COMMONWEALTH OF MASSACHUSETTS
HEALTH POLICY COMMISSION

TECHNICAL APPENDIX 2
TRENDS IN SPENDING AND CARE DELIVERY

ADDENDUM TO 2023 COST TRENDS REPORT

Table of Contents

1 Summary

This appendix describes the Health Policy Commission's (HPC) approach to examining broad trends in health care spending, value, and performance in Massachusetts from 2019 to 2021.

2 Data Sources

To examine changes in overall spending and enrollment by payer (Exhibit 2.1- Exhibit 2.4), the HPC used the Center for Health Information and Analysis (CHIA) annual reports. Sources for national data to compare trends between the U.S. and Massachusetts (Exhibit 2.3 and Exhibit 2.4) are from the Centers for Medicare and Medicaid Services (CMS). See details in the notes and sources under each exhibit.

For commercial spending analysis by category of service, the HPC used CHIA's All-Payer Claims Database (APCD) V2021. Analyses using the APCD's medical claims (Exhibit 2.5-Exhibit 2.7) include data from six commercial payers in the state: Blue Cross Blue Shield of Massachusetts, Tufts Health Plan, Harvard Pilgrim Health Care, Mass General Brigham Health Plan (formerly AllWays Health Partners), and Anthem (including Unicare, a GIC offering). Due to lack of pharmacy claims, Anthem data are excluded in prescription drug claim analyses (Exhibit 2.5, Exhibit 2.8-Exhibit 2.10).

For annual health care spending for a family of four in Massachusetts (no exhibit), the HPC used health insurance premium data from the Agency for Health Care Quality's Medical Expenditure Panel Survey (MEPS) Insurance Component, 2022, and out-of-pocket healthcare spending data from Current Population Survey's (CPS) Annual Social and Economic Supplement (ASEC; commonly referred to as the "March supplement"). This data was sourced from the Integrated Public Use Microdata Series (IPUMS).[1] For the definition of a middle-class family, the HPC used data from the General Social Survey (GSS).

For the small group enrollment analysis (Exhibit 2.11), the HPC used the Massachusetts Division of Insurance, Small Employer & Individual Membership Highlights, 2010-2021.[2] Premium data come from Medical Expenditure Panel Survey (MEPS) Insurance Component, 2012-2019. Data on high deductible health plan penetration come from CHIA Annual Reports, 2012-2021.

For the small group health insurance analysis (Exhibit 2.12), the HPC used 2013 –2022 CPS ASEC from the Integrated Public Use Microdata Series (IPUMS).

[1] https://cps.ipums.org/cps.
[2] https://www.mass.gov/service-details/individualsmall-group-membership.

3 Analyses

3.1 Commercial spending by category

3.1.1 Commercial spending by category

For exhibit**, "Commercial spending per member per year by category, 2019-2021"**, the HPC combined professional and facility spending by categories of care. Total spending by categories of care were calculated and divided by member years in the APCD to create per member per year amounts.

Categories of care	Data
Inpatient	APCD inpatient facility claims and professional claims (place of service code 21)
HOPD and ASC	APCD HOPD and ASC facility claims and professional claims (place of service codes 19, 22 and 24)
ED	APCD ED facility claims and professional claims (place of service code 23)
Office, urgent care, retail clinic	APCD office professional claims (place of service code 11, 20 and 17)
Pharmacy	APCD pharmacy claims; rebate amounts are from CHIA's 2023 annual report. Rebate not applied to COVID vaccines

3.1.2 HOPD spending by type of services

For exhibit**, "Commercial spending per member per year for HOPD services by type of services, 2019-2021",** the HPC focused on Massachusetts acute hospitals only (e.g., excluding psychiatric hospitals and spending that occurred in out of state hospitals). HOPD spending by type of service was categorized using the Restructured Berenson-Eggers Type of Service (BETOS) Classification System (RBCS) and Agency for Health Care Research and Quality (AHRQ) Surgery Flags Software. RBCS is a taxonomy that groups CPT codes into clinically meaningful categories and subcategories. RBCS is updated annually by a technical expert panel, and this analysis is based on the 2022 version of RBCS.

The RBCS contains the following categories: Anesthesia, Evaluation and Management (E&M), Imaging, Procedures, Tests, Treatments, DME and Other. The HPC largely followed this categorization, though some category names were changed for clarity (e.g., "Tests" to "Diagnostic tests and labs"). The treatments category was divided into three buckets of spending using the RBCS subcategories: chemotherapy and radiation oncology, injections and infusions (nononcologic), and other medical treatments. Spending on DME and Other were not shown in the exhibit as they were two much smaller categories of spending. Given that Procedures were a

particularly large category, the HPC identified major surgeries using the AHRQ Surgery Flags Software and created a separate category for those procedures. The rest of the procedures category was named "Colonoscopies, endoscopies, minor surgeries and other procedures."

