CENTER FOR HEALTH INFORMATION AND ANALYSIS

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TECHNICAL APPENDIX

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FY18 Massachusetts Acute Care Hospitals (January 2020)

TECHNICAL APPENDIX

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Introduction

Acute and non-acute hospitals included in *Massachusetts Hospital Profiles - Data through Fiscal Year 2018* were profiled on service, payer mix, quality, utilization, revenue, and financial performance. Details for each of these metrics are included in this technical appendix.

The Center for Health Information and Analysis (CHIA) relied on the following primary data sources to present information: the Hospital Cost Report, the Hospital Discharge Database (HDD), and the Hospital Standardized Financial Statement database.

Unless otherwise noted, metrics included in this report are based on data reported by acute and non-acute hospitals from Fiscal Year (FY) 2014 to FY2018. Descriptive acute and non-acute hospital information is from FY2018.

Hospital Cost Report:

The Hospital Cost Report is submitted each year by acute and non-acute hospitals and contains data on costs, revenues, and utilization statistics. For FY2014 acute hospitals were required to complete the Cost Report based on a fiscal year end of September 30 regardless of their actual fiscal year end. Beginning in FY2015, the new Hospital Cost Report requires hospitals to submit based on the same time frames as the Medicare 2552 Cost Report filing schedules, which reflects the unique fiscal year end of each hospital.

Hospital Discharge Database (HDD):

HDD data is submitted quarterly by acute hospitals and contains patient-level data identifying charges, days, and diagnostic information for all acute inpatient discharges. CHIA used FY2018 HDD data as of August 2019 for the service metrics, which includes discharges between October 1, 2017 and September 30, 2018 for all acute hospitals.

Hospital Standardized Financial Statements:

The Hospital Standardized Financial Statements are submitted quarterly and annually by acute hospitals based on their individual fiscal year end. The Standardized Financial Statements contain information on the hospital's assets, liabilities, revenues, expenses, and profits or losses. They reflect only the hospital's financial information; they do not reflect financial information for any larger health system with which a hospital may be affiliated.

Audited Financial Statements:

Audited Financial Statements are submitted annually by hospitals (or their parent organizations, if applicable). In addition to the financial figures that are found in the Hospital Standardized Financial Statements, the Audited Financial Statements contain an opinion from an independent auditor as well as notes from hospital or system management that elaborate on the financial performance and standing of the hospital or system during the fiscal year.

Quality Data Sources:

To compile the hospital quality measures, CHIA relied on the following primary data sources: HDD, the Centers for Medicare & Medicaid Services (CMS) Hospital Compare database, and The Leapfrog Group.

Data Verification:

Each year's Hospital Cost Report, hospital and multi-acute hospital system financial statements, Relative Price, and quality data reports were verified in accordance with respective reporting regulation requirements. Additional data verification forms that included each hospital's reported financial data were sent to each acute and non-acute hospital for FY2014-FY2018.

An **acute hospital** is a hospital that is licensed by the Massachusetts Department of Public Health and contains a majority of medical-surgical, pediatric, obstetric, and maternity beds.

Multi-Acute Hospital System Affiliation and Location

Massachusetts hospitals are generally affiliated with a larger health system. Health systems may include multiple hospitals and/or provider organizations while others may have only one hospital with associated providers or provider organizations. Multi-acute hospital system membership identifies those health systems with more than one acute hospital. This information was derived from Audited Financial Statements.

Below is a list of Massachusetts multi-acute hospital systems and their acute hospital members as of the end of each system's fiscal year 2018:

MULTI-ACUTE HOSPITAL SYSTEM	ACUTE HOSPITAL MEMBER
Baystate Health	Baystate Franklin Medical Center Baystate Medical Center Baystate Noble Baystate Wing Hospital
Berkshire Health Systems	Berkshire Medical Center Fairview Hospital
Cape Cod Healthcare	Cape Cod Hospital Falmouth Hospital
CareGroup	Beth Israel Deaconess Hospital – Milton Beth Israel Deaconess Hospital – Needham Beth Israel Deaconess Hospital – Plymouth Beth Israel Deaconess Medical Center Mount Auburn Hospital New England Baptist Hospital
Heywood Healthcare	Athol Hospital Heywood Hospital
Lahey Health System	Lahey Hospital & Medical Center Northeast Hospital Winchester Hospital
Partners HealthCare System	Brigham and Women's Hospital Brigham and Women's Faulkner Hospital Cooley Dickinson Hospital Martha's Vineyard Hospital Massachusetts Eye and Ear Infirmary Massachusetts General Hospital Nantucket Cottage Hospital Newton-Wellesley Hospital North Shore Medical Center
Shriners Hospitals for Children^	Shriners Hospitals for Children – Boston

