

COMMONWEALTH OF MASSACHUSETTS
HEALTH POLICY COMMISSION



TECHNICAL APPENDIX 4

**OTHER OPPORTUNITIES TO REDUCE EXCESS
SPENDING: SITE OF CARE, OVERPROVISION OF
SERVICES, AND ADMINISTRATIVE SPENDING**

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1 Summary

This appendix describes the Health Policy Commission’s (HPC) chapter on Opportunities to Reduce Excess Spending: Sites of Care, Overprovision of Services, and Administrative Costs.

2 Data Sources

This chapter draws upon several distinct data sources for analyses.

2.1 Use of high-acuity settings for low-acuity services

2.1.1 Use of higher-cost facilities versus physician offices for common services

The HPC used the Centers for Medicare and Medicaid Services (CMS) Medicare Physician and Other Practitioners – By Geography and Service public use files (2019) to services provided to Medicare beneficiaries either in a facility or office location. Spending data for rankings and cost estimates were sourced from the Medicare Physician Fee Schedule (MPFS) and Medicare Outpatient Procedure Payment Fee Schedule (OPPS).

2.1.2 Use of ambulatory surgical centers versus hospital outpatient departments for low-acuity procedures

For the number of independent ambulatory surgical centers (ASCs) by state, HPC used CMS data as reported by Becker’s ASC Review.¹ For the price and utilization exhibits on ASCs, the HPC used the Center for Health Information and Analysis’ All-Payer Claims Database (APCD) V2021.

2.1.3 Potentially avoidable emergency department visits

The exhibits that evaluate trends in potentially avoidable ED visits for five highest-volume diagnoses use the Massachusetts Acute Hospital Case-Mix Emergency Department Database (EDD), FY2019-2023, preliminary FY2023 Q2. The exhibits that examine trends in share across different settings of care (e.g., office, HOPD, urgent care, etc.) for the highest-volume potentially avoidable ED diagnoses use the APCD v2021.

2.1.4 Births in high-priced hospitals

The HPC used the Center for Health Information and Analysis (CHIA) Hospital Inpatient Discharge Database (HIDD) for calendar years 2019-2022 to measure total in-hospital deliveries, low-acuity deliveries, and total and low-acuity deliveries in community hospitals, teaching

hospitals, and academic medical centers, as well as deliveries in academic medical centers when patients had a closer community hospital based on their residential zip code. The HIDD includes all acute-care inpatient hospital discharges in Massachusetts.

The HPC used the APCD v2021 for calendar year 2021 to measure hospital prices for low-risk deliveries. The HPC's APCD includes data from six commercial payers in the state: Blue Cross Blue Shield of Massachusetts, Tufts Health Plan, Harvard Pilgrim Health Care², Massachusetts General Brigham Health Plan (formerly AllWays and Neighborhood Health Plan), Health New England, and Anthem (including Unicare, a GIC offering).

The HPC used publicly-available data from the CDC WONDER public health data dissemination system for calendar year 2021 to measure the share of deliveries taking place in birth centers nationally and in each state. The data used includes total births by state and location (hospital, freestanding birth center, clinic/doctor's office, residence, other, unknown).

2.2 Overprovision of care

2.2.1 Low-value care

The HPC used the APCD v2021 for calendar years 2017 through 2021 to identify and measure low-value care trends in the Massachusetts commercial market. Each calendar year used a previous year as a “look back” period to identify low-value care measures that require certain time trends in their identification, so that for example the year 2017 was used to help identify low-value care trends in 2018. The years of analysis for low-value care measure in the excessive utilization analysis from APCD v2021 are 2018-2021, with 2017 only used as an analytical period for identifying 2018 low-value care measures.

2.2.2 Excessive inpatient hospital use

For Medicare-specific analyses, the HPC used the CMS Medicare Geographic Variation Public Use File, by National, State, and County (2021). These data contain state-by-state data on numerous characteristics of the Medicare population, including utilization and spending. These data are based on 100% of Medicare fee-for-service claims. Population data came from the Medicare Monthly Enrollment data. Additional data used for regression adjustment come from the Centers for Disease Control's (CDC) Behavioral Risk Factor Surveillance System (BRFSS).

For all-payer analyses, the HPC used the Healthcare Cost and Utilization Project Inpatient (SID) and Emergency Department (SEDD) databases to capture all discharges that originated in a non-federal short-term general or specialty hospital ED. Overall state rates for all ages and payers were sources from the publicly available HCUP Summary Trend Tables.

2.2.3 Excessive imaging use

The HPC used the APCD v2021 for calendar year 2021 to measure excessive provision of imaging services.

