

**COMMONWEALTH OF MASSACHUSETTS  
HEALTH POLICY COMMISSION**

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**TECHNICAL APPENDIX C1  
HOSPITAL UTILIZATION**

**ADDENDUM TO 2018 COST TRENDS REPORT**

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## 1 Summary

This technical appendix describes the Health Policy Commission's (HPC) approach to examining hospital utilization in the 2018 Cost Trends Report.

## 2 Emergency department (ED) utilization

### 2.1 Data

For **Exhibit II: All ED visits, low-acuity avoidable ED visits, and behavioral health ED visits per 1,000 residents, 2012-2017**, HPC used the Emergency Department (ED) Database from the Center of Information and Analysis (CHIA) for 2012-2017. This dataset is part of CHIA's Massachusetts Acute Hospital Case Mix Database and includes all outpatient emergency department visits, including Satellite Emergency Facility visits, by patients whose visits resulted in neither an outpatient observation stay nor an inpatient admission at the reporting facility. The ED database contains patient demographics, clinical characteristics, services provided, charges, and hospitals and practitioner information, as well as mode of transport. The HPC also used the 2012-2017 American Community Survey (ACS) from the U.S. Census Bureau to calculate population rates. For more on this dataset see section 2.1 of this appendix or Technical Appendix D: Data Sources.

### 2.2 Analysis

#### *Low-acuity Avoidable Emergency Department Visits*

HPC's avoidable ED utilization analysis used the Medi-Cal methodology for calculating avoidable ED visits published by Medical Managed Care Division of California Department of Health Care Services<sup>1</sup>, with updated specifications to including ICD-9 and ICD-10 codes published online by Partnership Health Plan of California.<sup>2</sup> The main purpose of the Medi-Cal algorithm is to identify ED visits for primary care treatable conditions (i.e., visits that could have been provided in primary care setting, such as uncomplicated headaches, back pain, conjunctivitis and similar conditions). The Medi-Cal definition excludes any visits related to mental health problems, alcohol, or substance abuse. The Medi-Cal definition is considerably more conservative than other methodologies, such as the NYU algorithm used in some HPC analyses, and may under-report avoidable ED visits.

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<sup>1</sup> 2010 Statewide Collaborative QIP ER Remeasurement Report, Medical Managed Care Division, California Department of Health Care services, June 2012;  
[http://www.dhcs.ca.gov/dataandstats/reports/Documents/MMCD\\_Qual\\_Rpts/EQRO\\_QIPs/CA2011-12\\_QIP\\_Coll\\_ER\\_Remeasure\\_Report.pdf](http://www.dhcs.ca.gov/dataandstats/reports/Documents/MMCD_Qual_Rpts/EQRO_QIPs/CA2011-12_QIP_Coll_ER_Remeasure_Report.pdf)

<sup>2</sup> Primary Care Provider Quality Improvement Program, 2015 – 2016 Measurement Specifications, Partnership Health Plan of California; <http://partnershiphp.org/Providers/Quality/Documents/PCPQIP1516Spec2.pdf>

## *Behavioral Health Emergency Department Utilization*

HPC's analysis of behavioral health related ED visits were calculated using the Clinical Classifications Software (CCS) diagnostic classifications of mental health, alcohol and substance abuse diagnoses, based on primary diagnosis, for federal fiscal years 2012 to 2017. Some discontinuity in trends by diagnosis between 2015 and 2016 may attributed to the change in diagnostic coding from ICD-9 to ICD-10 in October 2016.

### **3 Inpatient admissions**

#### **3.1 Data**

For **Exhibit IV: Inpatient discharges per 1,000 residents by age group, 2011-2017** and **Exhibit V: Inpatient discharges per 1,000 residents by payer, 2014-2017**, HPC used the Hospital Inpatient Discharge Database (HIDD) from the Center of Information and Analysis (CHIA). This dataset is part of CHIA's Massachusetts Acute Hospital Case Mix Database. The HIDD database contains all discharges from Massachusetts acute hospitals from FY 2011 to FY 2017 and contains comprehensive patient-level information including socio-demographics, clinical data, and charge data. The sample included patients that resided in Massachusetts. For **Exhibit IV**, HPC used the 2011-2017 American Community Survey (ACS) from the US Census Bureau to calculate population rates. For **Exhibit V**, HPC obtained the number of enrollees by payer from the 2018 CHIA Enrollment Databook. For more on the CHIA Case Mix Database, see Technical Appendix D: Data Sources.