MULTI-ACUTE HOSPITAL SYSTEM	ACUTE HOSPITAL MEMBER
	Shriners Hospitals for Children – Springfield
Steward Health Care System	Morton Hospital, A Steward Family Hospital
	Nashoba Valley Medical Center, A Steward Family Hospital
	Steward Carney Hospital
	Steward Good Samaritan Medical Center
	Steward Holy Family Hospital
	Steward Norwood Hospital
	Steward Saint Anne's Hospital
	Steward St. Elizabeth's Medical Center
UMass Memorial Health Care	HealthAlliance-Clinton Hospital
	Marlborough Hospital
	UMass Memorial Medical Center
Wellforce	Lowell General Hospital
	MelroseWakefield Hospital
	Tufts Medical Center
Tenet Healthcare^	MetroWest Medical Center
	Saint Vincent Hospital

^Tenet Healthcare Corporation and Shriners Hospitals for Children are multi-state health systems with a large presence outside of Massachusetts. Both own two acute hospitals in Massachusetts (Tenet owns MetroWest Medical Center and Saint Vincent Hospital; Shriners owns Shriners Hospitals for Children – Boston and Shriners Hospitals for Children - Springfield).

Regional Definitions

The location for each acute hospital in this report was obtained, where possible, from hospital licensing information collected by the Massachusetts Department of Public Health (DPH). The hospital license includes information on a hospital's campuses and satellite offices.

The geographic regions presented in this report are derived from the Health Policy Commission (HPC) static geographic regions. The HPC regions were rolled up into larger regions for this publication to facilitate better comparison within each geographic area. The acute hospitals and the regions to which they were assigned are:

MASSACHUSETTS REGION	ACUTE HOSPITAL ASSIGNED TO REGION
Metro Boston	Beth Israel Deaconess Hospital – Milton
	Beth Israel Deaconess Hospital – Needham
	Beth Israel Deaconess Medical Center
	Boston Children's Hospital
	Boston Medical Center
	Brigham and Women's Faulkner Hospital
	Brigham and Women's Hospital
	Cambridge Health Alliance
	Dana-Farber Cancer Institute
	Massachusetts Eye and Ear Infirmary
	Massachusetts General Hospital
	MelroseWakefield Hospital
	Mount Auburn Hospital

MASSACHUSETTS REGION	ACUTE HOSPITAL ASSIGNED TO REGION
	New England Baptist Hospital
	Newton-Wellesley Hospital
	Shriners Hospitals for Children – Boston
	Steward Carney Hospital
	Steward St. Elizabeth's Medical Center
	Tufts Medical Center
Northeastern Massachusetts	Anna Jaques Hospital
	Emerson Hospital
	Lahey Hospital & Medical Center
	Lawrence General Hospital
	Lowell General Hospital
	Nashoba Valley Medical Center, A Steward Family Hospital
	North Shore Medical Center
	Northeast Hospital
	Steward Holy Family Hospital
	Winchester Hospital
Central Massachusetts	Athol Hospital
	Harrington Memorial Hospital
	HealthAlliance-Clinton Hospital
	Heywood Hospital
	Saint Vincent Hospital
	UMass Memorial Medical Center
Cape and Islands	Cape Cod Hospital
	Falmouth Hospital
	Martha's Vineyard Hospital
	Nantucket Cottage Hospital
Metro West	Marlborough Hospital
	MetroWest Medical Center
	Milford Regional Medical Center
	Steward Norwood Hospital
	Sturdy Memorial Hospital
Western Massachusetts	Baystate Franklin Medical Center
	Baystate Medical Center
	Baystate Noble Hospital
	Baystate Wing Hospital
	Berkshire Medical Center
	Cooley Dickinson Hospital
	Fairview Hospital
	Holyoke Medical Center
	Mercy Medical Center
	Shriners Hospitals for Children – Springfield
Metro South	Beth Israel Deaconess Hospital – Plymouth

MASSACHUSETTS REGION	ACUTE HOSPITAL ASSIGNED TO REGION
	Morton Hospital, A Steward Family Hospital
	Signature Healthcare Brockton Hospital
	South Shore Hospital
	Steward Good Samaritan Medical Center
Southcoast	Steward Saint Anne's Hospital
	Southcoast Hospitals Group

[1] For descriptions of the regions, see **http://www.mass.gov/anf/docs/hpc/2013-cost-trends-report-technical-appendix-b3-regions-of-massachusetts.pdf** (last accessed March 7, 2017).

