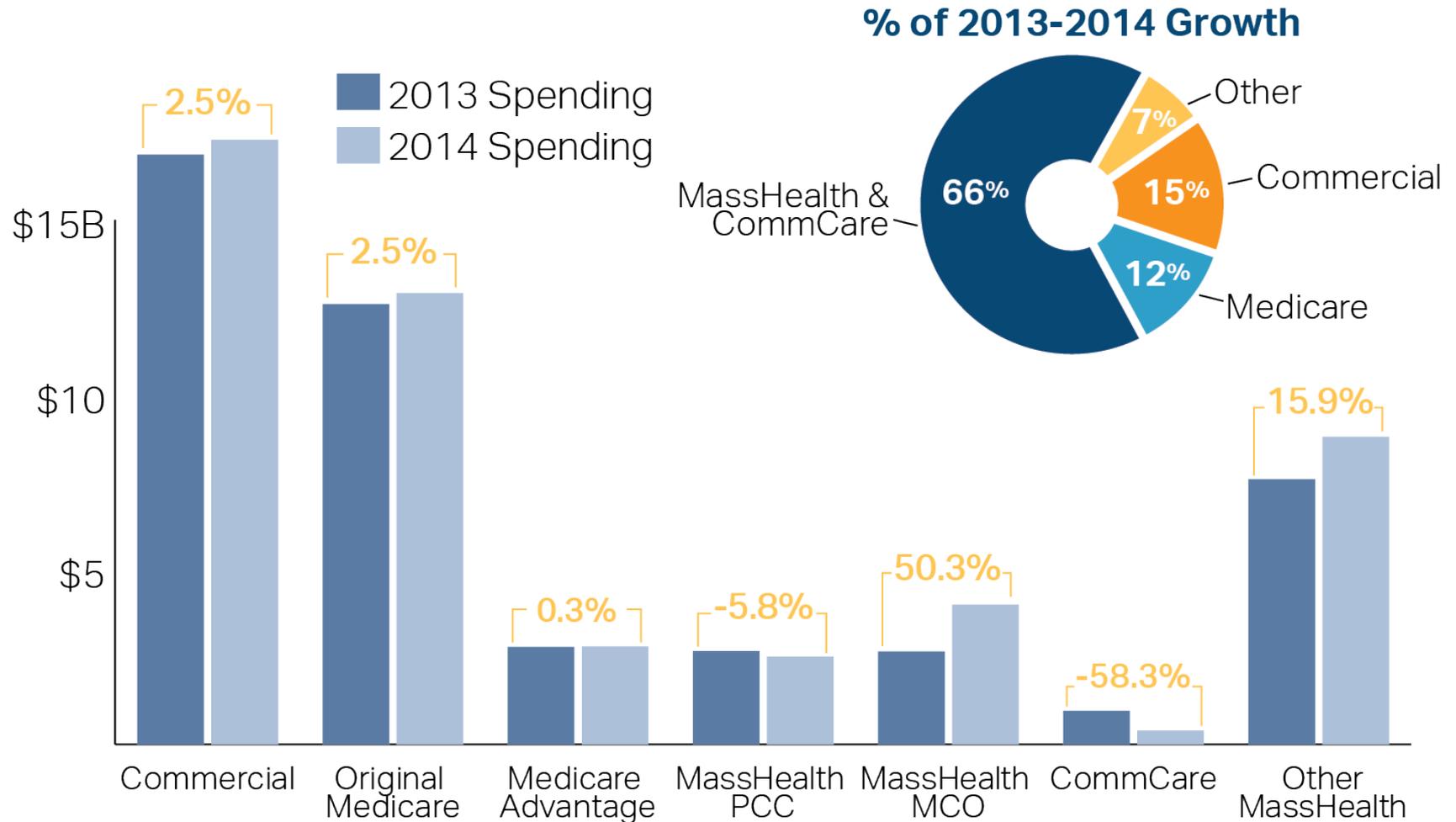


Note: U.S. data uses personal health expenditures (Centers for Medicare & Medicaid Services) divided by the U.S. population. Massachusetts data uses personal health expenditures (Centers for Medicare & Medicaid Services) through 2009, changes in total medical expenditures per member per year from the Center for Health Information and Analysis for 2010 and 2011, and changes in total health care expenditures per capita from the Center for Health Information and Analysis from 2012-2014.

Source: Centers for Medicare and Medicaid Services; Center for Health Information and Analysis

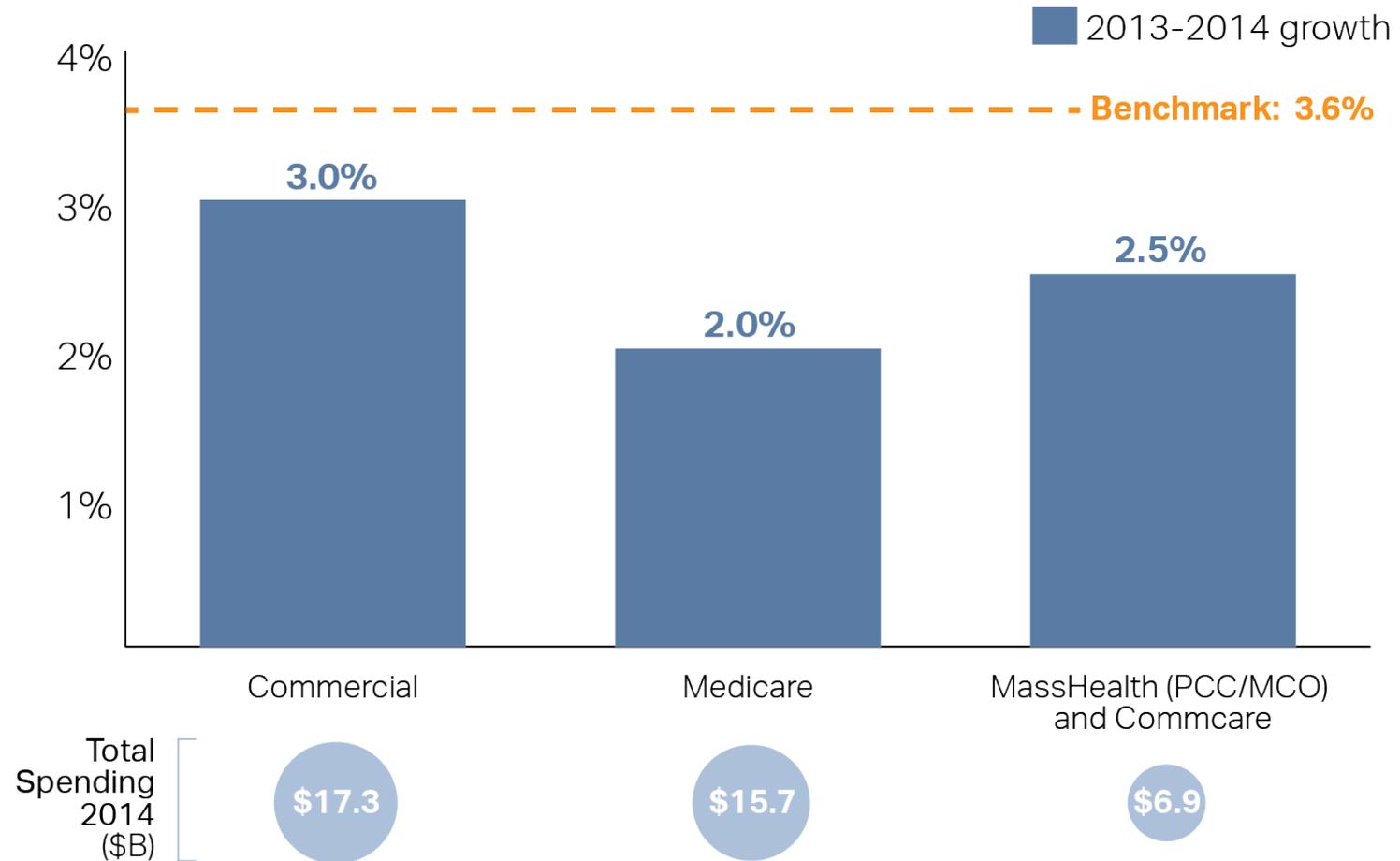
# Exhibit 2.2: Massachusetts healthcare spending, by payer type, 2013 and 2014

Spending in billions of dollars



## Exhibit 2.3: Growth in per-capita spending, by broad payer type, 2013-2014

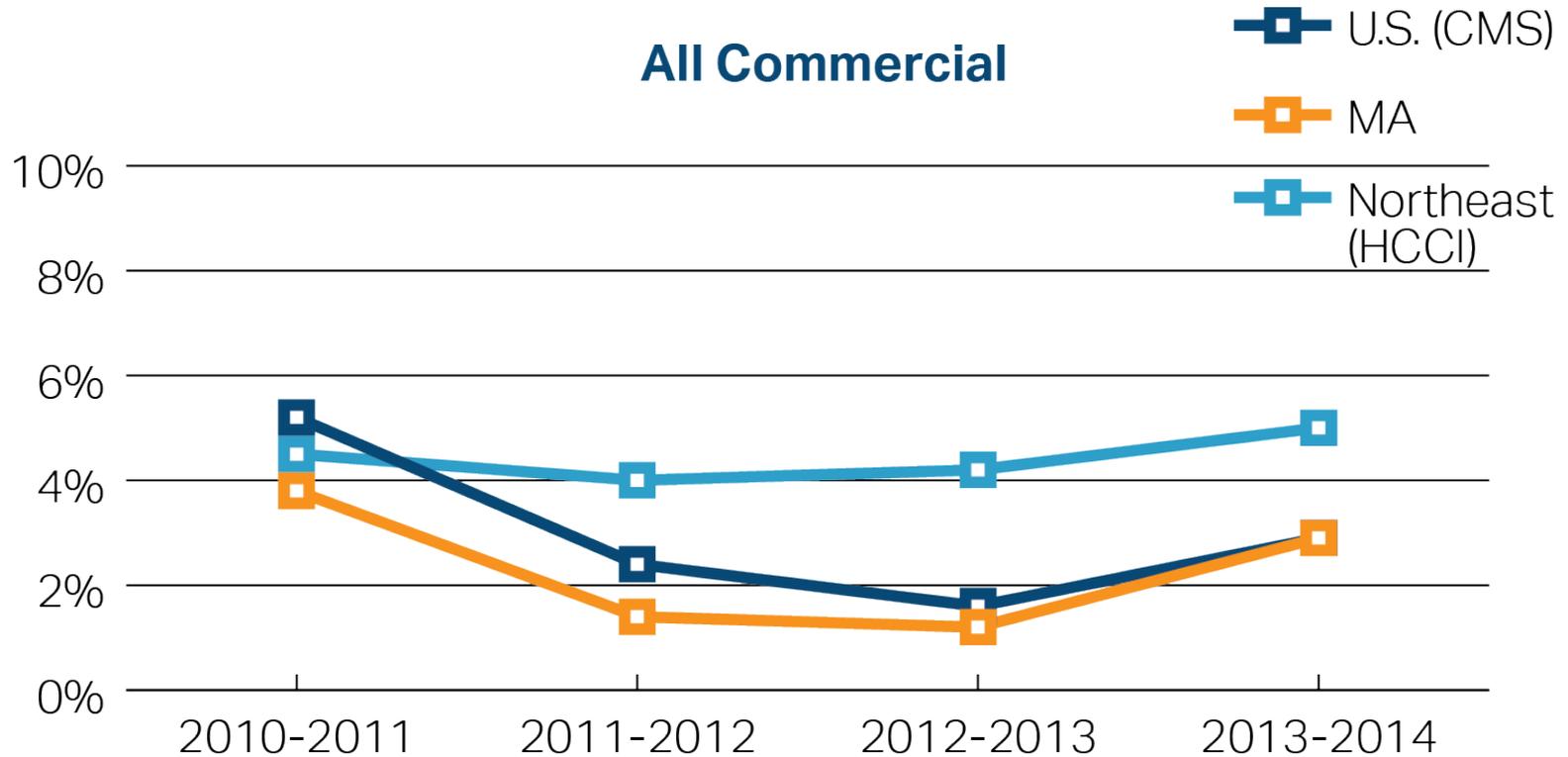
Percentage growth per member from previous year



Note: Commercial spending excludes actuarial completion of partial-claims.

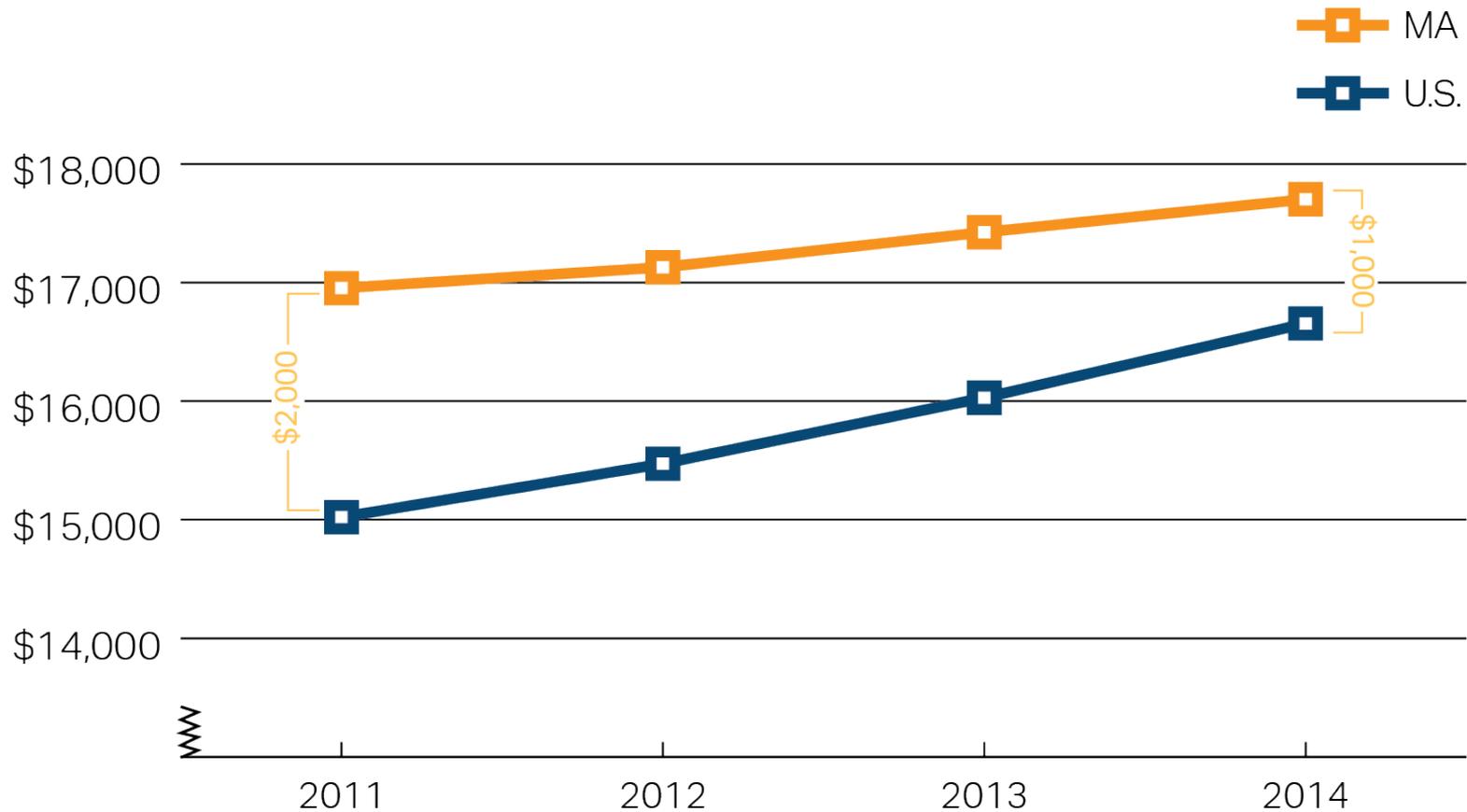
Source: Center for Health Information and Analysis