Given that RBCS is created using Medicare data, the taxonomy may miss some large volume or large spending CPT codes that are more relevant for the commercial population (e.g., invitro fertilization). The HPC worked with a clinical consultant and manually categorized the following CPT codes. Other unclassified CPT codes were excluded from the analysis.

CPT code	**Adapted RCBS category**
Any unclassified codes between J8501-J8999	Chemotherapy and radiation oncology
Any unclassified codes between J90000-J9999	Chemotherapy and radiation oncology
U0005	Diagnostic tests and labs
S0201	E & M
S9480	E & M
S9485	E & M
77061	Imaging
77062	Imaging
S8037	Imaging
S4015	Colonoscopies, endoscopies, minor surgeries and other procedures
90738	Injections and infusions (nononcologic)
S0020	Injections and infusions (nononcologic)
S0028	Injections and infusions (nononcologic)
S0030	Injections and infusions (nononcologic)
S0077	Injections and infusions (nononcologic)
Any unclassified codes between J0120-J8499	Injections and infusions (nononcologic)
All T codes	Other
V5261	Other

3.2 Spending on COVID-19 Tests and Vaccinations

For the side bar on COVID-19 tests and vaccinations, the HPC used CHIA's APCD, V2021. For PMPY spending and percent of total commercial spending represented by COVID-19 tests and vaccinations, all members from six payers were included. Exhibit **"Spending on COVID-19 Tests and Vaccinations"** examines uptake of COVID-19 tests and vaccines and includes members under 65 with full year medical coverage and prescription drug coverage only (e.g., Anthem members are excluded due to lack of prescription drug data).

Test codes were collected from the following sources: CHIA and AMA.

Vaccination codes were collected from the following sources: CHIA, AMA, CDC, and FDA (search term: COVID-19).

3.3 Pharmacy spending

3.2.1 Branded drug volume and spending

For exhibit **"Branded drug share of claims vs. share of net and gross spending, 2017-2021"** the HPC used CHIA's APCD pharmacy claims, V2021. COVID-19 vaccines, the vast majority of which are administered through plans' pharmacy benefits, were excluded to ensure that 2021 results are comparable to prior years.

3.2.2 Spending distribution for branded drugs

For exhibit **"Gross spending distribution per branded prescription, 2019-2021"**, the HPC used CHIA's APCD pharmacy claims, V2021. Similarly, COVID-19 vaccines are excluded to ensure comparability to results from prior years.

3.2.3 Cost-sharing for selected classes of drugs

For exhibit **"Average cost sharing per prescription (30-day supply) in selected classes of drugs, 2017-2021"**, the HPC selected three chronic conditions for which patients rely primarily on branded drugs for treatment: multiple sclerosis (MS), arthritis, diabetes. Diabetes drugs were further divided into insulin and non-insulin diabetes drugs. The APCD pharmacy claims were used for this analysis, thus excluding clinician-administered drugs for these conditions (which are in the APCD medical claims.)

Drugs	Sources
MS: Aubagio. Avonex, Bafiertam, Betaseron, Copaxone (brand and generic), Extavia, Gilenya, Glatopa, Kesimpta, Mavenclad, Mayzent, Plegridy, Ponvory, Rebif, Tecfidera (brand and generic), Vumerity, Zeposia	https://www.nationalmssociety.org/Treating-MS/Medications#section-1

Antiarthritics: Actemra, Cimzia, Cosentyx, Enbrel, Humira, Kevzara, Kineret, Olumiant, Orencia, Rinvoq, Simponi, Stelara, Taltz, Xeljanz	https://www.rheumatology.org/Portals/0/Files/2021-ACR-Guideline-for-Treatment-Rheumatoid-Arthritis-Early-View.pdf; https://www.arthritis.org/drug-guide/biologics/biologics
Non-insulin diabetes: Adlyxin, Bydureon, Byetta, Farxiga, Invokana, Januvia, Jardiance, Nesina, Onglyza, Ozempic, Saxenda, Steglatro, Tradjenta, Trulicity, Victoza 2-Pak, Victoza 3-Pak, Vipidia	https://professional.diabetes.org/sites/professional.diabetes.org/files/media/10.00-11.15_inzucchi_panel_discussion_on_new_medications.pdf
Insulin: Admelog, Afrezza, Apida Solosar, Apidra, Basaglar, Fiasp, Humalog, Humalog 50/50, Humalog 75/25, Humulin 70/30, Novolog, Humulin R, Humulin N, Humulin R U-500, Lantus, Levemir, Lyumjev, Novolin 70/30, Ryzodeg, Semglee, Suliqua, Toujeo Solostar, Tresiba, Tresiba Flextouch, Xultophy,	https://diabetesjournals.org/care/article/45/Supplement_1/S125/138908/9-Pharmacologic-Approaches-to-Glycemic-Treatment; https://www.aafp.org/pubs/afp/issues/2018/0101/p29.html; https://professional.diabetes.org/sites/professional.diabetes.org/files/media/10.00-11.15_inzucchi_panel_discussion_on_new_medications.pdf