The HPC used data from Centers for Medicare and Medicaid Services for Medicare Geographic Variation by National, State & County, 2021, to analyze state variation in the use of imaging in adults aged 65 and older with Original Medicare including CT, MRI, and other imaging services.

2.3 Excess administrative spending

2.3.1 Excess hospital administrative spending

The HPC used the RAND corporation hospital data³ for calendar years 2011 to 2021, which uses cost report data from the Centers for Medicare & Medicaid Services (CMS) Healthcare Cost Report Information System, to measure hospital administrative spending in both Massachusetts and the United States on average. To identify hospital type for each Massachusetts hospital, the HPC used the CHIA Massachusetts Hospital Profiles Databook from fiscal year 2021.

2.3.2 Excess payer administrative spending

The HPC used the CMS Medical Loss Ratio (MLR) Annual Reporting Forms for calendar years 2017 to 2021 for payer administrative spending. The data is publicly available and contains raw data submitted by insurance companies that were subject to medical loss ratio reporting requirements from 2017 to 2021. The form captures different classifications of expenses and premium for each state reported by the insurers.

3 Analyses

3.1 Use of high-acuity settings for low-acuity services

3.1.1 Use of higher-cost facilities versus physician offices for common services

For the exhibit “**Percentage of Original Medicare beneficiaries receiving each service in a facility versus an office setting in Massachusetts in the U.S. along with Medicare’s price per setting, 2019**”, HPC ranked the top 25 “cross-over” procedures (services that are clinically appropriate in both facility and office sites of care) based on their total spending in Massachusetts. Procedures were defined as likely to be clinically appropriate for both facility and office sites of care if they did not take place predominantly in only one setting, defined as less than 5% or more than 95% of the time. Procedures were identified using Current Procedural Terminology codes (CPT). Facility includes all settings with payment covered under the Medicare Outpatient Prospective Payment or Ambulatory Surgical Center System. Procedures specific to inpatient, ED, rehabilitation, and nursing were excluded.

Top 25 “cross-over” procedures:

Rank of total spending in MA	Procedure code	Procedure	Facility share in MA	Facility share in US	Difference
1	99214	Established patient, 25 mins	19.3%	7.8%	+11.5%
2	66984	Removal of cataract	35.3%	38.4%	-3.1%
3	99213	Established patient, 15 mins	13.8%	7.2%	+6.6%
4	93306	Ultrasound examination of heart	65.9%	58.5%	+7.4%
5	99215	Established patient, 40 mins	37.7%	17.8%	+19.9%
6	74177	CT scan of abdomen and pelvis, with contrast	88.2%	81.6%	+6.6%
7	88305	Microscope examination of tissue	44.5%	33.5%	+10.9%
8	92014	Eye exam, established patient, 1 or more visits	7.2%	1.8%	+5.4%
9	90834	Psychotherapy, 45 minutes	12.4%	9.6%	+2.9%
10	99204	New patient, 45 mins	21.8%	10.8%	+11.0%
11	78452	Nuclear medicine study of heart	58.4%	46.3%	+12.1%
12	45385	Polyp removal, endoscopic	89.8%	95.7%	-5.9%
13	45380	Biopsy of large bowel, endoscopic	90.5%	95.5%	-5.0%
14	99203	New patient, 30 mins	13.9%	7.4%	+6.5%
15	43239	Biopsy of small bowel, endoscopic	93.6%	96.1%	-2.5%
16	71046	X-ray of chest, 2 views	77.7%	60.8%	+16.9%
17	66982	Removal of cataract, complex	63.3%	49.5%	+13.8%
18	77067	Mammography of both breasts	61.4%	53.0%	+8.4%
19	99205	New patient, 60 mins	40.7%	21.0%	+19.7%
20	70553	MRI scan of brain, with contrast	68.3%	65.9%	+2.4%
21	71260	CT scan chest, with contrast	81.1%	70.7%	+10.4%

22	74176	CT scan of abdomen and pelvis, without contrast	91.8%	84.9%	+6.9%
23	66821	Removal of recurring cataract, with laser	37.8%	40.6%	-2.8%
24	29827	Repair of shoulder rotator cuff, endoscopic	93.7%	97.8%	-4.1%
25	99212	Established patient, 10 mins	13.5%	8.9%	+4.5%

3.1.2 Use of ambulatory surgical centers versus hospital outpatient departments for low-acuity procedures

The scope of this analysis was surgical procedures. The HPC applied the HCUP surgical procedure crosswalk to the CPT codes on outpatient and professional claims to define surgeries. The HPC then created surgical encounters by combining all the procedures performed on the same day for the same patient if there was at least one surgical CPT code during that date of service. In case of multiple surgical procedures during the same encounter the main surgical procedure was determined by the highest work relative value unit (RVU) of the CPT code, and the entire surgical encounter was placed in AHRQ’s clinical classification category software refined (CCSR) category according to the main procedure.⁴ Ambulatory surgical center (ASC) site of service for the surgical encounter was assigned based on whether the national provider identifier (NPI) of the service or billing provider belonged to an ASC on the Massachusetts DPH list of ASCs.