## Exhibit 2.4: Annual growth in commercial spending per enrollee, 2010-2014

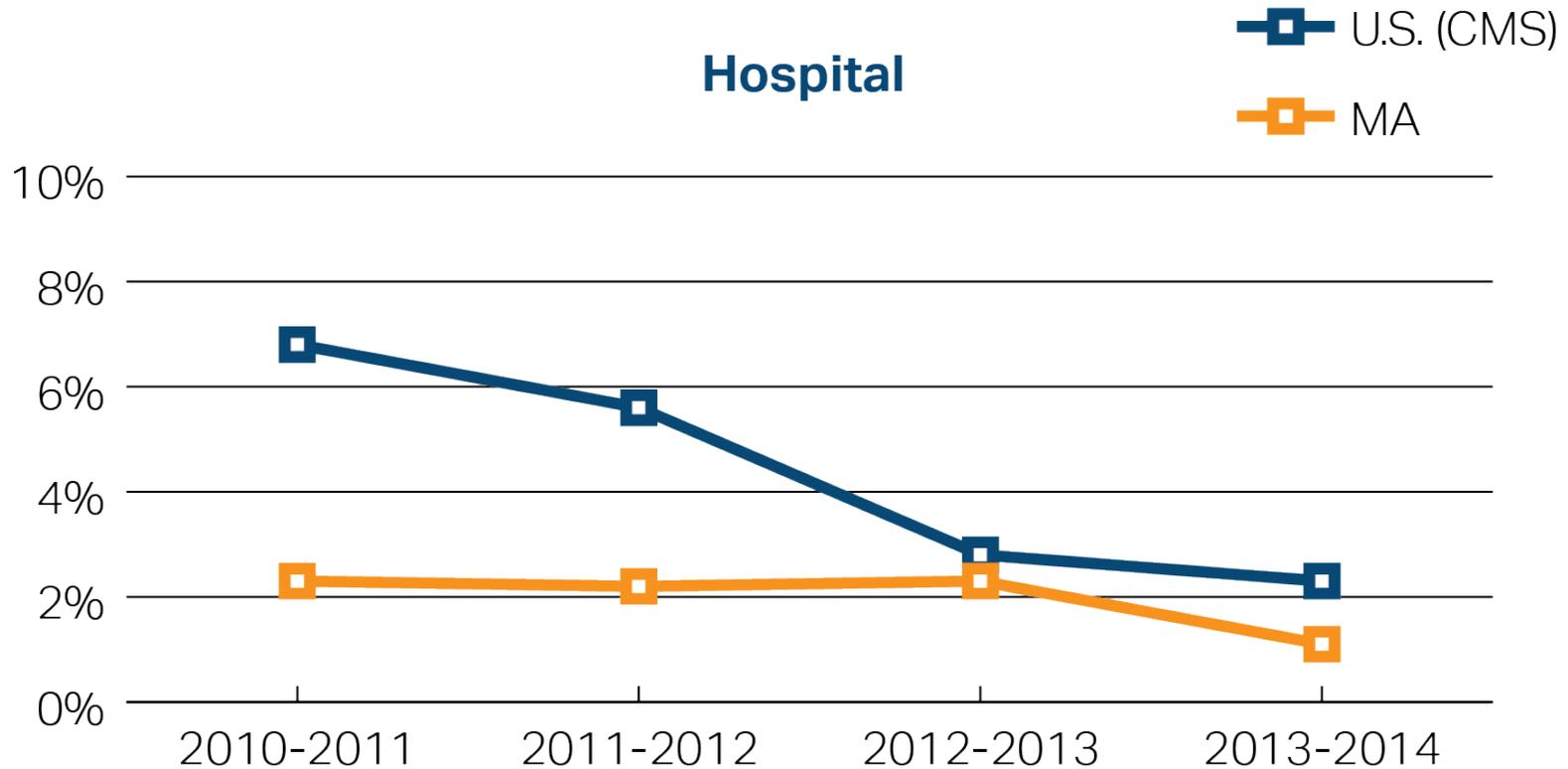


## Exhibit 2.5: Family health insurance premiums, Massachusetts and the U.S., 2011-2014

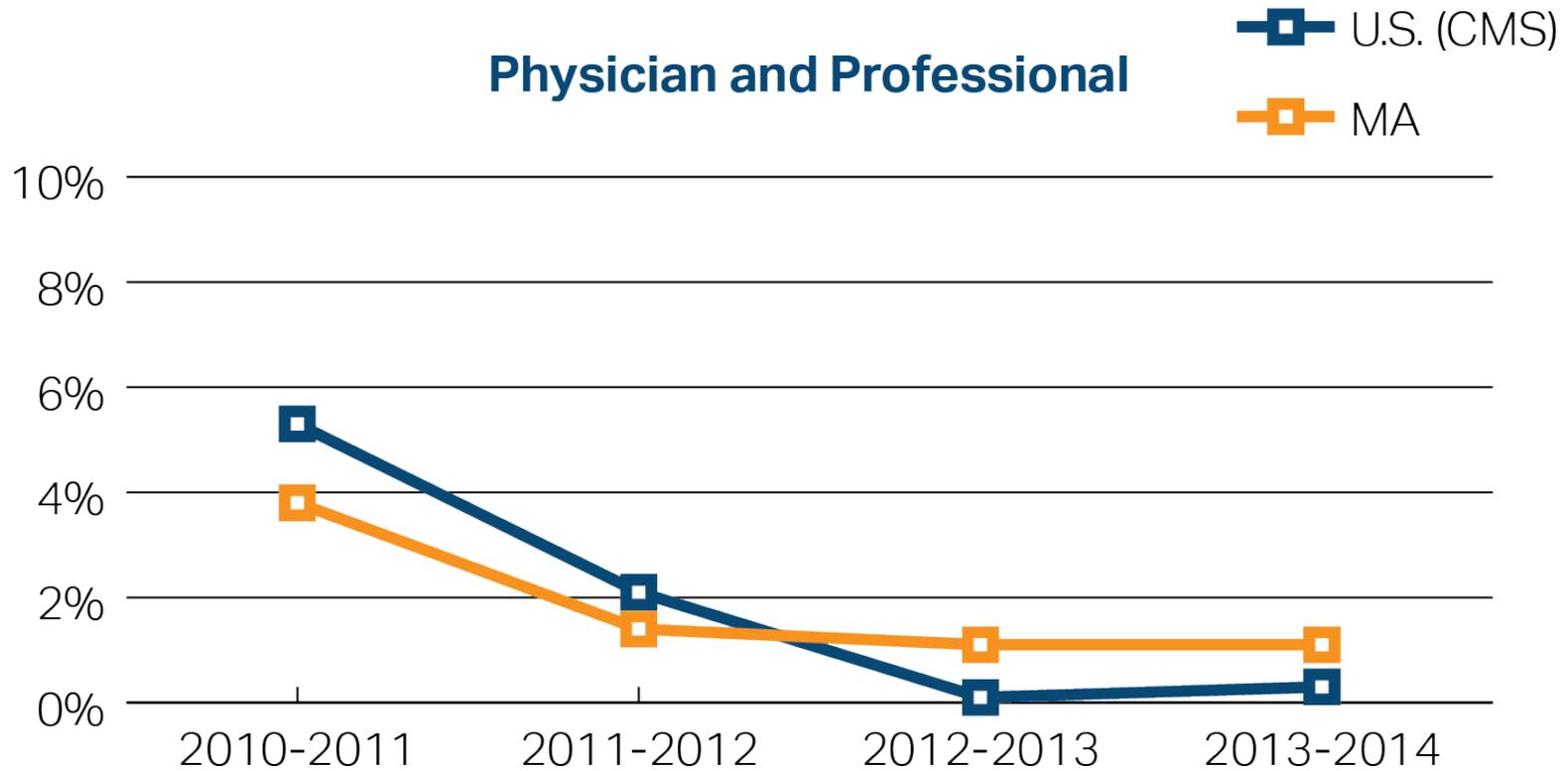
*Nominal dollars in the year shown*



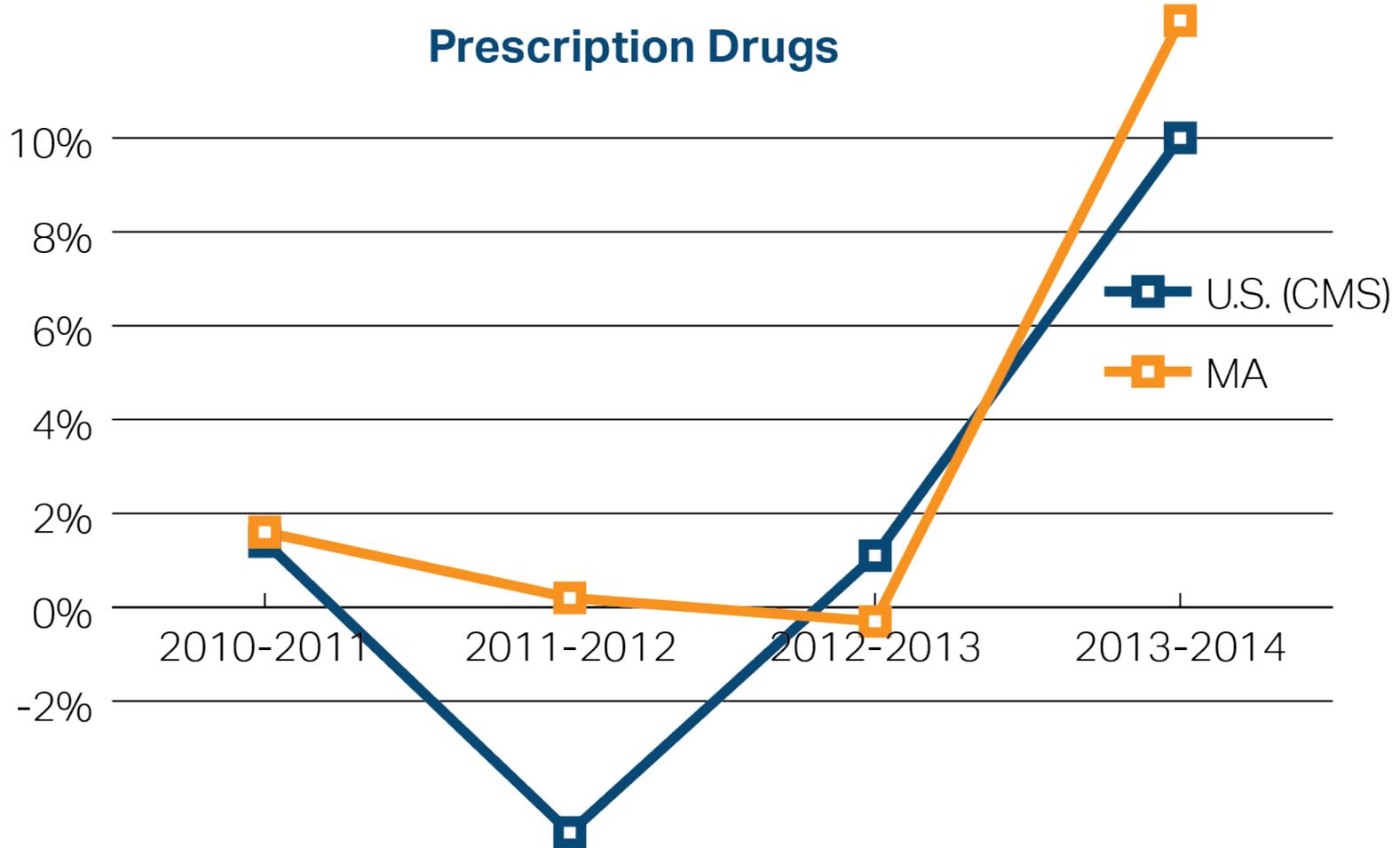
## Exhibit 2.6: Annual growth in commercial spending per enrollee, by spending category, 2010-2014



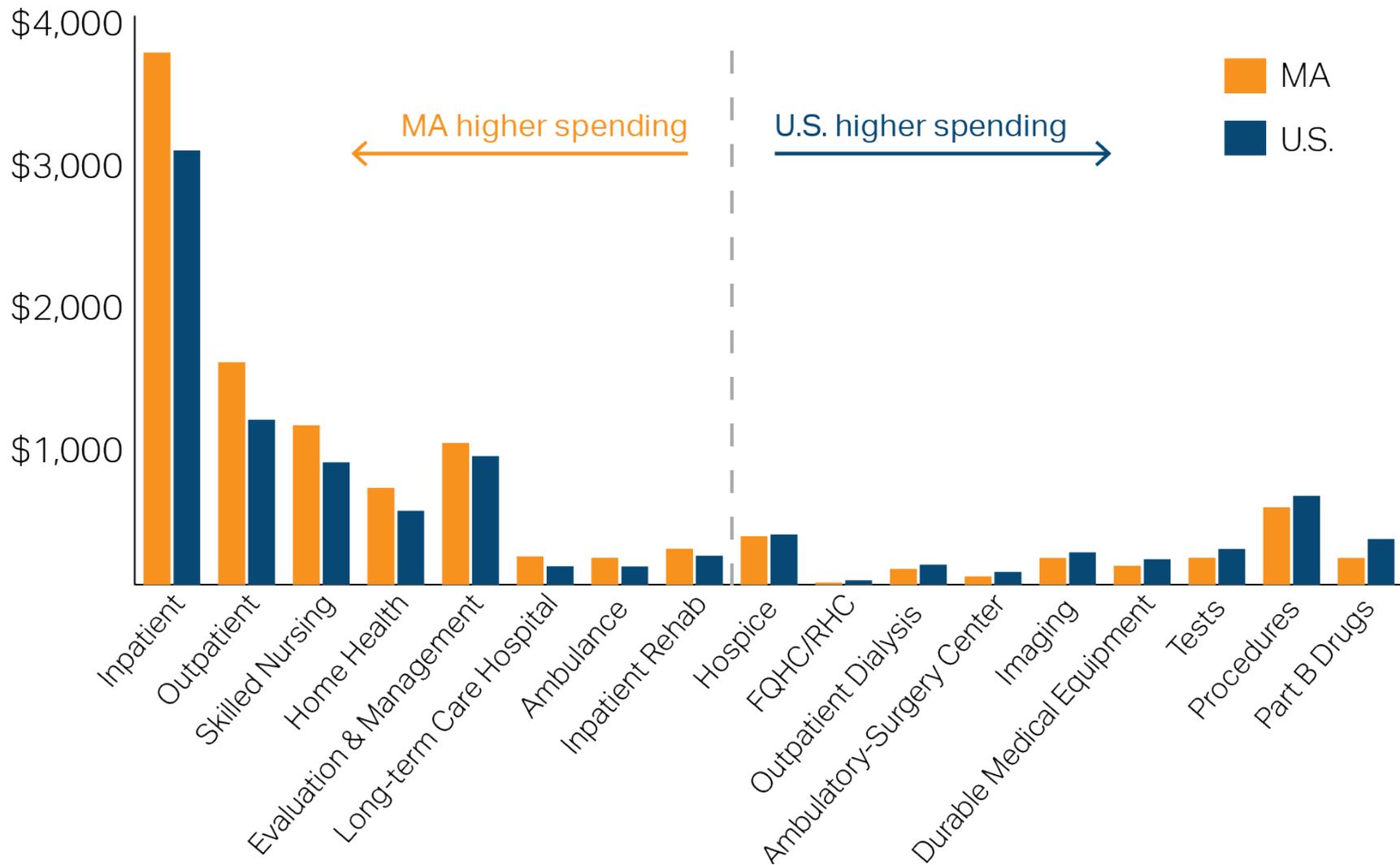
## Exhibit 2.6: Annual growth in commercial spending per enrollee, by spending category, 2010-2014



## Exhibit 2.6: Annual growth in commercial spending per enrollee, by spending category, 2010-2014



## Exhibit 2.7: Medicare spending per beneficiary (Original Medicare) in Massachusetts and in the U.S., by category, 2013

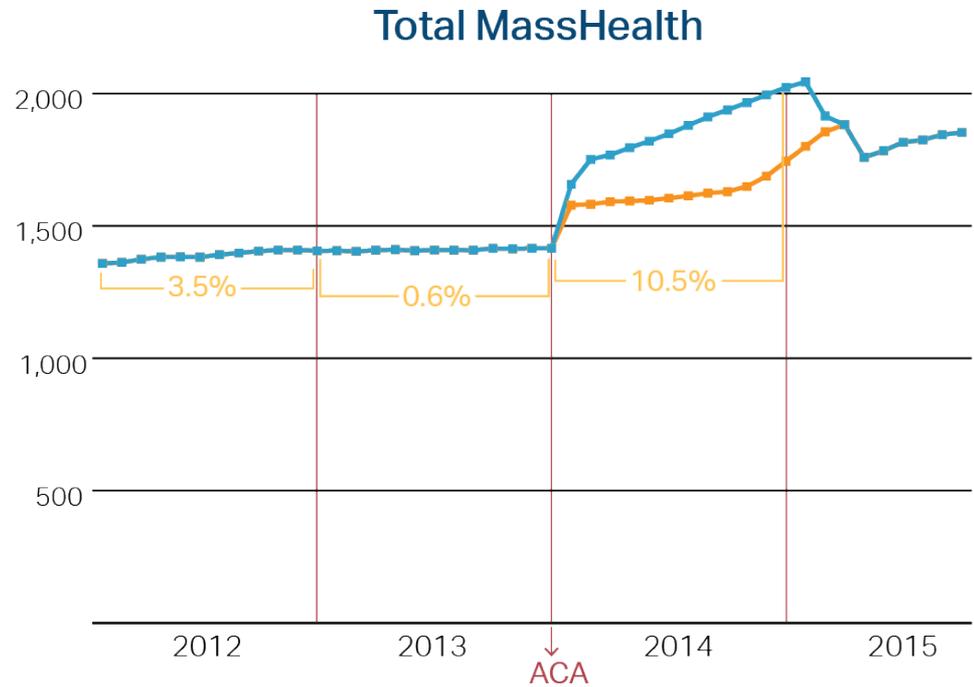
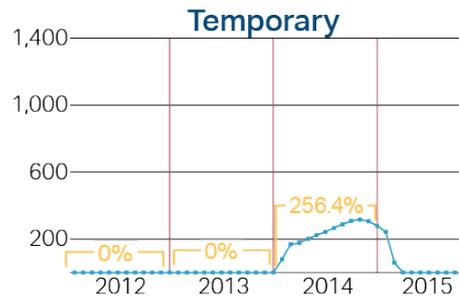
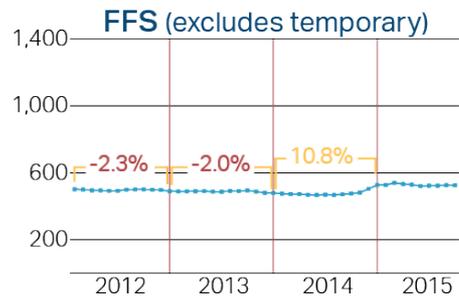
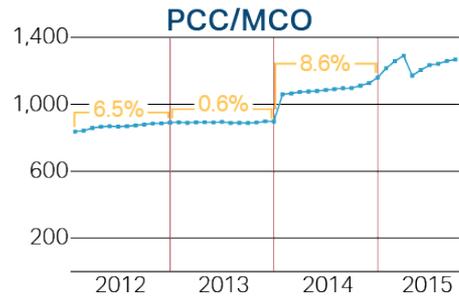


Note: Categories are ordered from left to right by the amount by which spending in Massachusetts exceeds national spending.

Source: Centers for Medicare and Medicaid Services

# Exhibit 2.8: MassHealth enrollment, January 2012-August 2015

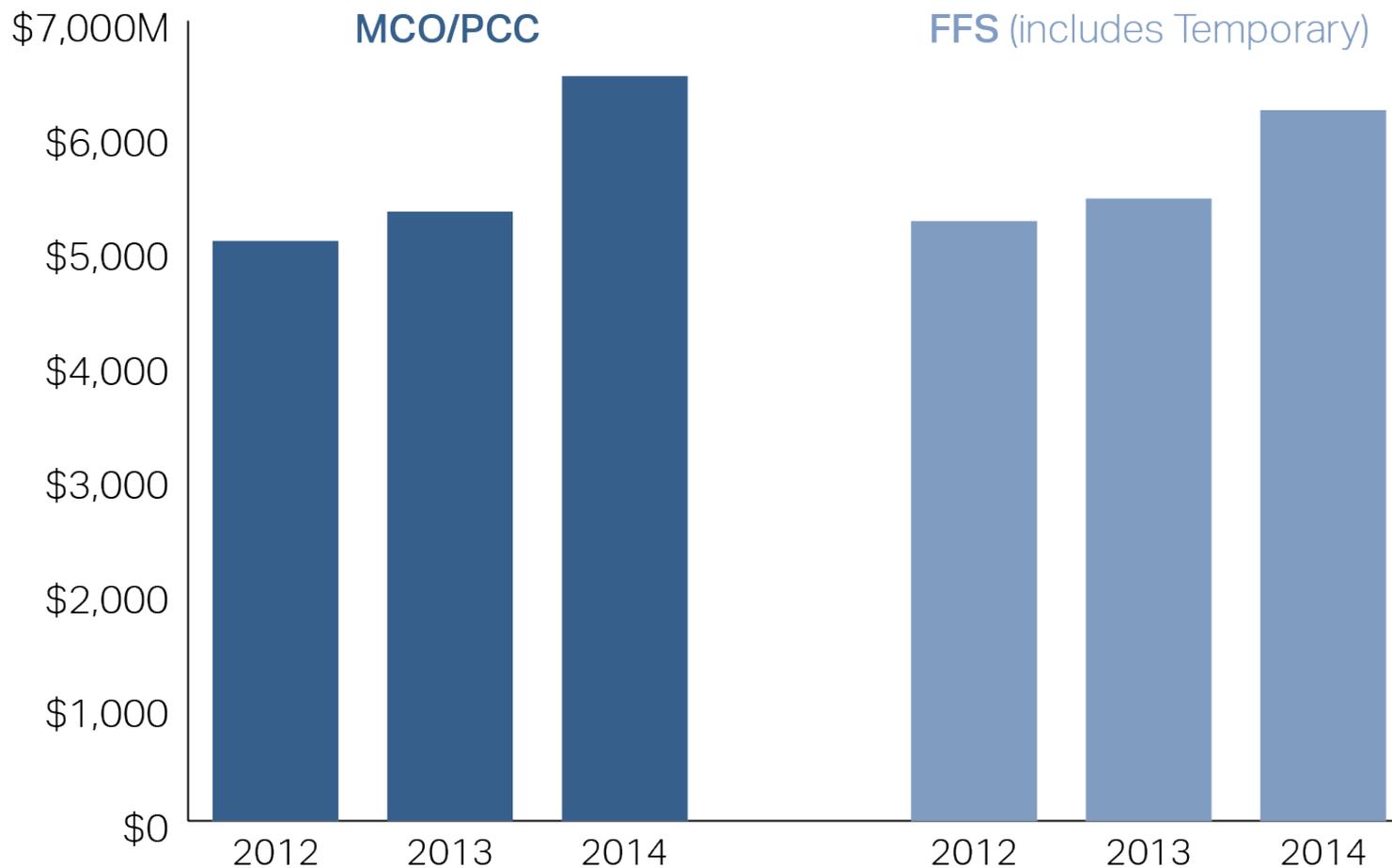
Thousands of enrollees per month



- Total (with Temp)
- Total (without Temp)

## Exhibit 2.9: MassHealth spending by program, 2012-2014

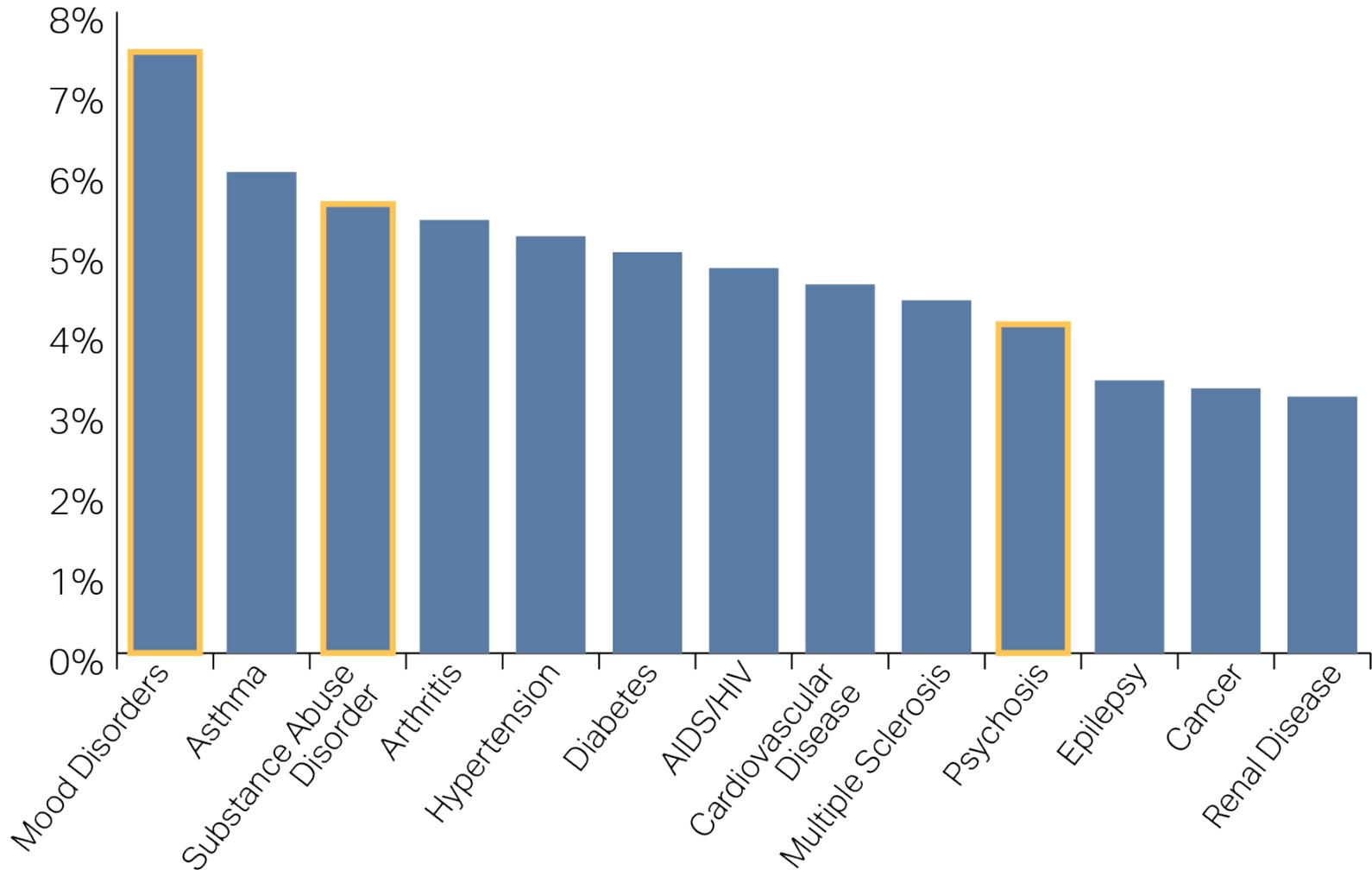
Millions of dollars in calendar year shown



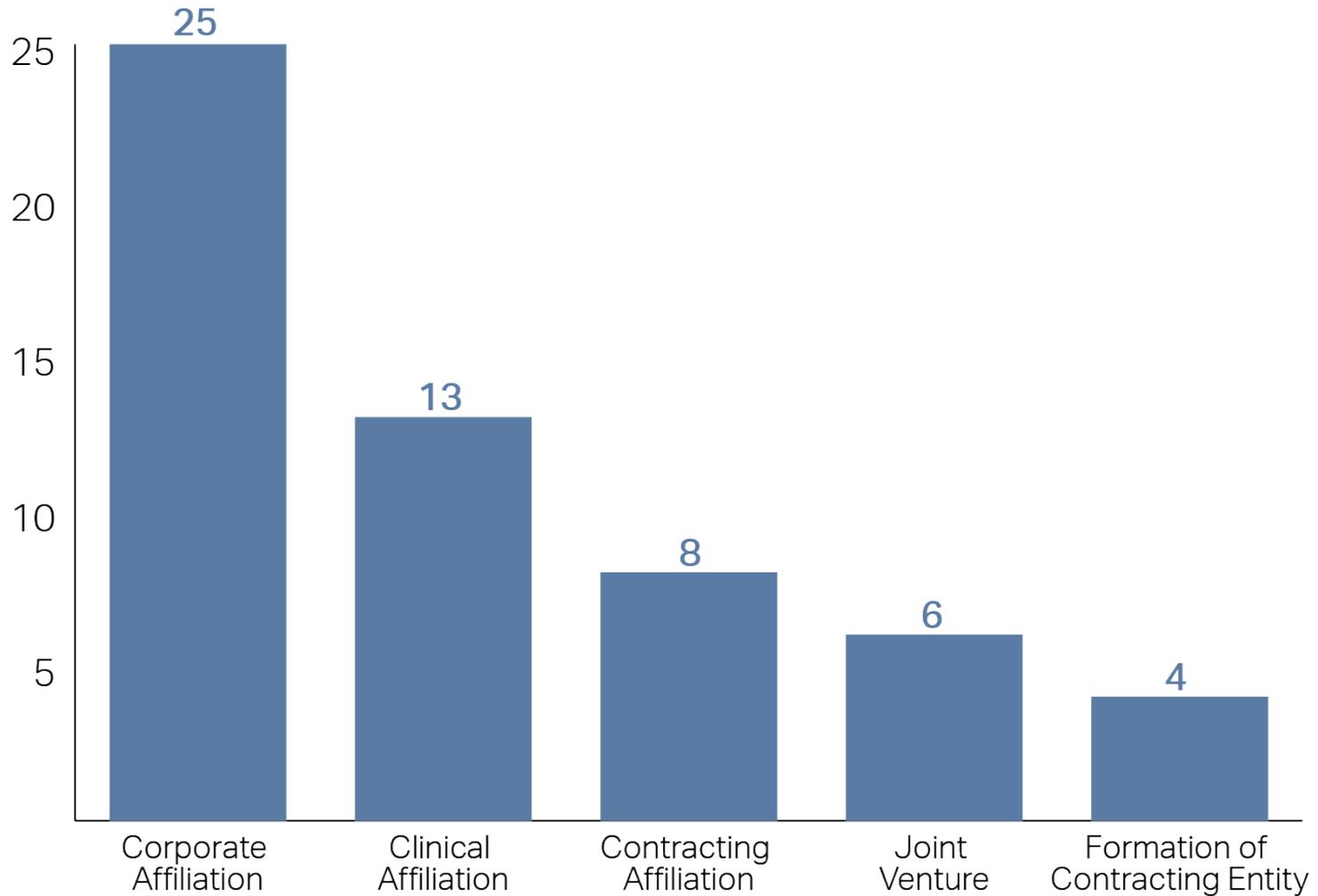
Note: Senior Care Option (SCO), Programs of All-Inclusive Care for the Elderly (PACE), and OneCare not included in Exhibit. These programs began as MassHealth managed care programs available to elderly, near elderly, and dual-eligible populations. For the SCO/PACE/OneCare program, spending was \$727M (2012), \$865M (2013), and \$1.14B (2014). OneCare began in 2013.