3.3 Psychotherapy spending among services delivered by non-physician professionals

To evaluate spending on services delivered by non-physician professionals, the HPC constructed an encounter-level file that allowed for evaluation of prices and utilization using a uniform definition of a procedure code encounter across ambulatory settings.

To create the encounter level file, the HPC begins with all professional claims billed in ambulatory sites of service. Services delivered by a non-physician professional were identified using provider taxonomy codes. Taxonomies included for analysis include behavioral health/social service, chiropractors, dental, diet/nutrition, emergency medical services, nurses, nursing service related, physician assistants/advanced practice nursing, podiatrists, respiratory/developmental/rehabilitative/restorative, speech/language/hearing, and technologists/technicians. Facility claims were appended to the remaining professional claims

and claims were collapsed to create encounters for claim lines billed for the same person (patient), on the same date of service, with the same procedure code (CPT). Encounters billed by out of state providers were excluded. Encounters indicating emergency department, observation, and inpatient utilization were excluded. Services delivered via telehealth by a non-physician professional were flagged and included for analysis.

Services were categorized using Restructured Berenson-Eggers Type of Service (BETOS) Classification System. Psychotherapy services (CPT codes 90832, 90833, 90834, 90836, 90837, and 90838) were a subset of the behavioral health services RCBS subcategory. Spending on psychotherapy services accounted for 73% of all behavioral health service spending in 2021.

Using the final analytic file, spending amounts across service categories were aggregated to analyze per member per month changes in spending from 2019 to 2021.

3.4 Affordability

For annual health care spending for a family of four in Massachusetts (no exhibit), the HPC used the Medical Expenditure Panel Survey's (MEPS) measure of annual family premiums and out-of-pocket (OOP) spending data from the Current Population Survey's (CPS) Annual Social and Economic Supplement (ASEC). OOP spending estimates are based on a three-year average for middle class families from 2020 to 2022. A "family" is defined as the primary family only and does not include related sub-families. "Middle class" family definition is based on General Social Survey (GSS) occupational prestige scores. This measure, the SEI10, is from the 2010 Socioeconomic Index of the General Social Survey (GSS) and was developed using a combination education and income to predict the prestige of Standard Occupational Classification (SOC) codes. The most recent version was released with the 2010 General Social Survey and included prestige scores for 539 occupations. Families where the main householder ("reference person") or their spouse was 65 years old or over, actively in the Armed forces or families were housed in group quarters, non-family households, and non-middle class families were excluded.

For exhibit "**Total small group enrollment and other market characteristics, Massachusetts, 2010-2021"**, the HPC used the Massachusetts Division of Insurance, Small Employer & Individual Membership Highlights, 2010-2021. Enrollment reflects membership in the small group market through commercial carriers and health maintenance organizations combined. Cost sharing and premium amounts are from CHIA databooks covering this time period and are converted to family premiums using ratios derived from the MEPS.

For exhibit "**Type of coverage among employees of small businesses (fewer than 100 employees) and large businesses (at least 100 employees), 2013 – 2022"**, the HPC used the 2013 –2022 Current Population Survey's (CPS) Annual Social and Economic Supplement (ASEC) to identify firm size and insurance type for employed persons in Massachusetts. This supplement adds detailed questions covering social and economic characteristics of U.S. families and households to existing data collection of labor force statistics by the CPS. In particular, the supplement collects employment and health insurance characteristics, such as firm size, employment status, health insurance coverage, plan type, payer, employee health insurance premium contributions and OOP medical spending. For this analysis, the HPC used the ASEC longitudinal files provided by IPUMs.[3]

For this analysis, HPC identified employed persons in Massachusetts with a valid firm size and health insurance status. The unemployed, seniors, and children under the age of 16 were excluded. Estimates were reported in two-year periods to improve reliability of estimates using the individual weights provided in the ASEC. Firm sizes were grouped into 1-99 employes (small group) and 100 employees and over (large group).

[3] Integrated Public Use Microdata Series: https://cps.ipums.org/cps/about.shtml