For the exhibit “**Share of selected surgical procedures performed in ASCs and HOPD price relative to ASC price (ASC=100%) for selected procedures commonly performed in both settings, 2021**”, the HPC shows relative prices for the top 13 surgical CCSR categories that had the highest ASC spending and that on average had similar complexity to the surgeries of the same category performed in HOPD setting (less than 3% difference from HOPD as measured by RVU for the main surgery of the encounter).

For the exhibit “**Number of independent ASCs per 100,000 residents, by state, 2021**”, the HPC used Becker’s report which combined the data on CMS certified ASC facilities in 2021 by state and state population from US Census 2020 to derive the number of ASCs per 100,000 residents.⁵

3.1.3 Potentially avoidable emergency department visits

For the exhibit “**Top diagnosis subcategories of potentially avoidable ED visits for Massachusetts residents, 2019 – 2022**”, the HPC analyzed CHIA Case-Mix EDD data for calendar years 2019 to 2022. The analysis includes Massachusetts residents of all ages and with any payer (e.g., commercial insurance, MassHealth, Medicare). Potentially avoidable ED visits

are based on the Billings algorithm, which classifies an ED visit into multiple categories. "Potentially avoidable" is defined for this exhibit as ED visits that had a primary diagnosis with at least a 70% probability of being emergent - primary care treatable or non-emergent. See the technical appendix for the hospital utilization chart pack for additional information on the Billings algorithm. Top diagnosis subcategories were identified as the top five diagnosis subcategories by volume among these visits in calendar year 2019. The top five diagnosis subcategories identified include: J069 (Acute upper respiratory infection, unspecified), R51, R510, and R519 (Headache), M545, M5450, M5451, and M5459 (Low back pain), R112 (Nausea with vomiting, unspecified), and N390 (Urinary tract infection, site not specified). More than one diagnosis code was included in the "Headache" and "Low back pain" subcategories to account for changes in ICD-10 coding guidance during the study period.

For the exhibit, "**Share of problem-based visits for highest-volume potentially avoidable ED diagnoses among residents by site of care, 2019 versus 2021**", the HPC analyzed CHIA APCD data for calendar years 2019 to 2021. The study population includes commercially-insured residents aged 0-64 with full medical coverage in that calendar year.

Problem-based evaluation and management (E&M) visits were classified using Healthcare Common Procedure Coding System (HCPCS) codes 99201-99205, 99211-99215, and 99281-99285. Sites of care were identified using a combination of CMS Place of Service codes, Health Care Cost Institute (HCCI) Service Categories, and HCSPCS/Current Procedural Terminology (CPT) codes.

Identifying non-telehealth sites of care

Site of care	Claim line type	Place of service code (professional claims)	HCCI service category (outpatient claims)
Office	Professional	11	N/A
HOPD	Professional or outpatient	19 or 22	N/A
Urgent care	Professional	20	N/A
ED	Professional or outpatient	23	1

HOPD outpatient claims were identified as outpatient claims that occurred on the same day as at least one HOPD professional claim, identified using the place of service codes noted in the table above. Outpatient claims that did not occur on the same day as at least one HOPD professional claim were excluded from the analysis.

Identifying telehealth site of care

Services provided via telehealth were identified using a combination of professional claim site of service codes, CPT codes, and CPT code modifiers. A claim line with any of the following was identified as indicating a telehealth service:

Professional claim site of service code	2
CPT code	G0406
	G0407
	G0408
	G0425
	G0426
	G0427
	G0508
	G0509
	G2010
	G2012
	G0071
	Q3014
	T1014
	98966
	98967
	98968
	98969
	98970
	98971
	98972
	99358
	99359
	99421
	99422
	99423
	G2061
	G2062
	G2063
	99441
	99442
	99443
	99444
	G2025
	G0459
0188T	

CPT code modifier	GT
	95
	GQ
	G0

Other notes

E&M visits were created by collapsing claim-lines in which services were provided on the same day, to the same patient, with the same site of service. Visits were excluded if they occurred on the same day as a visit at another site of care.

Behavioral health (BH), therapy, and counseling-related E&M visits were identified using CCSR MBD001-MBD034 and HCSPCS codes 99401-99412 and 90832-908308, respectively, and excluded. Visits that occurred as part of an inpatient stay were identified using inpatient medical claims or professional claims with site of service “21” and were also excluded.