Special Designations

Certain acute hospitals in Massachusetts have a special status among public payers due to their rural or relatively isolated locations:

Critical Access Hospital is a state designation given to hospitals that have no more than 25 acute beds, are located in a rural area, and are more than a 35-mile drive from the nearest hospital or more than a 15- mile drive in areas with mountainous terrains or secondary roads.[1] Critical Access Hospitals receive cost-based payments from Medicare and MassHealth.

Sole Community Hospital is a Medicare designation given to hospitals that are located in rural areas or are located in areas where it is difficult to access another hospital quickly. These hospitals are eligible to receive higher inpatient payments from Medicare than other hospitals.

[1] In addition, Critical Access Hospitals include hospitals that were, prior to January 1, 2006, designated by the State as a "necessary provider" of health care services to residents in the area. There are additional requirements to be designated as a Critical Access Hospital, including length of stay requirements, staffing requirements, and other provisions. See Code of Federal Regulations: 42 CFR 485.601-647.

Hospital Types

In order to develop comparative analytics, CHIA assigned hospitals to peer cohorts. The acute hospitals were assigned to one of the following cohorts according to the criteria below:

Academic Medical Centers (AMCs) are a subset of teaching hospitals. AMCs are characterized by (1) extensive research and teaching programs and (2) extensive resources for tertiary and quaternary care, and are (3) principal teaching hospitals for their respective medical schools and (4) full service hospitals with case mix intensity greater than 5% above the statewide average.

Teaching hospitals are those 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) and do not meet the criteria to be classified as AMCs.

Community hospitals are hospitals that are not teaching hospitals and have a public payer mix of less than 63%.

Community - High Public Payer (HPP) are community hospitals that are disproportionately reliant on public revenues by virtue of a public payer mix of 63% or greater. Public payers include Medicare, Medicaid, and other government payers, including the Health Safety Net.

Specialty hospitals are not included in any cohort comparison analysis due the unique patient populations they serve and/or the unique sets of services they provide.

We are using the FY2018 Cohort Designations. Below is a list of acute hospital cohorts and the hospitals assigned to each, based on FY18 data (with the exception of Teaching which is based on FY2017 to be consistent with the Massachusetts Acute Hospital and Health System Financial Performance: FY 2018 Published in September 2019):

COHORT DESIGNATION	ACUTE HOSPITAL
AMC	Beth Israel Deaconess Medical Center
	Boston Medical Center
	Brigham and Women's Hospital
	Massachusetts General Hospital
	Tufts Medical Center
	UMass Memorial Medical Center
Teaching	Baystate Medical Center
	Cambridge Health Alliance
	Lahey Hospital & Medical Center
	Mount Auburn Hospital
	Saint Vincent Hospital
	Steward Carney Hospital
	Steward St. Elizabeth's Medical Center
Community	Anna Jaques Hospital
	Beth Israel Deaconess Hospital – Milton
	Beth Israel Deaconess Hospital – Needham
	Brigham and Women's Faulkner Hospital
	Cooley Dickinson Hospital
	Emerson Hospital
	Martha's Vineyard Hospital