Source: Center for Health Information and Analysis, Total Health Care Expenditures

## Exhibit 2.10: Cost-sharing as a percentage of total spending for individuals with given diagnosed conditions, 2013

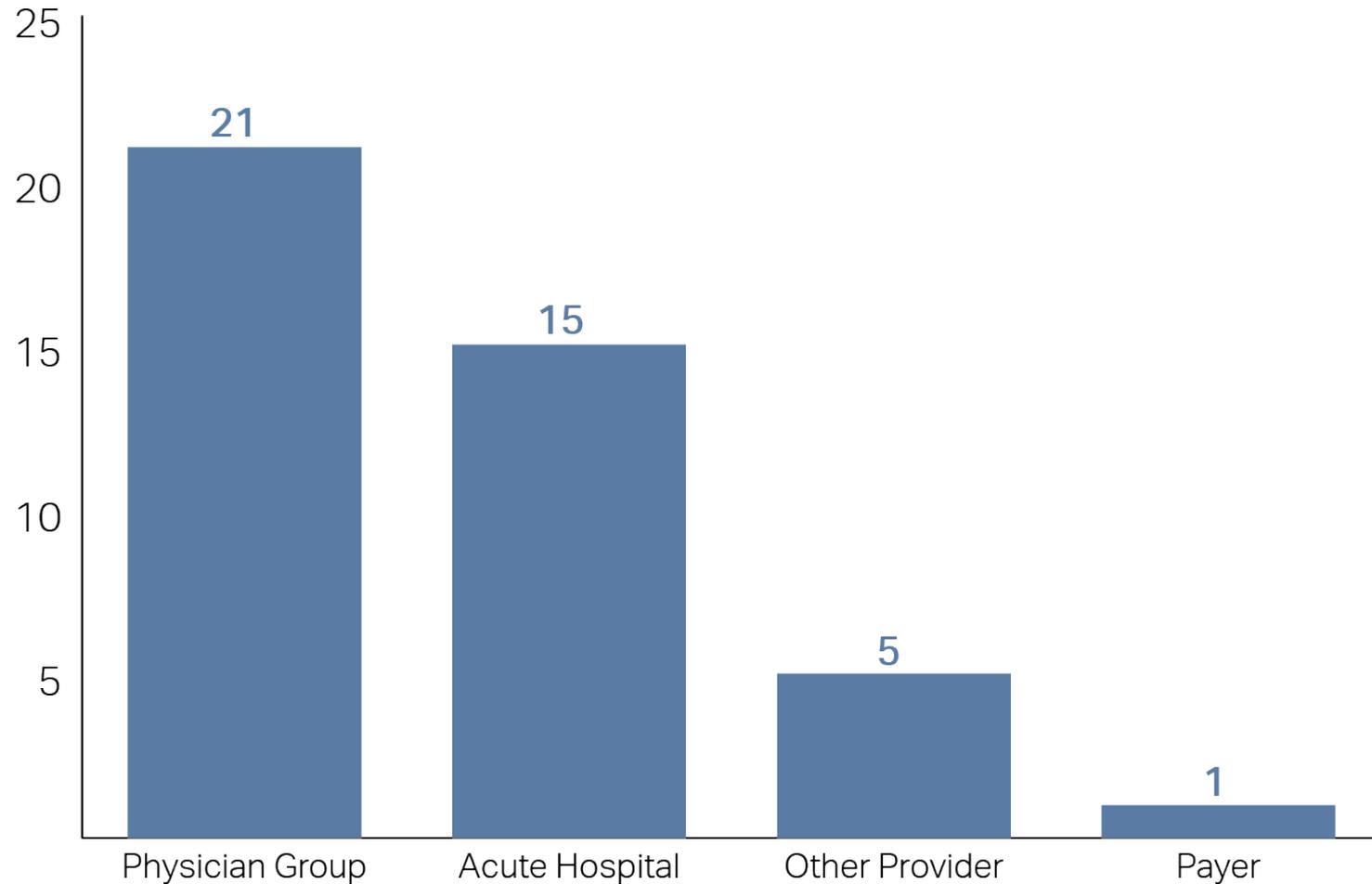


## Exhibit 3.1: Frequency of provider alignment types for which the HPC received material change notices, 2013-2015

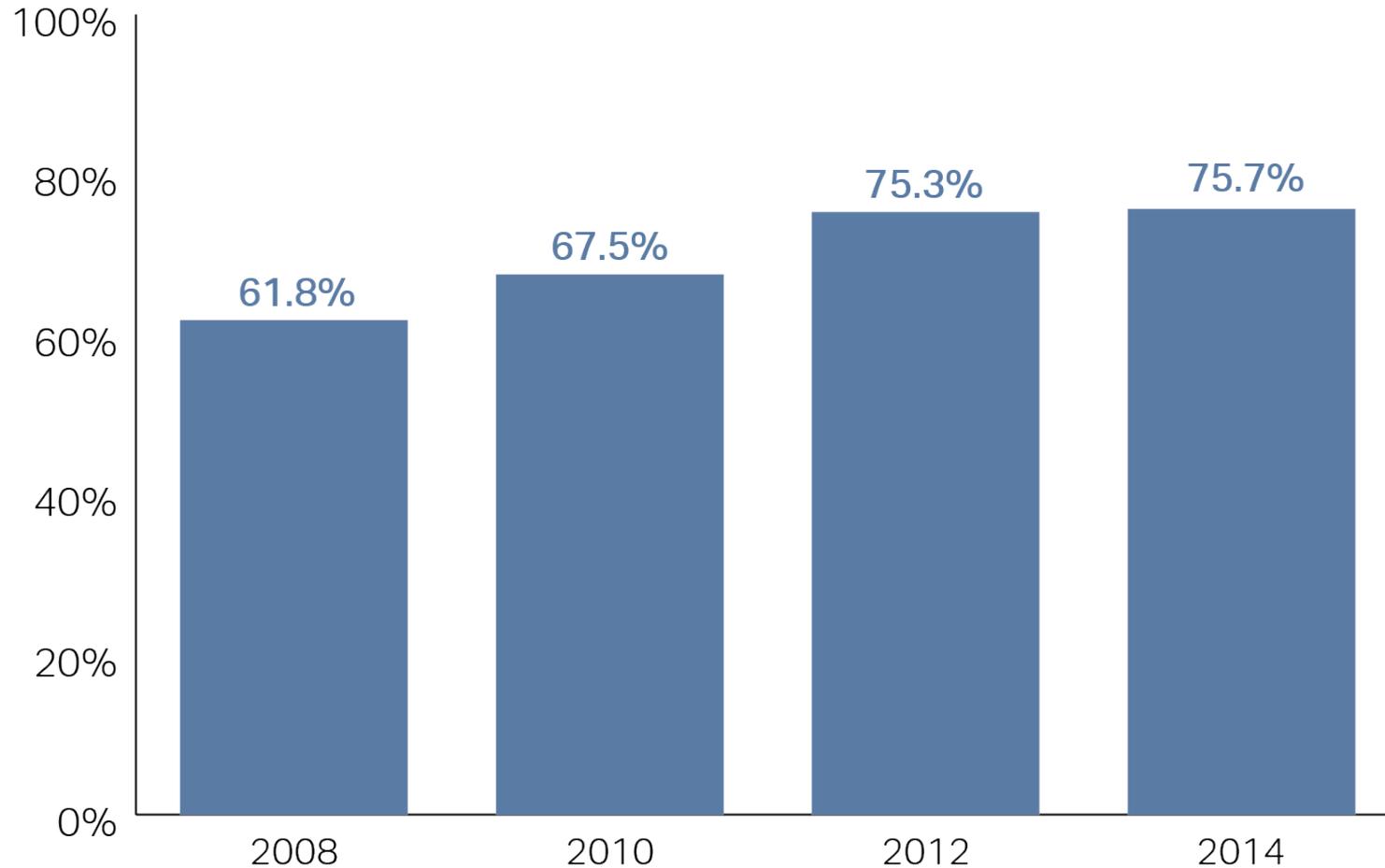


## Exhibit 3.2: Frequency of providers involved in Material Change Notices consisting of corporate or contracting affiliations

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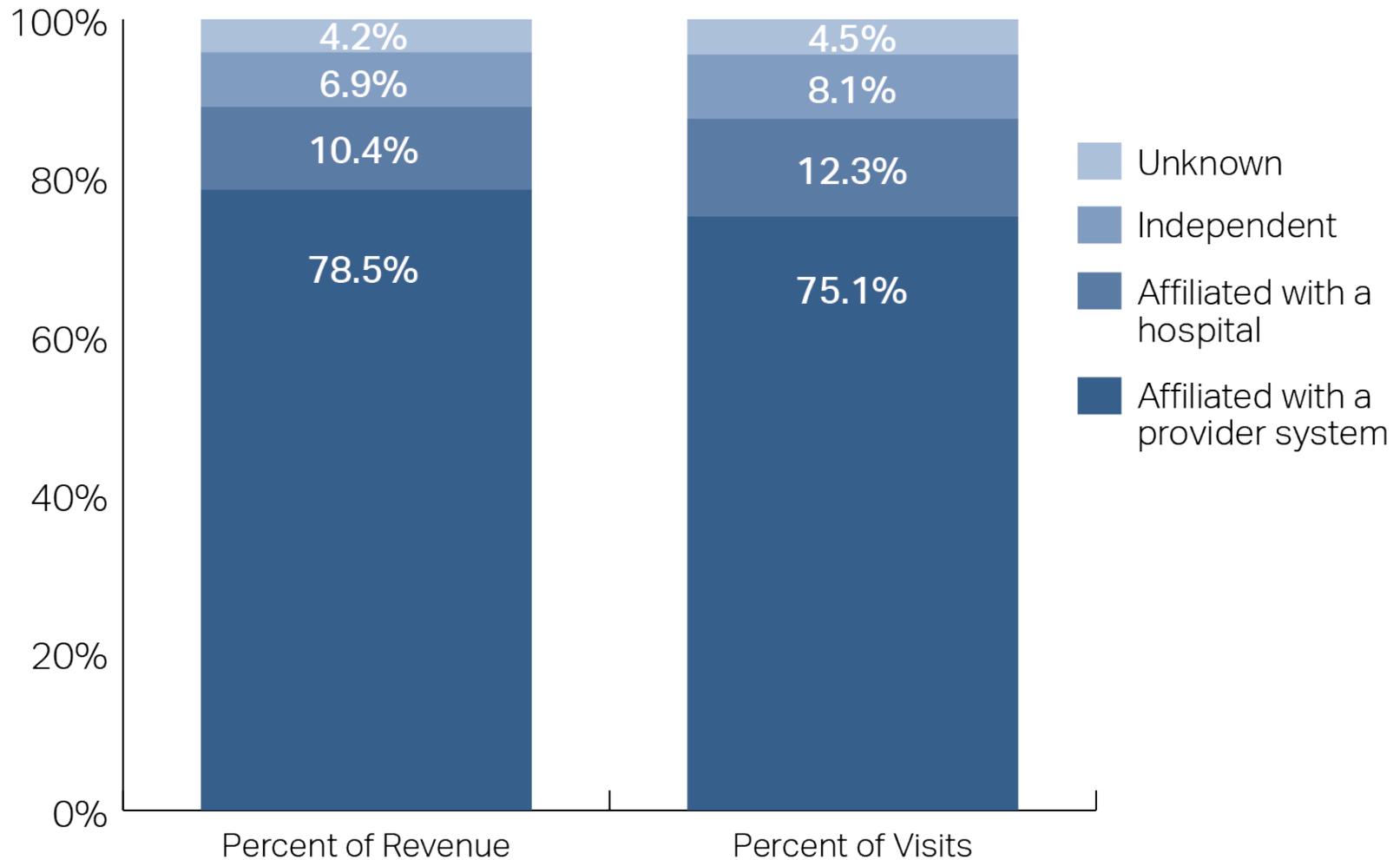
## Exhibit 3.3: Percentage of primary care physicians affiliated with large provider systems, 2008-2014



Note: Reflects primary care physicians associated with Partners Community Health Care, Beth Israel Deaconess Care Organization, Steward Health Care Network, New England Quality Care Alliance, Atrius Health, UMass Memorial Health Care, Baycare Health Partners, and Lahey Health System.

Source: HPC analysis of data from Massachusetts Health Quality Partners

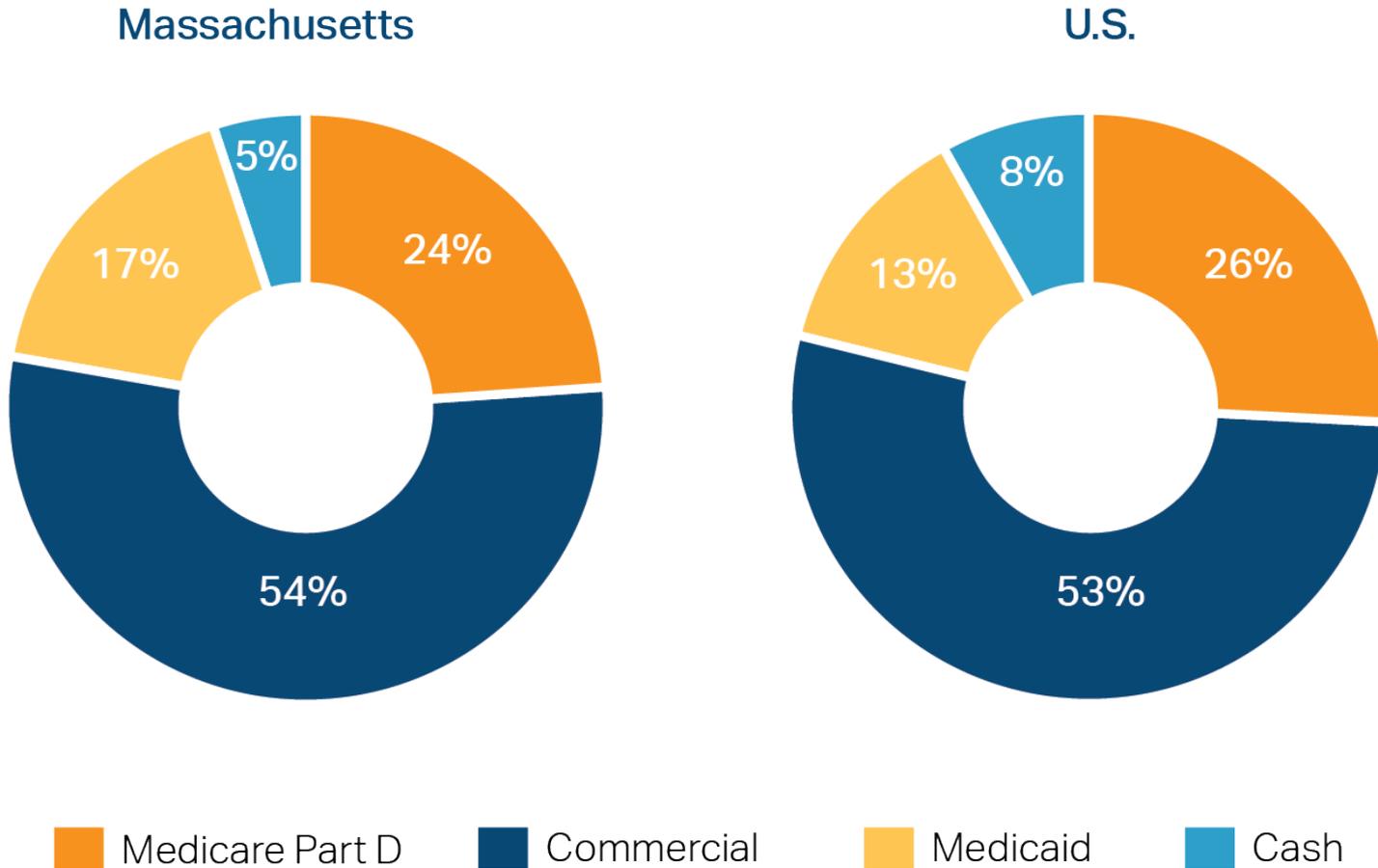
## Exhibit 3.4: Percentage of primary care physician revenue and visits by affiliation status, 2012



Note: For the purposes of this analysis, major provider systems include Atrius Health, Baystate Health System, Beth Israel Deaconess Care Organization, Lahey Health System, New England Quality Care Alliance, Partners Community Health Care, Steward Health Care Network, and UMass Memorial Health Care. Primary care physicians affiliated with multiple systems are counted as being part of a major provider system.

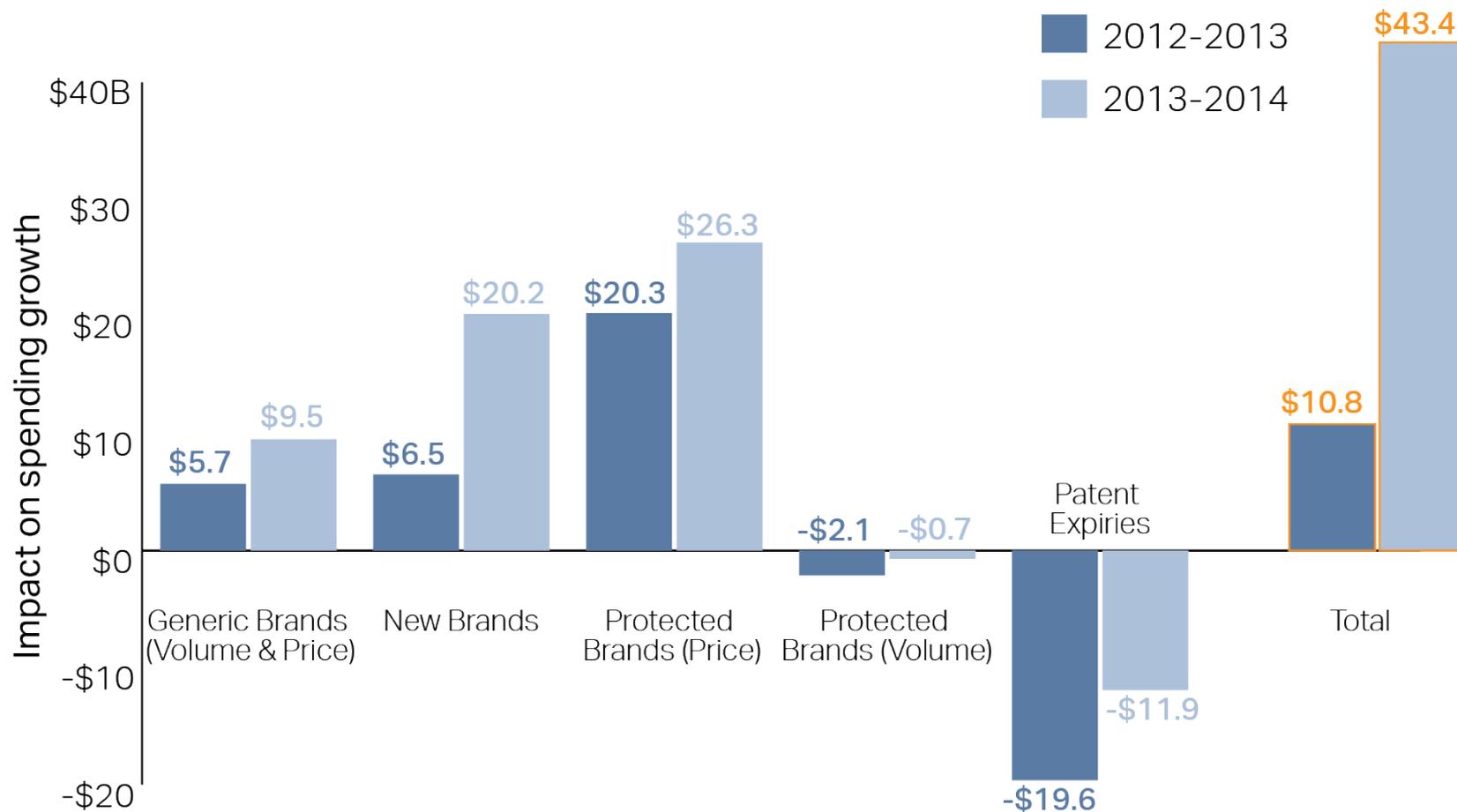
Source: 2012 APCD claims for BCBS and HPHC, 2012 MHQP Master Provider Database

## Exhibit 4.1: Distribution of retail prescriptions in Massachusetts and the U.S., by payer, 2014



## Exhibit 4.2: Components of U.S. drug spending growth, 2013-2014

Billions of dollars in year shown



## Exhibit 4.3: Massachusetts' top 20 drug-therapy classes by spending, with growth rates, 2010-2014

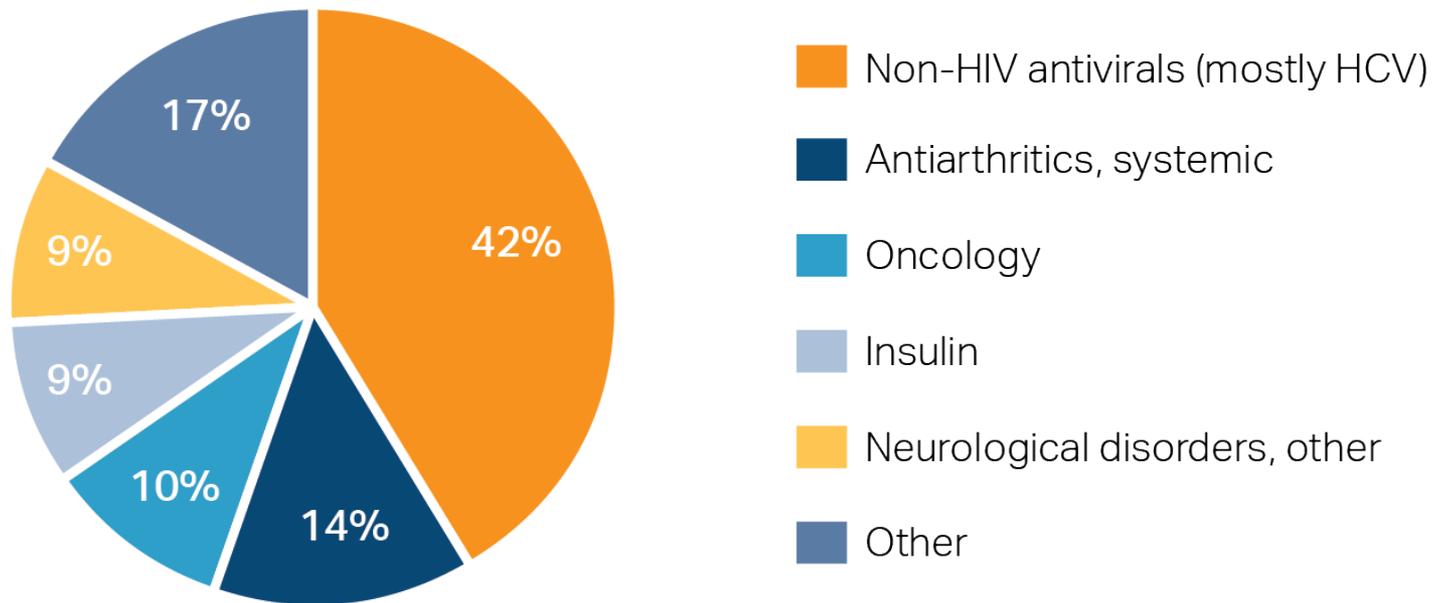
	Spending					Growth			
	2010	2011	2012	2013	2014	2010-2011	2011-2012	2012-2013	2013-2014
<b>Oncology</b>	\$506.1	\$520.3	\$578.5	\$620.0	\$696.4	2.8%	11.2%	7.2%	12.3%
<b>Antiarthritics, Systemic</b>	\$228.4	\$264.1	\$316.2	\$390.6	\$501.5	15.6%	19.7%	23.5%	28.4%
<b>Non-HIV Antivirals (mostly HCV)</b>	\$64.4	\$88.7	\$107.2	\$96.4	\$436.0	37.7%	20.9%	-10.1%	352.3%
<b>Insulin</b>	\$182.0	\$209.3	\$270.3	\$361.4	\$432.9	15.0%	29.1%	33.7%	19.8%
<b>Antipsychotics</b>	\$499.7	\$567.1	\$405.9	\$342.5	\$355.4	13.5%	-28.4%	-15.6%	3.8%
<b>HIV Antivirals</b>	\$227.0	\$255.4	\$301.4	\$331.1	\$348.0	12.5%	18.0%	9.9%	5.1%
<b>Inhaled Steroids</b>	\$256.8	\$277.8	\$307.9	\$345.1	\$347.5	8.2%	10.8%	12.1%	0.7%
<b>Immunomodulators</b>	\$128.9	\$141.1	\$171.3	\$206.4	\$269.9	9.5%	21.4%	20.5%	30.8%
<b>GI Anti-Inflammatory</b>	\$164.4	\$185.1	\$300.7	\$335.6	\$257.6	12.6%	62.5%	11.6%	-23.2%
<b>Analeptics</b>	\$177.1	\$207.1	\$243.1	\$248.1	\$243.4	16.9%	17.4%	2.1%	-1.9%
<b>Neurological Disorders, Other</b>	\$77.3	\$108.4	\$134.6	\$171.0	\$239.3	40.2%	24.2%	27.0%	39.9%
<b>Cholesterol Reducers</b>	\$312.6	\$340.1	\$262.2	\$225.5	\$223.1	8.8%	-22.9%	-14.0%	-1.1%
<b>Bronchodilators</b>	\$166.5	\$187.3	\$219.3	\$221.1	\$207.2	12.5%	17.1%	0.8%	-6.3%
<b>Anticoagulants</b>	\$274.4	\$260.8	\$215.2	\$172.0	\$178.5	-5.0%	-17.5%	-20.1%	3.8%
<b>Analgesic Narcotics</b>	\$133.0	\$139.0	\$151.2	\$163.4	\$168.2	4.5%	8.8%	8.1%	2.9%
<b>Specific Antagonists</b>	\$88.2	\$111.3	\$142.2	\$152.6	\$160.0	26.2%	27.8%	7.3%	4.8%
<b>Antidepressants</b>	\$249.0	\$230.0	\$200.2	\$216.3	\$157.6	-7.6%	-13.0%	8.0%	-27.1%
<b>Hematinics</b>	\$216.2	\$182.6	\$160.1	\$155.6	\$153.0	-15.5%	-12.3%	-2.8%	-1.7%
<b>Non-Insulin Diabetes</b>	\$141.4	\$142.0	\$133.9	\$128.2	\$149.9	0.4%	-5.7%	-4.3%	16.9%
<b>Seizure Disorders</b>	\$113.2	\$118.0	\$115.3	\$136.0	\$148.9	4.2%	-2.3%	18.0%	9.5%

Note: Drug spending figures do not account for manufacturer rebates, which can affect both level and trend.