The most frequently occurring diagnosis code for a visit was treated as the main diagnosis code for that visit. If a most-frequently occurring diagnosis code could not be identified for a visit, the diagnosis code for the highest-priced claim line in that visit was treated as the main diagnosis code for that visit. Only visits for the highest-volume diagnosis subcategories identified in the HPC’s analysis of the CHIA Case Mix Emergency Department Database (EDD), as described for Exhibit 4.4., were included. Highest-volume diagnosis subcategories include: J069 (Acute upper respiratory infection, unspecified), R51, R510, and R519 (Headache), M545, M5450, M5451, M5459 (Low back pain), R112 (Nausea with vomiting, unspecified), and N390 (Urinary tract infection, site not specified). More than one diagnosis code was included in the “Headache” and “Low back pain” categories to account for changes in ICD-10 coding guidance during the study period.

3.1.4 Births in high-priced hospitals

Labor and delivery hospital discharges were identified using APR-DRGs 539, 540, 541, 542, and 560 from APR-DRG version 36. Individuals ages 18-49 were retained for analysis. Inpatient stays of greater than 7 days were excluded.

Low-acuity deliveries were defined as full-term (37-41 weeks), vertex (head-down), singleton, vaginal deliveries of APR-DRG severity level 1 where the patient did not have a complicating diagnosis of hypertension (including preeclampsia), diabetes, or a placental disorder.⁶ APR-DRGs 539 and 540 were used to identify cesarean deliveries. AHRQ CCSR categories were used to identify patients with hypertension and diabetes, and ICD-10 diagnosis codes were additionally used to identify patients with pre-term (<37 weeks) and post-term (≥42 weeks) deliveries, breech presentation, multiple pregnancy, hypertension, diabetes, and placental disorders:

Criteria	ICD-10 diagnosis codes
Pre-term (<37 weeks)	P0720-P0725, P0732-P0739, Z3A01, Z3A08, Z3A09, Z3A11-Z3A16, Z3A19-Z3A36r
Post-term (≥42 weeks)	O480, O481, P0821, P0822, Z3A49, Z3A42
Breech presentation	O321XX0-O321XX9, O641XX0-O641XX9
Multiple pregnancy	O30001-O30049, O30091-O30129, O30191-O30299, O30801-O30899, O3090-O3093
Hypertension	O113, O114, O119, O1400, O1402, O1410, O1413, O1414, O1490, O1493, O1494, O1500, O151
Diabetes	O24013, O24019, O2402, O24113, O24119, O2412, O2413, O24313, O24319, O2432, O24410, O24414, O24419, O24420, O24424, O24429, O24813, O24819, O2482, O2483, O24919, O2492
Placenta previa	O4400-O4403, O4410-O4413, O4420, O4421-O4423, O4430-O4433
Placenta percreta	O43231-O43233, O43239
Placenta accreta	O43211-O43213, O43219

Patients’ closest delivery hospital was identified using driving distance between the hospital and patients’ residential zip code. Hospitals without obstetric units and temporarily closed hospitals were excluded.

The data for analysis was composed of unique labor-and-delivery discharges identified in the HIDD, with an indicator for low-acuity discharges as defined above. Analyses explored total annual discharges, discharges per hospital cohort (Community, Teaching, or Academic Medical Center), and discharges per hospital, with breakdowns by acuity, payer (commercial, Medicaidⁱ, and other, including Medicare and other public coverage), DRG severity level, delivery type (vaginal or cesarean), and Academic Medical Center discharges where patients had a closer community hospital.

For the exhibit “Share of births in birth centers by state, 2021”, births reported by CDC WONDER were summed by state to create statewide totals, which were used as denominators for the calculation of the percentage of deliveries in freestanding birth centers per state, as well as the calculation of a nationwide percentage. The HPC also estimated the number of deliveries in birth centers that would have taken place per state if each state’s share of birth center deliveries matched the national average.

For price analyses, the construction of the analytic file use similar methodology as used in other price analyses (see **Technical Appendix 3: Opportunities to Reduce Excess Spending: Prices**); however, to create a patient-only price for delivery, the HPC excluded professional claim lines likely to be for newborn services based on diagnoses, procedure codes, and provider specialties. Low-acuity deliveries were defined as those with APR-DRG severity level 1.

ⁱ Due to an increase in hospitals that saw a large proportion of MassHealth patients reporting patients in the discharge data as “self-pay,” HPC included these patients as part of combined MassHealth/self-pay category.

Hospitalizations with length of stay of 6 or more days were excluded, as were those that ended in transfers to other hospitals or patient death. Estimates combined the professional and facility component of pricing. Mean low-acuity delivery prices were calculated for each hospital cohort.