COHORT DESIGNATION	ACUTE HOSPITAL
	Milford Regional Medical Center
	Nantucket Cottage Hospital
	Newton-Wellesley Hospital
	South Shore Hospital
	Winchester Hospital
Community – High Public Payer	Athol Hospital
	Baystate Franklin Medical Center
	Baystate Noble Hospital
	Baystate Wing Hospital
	Berkshire Medical Center
	Beth Israel Deaconess Hospital – Plymouth
	Cape Cod Hospital
	Fairview Hospital
	Falmouth Hospital
	Harrington Memorial Hospital
	HealthAlliance-Clinton Hospital
	Heywood Hospital
	Holyoke Medical Center
	Lawrence General Hospital
	Lowell General Hospital
	Marlborough Hospital
	MelroseWakefield Hospital
	Mercy Medical Center
	MetroWest Medical Center
	Morton Hospital, A Steward Family Hospital
	Nashoba Valley Medical Center, A Steward Family Hospital
	North Shore Medical Center
	Northeast Hospital
	Signature Healthcare Brockton Hospital
	Southcoast Hospitals Group
	Steward Good Samaritan Medical Center
	Steward Holy Family Hospital
	Steward Norwood Hospital
	Sturdy Memorial Hospital
	Steward Saint Anne's Hospital
Specialty	Boston Children's Hospital
	Dana-Farber Cancer Institute
	Massachusetts Eye and Ear Infirmary
	New England Baptist Hospital
	Shriners Hospitals for Children – Boston
	Shriners Hospitals for Children – Springfield

At a Glance

Hospital system affiliation notes with which multi-acute hospital system, if any, the hospital is affiliated.

Hospital system surplus (loss) is the hospital system's profit/loss in FY 2018.

Change in ownership notes change in ownership during the period of the analysis.

Total staffed beds are the average number of beds during the fiscal year that were in service and staffed for patient use.

Inpatient occupancy rate is the average percent of staffed inpatient beds occupied during the reporting period. Percentage of occupancy is calculated as follows: Inpatient Days divided by Weighted Average Staffed Beds times 365 (or the number of days in the reporting period).

Special public funding indicates whether the hospital received Infrastructure and Capacity Building (ICB), Community Hospitals Acceleration, Revitalization and Transformation (CHART), or Health Care Innovation Investment (HCII) grants. Special public funding is grant money given to hospitals by the state or federal government. The amounts listed may be total grant allocations that will be disbursed over a period of time, or a portion of a grant that was disbursed in FY18. For more information please see the Special Public Funding notes contained in Appendix D.

Trauma Center designation is determined by the Massachusetts Department of Public Health and the American College of Surgeons, with Level 1 being the highest designation given to tertiary care facilities. Facilities can be designated as Adult and/or Pediatric Trauma Centers.[2] While there are five levels of trauma center designations recognized nationally, Massachusetts hospitals only fall under Levels 1, 2, and 3 for Adult and/or Levels 1 and 2 for Pediatric.

> **Level 1 Trauma Center** is a comprehensive regional resource that is a tertiary care facility central to the trauma system. A Level 1 Trauma Center is capable of providing total care for every aspect of injury, from prevention through rehabilitation.
>
> **Level 2 Trauma Center** is able to initiate definitive care for all injured patients, and provide 24- hour immediate coverage by general surgeons, as well as coverage by the specialties of orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology and critical care.
>
> **Level 3 Trauma Center** has demonstrated an ability to provide prompt assessment, resuscitation, surgery, intensive care and stabilization of injured patients and emergency operations, including the ability to provide 24-hour immediate coverage by emergency medicine physicians and prompt availability of general surgeons and anesthesiologists.

Case mix index (CMI) is a relative value assigned to the hospital's mix of inpatients to determine the overall acuity of the hospital's patients and is compared with the CMI of peer hospitals and the statewide average CMI. CHIA calculated each hospital's CMI by applying the 3M™ All Patient Refined (APR) grouper, version 30 with Massachusetts-specific baseline cost weights to each hospital's HDD data. Hospitals validate their HDD data submissions annually with CHIA.

[2] American Trauma Society, Trauma Center Levels Explained. Available at: **http://www.amtrauma.org/?page=TraumaLevels** (last accessed October 6, 2017).

The APR grouper and Massachusetts-specific baseline cost weights used in this year's publication are consistent with those used in last year's publication. All case mix information included in this report has been grouped under APR grouper, version 30.

Inpatient Net Patient Service Revenue (NPSR) per Case Mix Adjusted Discharge (CMAD) measures the hospital's NPSR divided by the product of the hospital's discharges and its case mix index. NPSR includes both net inpatient revenue and inpatient premium revenue.

> **Inpatient Net Revenue per CMAD** growth rate for each hospital was calculated by dividing the hospital's Net Patient Service Revenue (NPSR) by the total CMADs

Inpatient – outpatient revenue is derived from the amount of GPSR reported for inpatient and outpatient services in the Hospital Cost Report.