Source: IMS Health Incorporated

## Exhibit 4.4: Top therapy classes by contribution to 2014 drug spending growth in Massachusetts

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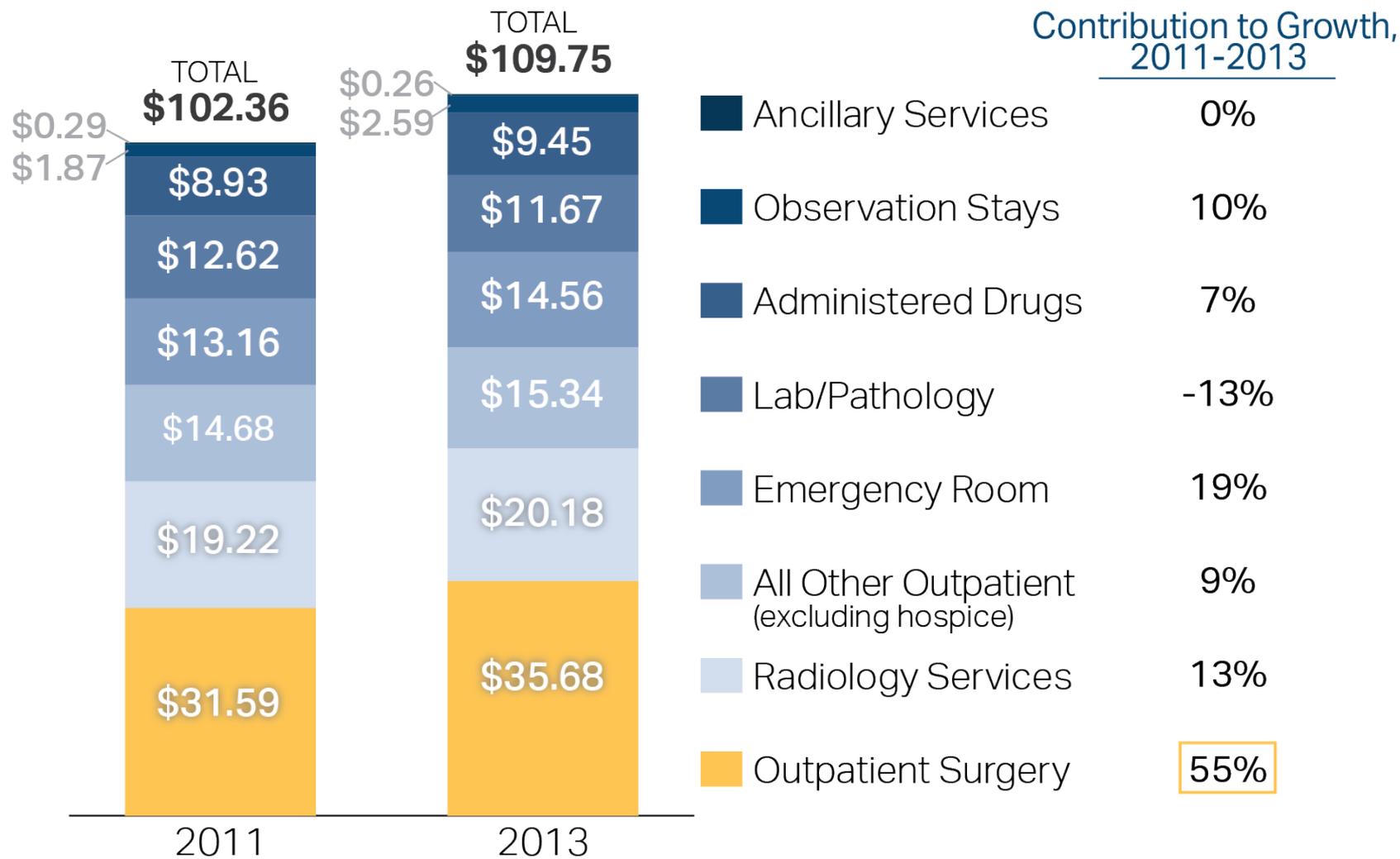


Note: Spending includes drugs provided in both pharmacy (prescription) and non-pharmacy (hospital and physician office) settings. IMS estimates are not directly comparable to Center for Health Information and Analysis methodology; top contributions may represent upper bound estimates.

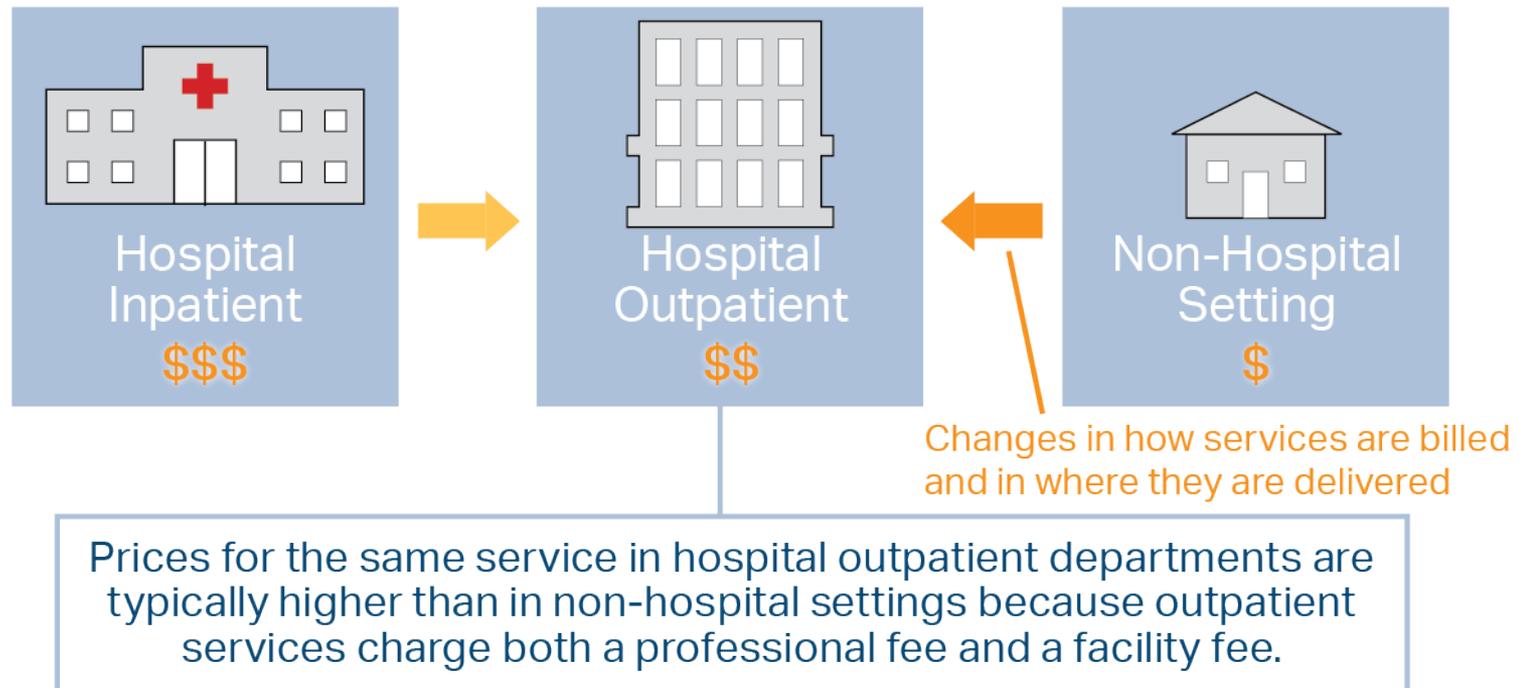
Source: IMS Health Incorporated

# Exhibit 5.1: Commercial spending per member per month in Massachusetts, by outpatient service category, 2011 – 2013

Per member per month spending



## Exhibit 5.2: Shifts in settings to hospital outpatient departments



## Exhibit 5.3: Differences in Medicare program payments and beneficiary cost sharing for outpatient office visits provided in freestanding practices and hospital-based entities, 2014

	Service provided in freestanding physician practice	Service provided in a hospital outpatient department		
	MPFS physician office rate (a) "Professional fee"	MPFS physician facility rate (a) "Professional fee"	OPPS rate (b) "Facility fee"	Total hospital-based rate
<b>Program payment</b>	\$58.46	\$41.26	\$74.02	\$115.28
<b>Beneficiary cost sharing</b>	\$14.62	\$10.32	\$18.51	\$28.83
<b>Total payment</b>	\$73.08	\$51.58	\$92.53	\$144.11

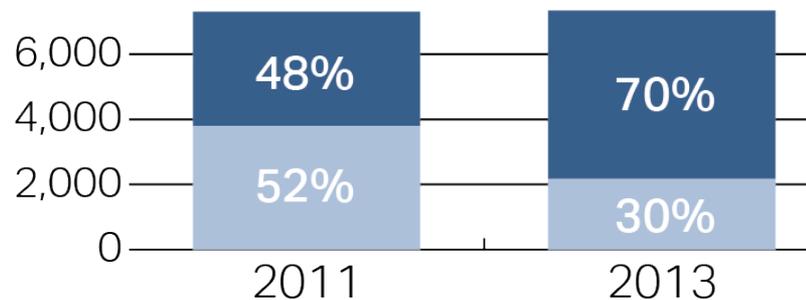
Note MPFS: Medicare physician fee schedule. OPPS: Outpatient Prospective Payment System. (a) Paid under the Medicare physician fee schedule. (b) Paid under the OPPS.

Source: Health Affairs. Health Policy Brief: Site-Neutral Payments, 2014. Medicare Payment Advisory Commission table updated by Health Affairs with 2014 payment rates from Centers for Medicare and Medicaid Services website. The Current Procedural Terminology code used for this example under the physician fee schedule is 99213. The Healthcare Common Procedure Code Set code used for this example under the outpatient prospective payment system (OPPS) is G0462

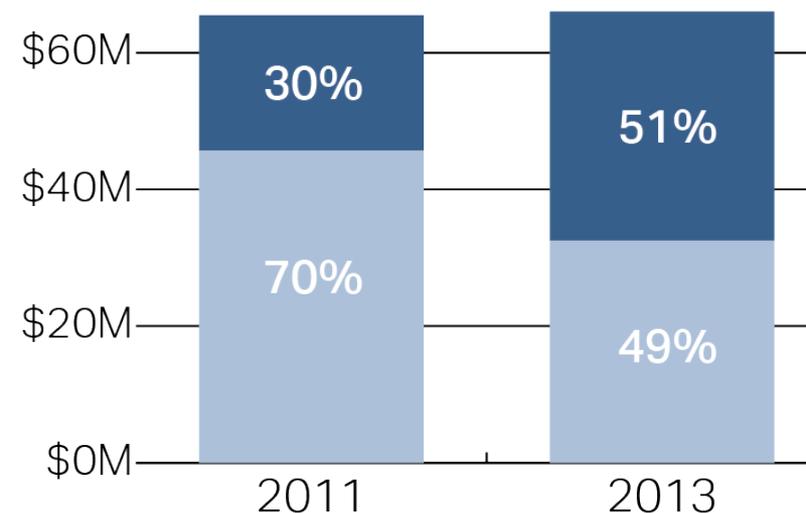
## Exhibit 5.4: Change in volume for five major cross-over surgical procedures performed in acute care hospitals, 2011 – 2013

*Volume and spending for laparoscopic cholecystectomy, laparoscopic appendectomy, arthrodesis, laparoscopic total hysterectomy, and laparoscopic vaginal hysterectomy*

### Total Number of Procedures 2011 to 2013



### Total Spending 2011 to 2013



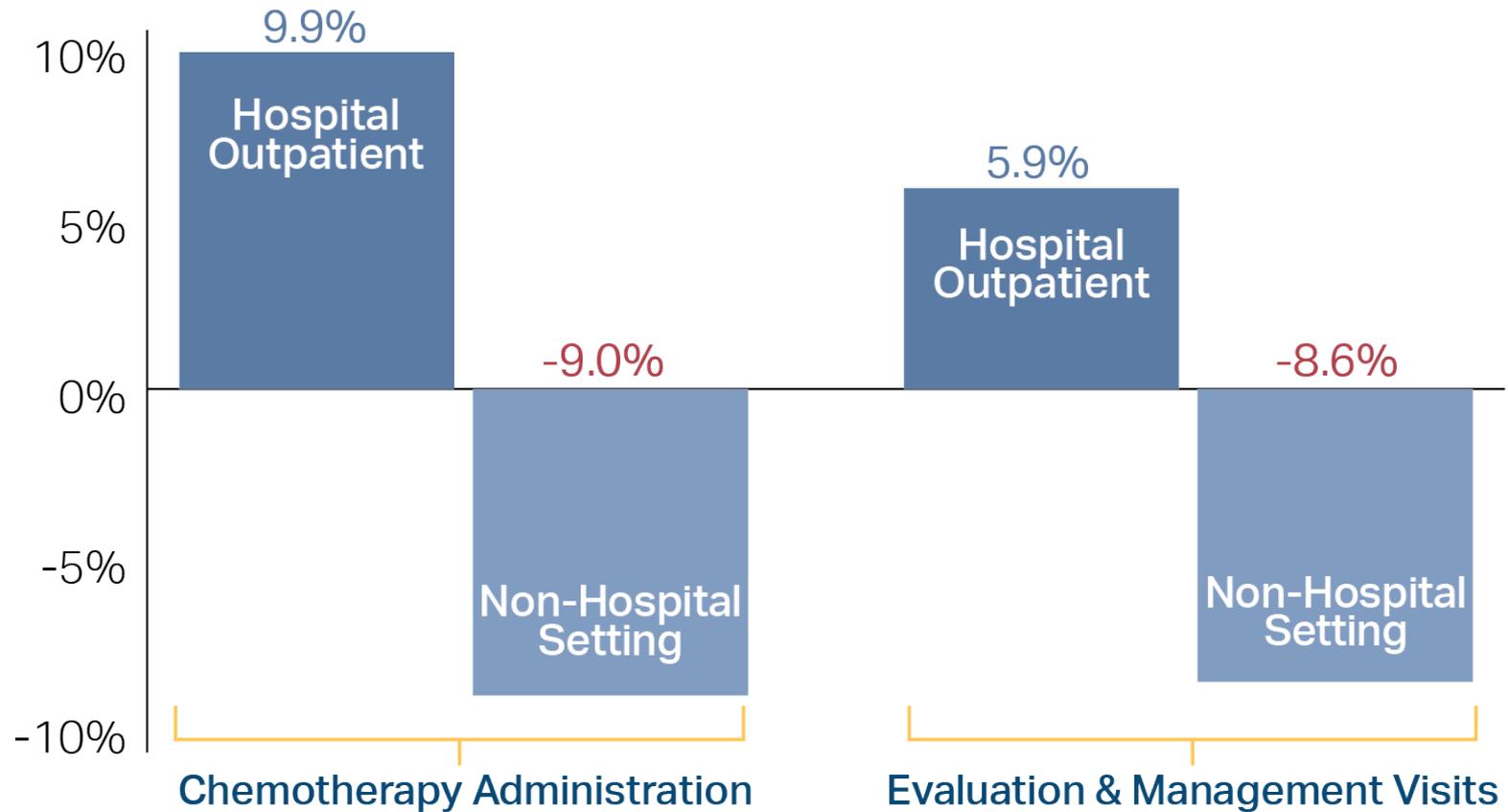
■ Outpatient    ■ Inpatient

Note: The five major cross-over procedures were identified as the highest volume procedures billed by surgeons in 2013, where at least 10 percent of the surgeries occurred at an inpatient hospital and at least 10 percent occurred in an outpatient setting. Total spending includes insurer and enrollee payments for the facility portion of the surgical procedure. Commercial FFS spending does not include capitated payments (see Technical Appendix).

Source: HPC analysis of Massachusetts All-Payer Claims Database, 2011-2013

## Exhibit 5.5: Changes in site of care for chemotherapy administration and E&M visits, 2011-2013

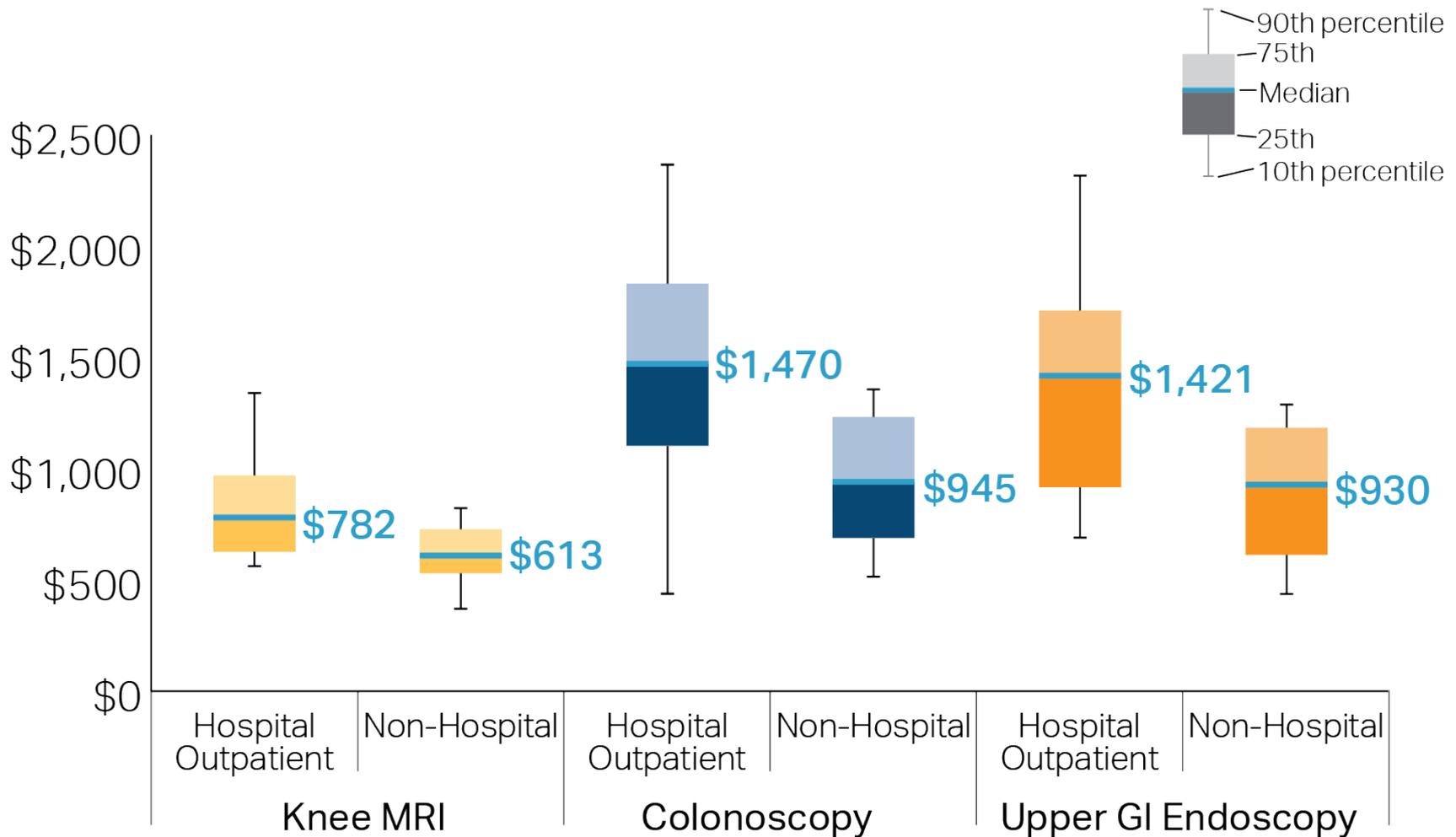
Percentage change in number of procedures per 1,000 member months



Note: \* Median price. Procedures with a missing site of service or nonhospital outpatient site were excluded. Spending includes insurer and enrollee payments for both the facility and professional portion of the covered medical service, on all claim lines for the same patient on the same date with the same CPT procedure code. Commercial FFS spending does not include capitated payments. Non-hospital setting includes office, independent lab, urgent care, ambulatory surgical center, independent clinic, FQHC, public health clinic, walk-in retail health clinic, or rural health clinic (see Technical Appendix).

