COMMONWEALTH OF MASSACHUSETTS

HEALTH POLICY COMMISSION

TECHNICAL APPENDIX B5

HOSPITAL UTILIZATION

ADDENDUM TO 2016 COST TRENDS REPORT

Table of Contents

1 Summary

This technical appendix describes the Health Policy Commission's (HPC) approach to examining hospital utilization in the 2016 Cost Trends Report.

2 Emergency department (ED) utilization

2.1 Data

For this analysis, HPC used the Emergency Department (ED) Database from the Center of Information and Analysis (CHIA). 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 American Community Survey (ACS) from the U.S. Census Bureau to calculated population rates. For more on the CHIA Case Mix Database, see Technical Appendix C: Data Sources.

2.2 Analysis

HPC's ED utilization analyses used the Emergency Department algorithm developed by John Billings and colleagues at New York University[1]. The main purpose of the NYU ED algorithm is to identify ED visits for primary care treatable conditions - i.e., visits that could have been provided in primary care setting or emergencies that could have been avoided if primary care had been delivered at an earlier stage of illness. The NYU algorithm assigns the probability that each ICD-9 diagnosis code associated with an ED visit falls into one of the four categories: (1) non-emergent; (2) an emergency for a problem requiring contact with the medical system within 12 hours but treatable in an office visit (primary care treatable); (3) an emergency not treatable in an office visit but preventable or avoidable; and (4) an emergency that is not preventable or avoidable.

Additionally, the algorithm also classifies injury, mental health problems, alcohol, or substance abuse separately. Accordingly, these conditions are pulled out of the emergent/non-emergent standard classification. Visits that result from injuries were then added to the emergency category. Behavioral health related ED visits were calculated from Billing's classification of mental health, alcohol and substance abuse diagnoses, which are based on primary diagnosis. HPC applied the algorithm to ED visits from hospital fiscal years 2011 to 2015.

Following the NYU's ED algorithm, avoidable ED utilization in this report is defined as ED visits that did not require ED care, including two categories: (1) non-emergent; (2) emergent, primary care treatable. Emergency ED utilization is defined as ED visits that required ED care, including two categories: (1) emergent, ED care needed, preventable and avoidable; (2) emergent, ED care needed, not preventable/avoidable.

3 Behavioral health (BH) ED utilization

3.1 Data

For this analysis, HPC continued to use the Emergency Department (ED) Database from the Center of Information and Analysis (CHIA). For more on this dataset see section 2.1 of this appendix or Technical Appendix C: Data Sources.

3.2 Definitions

3.2.1 Behavioral health (BH)

Behavioral health (BH) patients were identified using the Billing's algorithm and were patients with a primary diagnosis code related to mental health, alcohol or substance abuse. In **Exhibit 5.3** and **5.4**, non-primary BH patients are those that had secondary diagnosis code classified by

[1] Billings, J. Emergency Department Use in New York City. NYU Wagner School's Center for Health and Public Service Research. 2000. Available from: http://wagner.nyu.edu/faculty/billings/nyued-background.

the Billing's algorithm as being related to mental health, alcohol, or substance abuse, but a non BH-related primary diagnosis code.

3.2.2 Length of stay and ED boarding

Length of stay was calculated by taking the difference between the patient's ED registration time and ED discharge time. ED boarding is defined as patients with a length of stay of 12 hours or more.

4 Inpatient admissions

4.1 Data

For this analysis, 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 2015 and contains comprehensive patient-level information including socio-demographics, clinical data, and charge data. The sample included patients that resided in Massachusetts. HPC also used the American Community Survey (ACS) from the US Census Bureau to calculated population rates. For more on the CHIA Case Mix Database, see Technical Appendix C: Data Sources.

4.2 Analysis

4.2.1 Preventable inpatient admissions

For this HPC applied measures of preventable hospitalization developed by the Agency for Healthcare Research and Quality (AHRQ). HPC used AHRQ's Prevention Quality Indicators (PQIs), a set of measures that can be used with inpatient discharge data to identify the quality of ambulatory care. This analysis used version 4.5 of the PQIs, released in May 2013. [2] HPC used the Chronic PQI composite for this analysis which included the following conditions:

Chronic conditions:

1. PQI 1—Diabetes Short-term Complications Admission Rate
2. PQI 3—Diabetes Long-term Complications Admission Rate
3. PQI 5—Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate
4. PQI 7—Hypertension Admission Rate
5. PQI 8—Heart Failure Admission Rate
6. PQI 13—Angina Without Procedure Admission Rate
7. PQI 14—Uncontrolled Diabetes Admission Rate
8. PQI 15—Asthma in Younger Adults Admission Rate
9. PQI 16—Lower-Extremity Amputation among Patients with Diabetes Rate

[2] The CDC's analysis does an adjustment by age and gender on the basis of the 2000 standard population.

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. HPC created a composite for all individuals with either COPD or Asthma by adding the numerators for PQI 5 and PQI 15 together and using a denominator consisting of all individuals age 18 or older. In addition, HPC created a composite of preventable hospitalizations from diabetes by summing the rates across PQIs 1, 3, 14, and 16. Following specifications from AHRQ, the HPC also constructed a composite of preventable hospitalizations for all conditions.

4.2.2 Community appropriate discharges

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). Some complex care may not be suitable for treatment in community hospitals because they may lack the specialized technology or staffing to care for rare conditions; other cases which are less complex or which can be treated using well-established treatment protocols can be handled in much the same way at any hospital. The HPC chose to exclude cases with DRGs that might be suitable for only some community hospitals or in limited cases depending on clinical circumstances and differences in resources. As a result, analyses involving community-appropriate care exclude about a third of all discharges, including those for patients receiving routine procedures, but who experienced minor or major complications.

Normal newborns (DRG 795) were also excluded from this analysis to avoid counting a discharge for the mother and a discharge for the neonate, when in fact HPC reason that a normal birth should be counted as only one discharge. Discharges in Major Diagnosis Categories 19 and 20 (psychiatric and rehabilitation) and those with a length of stay of greater than 180 days were also excluded from this analysis as these cases should not really be considered to fall into the category of general acute care given that there are other sets of providers of these services (specialty psychiatric hospitals and rehab hospitals, respectively) that we are not counting in this market assessment (e.g., our list of hospitals does not include Spaulding, McLean, Bayridge, etc).