Outpatient revenue is the hospital's reported net revenue for outpatient services. Net outpatient service revenue includes both net outpatient revenue and outpatient premium revenue.

> **Outpatient Revenue** growth rate for each hospital represents the percent change in a hospital's reported net revenue for outpatient services. Note that this measure examines the growth in total outpatient revenue and is not adjusted for patient volume, severity or service mix.

Total revenue is the hospital's total unrestricted revenue in FY 2018.

Total surplus (loss) is the hospital's reported profit/loss in FY 2018.

Public payer mix is determined based upon the hospital's reported Gross Patient Service Revenue (GPSR). See Payer Mix metric description in this appendix for more information. We are using the FY2018 GPSR.

Calendar Year (CY) 2017 Commercial Statewide Relative Price reflects a relativity calculated for a given provider across all commercial payers (statewide RP or "S-RP"). For more information on S-RP methodology, refer to **http://www.chiamass.gov/assets/docs/r/pubs/19/relative-price-methodology-paper.pdf**

Top three commercial payers represent those with the largest percentage share of total commercial payments at that hospital.

Inpatient discharges data was sourced from the Hospital Cost Report. See the Inpatient Discharge metric for more information.

> **Inpatient discharges** growth rate for each hospital measures the percent change in discharges for inpatient admissions.

Emergency department visits include any visit by a patient to an emergency department that results in registration at the Emergency Department but does not result in an outpatient observation stay or the inpatient admission of the patient at the reporting facility. An Emergency Department visit occurs even if the only service provided to a registered patient is triage or screening.

> **Emergency department visits** growth rate for each hospital measures the percent change in emergency department visits.

Outpatient visits are the total outpatient visits reported by the hospital. Note that outpatient visits may not be uniformly reported across hospitals. Where substantial increases / decreases were observed, hospitals were notified and afforded the opportunity to update the information provided. In most cases, hospitals provided explanations but did not revise their data.

> **Outpatient visits** growth rate for each hospital measures the percent change in total outpatient visits to a hospital.

Readmission rate is calculated using the Hospital-Wide All-Cause Unplanned 30-day Readmission Measure developed by CMS and the Yale Center for Outcomes Research, and applied to the Massachusetts adult all-payer population. Readmissions are defined as an admission for any reason to the same or a different hospital within 30 days of a previous discharge. Obstetric, primary behavioral health, cancer, and rehabilitation discharges are excluded from the calculations. The raw readmissions rate is reported, which is the number of readmissions within 30 days divided by the total number of eligible discharges.

Early elective deliveries rate measures the proportion of deliveries that were completed between 37 to 39 weeks gestation without medical necessity, following an induction or cesarean section. Thirty-six acute hospitals reported data for this indicator. All data were received from The Leapfrog Group as pre-calculated percentages. The patient population represents all payers and all ages, and the data period was 2018. Participation in the Leapfrog survey is voluntary; where a hospital does not complete the survey or report on certain items in the survey, the measure is also not included in the profiles.

Acute Hospital Profiles: Services

Most common inpatient diagnosis related groups (DRGs) and the percentage of those DRGs treated at that hospital for the region.

- **Data Sources:** FY 2018 HDD data as of August 2019 and the 3M™ APR-DRG 30 All Patient Refined Grouper

- **Hospital Calculation:** Each discharge was grouped and ranked by DRG code. The subject hospital's 10 most frequently occurring DRGs were identified and those DRGs were then summed for all hospitals in the region in order to calculate the percent of regional discharges that were treated at the subject hospital. The total number of the subject hospital's discharges was compared to the sum of all hospital discharges in the region to determine the overall proportion of regional discharges.

For more information on DRGs, please see Appendix C.

Most common communities from where the hospital's inpatient discharges originated, and the total percent of all discharges (from Massachusetts hospitals) from that community that went to that hospital.

- **Data Source:** FY 2018 HDD data as of August 2019 for discharge information; patient origin was determined by the zip codes from where the patients resided. In larger cities, the top communities may reflect postal code neighborhoods.

- **Hospital Calculation:** The zip code for each patient discharge was matched with the USPS community name, and then grouped and ranked. The most frequently occurring communities were then summed for all hospitals in the region to calculate the percent of community discharges that went to the subject hospital.