Source: HPC analysis of the Massachusetts All-Payer Claims Database, 2011-2013

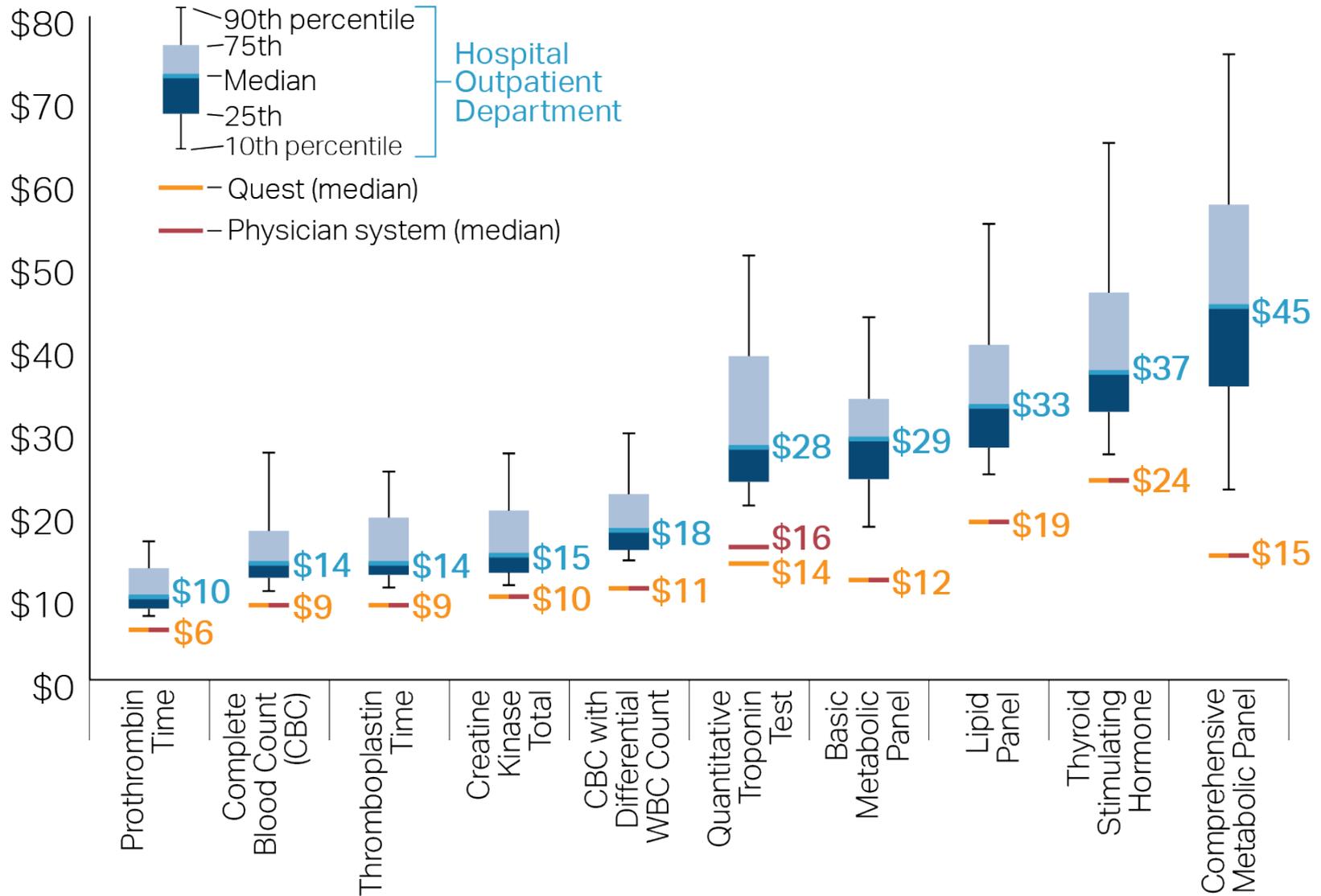
## Exhibit 5.6: Comparison of spending per procedure between hospital outpatient and non-hospital settings, 2013



Note: Procedures with a missing site of service or non-hospital outpatient site were excluded. Spending includes insurer and enrollee payments for both the facility and professional portion of the covered medical service, on all claim lines for the same patient on the same date with the same procedure code. Commercial spending does not include capitated payments. See Technical Appendix

Source: HPC analysis of Massachusetts All-Payer Claims Database, 2011-2013

## Exhibit 5.7: Prices for common lab tests by setting, 2012

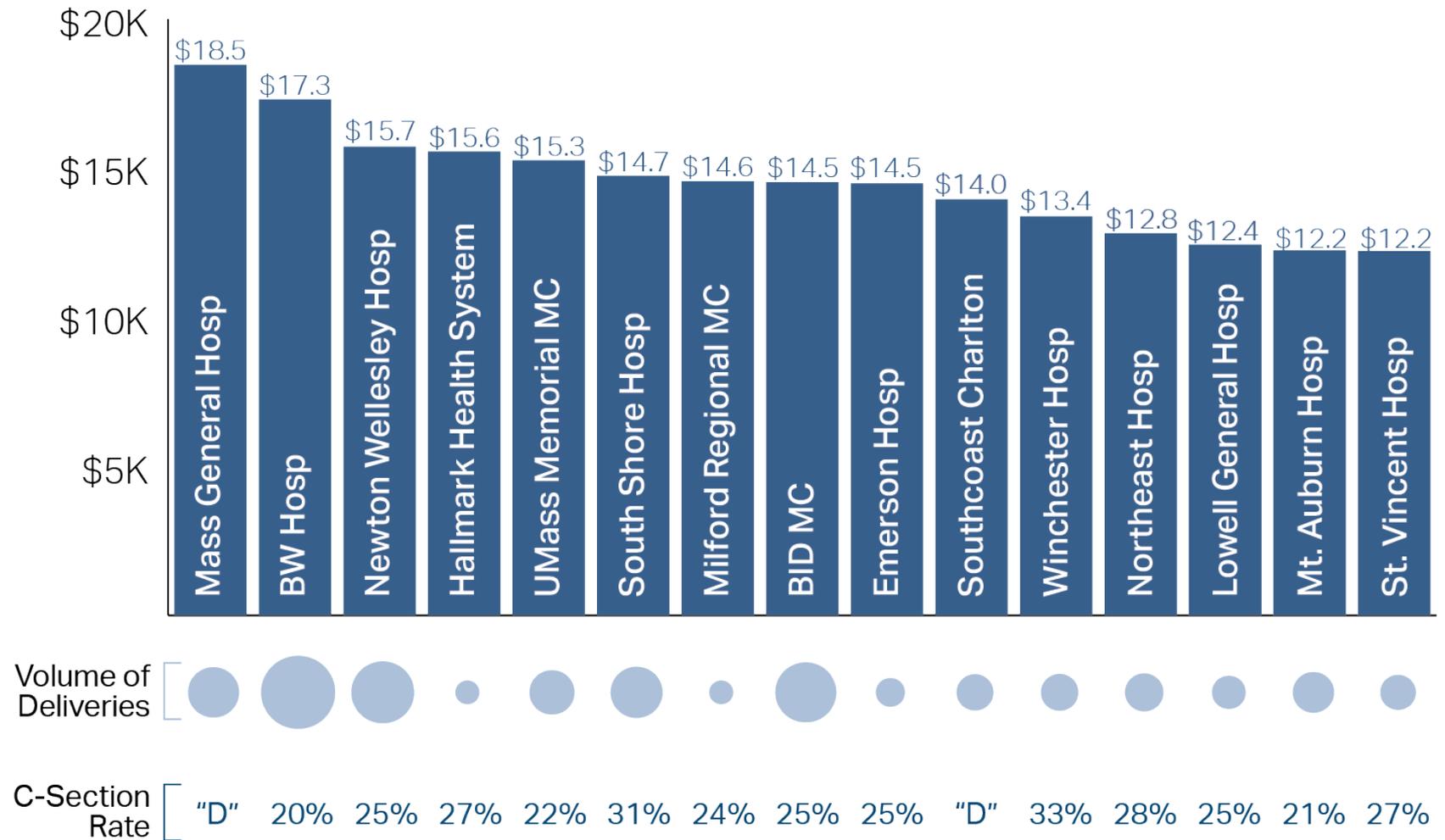


Note: Tests in the hospital setting were only included if billed as an outpatient service. Providers are included if they performed at least 15 tests.

Source: HPC analysis of Massachusetts All-Payer Claims Database, 2012

## Exhibit 7.1: Average spending for normal deliveries by hospital, selected hospitals, 2011-2012

Spending per episode, “thousands of dollars”



Note: This chart is limited to the 15 hospitals with the greatest number of normal deliveries paid by commercial payers in 2014. Both vaginal and C-section deliveries are included. “D” indicates that the hospital declined to voluntarily submit rates. C-section rate is the nulliparous term singleton vertex (NTSV) C-section rate.

Source: HPC analysis of the Massachusetts All-Payer Claims Database, 2011-2012, HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014; Leapfrog Group

## Exhibit 7.2: Average spending for normal deliveries by hospital, all hospitals, 2011-2012

Hospital	Hospital Cohort	Corporate Affiliation	Episode Spending	Procedural Spending			
			Pregnancy Episode Spending	Vaginal Delivery Spending	C-Section Spending	2014 Commercial Discharges	C-Section Rate
Massachusetts General Hospital	AMC	Partners	\$18,475	\$14,763	\$19,542	1847	D
Brigham and Women's Hospital	AMC	Partners	\$17,312	\$14,042	\$18,002	3897	20%
North Shore Medical Center	Community	Partners	\$16,405	\$11,652	\$16,785	311	D
Steward St. Elizabeth's Hospital	Teaching	Steward	\$15,987	*	*	409	26%
Newton Wellesley Hospital	Community	Partners	\$15,718	\$12,148	\$15,846	2795	25%
Hallmark Health System	Community	Independent	\$15,561	\$10,599	\$13,796	406	27%
UMass Memorial Medical Center	AMC	UMass	\$15,266	\$12,284	\$15,432	1437	22%
Tufts Medical Center	AMC	Independent	\$15,262	*	*	432	36%
South Shore Hospital	Community	Independent	\$14,745	\$11,492	\$14,539	1910	31%
Milford Regional Medical Center	Community	Independent	\$14,564	\$10,270	\$13,127	406	24%
Beth Israel Deaconess Medical Center	AMC	BID	\$14,534	\$11,414	\$12,884	2631	25%
Emerson Hospital	Community	Independent	\$14,497	\$10,705	\$13,291	597	25%
Cooley Dickinson Hospital	Community	Partners	\$14,381	*	*	339	28%
Berkshire Medical Center	Teaching	Berkshire Health	\$14,249	*	*	246	21%
Falmouth Hospital	Community	Cape Cod	\$14,219	*	*	141	30%
Southcoast Charlton Memorial Hospital	Community	Independent	\$13,956	\$10,367	\$13,175	959	D
Steward Holy Family Hospital	Community	Steward	\$13,880	*	*	305	43%
Cape Cod Hospital	Community	Cape Cod	\$13,772	\$9,622	\$12,787	232	24%
Beth Israel Deaconess - Plymouth	Community	BID	\$13,694	*	*	298	24%
Baystate Medical Center	Teaching	Baystate	\$13,611	\$10,734	\$15,291	1262	23%
Metrowest Medical Center	Community	Tenet	\$13,557	*	*	213	27%
Southcoast St. Luke's Hospital	Community	Independent	\$13,455	\$10,199	\$11,787	*	D

Note: "D" indicates that the hospital declined to voluntarily submit rates. "N/A" indicates that the hospital was not eligible to submit rates. Both vaginal and C-section deliveries are included in episode spending. C-section rate is the nulliparous term singleton vertex (NTSV) C-section rate.

Source: HPC analysis of the Massachusetts All-Payer Claims Database, 2011-2012; HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014; Leapfrog Group

## Exhibit 7.2: Average spending for normal deliveries by hospital, all hospitals, 2011-2012 (continued)

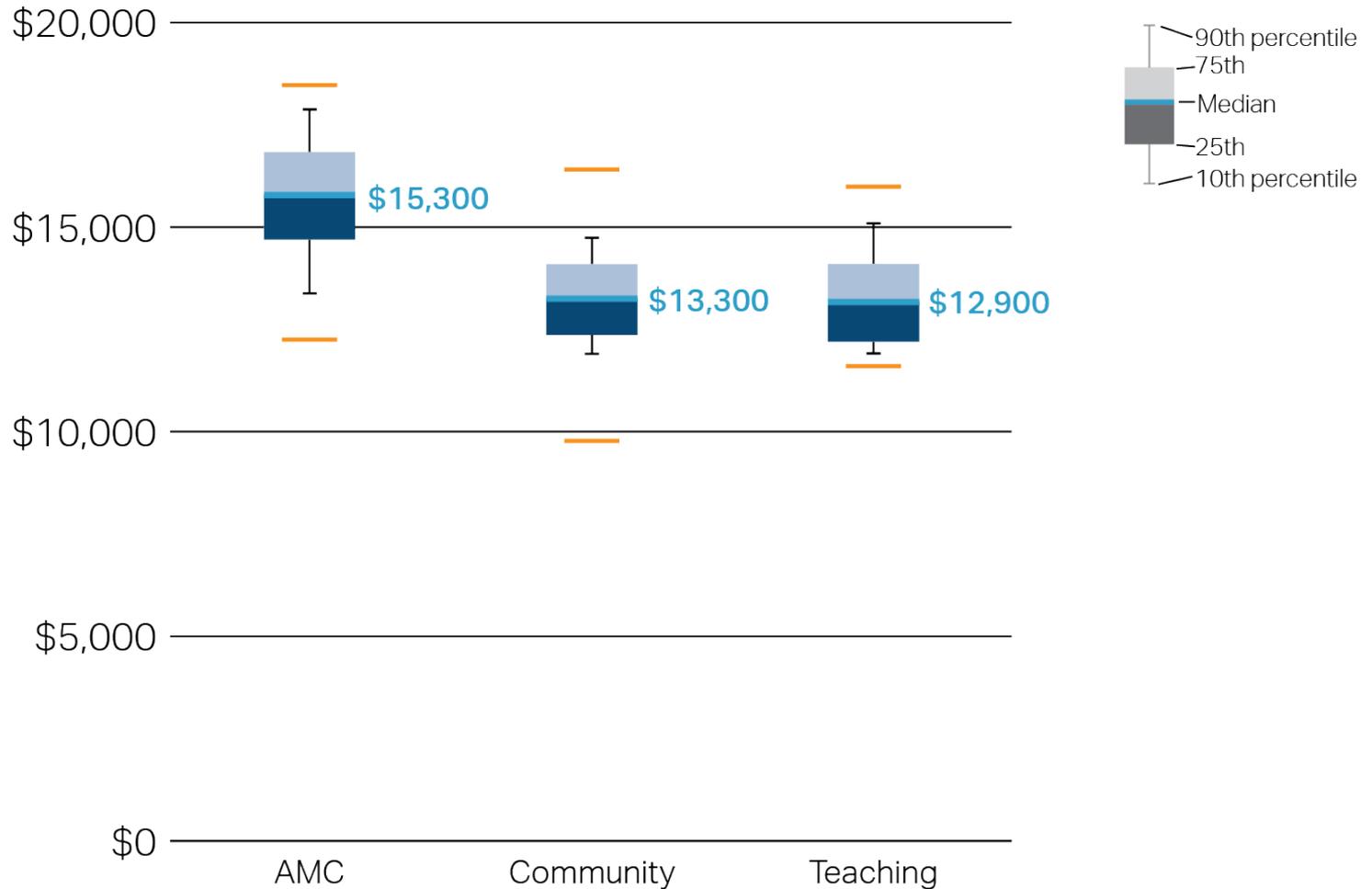
Hospital	Hospital Cohort	Corporate Affiliation	Episode Spending	Procedural Spending		2014 Commercial Discharges	C-Section Rate
			Pregnancy Episode Spending	Vaginal Delivery Spending	C-Section Spending		
Winchester Hospital	Community	Lahey	\$13,385	\$9,889	\$12,223	987	33%
Signature Brockton Hospital	Community	Independent	\$13,320	*	*	239	27%
Steward Good Samaritan Medical Center	Community	Steward	\$13,090	\$9,137	\$11,975	165	36%
North Adams Regional Hospital	Community	Independent	\$12,849	*	*	8	N/A
Northeast Hospital	Community	Lahey	\$12,817	\$9,917	\$12,038	1048	28%
Harrington Hospital	Community	Independent	\$12,789	*	*	60	14%
Steward Norwood Hospital	Community	Steward	\$12,704	*	*	165	28%
Lawrence General Hospital	Community	Independent	\$12,656	*	*	284	22%
Lowell General Hospital	Community	Wellforce	\$12,437	\$9,573	\$12,326	803	25%
Mercy Hospital	Community	Independent	\$12,374	*	*	353	25%
Boston Medical Center	AMC	Independent	\$12,261	*	*	299	30%
Mount Auburn Hospital	Teaching	Independent	\$12,247	\$9,570	\$12,433	1208	21%
St. Vincent Hospital	Teaching	Tenet	\$12,221	\$9,616	\$12,641	894	27%
HealthAlliance Hospital	Community	UMass	\$12,201	\$9,692	\$11,973	281	D
Sturdy Memorial Hospital	Community	Independent	\$11,980	*	*	289	31%
Steward Morton Hospital	Community	Steward	\$11,945	*	*	116	34%
Baystate Franklin Hospital	Community	Baystate	\$11,906	*	*	166	30%
Southcoast Tobey Hospital	Community	Independent	\$11,706	*	*	*	D
Anna Jacques Hospital	Community	Independent	\$11,602	*	*	332	30%
Cambridge Health Alliance	Teaching	Independent	\$11,601	*	*	257	19%
Heywood Hosp	Community	Heywood Health-care	\$9,772	*	*	164	19%

Note: "D" indicates that the hospital declined to voluntarily submit rates. "N/A" indicates that the hospital was not eligible to submit rates. Both vaginal and C-section deliveries are included in episode spending. C-section rate is the nulliparous term singleton vertex (NTSV) C-section rate.

Source: HPC analysis of the Massachusetts All-Payer Claims Database, 2011-2012; HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014; Leapfrog Group

# Exhibit 7.3: Average spending for normal deliveries by hospital type, all hospitals, 2011-2012

Spending per episode, dollars

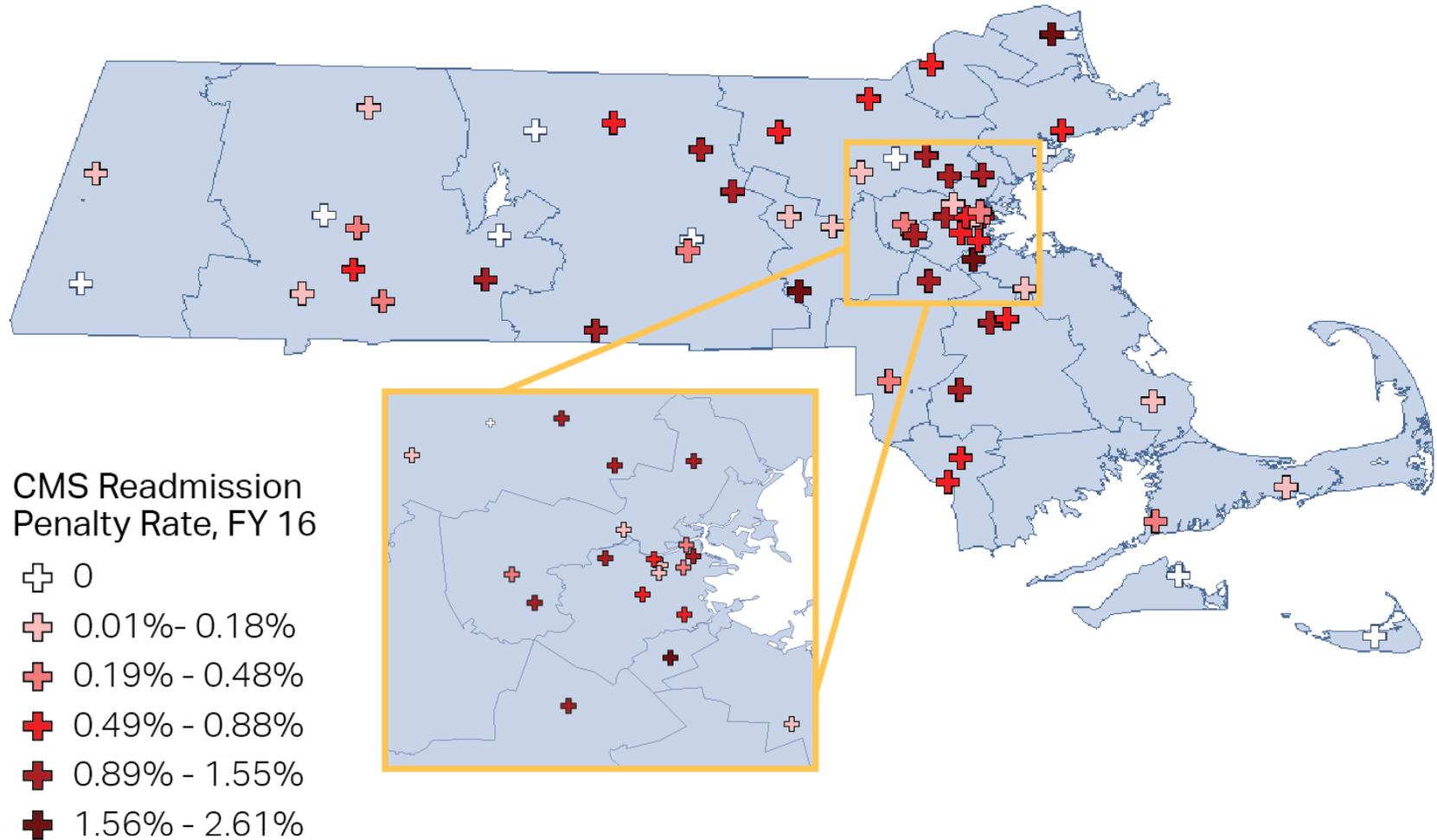


Note: Both vaginal and C-section deliveries are included in episode spending.  
Source: HPC analysis of the Massachusetts All-Payer Claims Database, 2011-2012

## Exhibit 8.1: Hospital use in Massachusetts and the U.S., 2014

	Units, year	MA	US	Difference	MA Rank (1=best)
<b>Inpatient Days</b>	Per 1,000 persons	625	577	8.3%	33
<b>Inpatient Admissions</b>	Per 1,000 persons	118	106	11.3%	36
<b>Outpatient Visits</b>	Per 1,000 persons	3,302	2,145	53.9%	47
<b>ED Visits</b>	Per 1,000 persons	481	423	13.7%	29
<b>Medicare Readmission Rate</b>	Percent	17.4%	17.0%	.4 percentage points	34

## Exhibit 8.2: Massachusetts hospitals penalized for readmissions and assessment rate, FY 2016

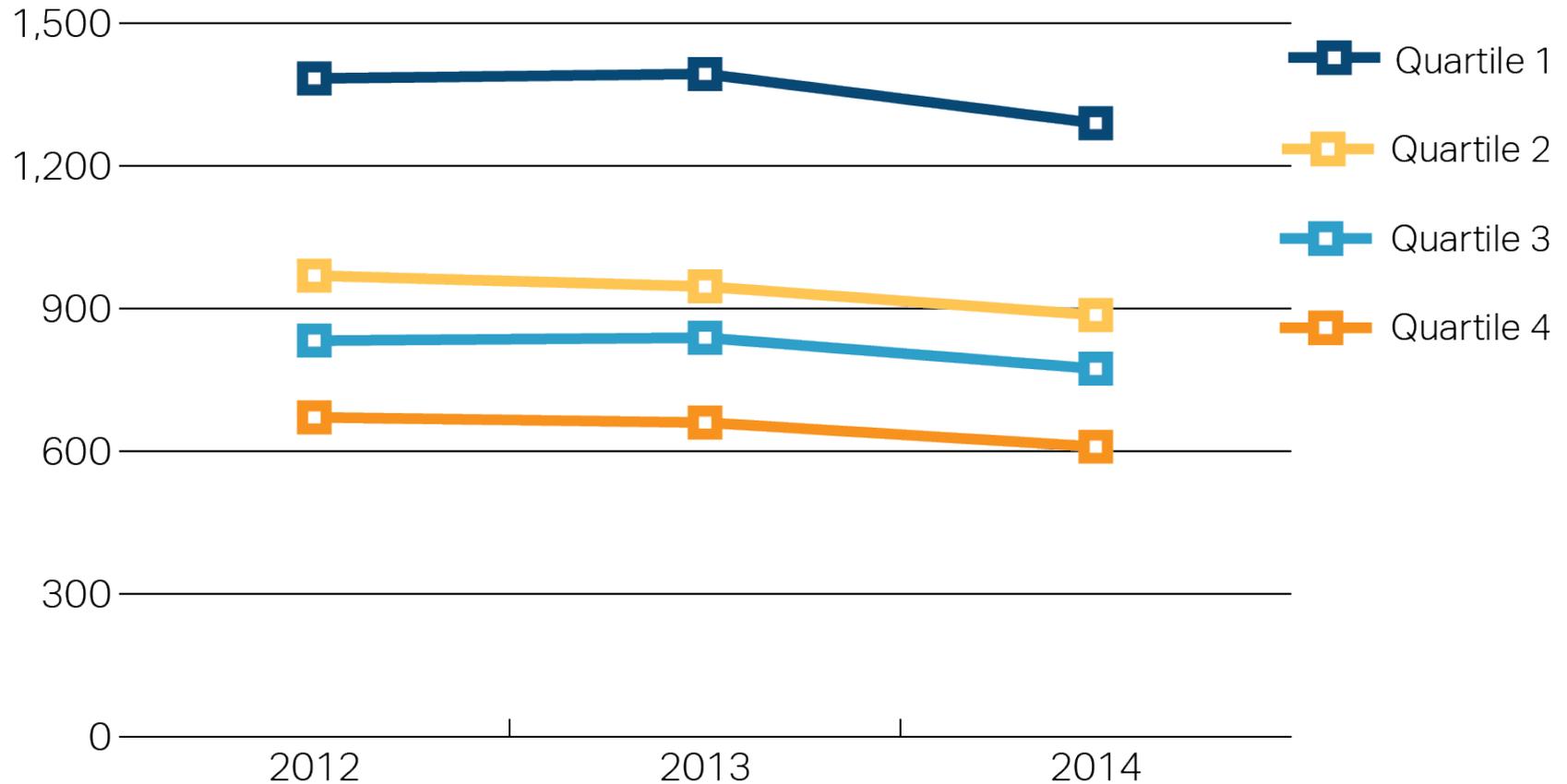


Note: Excludes Specialty and VA Hospitals. Penalty rates apply to Original Medicare payments for inpatient care.