3.2 Overprovision of care

3.2.1 Low-value care

For the exhibit “**Trends in low value care services in Massachusetts, 2018 – 2021**,” the HPC identified cases where a patient received a low-value service in the APCD v2021 2018-2021 data, excluding cases when their medical claims history indicates that the procedure may be warranted, such as individuals with imaging for heel pain who had a recent prior surgery. These measures were identified using algorithms to separate and identify low-value care services that were developed and adapted from published papers, journals, and literature on the topic.

The LVC services are screenings (T3 (Thyroid) screening for patients with hypothyroidism, Cardiac stress testing for patients with an established diagnosis of ischemic heart disease or angina, Vitamin D screening for patients without chronic conditions), testing and procedures (Baseline labs in patients without significant systemic disease undergoing low risk surgery, Pre-operative EKG, chest X-ray, and pulmonary function testing, spinal injections for lower back pain), imaging (DEXA bone density scans, brain imaging for simple syncope, imaging for low back pain, imaging for heel pain), and prescriptions (antibiotics for upper respiratory and ear infections, concurrent antipsychotics, concurrent anticholinergics, chronic benzodiazepines, and gabapentinoids for non-neuropathic pain).

See the **Provider Organization Performance Variation (POPV) Chartpack and Technical Appendix** for more details on the services, measures, and methodology for identifying low value services.

3.2.2 Excessive inpatient hospital use

For Medicare-specific analyses, the HPC limited analysis to Medicare A and B beneficiaries aged 65 and over in each state. The HPC regression adjusted observed state hospitalization rates to account for differences in due to differences in age, Medicare Advantage uptake, disability, physical activity limitations, and health status.

For overall state rates for all ages and payers, analysis was restricted to states reporting data in both inpatient and ED settings. States without 12 months of data in the year were also excluded. This resulted in 35 states in the analysis, including Massachusetts. U.S. comparison includes 34 states and excludes Massachusetts.

For analyses by diagnosis, the HPC focused on Massachusetts and seven comparison states (MD, MN, NC, NJ, NY, VT, and OR). These states were chosen because they (1) had data for both SID and SEDD, (2) their datasets contained all the data elements needed for analyses, and (3) were representative of the range of state ED admission rates. These analyses were restricted to adult discharges only (80-85% of discharges). Discharges where the diagnosis was missing or where the patient left against medical advice or died were excluded.

For the exhibit “**Inpatient discharge rate per 1,000 Original Medicare beneficiaries aged 65+, by state, 2021**”, the HPC reports the observed inpatient discharge rate per 1,000 Original Medicare beneficiaries (part A and B). Beneficiaries who receive insurance due to disability and/or end-stage renal disease (ESRD) are excluded.

For the exhibit “**Difference between observed and expected number of inpatient discharges among Original Medicare beneficiaries, by state, 2021**”, excess utilization was defined as the difference between the observed hospitalization rate and the expected rate based on regression adjustment. The HPC used regression adjustment of observed inpatient hospitalization rates to account for differences in age, Medicare Advantage uptake, disability, physical activity limitations, and health status in state Medicare populations (see below).

Characteristics used in regression adjustment:

Characteristic	Source	Description
Inpatient stays	CMS Geographic Public use file	IP Covered Stays Per 1,000 Beneficiaries
Aged 75 to 84	CMS Enrollment	Share of population 75 to 84
Aged 85 and over	CMS Enrollment	Share of population 85 and over
Medicare advantage	CMS Enrollment	Medicare Advantage Participation Rate
Blind	BRFSS	Are you blind or do you have serious difficulty seeing, even when wearing glasses?
Difficulty with errands	BRFSS	Do you have difficulty doing errands alone?
Difficulty dressing	BRFSS	Do you have difficulty dressing or bathing?
Difficulty walking	BRFSS	Do you have serious difficulty walking or climbing stairs?
Binge drinking	BRFSS	Binge drinkers (males having five or more drinks on one occasion, females having four or more drinks on one occasion)
Smoker	BRFSS	Adults who are current smokers

Physical activity	BRFSS	During the past month, did you participate in any physical activities?
Obesity	BRFSS	Body Mass Index (BMI) from 30.0 - 99.8 (Obese)

For the exhibit “**Inpatient discharges per 1,000 population by type of discharge, 2019**,” maternity was defined as inpatient stays for delivery and normal newborn discharges. ED admissions were defined as non-elective inpatient stays that admitted through the ED. Scheduled or urgent was defined as non-elective inpatient stays that were not admitted through the ED or elective inpatient stays.

For the exhibit “**Percentage of ED visits resulting in an inpatient admission, 2019**,” ED visits resulting in an inpatient admission represents the share of all visits originating in an ED that were ultimately admitted to an inpatient unit by state. Data are for all ages and payers.