A **hospital's top communities by inpatient origin** were determined using a hospital's FY18 discharge data from the HDD. Patient origin was determined by the reported zip code for each patient's residence. In larger cities, communities may include multiple zip codes. These zip codes were rolled up to reflect postal code neighborhoods based on the United States Postal Service Database. For more information on the zip codes included within each region, please see the databook.

For example, Boston zip codes were rolled up to the following designations: Boston (Downtown) includes: Back Bay, Beacon Hill, Downtown Boston, the Financial District, East Boston, Fenway/Kenmore, South Boston and South End. The remaining Boston communities with multiple zip codes were rolled up to these designations: Allston, Brighton, Charlestown, Dorchester, Dorchester Center, Hyde Park, Jamaica Plain, Mattapan, Mission Hill, Roslindale, Roxbury, and West Roxbury.

Acute Hospital Profiles: Quality Measures

To compile provider quality performance information, CHIA relied on the following primary data sources: CHIA's Hospital Discharge Database (HDD), the Centers for Medicare and Medicaid Services (CMS) Hospital Compare database, and The Leapfrog Group. Metrics are based on varied data periods due to differences in reporting time frames across the data sources. For each metric, the associated reporting time period is listed.

Health Care-Associated Infections of three different types are reported:

1. Central Line-Associated Blood Stream Infections (CLABSI): This measure captures the observed rate of health care-associated central line-associated bloodstream infections among patients in an inpatient acute hospital, compared to the expected number of infections based on the hospital's characteristics and case mix.

2. Catheter-Related Urinary Tract Infections (CAUTI): This measure captures the observed rate of health care-associated catheter-related urinary tract infections among patients in an inpatient acute hospital (excluding patients in Level II or III neonatal ICUs), compared to the expected number of infections based on the hospital's characteristics and case mix.

3. Surgical Site Infections (SSI): Colon Surgery: This measure captures the observed rate of deep incisional primary or organ/space surgical site infections during the 30-day postoperative period following inpatient colon surgery, compared to the expected number of infections based on the hospital's characteristics and case mix.

- **Data source:** CMS Hospital Compare
- **Data Period:** 2017-2018
- **Hospital Calculation:** These health care-associated infections are reported using the Standard Infection Ratio (SIR), which is the number of infections in a hospital compared to the number of expected infections. The SIR for CLABSI and CAUTI is risk adjusted for type of patient care locations, hospital affiliation with a medical school, and bed size. The SIR for SSI: Colon Surgery is risk adjusted for procedure-related factors, such as: duration of surgery, surgical wound class, use of endoscope, re-operation status, patient age, and patient assessment at time of anesthesiology.

  All SIRs for Health Care-Associated Infections are retrieved from CMS Hospital Compare as pre-calculated SIRs.
- **Cohort Calculation:** Not applicable
- **National Comparative:** CMS Hospital Compare
- **Patient Population:** All payers, Age 18+

Hospital Readmission rates are calculated using the Hospital-Wide All-Cause Unplanned 30-day Readmission Measure developed by CMS and the Yale Center for Outcomes Research, and applied to the Massachusetts adult all-payer population. Readmissions are defined as an admission for any reason to the same or a different hospital within 30 days of a previous discharge. Obstetric, primary behavioral health, cancer, and rehabilitation discharges are excluded from the calculations. The raw readmission rate is reported, which is the number of readmissions within 30 days divided by the total number of eligible discharges.

- **Data source:** CHIA's Hospital Discharge Database
- **Data Period:** FY 2018
- **Hospital Calculation:** The raw readmission rate reflects the number of unplanned readmissions within 30 days divided by the total number of eligible discharges during the designated time period.

- **Cohort Calculation:** Not applicable
- **State Comparative:** The method yields a statewide readmission rate across all the Commonwealth's acute-care hospitals for the designated time period.
- **Patient Population:** All payers, age 18+, excluding obstetric, primary psychiatric, cancer, and rehabilitation discharges.

Acute Hospital Profiles: Utilization Trends

Change in volume of inpatient discharges measures discharges for inpatient admissions.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 5a, Row 25, Column 2

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 5, Line 47, Column 1

- **Hospital index calculation:** Displays the percent change in the number of inpatient discharges for each year, using FY 2014 as the base year. FY 2015: (FY 2015-FY 2014)/FY 2014, FY 2016: (FY 2016-FY 2014)/FY 2014, FY 2017: (FY 2017-FY 2014)/FY 2014, FY 2018: (FY 2018-FY 2014)/FY 2014.