Source: Kaiser Family Foundation; analysis of Centers for Medicare and Medicaid Services data; Centers for Medicare and Medicaid Services data

## Exhibit 8.3: Chronic preventable hospital admissions by income quartile, 2012-2014

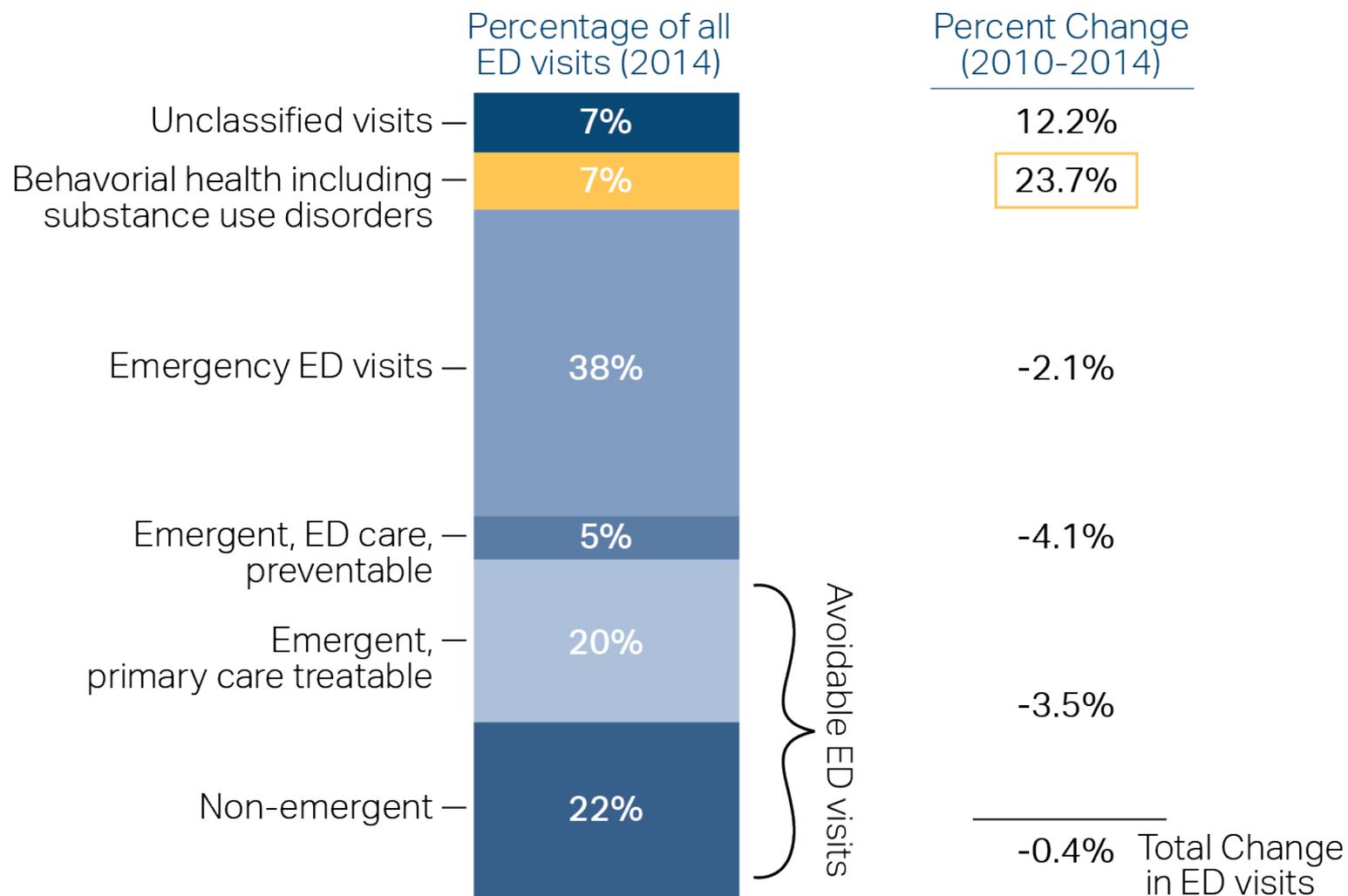
Age and sex adjusted hospitalizations per 100,000 residents



Note: Income Quartiles range from \$0 - \$52K, 52K - 69K, 69K - 87K, and 87K+.

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2012-2014

## Exhibit 8.4: Emergency Department visits by type, 2010-2014

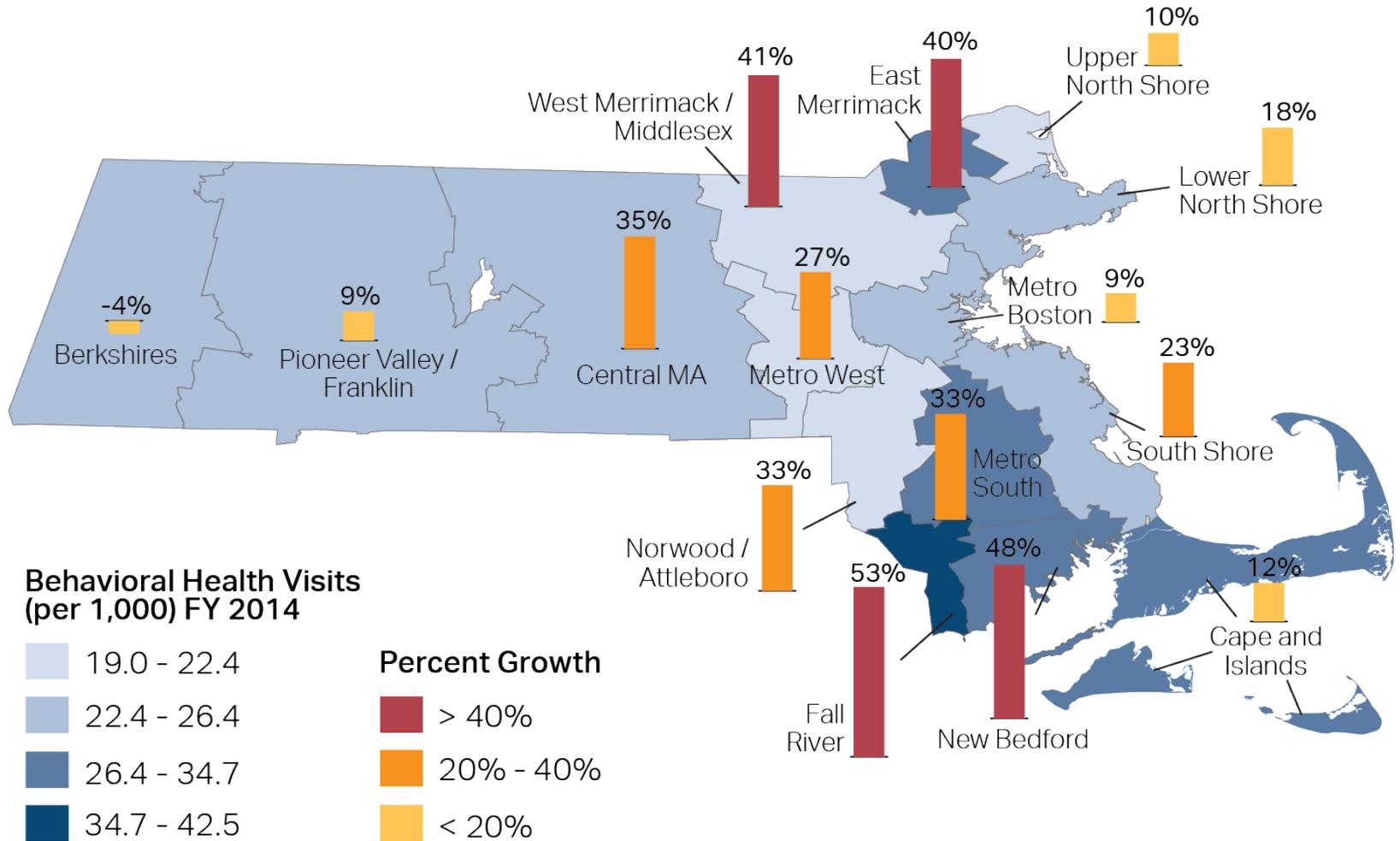


Note: Definition for avoidable ED visits based on NYU Billings Algorithm.

Source: NYU Center for Health and Public Service Research; HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, FY2010-2014

# Exhibit 8.5: Behavioral health-related emergency department visits per 1,000 residents, 2010 - 2014

Vertical bars show growth in visits

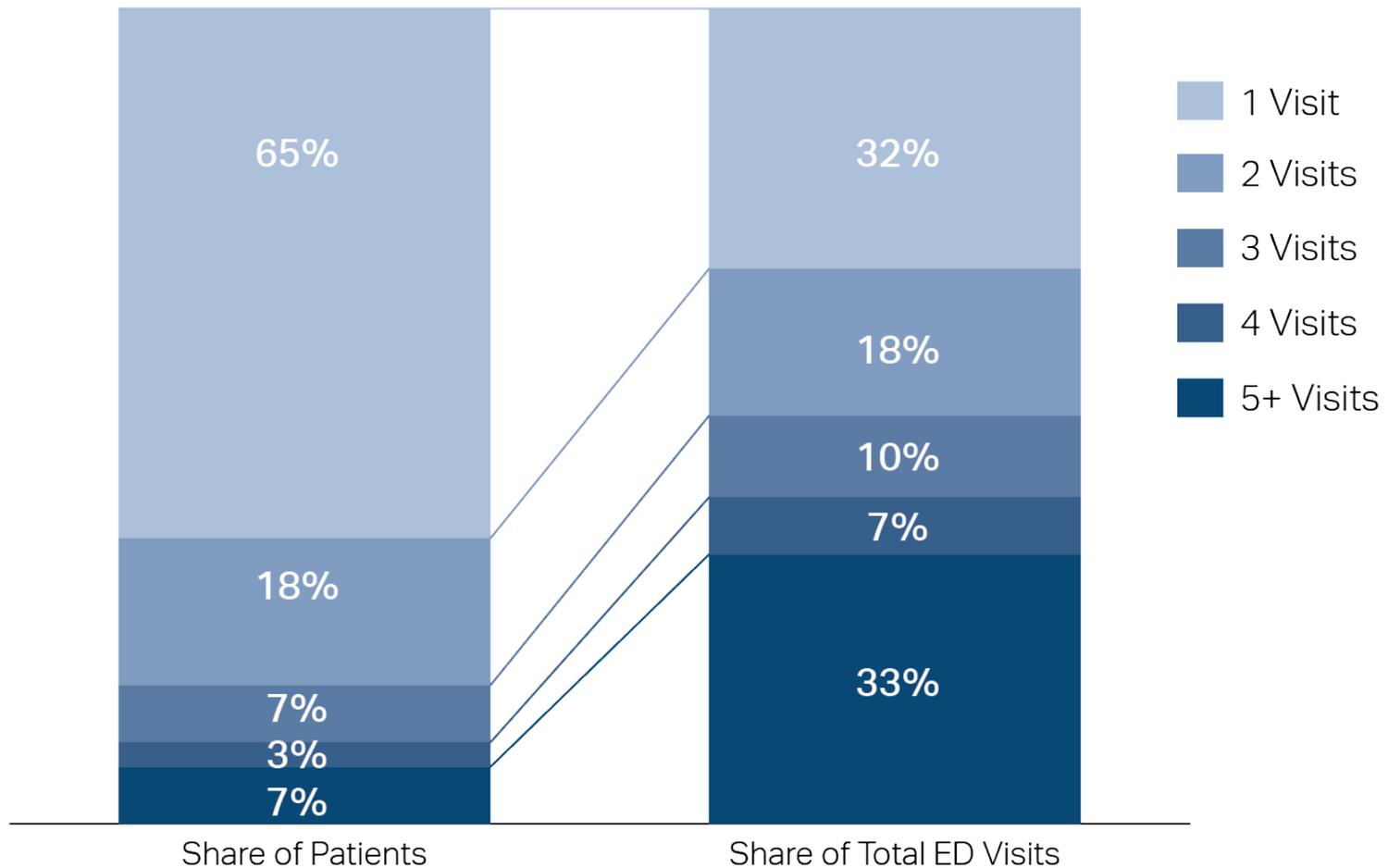


Note: Behavioral health includes mental health and substance use disorders. All conditions are based on primary diagnosis. All rates are adjusted for age and sex.

Source: NYU Center for Health and Public Service Research HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, FY2010-2014

## Exhibit 8.6: Emergency Department visits by patient visit frequency, 2014

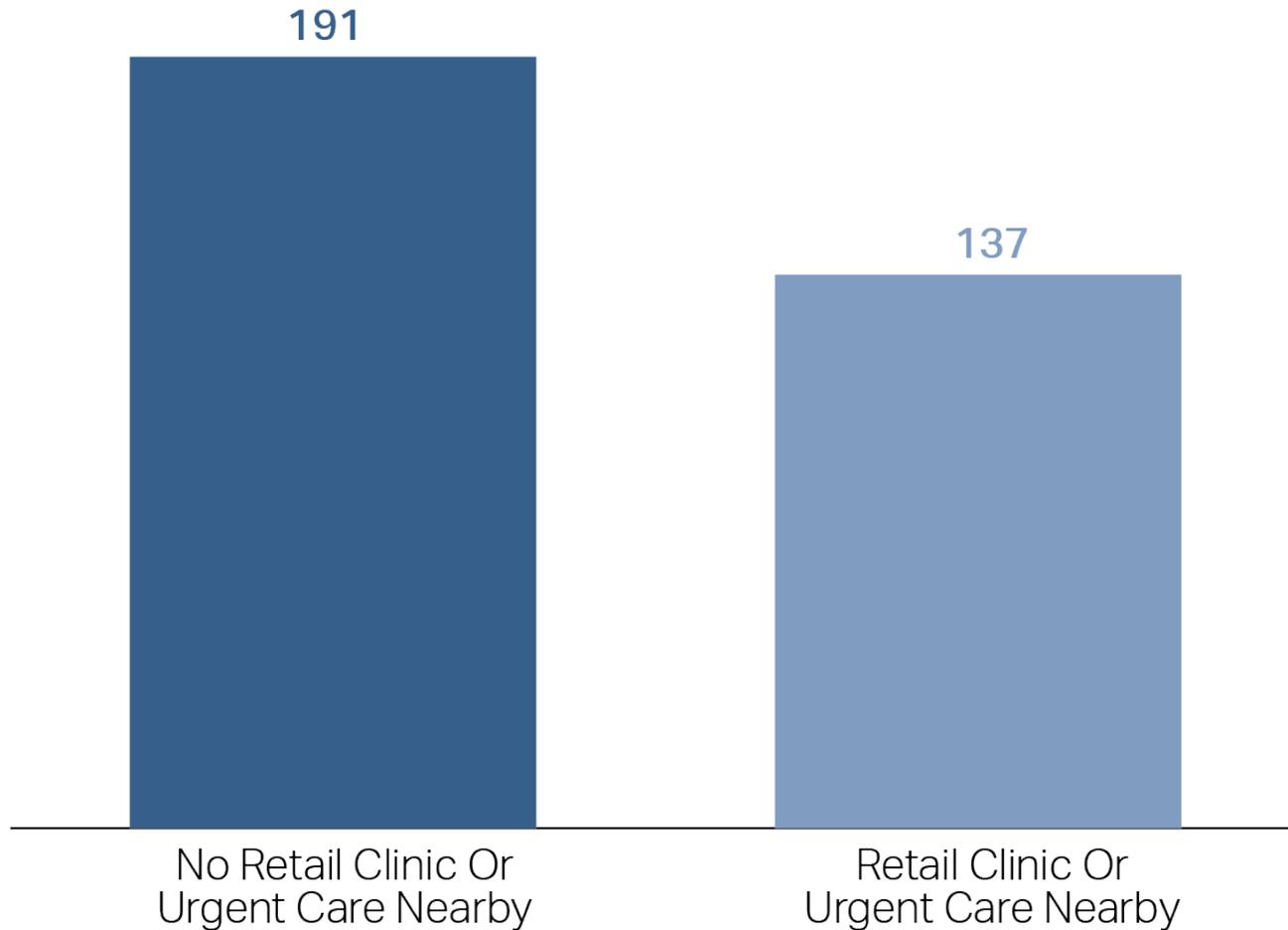
*Visits per year*



## Exhibit 8.7: Avoidable Emergency Department use by proximity to retail clinic or urgent-care sites, 2014

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*Number of avoidable ED visits per 1,000 residents*

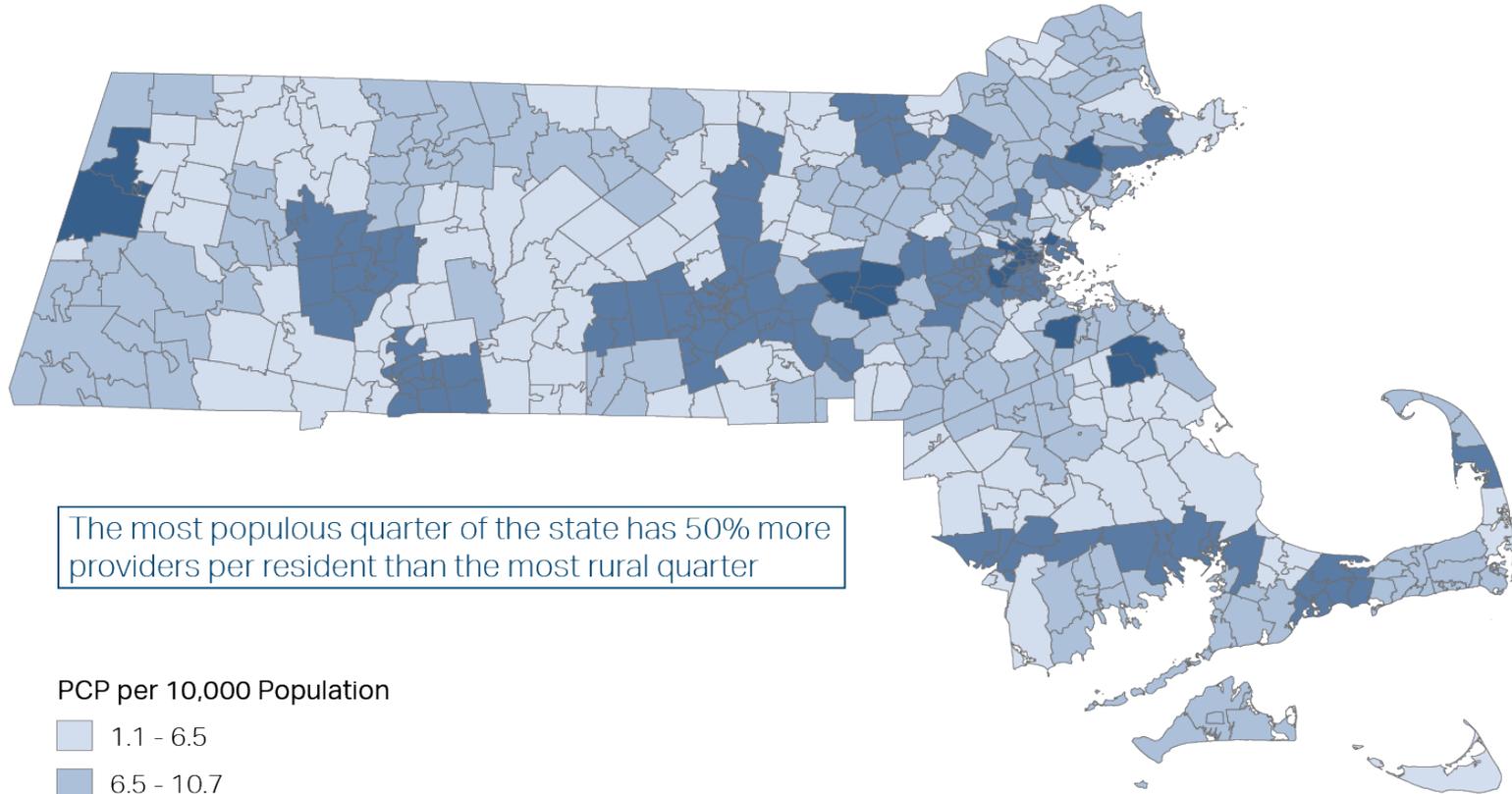


Note: Residents shown all live within 5 miles of an ED. Residents who do not live within 5 miles of an ED are excluded from Exhibit.