For exhibit “**Percentage of ED visits among adults resulting in an inpatient admission by condition, Massachusetts vs comparison states, 2019**,” the HPC identified the 25 highest-volume conditions in Massachusetts Emergency Departments. Patients under age 18, those with a missing diagnosis, and patients who left against medical advice or expired in the ED were excluded.

3.2.3 Excessive imaging use

Analysis included all CT and MRI imaging encounters for patients attributed to one of the thirteen largest provider organizations in the All-Payer Claims Database (Acton, Atrius, Baystate, Beth Israel Lahey Health, Boston Medical Center, Massachusetts General Brigham, Reliant, Signature, South Shore, Southcoast, Steward, UMass, and Wellforce) restricted to those 18 years and older with at least 12 months of health insurance coverage, with rates adjusted for differences in age, sex, health status, and community-level variables related to education and socioeconomic status (N = 786,327).

The rate of use of imaging (CT and MRI encounters) for the providers with the highest use would be reduced to the level of the provider with the 75th percentile rate in 2021. This was calculated across providers after patient attribution to provider organizations, with the 75th percentile rate among providers acting as a cap for utilization and replacing the utilization rate above the 75th percentile for providers with excess imaging. Then, new total utilization and spending rates were calculated with the utilization limit in place.

For the exhibit “**Imaging use per 1,000 Original Medicare beneficiaries, 2021**,” the HPC analyzed state variation in the use of imaging in adults aged 65 and older with Original Medicare including CT, MRI, and other imaging services such as ultrasound and X-ray.

See the **POPV Chartpack and Technical Appendix** for more details on the services, measures, and methodology for imaging analysis and patient attribution.

3.3 Excess administrative spending

3.3.1 Excess hospital administrative spending

Hospital administrative spending was defined as cost centers with administrative and non-clinical expenses. These included the following cost centers, as defined by the hospital cost report form CMS-2552-10: admin and general, central services and supply, nursing administration, maintenance and repairs, operation of plant, medical records, employee benefits, capital moveable equipment, and capital building and fixtures.

To measure hospital administrative spending, the HPC used net expenses from worksheet BI of form CMS-2552-10, which are expenses that account for reclassifications and adjustments, including accrued and/or deferred revenues and/or expenses. Spending per discharge equivalent was calculated by taking the sum of net expenses for administrative cost categories and dividing by the number of discharge equivalents.

For the exhibit “**Administrative spending categories based on CMS hospital cost reports**”, definitions of and examples for spending categories were taken from the CMS Provider Reimbursement Manual Part 2, Chapter 40: *Hospital and hospital health care complex cost report*, Form CMS-2552-10, Section 4013. The HPC combined some spending categories into larger groupings. Cost centers “capital buildings and fixtures” and “capital moveable equipment” were joined to create a singular capital category. Cost centers “admin and general” and “central services and supply” were combined to create “central services and general administration.” The centers “maintenance and repairs” and “operation of plant” were combined to create a general “maintenance” category.

For the exhibit “**Administrative spending per discharge equivalent in Massachusetts hospitals, 2011 – 2021**”, to compare administrative spending across Massachusetts, the HPC only included Massachusetts general short-term hospitals from calendar year 2011 to 2021. The HPC excluded the following hospitals, resulting in 46 Massachusetts short term general acute care hospitals included in the analysis:

Exclusion Basis	Hospitals Dropped from Analysis
Missing data for at least one cost center included in definition of administrative spending	Baystate Franklin Medical Cener, Baystate Mary Lane and Wing Hospital, Beth Israel Deaconess Hospital Needham, Boston Medical Center, Cape Cod Hospital, Fairview Hospital, Falmouth Hospital, South Shore Hospital, and Steward St. Elizabeth’s Medical Center
Missing data for relevant years	Beth Israel Deaconess Plymouth, Jordan Hospital, Saints Medical Center, Steward Norwood Hospital, UMMHC Clinton

	Hospital, Merrimack Valley Hospital, and Quincy Medical Center
Hospital closure	North Adams Regional Hospital
Non-acute care hospital	Soldier’s Home Chelsea and Adcare Hospital of Worcester

The sums of these categories for all hospitals in the sample were calculated and used as Massachusetts aggregates. Spending was calculated on a per discharge equivalent basis by dividing total spending for each category by total discharge equivalents, which was done for each year.

For exhibit “**Administrative spending per discharge equivalent in Massachusetts hospitals by hospital type, 2021**”, using the same sample of 46 MA short term general acute care hospitals as the above exhibit for calendar year 2021, the HPC calculated the spending per discharge equivalent for the nine administrative expense categories for each MA hospital. Hospitals were then grouped into one of four categories using the CHIA Hospital Profiles: academic medical center, community hospital, community-high public payer hospital, or teaching hospital. The average spending for each of the administrative expenses across those five hospital types was then calculated.

