COMMONWEALTH OF MASSACHUSETTS
HEALTH POLICY COMMISSION

TECHNICAL APPENDIX B2
ADMISSIONS FROM THE EMERGENCY DEPARTMENT

ADDENDUM TO 2018 COST TRENDS REPORT

Table of Contents

1 Summary 3
2 Hospitals 3
3 ED admission 3
3.1 Data 3
3.2 Definitions 3
3.2.1 ED admission 3
3.2.2 Exclusions 4
3.2.3 Clinical Classifications Software 4
3.2.4 Patient adjustment 4
4 ED revisit 4
4.1 Data 4
4.2 Definitions 5
4.2.1 ED Revisit 5
4.2.2 Exclusions 5
4.2.4 Patient adjustment 5

1 Summary

This appendix describes the Health Policy Commission's (HPC) approach to the analyses contained in **Chapter 3: "Admissions from the Emergency Department"** of the 2018 Cost Trends Report.

2 Hospitals

The analyses in Chapter 3 compare admission rates for patients whose stay originated in an emergency department (ED) at a Massachusetts acute care hospital. To account for the possibility of inconsistent reporting at the site-level, all sites were aggregated to the license level for those sites that bill as one unit. This follows the method used by the Center for Health Information and Analysis (CHIA) in their *Massachusetts Hospital Profiles*. This resulted in 55 hospitals reported for this analysis. For more information on these groupings, please see the Center for Health Information and Analysis FY16 Hospital Profiles Technical Appendix: http://www.chiamass.gov/assets/docs/r/hospital-profiles/2016/Massachusetts-Hospitals-Profiles-Technical-Appendix-FY16.pdf.

3 ED admission

3.1 Data

The HPC used the CHIA Hospital Inpatient Discharge Database (HIDD), Outpatient Observation Database (OOD), and Emergency Department Database (ED) for FY2015 and FY2016. These datasets comprise the CHIA Acute Hospital Case Mix data. These datasets contain either discharge- or visit-level data covering socio-demographic characteristics of the patient and other details of their visit or admission, including reason for, duration of, and services and procedures provided during the visit or admission.

3.2 Definitions

3.2.1 ED admission

An ED admission is a visit beginning in the ED and resulting in admission and discharge from an inpatient unit. This may include visits where the patient was sent to observation status and then admitted to the inpatient unit. Also include were two other types of "admissions": transfers to other acute hospitals from the ED and observations above 48 hours.

Transfers to other acute hospitals were included because these visits are likely to result in an inpatient admission at the receiving hospital. For this reason, transfers in were excluded from the analysis to avoid double-counting.

Patients under observation status for lengths of stay (LOS) over 48 hours were included due to resource utilization resembling a typical inpatient discharge. Some have found that observation status has become a substitute for an inpatient stay in some cases, particularly in response to CMS rules governing the length of stay for such stays (e.g. "2-midnight rule").

Discharge originating in the ED
Any ED revenue code (0450, 0451, 0456, 0459, 0981) or ED flag code "1" or "2" in HDD; an ED flag code "1" or "2" or source of visit "R" in OOD; or any record contained in the ED Case Mix database.

Discharge that included observation status
Any observation status revenue code (0762, 0769) or any record contained in the OOD Case Mix database.

Discharge transferred to another hospital
Any discharge in ED with a departure status of "3".

3.2.2 Exclusions

The exclusions for this analysis included:

- Children (ages 0-17);
- Specialty hospitals (Boston Children's Hospital, Dana- Farber Cancer Institute, Mass Eye and Ear, New England Baptist, Shriners, Shriners for children);
- Hospitals with data inconsistencies (Martha's Vineyard, Nantucket Cottage);
- Those who transferred into an inpatient unit (see above; admission source code "4" or "7");
- Trauma, behavioral health, maternity, and unclassified diagnoses (multi-level CCS categories 5, 11, 16 and 18; only medical diagnoses were included); and
- All patients dead on arrival or expired during visit, patients who eloped or met personal physician, or discharges missing a diagnosis code.