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database FY2014; Massachusetts Department of Public Health

# Exhibit 9.1: Number of primary care providers per 10,000 Massachusetts residents, by primary care service area

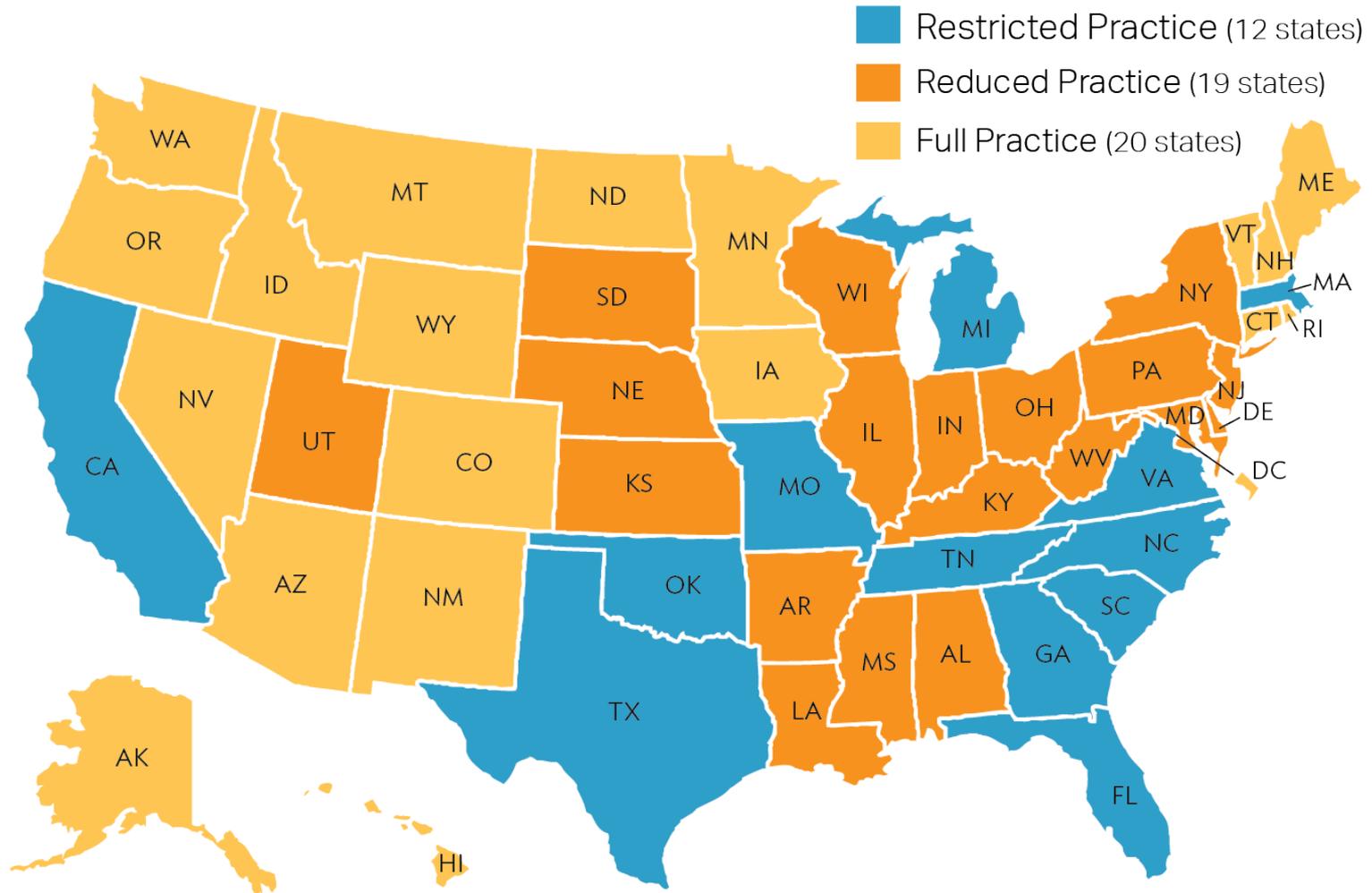
*Full-time equivalent physicians, nurse practitioners and physician assistants*



Note: Massachusetts is divided into 158 regions called Primary Care Service Areas (PCSAs). These areas were developed by researchers associated with the Dartmouth Atlas of Health Care and represent a geographic approximation of patients' travel patterns to obtain to primary care services. According to common practice, Nurse Practitioners and Physician Assistants weighted as equivalent to .75 relative to a physician. See Technical Appendix .

Source: SK&A Office Based Physician Database, September 30, 2015; Massachusetts Department of Public Health: Health Care Workforce Center

## Exhibit 9.2: Nurse practitioner state practice environment, 2014



Note: States are defined primarily based on laws governing requirements surrounding physician collaboration and supervision.

Source: American Association of Nurse Practitioners

## Exhibit 10.1: Distribution of Massachusetts and U.S. discharge destination by payer, all DRGs, 2012

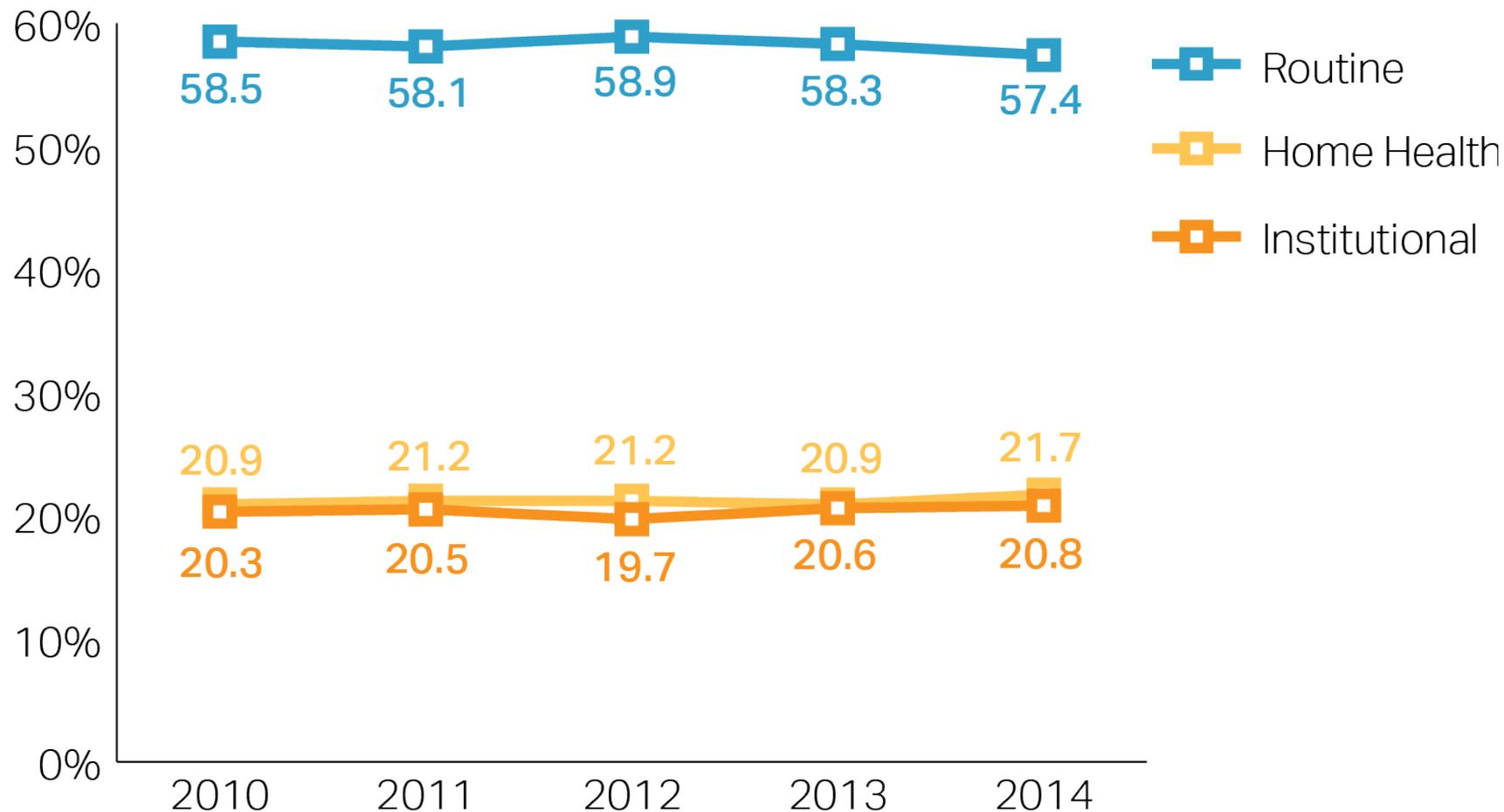
*Percentage of patients discharged to each category of care*

For all discharges												
	Commercial			Medicare			Medicaid			Total		
	MA	US	Difference	MA	US	Difference	MA	US	Difference	MA	US	Difference
<b>Routine</b>	77.8	85.9	-8.1	39.1	50.8	-11.7	79.9	88.7	-8.8	60.9	71.6	-10.7
<b>Home Health</b>	14.6	7.8	6.8	24.9	18.5	6.5	11.7	5.2	6.5	18.7	11.7	7.0
<b>Institutional</b>	7.6	6.3	1.3	36.0	30.8	5.3	8.5	6.2	2.3	20.4	16.7	3.8
<b>All PAC</b>	22.2	14.1	8.1	60.9	49.2	11.7	20.2	11.3	8.8	39.1	28.4	10.7

Note: Institutional includes Skilled Nursing Facility; Short-term hospital; Intermediate Care Facility (ICF); and Another Type of Facility.

Source: HPC analysis of Healthcare Cost and Utilization Project (HCUPs) Massachusetts State Inpatient Database & Nationwide Inpatient Sample Survey, 2012

## Exhibit 10.2: Adjusted percentage of discharges to post-acute care, all DRGs, 2010-2014



Note: Probabilities adjusted for changes in case mix over time. UMass is excluded due to coding irregularities in the database. Institutional includes skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals.

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014 and Massachusetts Health Data Consortium Inpatient Discharge Database, 2010-2013

## Exhibit 10.3: Post-acute care spending for commercial and Medicare enrollees, 2011-2013

	Commercial			Medicare		
	2011	2013	% change 2011 - 2013	2011	2013	% change 2011 - 2013
<b>Total spending (\$ millions)</b>						
All PAC	\$47.8	\$48.3	1.0%	\$1,419.5	\$1,252.3	-11.8%
Institutional PAC	\$28.1	\$26.9	-4.3%	\$1,196.6	\$1,043.0	-12.8%
SNF	\$19.5	\$20.0	2.6%	\$890	\$760.5	-14.6%
IRF	\$5.1	\$5.70	11.8%	\$143.5	\$139.9	-2.5%
LTCH	\$3.3	\$1.1	-66.7%	\$162.6	\$209.2	28.7%
Home Health	\$19.7	\$21.4	8.6%	\$222.9	\$209.3	-6.1%
<b>Mean spending per user</b>						
All PAC	TBD	TBD	TBD	\$9,390	\$8,857	-5.7%
Institutional PAC	\$8,800	\$8,964.00	1.9%	\$21,325	\$19,724	-7.5%
SNF	\$6,871	\$7,381	7.4%	\$17,827	\$15,970	-10.4%
IRF	\$17,509	\$18,603	6.2%	\$21,975.00	\$22,734	3.5%
LTCH	\$28,033	\$25,799	-8.0%	\$36,492.00	\$39,137	7.2%
Home Health	\$1,037	\$1,178	13.6%	\$3,012.0	\$3,242	7.6%

Notes: Estimates include PAC utilization through December 31, starting within 60 days of an acute hospital discharge on or after January 1 of the calendar year. Spending includes insurer and enrollee payments for covered services.

Source: HPC analysis of the Massachusetts All-Payer Claims Database, 2011 and 2013

## Exhibit 10.4: Discharge destination by payer following joint replacement (DRG 470), Massachusetts and the U.S., 2012

*Percentage of discharges to each post-acute care setting*

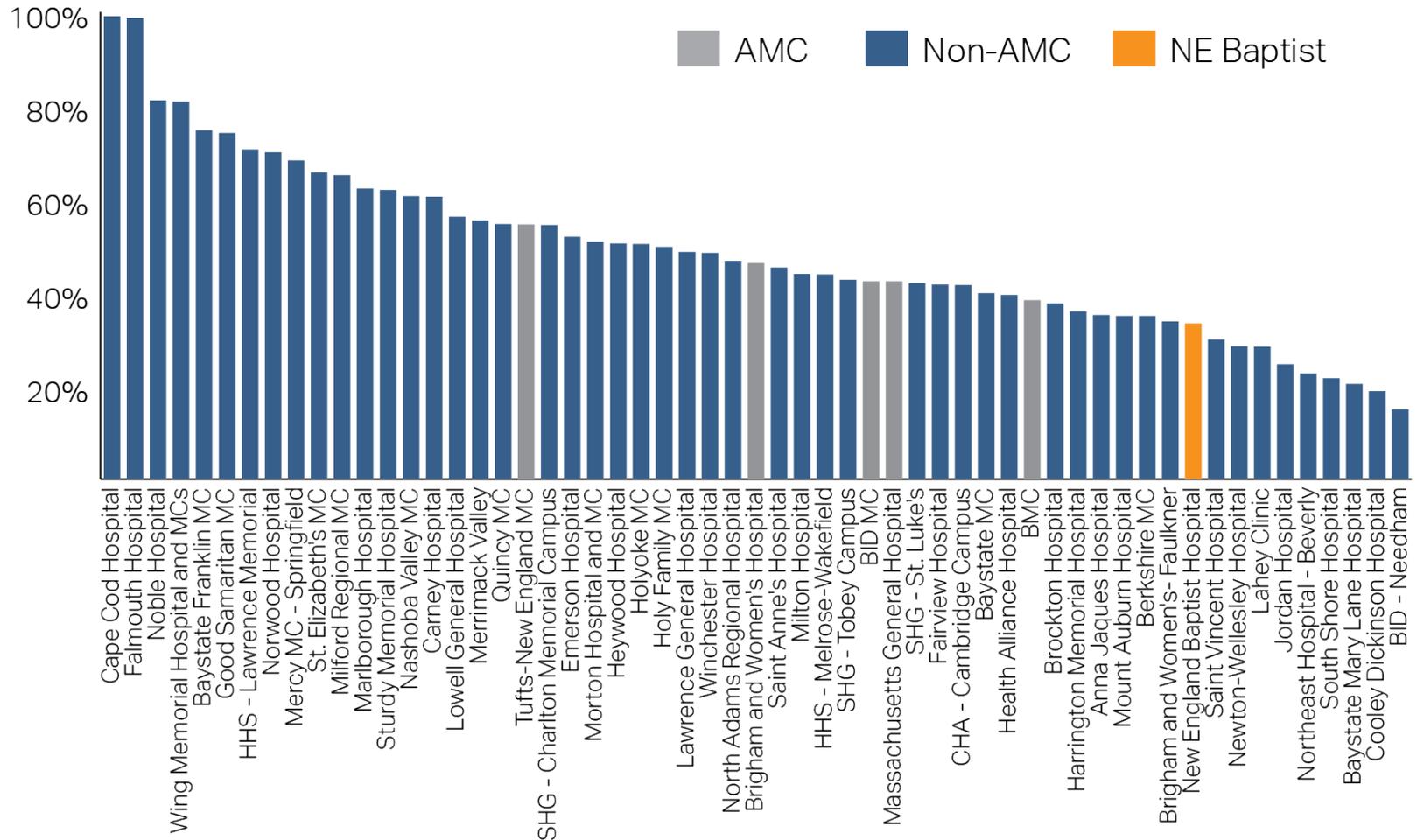
For DRG 470 (joint replacement)												
	Commercial			Medicare			Medicaid			Total		
	MA	US	Difference	MA	US	Difference	MA	US	Difference	MA	US	Difference
<b>Routine</b>	6.4	35.5	-29.1	3.4	18.9	-15.4	13.1	31.5	-18.4	5.1	25.6	-20.6
<b>Home Health</b>	67.2	48.2	19.0	29.7	32.5	-2.8	47.9	39.5	8.5	45.9	38.7	7.2
<b>Institutional</b>	26.4	16.3	10.1	66.8	48.6	18.2	38.9	29.0	9.9	49.1	35.7	13.4
<b>All PAC</b>	93.6	64.5	29.1	96.6	81.1	15.4	86.9	68.5	18.4	95.0	74.4	20.6

Note: Institutional includes Skilled Nursing Facility; Short-term hospital; Intermediate Care Facility (ICF); Diagnosis-related group (DRG); and Another Type of Facility.

Source: HPC analysis of Healthcare Cost and Utilization Project (HCUPs) Massachusetts State Inpatient Database & Nationwide Inpatient Sample Survey, 2012

# Exhibit 10.5: Percentage of discharges to institutional post-acute care following joint replacement (DRG 470), by hospital, 2014

Adjusted share of discharges to an institutional setting versus home health or routine care

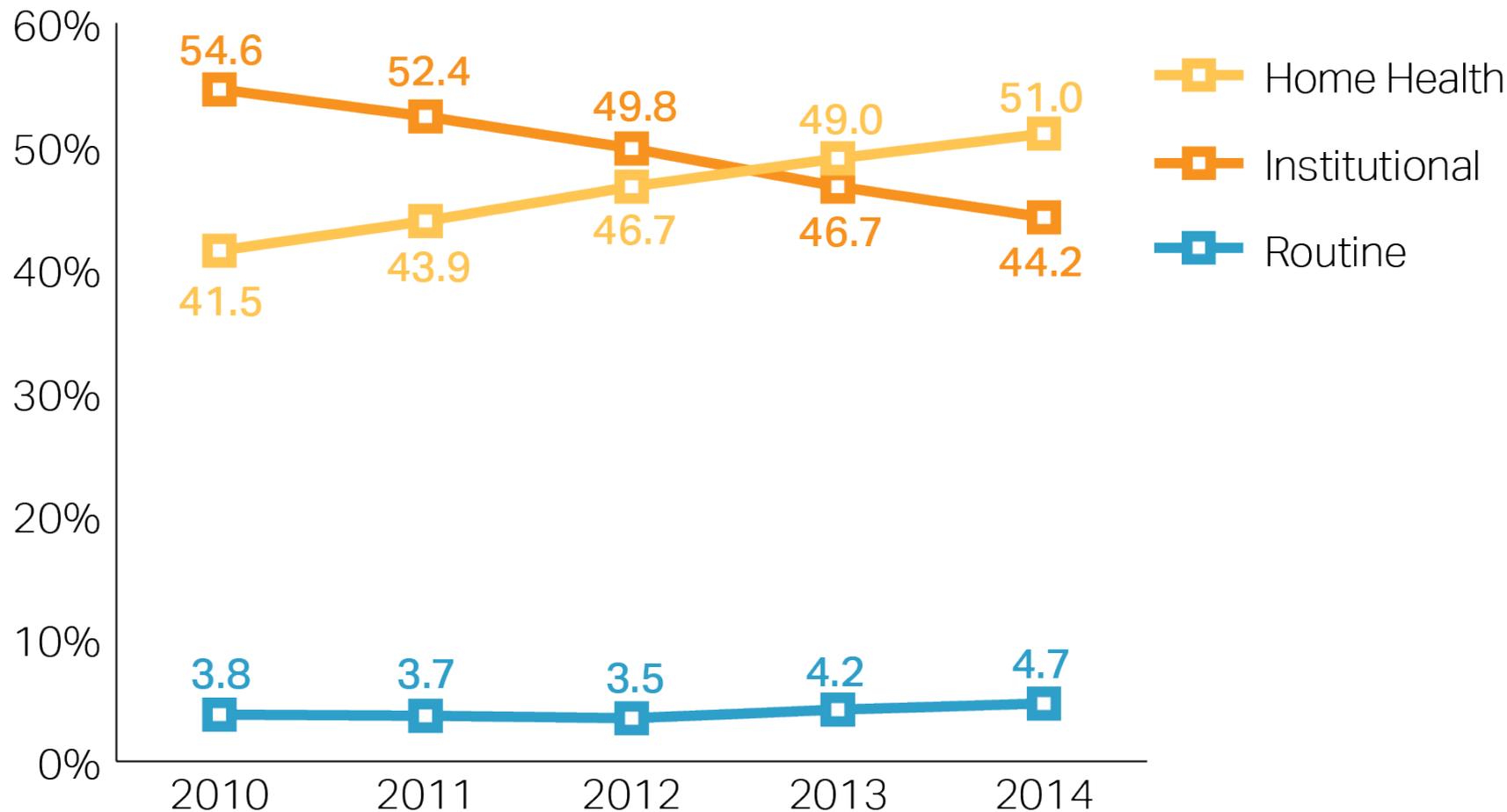


Note: Probabilities for each hospital were calculated after adjusting for the following: age, sex, payer group, income, admission source of the patient, and length of stay. The agency's sample included only adult patients who were discharged to routine care or some form of PAC. Specialty hospitals, except New England Baptist, were excluded from the display table and the average hospital rate. UMass is excluded due to coding irregularities in the database. Institutional includes skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals. DRG= diagnosis-related group; NE Baptist= New England Baptist; AMC= Academic Medical Center (see Technical Appendix).

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014

## Exhibit 10.6: Discharge destination of patients following joint replacement (DRG 470), 2010-2014

Percentage discharged to each setting

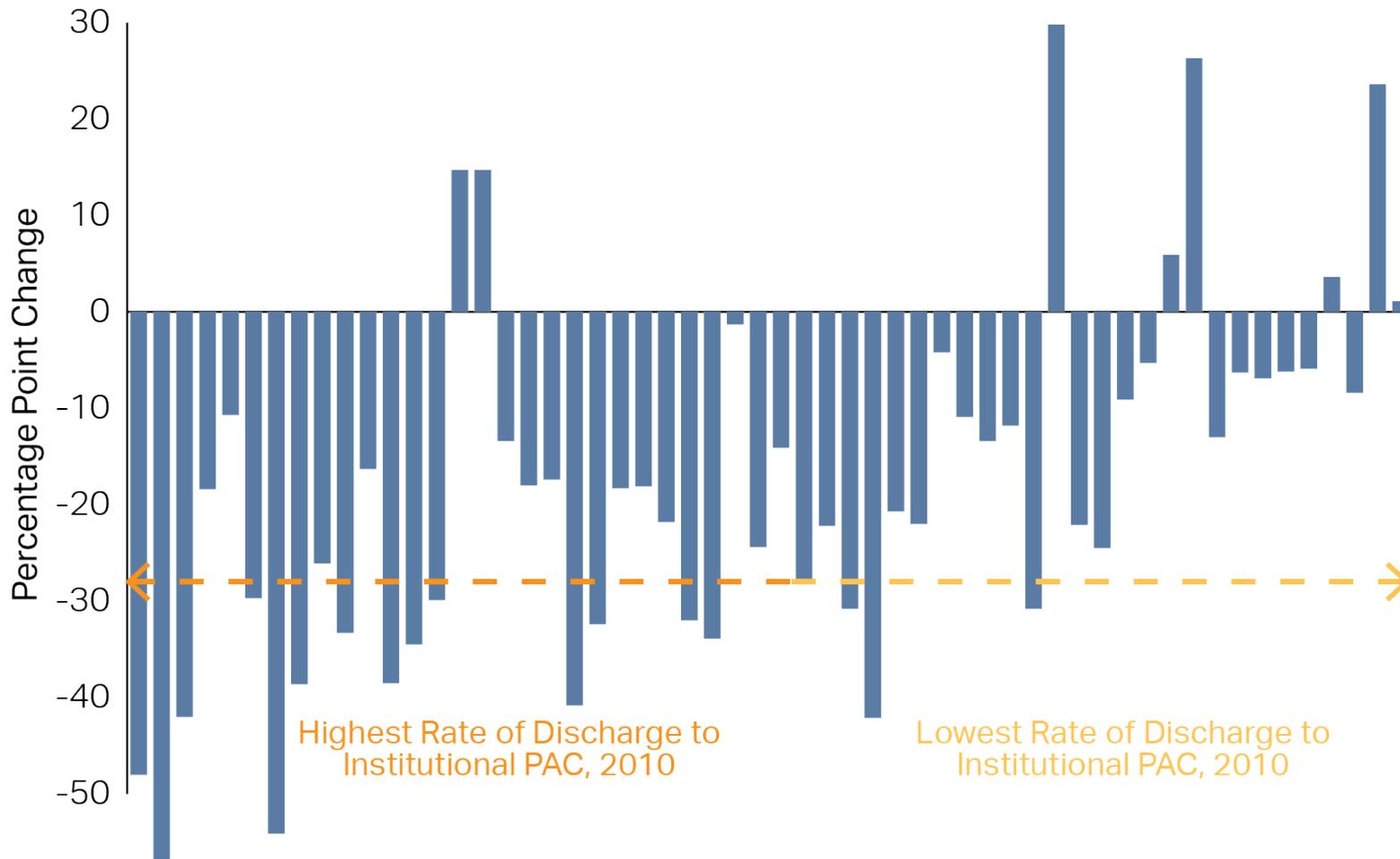


Note: UMass is excluded due to coding irregularities in the database. Institutional includes skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals.