3.3.2 Excess payer administrative spending

To investigate payer administrative costs, the HPC used the payer administrative spending in the CMS Medical Loss Ratio (MLR) Annual Reporting Forms for calendar years 2017 to 2021.

The HPC combined forms reported by 11 payers who operated in Massachusetts. The HPC used the CHIA Annual Report for the fiscal year 2022 to identify the payer entities. These payers were:

Aetna	Aetna Health Inc. (a Pennsylvania corporation)
	Aetna Life Insurance Company
AllWays (now known as MGBHP)	AllWays Health Partners, Inc.
	Partners HealthCare Insurance Company
BCBSMA	Blue Cross and Blue Shield of Massachusetts HMO Blue, Inc.
	Blue Cross and Blue Shield of Massachusetts, Inc.
BMCHP	Boston Medical Center Health Plan, Inc.
Cigna	Cigna Health and Life Insurance Company
Fallon	Fallon Community Health Plan
	Fallon Health and Life Assurance Co.
HNE	Health New England, Inc.
HPHC	Harvard Pilgrim Health Care Inc.
	HPHC Insurance Company, Inc.
THPP	Tufts Health Public Plans Inc.

Tufts	Tufts Associated Health Maintenance Organization, Inc.
	Tufts Insurance Company
UnitedHealth Group	UnitedHealthcare Insurance Company

The HPC identified administrative costs reported by the above-mentioned payers and classifies into two categories “General Administration” and “Commissions” by small group and large group market coverage.

Administrative cost categories	Administrative cost categories details
General Administration	Community benefit expenditures
	Cost containment expenses
	All other claims adjustment expenses
	Direct sales salaries and benefits
	Other general and administrative expenses
Commissions	Agents and brokers fees and commissions

To measure the total net premiums amount for all payers, the HPC used the reported total direct premium earned and subtracted the total rebates paid from it, for both small and large market coverage groups.

For the exhibit “**Administrative spending in dollars per member per month and share of premium revenue in small and large group market in Massachusetts, 2017 – 2021**”, per Member Per Month (PMPM) values for administrative costs categories and net premiums were calculated by dividing the total values by the reported total number of member months. Subsequently, percentage values were calculated by dividing PMPM values for administrative costs categories by the PMPM value for net premiums.

4 Cost savings estimates

Use of higher-cost facilities versus physician offices for common services

The HPC estimated the savings from shifting the share of ambulatory services (e.g., imaging) in HOPDs and other facilities halfway from the current percentage to the national percentage. The HPC identified the top 25 highest services in total spending in Massachusetts in 2019. For each service, HPC calculated the share of services provided in a facility versus an office setting for both Massachusetts and the U.S. The HPC then calculated the difference between the Massachusetts and U.S. percentage for each service, and deriving the facility share of services that is halfway from the current percentage to the national percentage. This new percentage was used to calculate the total number of facility services and spending under this scenario and, ultimately, the estimated spending reductions.

Use of ambulatory surgical centers versus hospital outpatient departments for low-acuity procedures

To estimate the savings from shifting some HOPD services to the ASC setting, the HPC first selected surgeries (or non-surgical procedures, such as screening colonoscopy) of comparable complexity in every CCS category as those that have work RVU below the 75th percentile of RVUs of the surgeries performed at ASCs. Procedure categories were included in the savings calculation only if ASCs performed at least 20 comparable surgeries/procedures of this kind in 2021, and only if number of those surgeries in HOPD setting exceeded their number in ASC. HPC estimated saving for each of the selected CCS procedure categories as the difference in the average price of comparable surgeries provided in HOPD and ASC setting for each category times the number of surgeries at ASC times 50% - in essence, increasing the number of comparable surgeries in each CCS categories at ASCs by 50%.

Potentially avoidable emergency department visits

For estimated spending reductions from reduced use of potentially avoidable ED visits in some regions of Massachusetts, the HPC used rates of potentially avoidable ED visits by region of Massachusetts in 2021, calculated using CHIA's Massachusetts Case-Mix Emergency Department Database (EDD) data. See the **technical appendix for the hospital utilization chartpack** for additional methods details. Rates of potentially avoidable ED visits include all ages and all payers (e.g., commercial insurers, MassHealth, Medicare).