### **4 Preventable inpatient discharges**

#### **4.1 Data**

For **Exhibit VI: Preventable inpatient admission rates by HPC region, 2017**, HPC used the Hospital Inpatient Discharge Database (HIDD) from the Center of Information and Analysis (CHIA). This dataset is part of CHIA's Massachusetts Acute Hospital Case Mix Database. The HIDD database contains all discharges from Massachusetts acute hospitals from FY 2011 to FY 2017 and contains comprehensive patient-level information including socio-demographics, clinical data, and charge data. The sample included patients that resided in Massachusetts. For more on the CHIA Case Mix Database, see Technical Appendix D: Data Sources. The HPC also used the 2011-2017 American Community Survey (ACS) from the U.S. Census Bureau to calculate population rates. For more on the CHIA Case Mix Database, see Technical Appendix D: Data Sources.

#### **4.2 Analysis**

The preventable inpatient discharge methodology applies the Agency for Healthcare Research and Quality's (AHRQ) Prevention Quality Indicators (PQIs), a set of measures that can be used with inpatient discharge data to identify the quality of care for "ambulatory care sensitive conditions". This analysis uses version 7.0 of the PQIs, released in June 2018. HPC used the Prevention Quality Overall Composite (PQI 90) for this analysis which included the following

conditions: PQI 1—Diabetes Short-term Complications Admission Rate; PQI 3—Diabetes Long-term Complications Admission Rate; PQI 5—Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate; PQI 7—Hypertension Admission Rate; PQI 8—Heart Failure Admission Rate; PQI 10 – Dehydration Admission Rate; PQI 11 – Bacterial Pneumonia Admission Rate; PQI 12 – Urinary Tract Infection Admission Rate; PQI 14—Uncontrolled Diabetes Admission Rate; PQI 15—Asthma in Younger Adults Admission Rate; and PQI 16—Lower-Extremity Amputation among Patients with Diabetes Rate.

Each measure consists of a numerator (the number of hospitalizations) and a denominator (the size of the relevant population). The denominators for all PQIs, except for PQI 5—COPD or Asthma in Older Adult and PQI 15—Asthma in Younger Adults, are individuals age 18 or older. Following specifications from AHRQ, the HPC also constructed a composite of preventable hospitalizations for all conditions.

All mapping visualizations were done with ESRI's ArcMap 10.

## 5 Share of commercial inpatient discharges

### 5.1 Data

For **Exhibit VII: Share of commercial inpatient discharges in the five largest hospital systems, 2011-2017**, HPC used the Hospital Inpatient Discharge Database (HIDD) from the Center of Information and Analysis (CHIA). This dataset is part of CHIA's Massachusetts Acute Hospital Case Mix Database. The HIDD database contains all discharges from Massachusetts acute hospitals from FY 2011 to FY 2017 and contains comprehensive patient-level information including socio-demographics, clinical data, and charge data. The analysis excluded non-commercial discharges, discharges for out-of-state patients, non-acute discharges (i.e., discharges with a length of stay of greater than 180 days and rehabilitation discharges), and discharges for normal newborns (including normal newborns would count a single delivery as two discharges). For more on the CHIA Case Mix Database, see Technical Appendix D: Data Sources.

## 6 Share of community appropriate discharges

### 6.1 Data

For **Exhibit VIII: Share of community appropriate discharges by hospital type, 2012-2017**, HPC used the Hospital Inpatient Discharge Database (HIDD) from the Center of Information and Analysis (CHIA). This dataset is part of CHIA's Massachusetts Acute Hospital Case Mix Database. The HIDD database contains all discharges from Massachusetts acute hospitals from FY 2012 to FY 2017 and contains comprehensive patient-level information including socio-demographics, clinical data, and charge data. The sample included patients that resided in Massachusetts. For more on the CHIA Case Mix Database, see Technical Appendix D: Data Sources.

## 6.2 Definitions

“Community hospitals” are general acute care hospitals that do not support large teaching and research programs. “Teaching hospitals” are defined as hospitals that report at least 25 full-time equivalent medical school residents per one hundred inpatient beds in accordance with Medicare Payment Advisory Commission (MedPAC) guidelines. “Academic medical centers” are a subset of teaching hospitals characterized by (1) extensive research and teaching programs, (2) extensive resources for tertiary and quaternary care, (3) principal teaching hospitals for their respective medical schools, and (4) full service hospitals with case mix intensity greater than 5 percent above the statewide average. These definitions are consistent with CHIA’s designations in the Massachusetts Hospital Profiles, but HPC combines CHIA’s community hospitals and community-high public payer hospitals into one community hospital category.

## 6.3 Definitions

Discharges that could be appropriately treated in community hospitals were determined based on expert clinician assessment of the acuity of care provided, as reflected by the cases’ diagnosis-related groups (DRGs). This list excluded DRGs for which treatment might not be suitable at a significant proportion of community hospitals based on limitations on available resources or clinical expertise. Discharges for normal newborns (to avoid double-counting), Psychiatric and rehabilitation discharges (DRGs in MDC categories 19 and 20), lengths of stay above 180 days, non-Massachusetts residents, transfers *to* another hospital, at teaching hospitals and AMCs that are transfers *from* another hospital, or from specialty hospitals were excluded. (Those with missing values for these key variables were also excluded.)