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014 and Massachusetts Health Data Consortium Inpatient Discharge Database, 2010-2013

# Exhibit 10.7: Change in percentage of discharges to institutional post-acute care following joint replacement (DRG 470), by hospital, from 2010 to 2014

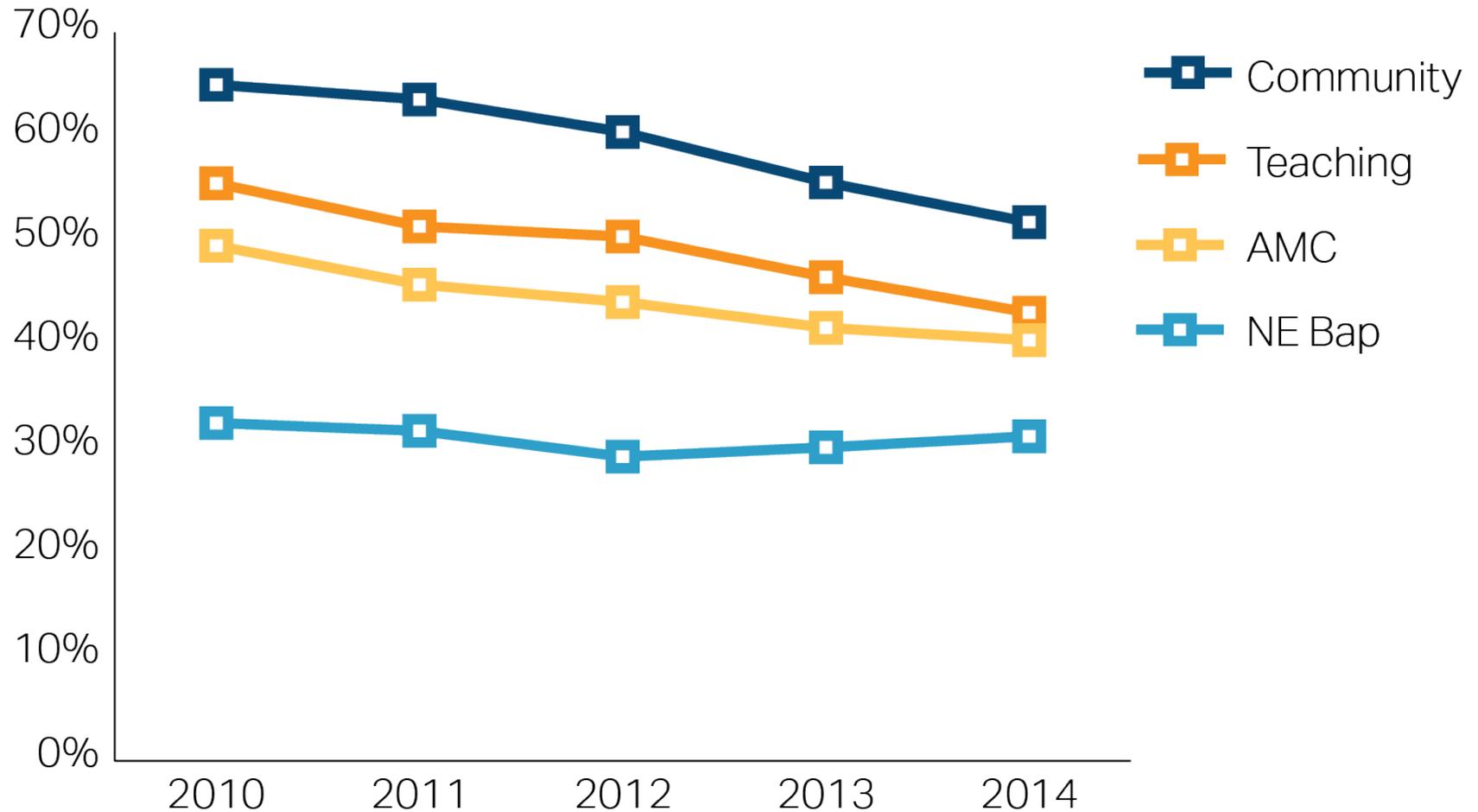
Percentage point change



Note: Hospitals ranked by rate of institutional PAC use in 2010. Hospitals with fewer than 15 joint replacement discharges in 2010 were excluded. Probabilities for each hospital were calculated after adjusting for the following: age, sex, payer group, income, admission source of the patient, and length of stay. The agency's sample included only adult patients who were discharged to routine care or some form of PAC. Specialty hospitals, except New England Baptist, were excluded. UMass is excluded due to coding irregularities in the database. Institutional includes skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals. DRG= diagnosis-related group; (see Technical Appendix).

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014 and Massachusetts Health Data Consortium Inpatient Discharge Database, 2010-2013

## Exhibit 10.8: Percent of patients discharged to institutional post-acute care following joint replacement (DRG 470), by hospital type, 2010-2014



Note: The agency's sample included only adult patients who were discharged to routine care or some form of PAC. Specialty hospitals, except New England Baptist, were excluded. UMass is excluded due to coding irregularities in the database. Institutional includes skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals. DRG = diagnosis-related group. AMC = academic medical center. NE Bap = New England Baptist. (See Technical Appendix).

Source: HPC analysis of Center for Health Information and Analysis Hospital Inpatient Discharge Database, 2014 and Massachusetts Health Data Consortium Inpatient Discharge Database, 2010-2013

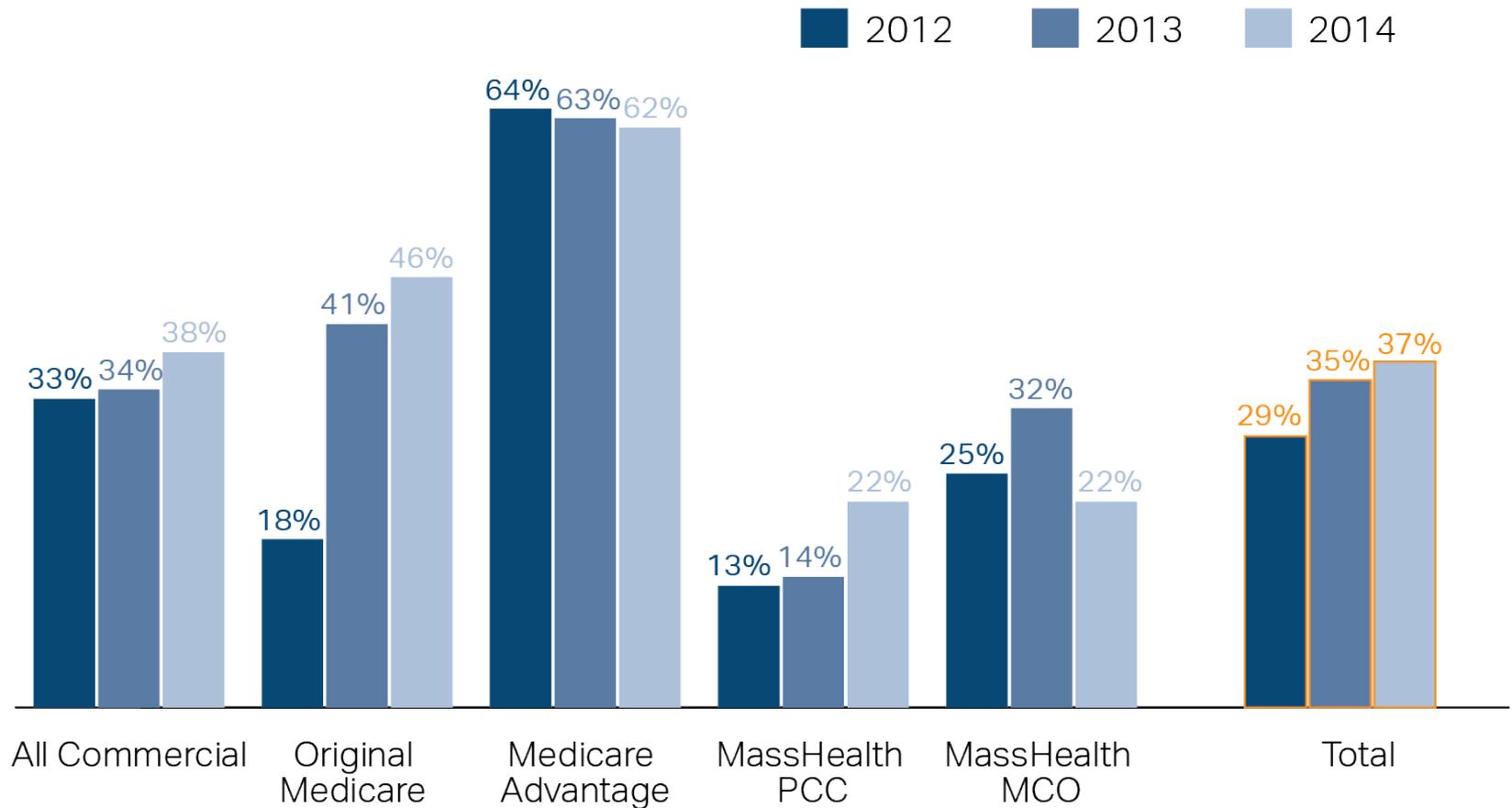
## Exhibit 10.9: Post-acute care spending following joint replacement (DRG 470), for commercial and Medicare enrollees, 2011-2013

	Commercial			Medicare		
	2011	2013	% change 2011 - 2013	2011	2013	% change 2011 - 2013
<b>Total spending (dollars in thousands)</b>						
All PAC	\$10,494	\$9,167	-12.60%	\$88,873	\$85,509	-3.80%
Institutional PAC	\$5,206	\$3,848	-26.10%	\$64,424	\$59,147	-8.20%
SNF	\$4,845	\$3,534	-27.10%	\$54,968	\$49,121	-10.60%
IRF	\$290	\$314	8.30%	\$8,942	\$9,544	6.70%
LTCH	\$72	\$0	N/A	\$514	\$482	-6.20%
Home Health	\$5,288	\$5,319	0.50%	\$24,449	\$26,363	7.80%
<b>Mean spending per user</b>						
All PAC	\$2,646	\$2,529	-4.40%	\$10,341	\$9,046	-12.50%
Institutional PAC	\$4,368	\$4,548	4.10%	\$10,773	\$9,952	-7.60%
SNF	\$4,187	\$4,315	3.00%	\$9,971	\$8,899	-10.80%
IRF	\$8,520	\$11,625	36.40%	\$16,467	\$18,144	10.20%
LTCH	\$23,940	N/A	N/A	\$24,479	\$34,405	40.50%
Home Health	\$1,462	\$1,576	7.80%	\$3,429	\$3,534	3.10%

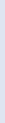
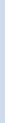
Note: DRG = diagnosis-related group.

Source: HPC analysis of Massachusetts All-Payer Claims Database, 2011 and 2013

## Exhibit 11.1: APM coverage by payer type, 2012-2014

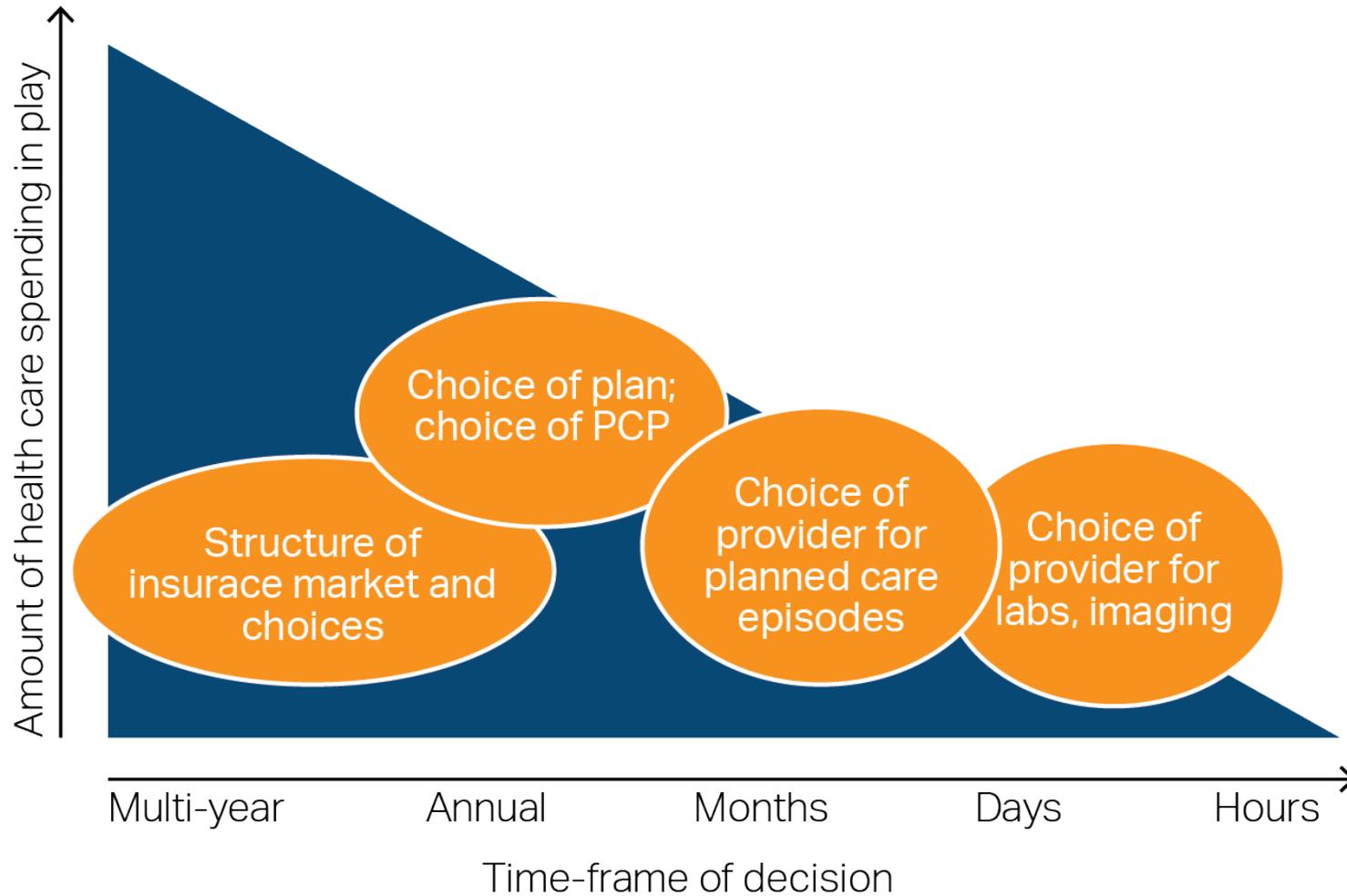


## Exhibit 11.2: APM coverage by HMO and PPO, commercial payers, 2014

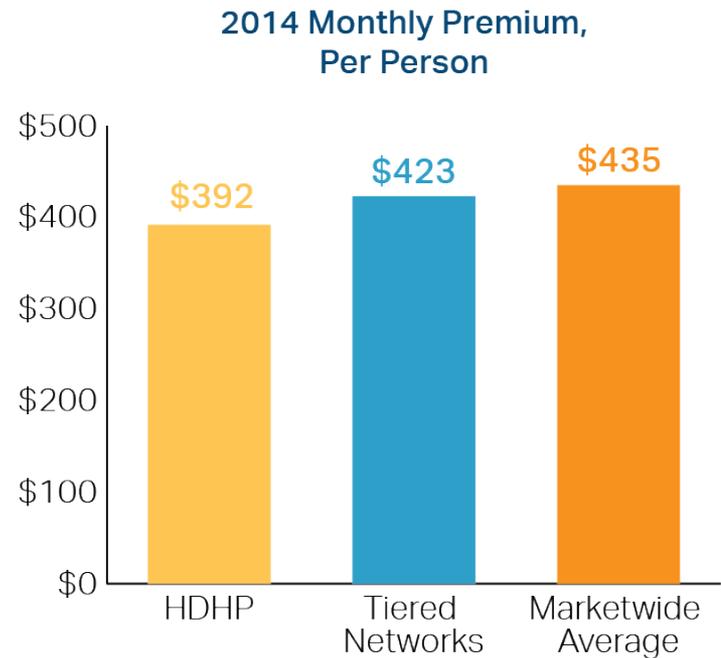
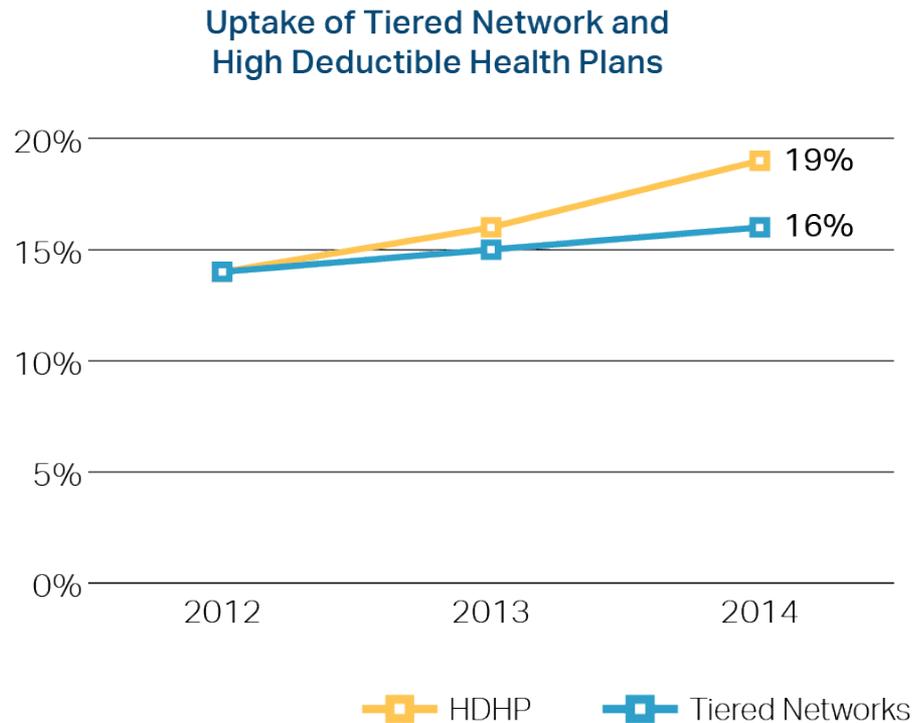
	HMO members as percent of all members	Percent of HMO members covered by APMs	PPO members as percent of all members	Percent of PPO members covered by APMs	Percent of all members covered by APMs
BCBS	53% 	* 91% 	47% 	0% 	48% 
HPHC HPI	71% 	* 65% 	27% 	0% 	46% 
Tufts/Network	67% 	* 60% 	33% 	11% 	43% 
Other	40% 	33% 	47% 	2% 	15% 
<b>Total</b>	<b>55%</b> 	<b>68%</b> 	<b>42%</b> 	<b>2%</b> 	<b>38%</b> 

\* Met HMO coverage goal from 2014 Cost Trends Report

## Exhibit 12.1: A framework for demand-side incentives



## Exhibit 12.2: Tiered and high-deductible products in Massachusetts, 2012-2014



Note: Premiums include fully insured market only and are net of rebates and scaled to account for partial benefits. Market penetration percentages include both fully and self-insured markets.

Source: Center for Health Information and Analysis, 2015

## Exhibit 13.1: Dashboard of key HPC system performance metrics

Key Area	Measure	MA Time Trend		Direction of Change	U.S. Comparison (1 = best)	MA relative to U.S.	Target
Benchmark and spending	1. Growth of THCE per capita (performance assessed relative to 3.6% benchmark)	2.4% (2012-2013)	4.8% (2013 - 2014)	■	4.2% (2013-2014)	■	<3.6%
	2. Growth in premiums	Family: 1.7% Single: 2.8% (2012-2013)	Family: 1.6% Single: 0.9% (2013-2014)	▲	Family: 3.9% Single: 4.7% (2013-2014)	▲	
	2a. Level of premiums	Family: \$17,424 Single: \$6,290 (2013)	Family: \$17,702 Single: \$6,348 (2014)	N/A	Family: \$16,655 Single: \$5,832 (2014)	■	
	3. Individuals with high out-of-pocket spending relative to income	N/A	11% (2013 and 2014 average)	N/A	MA ranked 2nd out of 51 (US = 15%) (2013 and 2014 average)	▲	
Efficient, high-quality care delivery	4. Readmission rate (Medicare 65+)	19.4% (2010) 18.2% (2012)	17.4% (2013)	▲	MA ranked 39th out of 51 (US = 17.0%) (2013)	■	
	4a. Readmission rate (All payer)	15.9% (2011)	15.0% (2013)	▲	N/A	N/A	<13% by 2019
	5. ED utilization (per 1,000 persons)	361 (2010) 357 (2013)	349 (2014)	▲	MA ranked 35th out of 51 (2013)	■	
	5a. Behavioral health ED utilization (per 1,000 persons)	21(2010) 24 (2013)	25 (2014)	■	N/A	N/A	
	6. Percentage of inpatient cases discharged to institutional PAC	20.6% (2013)	20.8% (2014)	●	MA = 20.4% (2012) US = 16.7% (2012)	■	
	7. At-risk adults without a doctor visit	7% (2013)	7% (2014)	●	13% (2014)	▲	
	8. Percentage of primary care physicians practicing in certified PCMHs	1,580 20.3% of all PCPs (2014)	2,024 25.3% of all PCPs (2015)	▲	15.2% of all PCPs (2015)	▲	33% by 2017; 20% in Prime practice by 2017

## Exhibit 13.1: Dashboard of key HPC system performance metrics (continued)

Key Area	Measure	MA Time Trend		Direction of Change	U.S. Comparison (1 = best)	MA relative to U.S.	Target
APMs	9. Percentage of original Medicare members in APMs	41% (2013)	46% (2014)	▲	16% (2014)	▲	
	10. Percentage of commercial HMO members in APMs	61% (2013)	68% (2014)	▲	N/A	N/A	80% by 2017
	11. Percentage of commercial PPO members in APMs	~1% (2013)	2% (2014)	●	N/A	N/A	33% by 2017
	12. Percentage of MassHealth members in APMs	PCC: 14% (2013) MCO: 32% (2013)	PCC: 22% (2014) MCO: 22% (2014)	●	N/A	N/A	
Value-based markets	13. Enrollment in tiered network products	Tiered: 14.5% (2013)	Tiered: 16.0% (2014)	●	N/A	N/A	
	14. Percentage of discharges in top 5 systems	51% (2012) 53% (2013)	56% (2014)	■	N/A	N/A	
	15. Percentage of discharges from hospitals with relative price of 1.0 or above	69% (2010) 72% (2013)	73% (2014)	■	N/A	N/A	

Note: THCE = total health care expenditures; ED = Emergency Department; HMO = health maintenance organization; PPO = preferred provider organization; APM = alternative payment method; PCMH = patient-centered medical home.

Source: Measure 1-MA: Centers for Health Information and Analysis Annual Report, 2015 Measure 1-US: Centers for Medicare and Medicaid Services National Health Expenditure Data, 2013-2014 Measures 2,2a: HPC analysis of Medical Expenditure Panel Survey data, 2012-2014 Measure 3: Commonwealth Fund Scorecard on State Health System Performance, 2015 Measure 4: Institute of Medicine analysis of CMS Medicare Geographic Variation Data Files, 2015 Measure 4a: Center for Health Information and Analysis Hospital-Wide Adult All-Payer Readmissions in Massachusetts: 2011-2013 (Report) Measures 5, 5a-MA: HPC analysis of Center for Health Information and Analysis Emergency Department Data Base , 2010-2014 Measures 5-US and MA comparison: Kaiser Family Foundation State Health Facts, accessed 2015 Measure 6-MA: HPC analysis of Center for Health Information and Analysis Hospital Discharge Database, 2013-2014 Measure 6-US and MA comparison: HPC analysis of HCUP Nationwide Inpatient Sample and State Inpatient Database, 2012 Measure 7: Commonwealth Fund Scorecard on State Health System Performance, 2015 Measure 8: HPC analysis of National Commission on Quality Assurance Clinician Directory and of American Association of Medical Colleges State Physician Workforce Database, 2014-2015 Measure 9: HPC analysis of Centers for Medicare and Medicaid Services ACO performance data , 2013-2014 Measure 10,11: HPC analysis of Center for Health Information and Analysis 2015 Annual Report: 2013-2014 Data Book Measure 12: MassHealth personal communication, 2014 and HPC analysis of Center of Health Information and Analysis 2015 Annual Report: 2013-2014 Data Book Measure 13: HPC analysis of Center for Health Information and Analysis 2015 Annual Report: 2013-2014 Data Book Measure 14: HPC analysis of Center for Health Information and Analysis Hospital Discharge Database , 2012-2014 Measure 15: HPC analysis of Center for Health Information and Analysis Relative Price Data Book, 2009-2014.