The scenario for the estimated spending reductions assumed a reduction in potentially avoidable ED visits for each region in Massachusetts to the 75th percentile rate among all regions in 2021. The estimate assumes that the cost of a potentially avoidable ED visit is replaced by the average cost of an urgent care visit. Average statewide prices for ED visits and urgent care visits for the five highest-volume diagnosis subcategories for potentially avoidable ED visits were used in cost estimations. Average statewide prices for visits for these diagnosis subcategories were calculated for commercially-insured Massachusetts residents aged 0-64 using the APCD, using the methodology described in section 3.1.3 above. Visits with prices that were 10 times, or less than 20% of, the statewide median, less than or equal to zero, or paid under global payment arrangements or other non-fee-for-service methods were excluded from the analysis. Average statewide prices were estimated at \$1,389 for ED visits and \$186 for urgent care visits for the five highest-volume diagnosis subcategories.

Births in high-priced hospitals

For the estimate of reduced spending for low-acuity commercial deliveries in AMCs where patients “drove past” their nearest community hospital, the HPC used the count of 2021 low-acuity commercially insured vaginal births in AMCs where patients had a closer community hospital as measured in the HIDD (2,010) and estimated the reduction in spending if half (1,005)

had taken place in community hospitals by multiplying the 1,005 births by the mean price of each low-acuity community hospital delivery (\$13,831), separately multiplying the 1,005 births by the mean price of each low-acuity AMC delivery (\$18,142), and subtracting to find the difference in dollar amounts.

For the estimate of reduced spending for all low-acuity commercial deliveries in AMCs, the HPC used the count of 2021 low-acuity commercially insured vaginal births in AMCs as measured in the HIDD (3,303) and estimated the reduction in spending if half (1,652) had taken place in community hospitals by multiplying the 1,652 births by the mean price of each low-acuity community hospital delivery (\$13,831), separately multiplying the 1,652 births by the mean price of each low-acuity AMC delivery (\$18,142), and subtracting to find the difference in dollar amounts.

Each of these estimates was then scaled to the full commercially insured population using a multiplier.

Low-value care

For this analysis, the number of low-value care encounters in years 2019-2021 were proportionally adjusted to be comparable to the 2018 APCD population size (N = 1,627,147). Excessive spending and utilization reduction of 50% calculations took the 2021 spending amount for all of the LVC encounters, scaled the spending for the full commercial population, and then calculated 50% of that total spending value.

Excessive inpatient hospital use

The HPC estimated the reduction in spending from reducing the rate of hospitalization among Massachusetts Medicare beneficiaries to halfway between the current rate and the U.S. average rate, controlling for age and other factors (see above). Hospitalization data were limited to in-state residents aged 65 or over with Medicare as their primary payer. The HPC then applied this excess number of hospitalizations to per capita inpatient spending data from Medicare (price of an average inpatient stay). To model reductions in spending, the HPC estimated a 50% reduction in inpatient utilization and 75% reduction in the price of an average inpatient stay, to account for the possibility that if these hospitalizations did not take place, there might be alternative care (such as home health care) that would be required instead.

Excessive imaging use

For a utilization adjustment, the HPC decided that the rate of use of imaging (CT and MRI encounters) for the providers with the highest use would be reduced to the level of the provider with the 75th percentile rate in 2021. This was calculated across providers after patient attribution to provider organizations, with the 75th percentile rate among providers acting as a

cap for utilization, and replacing the utilization rate above the 75th percentile for providers with excess imaging. Then, new total utilization and spending rates were calculated with the utilization limit in place, with saving estimates calculated by subtracting the new total spending amount from the original spending amount. The results were then scaled to be representative of the full commercial population.

¹ Roberston, Marcus. First-ever ranking of all 50 states by ASC per capita. Becker's ASC Review: February 9, 2022. Accessed at: <https://www.beckersasc.com/benchmarking/first-ever-ranking-of-all-50-states-by-asc-per-capita.html>.

² Tufts Health Plan and Harvard Pilgrim Health Care merged under a new parent company, Point32 Health, in January 2021, but continue to report data to the APCD under separate payer identifiers. As such, any analyses by payer are performed using all available payer identifiers.

³ RAND Hospital Data: Web-Based Tool. Santa Monica, CA: RAND Corporation, 2018.

⁴ Agency for Healthcare Research and Quality. Healthcare Cost & Utilization Project. Clinical Classifications Software Refined (CCSR). Available at https://hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp

⁵ Roberston, Marcus. First-ever ranking of all 50 states by ASC per capita. Becker's ASC Review: February 9, 2022. Accessed at: <https://www.beckersasc.com/benchmarking/first-ever-ranking-of-all-50-states-by-asc-per-capita.html>.

⁶ American College of Obstetricians and Gynecologists. Levels of Maternal Care: Obstetric Care Consensus No. 9. August 2019. Available at <https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2019/08/levels-of-maternal-care>