3.2.3 Clinical Classifications Software

Clinical Classification Software (CCS) was used to group diagnoses into about 300 smaller groupings of similar diagnoses. Please see https://hcup-us.ahrq.gov/toolssoftware/ccs10/ccs10.jsp for more information on CCS methodology.

3.2.4 Patient adjustment

All ED admission rates were adjusted for patient characteristics, including age, gender, race, payer, income (based on zip code), and drive time to nearest ED from their residence zip code. Adjustments were conducted using ordinary least squares (OLS) regression in STATA 13.

Inflation-adjusted estimates of median income by zip code were attributed to patients using American Community Survey data (2015; 5-year estimates). Missing income values were imputed using the average of median income for the patient's city.

Drive time analysis was conducted using ArcMap 10.2 and STATA. Zip codes were matched to nearest the nearest acute care emergency department using ArcMap's "Near" function. EDs were identified as acute care hospital "facilities licensed by the state to have an emergency department open 24 hours a day, seven days a week." See "Acute Care Hospitals" at https://www.mass.gov/service-details/massgis-data-layers for more information.

Drive times between zip codes and nearest ED were calculated using STATA's "georoute" function, which uses an API to calculate distances in real time. Distances were calculated in miles. Please see https://ideas.repec.org/c/boc/bocode/s458264.html for more information.

4 ED revisit

4.1 Data

The HPC used the CHIA Hospital Inpatient Discharge Database (HIDD), Outpatient Observation Database (OOD), and Emergency Department Database (ED) for FY2015 and FY2016. These datasets comprise the CHIA Acute Hospital Case Mix data. These datasets contain either discharge- or visit-level data covering socio-demographic characteristics of the patient and other details of their visit or admission, including reason for, duration of, and services and procedures provided during the visit or admission.

4.2 Definitions

4.2.1 ED Revisit

An ED revisit is defined as a visit back to an Emergency Department within 7 days of a prior discharge from the emergency department. Discharges from the emergency department do not include ED visit that resulted in inpatient or observation stay, or those discharges transferred to other facilities (see definitions). ED revisits within 7 days of a prior ED discharge include those ED visits that result in an inpatient or observation stay, as well as those visits where the patient was discharged from the Emergency department. Revisits do not include inpatient or observation hospital stays that did not originate in the ED.

ED revisits are calculated for specific conditions based on CCS categories (see section 3.2.3), and were calculated separately for pneumonia, UTI and non-specific chest pain. For specific condition calculations, discharges from which the revisit is calculated are limited to the specific CCS category, but revisits included any medical visit to the emergency room excluding only visits with behavioral health, maternity and trauma diagnoses based on CCS categories (see exclusions in 4.2.2 below).

ED visit where patient was discharged from the Emergency department
Any record contained in the ED Case Mix database, excluding discharges transferred to other facilities (discharge with a departure status of “3”).

ED visit that result in inpatient or observation stay
Records in the HIDD data where any ED revenue code (0450, 0451, 0456, 0459, 0981) or ED flag code “1” or “2” in HDD; an ED flag code “1” or “2” or source of visit “R” in OOD, and any record contained in the OOD Case Mix database, or any record in HDD database with observation status revenue code (0762, 0769).

4.2.2 Exclusions

The exclusions for this analysis included:

- Children (ages 0-17);
- Specialty hospitals (Boston Children’s Hospital, Dana-Farber Cancer Institute, Mass Eye and Ear, New England Baptist, Shriners, Shriners for children);
- Hospitals with data inconsistencies (Martha's Vineyard, Nantucket Cottage);
- Those who transferred into an inpatient unit (see above; admission source code “4” or “7”);
- Trauma, behavioral health, maternity, and unclassified diagnoses (multi-level CCS categories 5, 11, 16 and 18; only medical diagnoses were included); and
- All patients dead on arrival or expired during visit, patients who eloped or met personal physician, or discharges missing a diagnosis code.

4.2.4 Patient adjustment

All ED revisit rates were adjusted for patient characteristics, including age, gender, race, payer, income (based on zip code), and drive time to nearest ED (based on zip code), using the methodology described in section 3.2.