- **Cohort calculation:** Represents the percent change of total discharges across all hospitals in the cohort for each year. For example: Cohort for FY 2015 = (Sum of discharges at cohort hospitals in FY 2015-Sum of discharges at cohort hospitals in FY 2014)/Sum of discharges at cohort hospitals in FY 2014.

Change in volume of outpatient visits measures total outpatient visits to a hospital. Note that outpatient visits may not be uniformly reported across hospitals.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 5a, Row 39, Column 2

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 5, Line 301, Column 1

- **Hospital index calculation:** Calculate the percent change between each year, using FY14 as the base year. FY 2015: (FY 2015-FY 2014)/FY 2014, FY 2016: (FY 2016-FY 2014)/FY 2014, FY 2017: (FY 2017-FY 2014)/FY 2014, FY 2018: (FY 2018-FY 2014)/FY 2014.

- **Cohort calculation:** Represents the median of the percent change across all hospitals in the cohort for each year. For example: Cohort for FY 2015 = median of (% change for hospital A, % change for hospital B, % change for hospital C...)

Acute Hospital Profiles: Patient Revenue Trends

Net inpatient service revenue per case mix adjusted discharge (CMAD) measures the hospital's net inpatient service revenue (NPSR) divided by the product of the number of the hospital's discharges and its case mix index. NPSR includes both net inpatient revenue and inpatient premium revenue.

- **Data Sources:** NPSR and discharges were sourced from the Massachusetts Hospital Cost Report; Case Mix Index (CMI) is sourced from HDD.

- **Hospital calculation:** The hospital's inpatient net revenue per CMAD was calculated by dividing NPSR by the total CMAD for each year.

- **Cohort calculation:** The range of all revenue/CMAD values for cohort hospitals are represented by the vertical black line. The cohort value denotes the median revenue per CMAD for all cohort hospitals.

Variation in inpatient discharge counts:

Hospitals may report different numbers of discharges on the Hospital Cost Report and the HDD. Hospitals have explained that this is due to:

- *Timing* – while HDD is accurate when submitted (75 days after the close of a quarter), a case may be reclassified as outpatient, usually due to a change in payer designation. Payers may have different clinical criteria for defining an inpatient and outpatient stay.
- *HDD edits* – discharges reported by the hospital that did not pass HDD edits may have been excluded from the HDD but included in the Hospital Cost Report;
- Payer classification/status differences between the Hospital Cost Report and HDD;

Since a hospital's case mix index is calculated using the HDD, which often includes a lower number of discharges than reported by the hospital on the Hospital Cost Report, the calculation of a hospital's total case mix adjusted discharges equals the number of discharges reported on the Hospital Cost Report, multiplied by the case mix index.

Change in total outpatient revenue measures a hospital's reported net revenue for outpatient services. Net outpatient service revenue includes both net outpatient revenue and outpatient premium revenue. Note that this measure examines the growth in total outpatient revenue and is not adjusted for patient volume, severity or service mix.

- **Data Sources:**

  FY 2014, 403 Cost Report, Schedule 5a, Rows 78.01 (net outpatient revenue) + 78.02 (outpatient premium revenue), Column 2

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 5, Line 209, Column 1

- **Hospital index calculation:** Displays the percent change between each year, using FY14 as the base year. FY 2015: (FY 2015-FY 2014)/FY 2014, FY 2016: (FY 2016-FY 2014)/FY 2014, FY 2017: (FY 2017-FY 2014)/FY 2014, FY 2018: (FY 2018-FY 2014)/FY 2014.

- **Cohort calculation:** Represents the median of the percent change across all hospitals in the cohort for each year. For example: Cohort for FY15= median of (% change for hospital A, % change for hospital B, % change for hospital C...)

Acute Hospital Profiles: Financial Performance

Total Revenue, Total Costs and Profit / Loss measure the amount of the subject hospital's Total Revenue, Total Costs, and Total Profit or Loss for each year from 2014 through 2018.

- **Data Sources:** Financial Statements: The line numbers for each data point are as follows: Total Unrestricted Revenue (row 65), Operating Revenue (row 57.2), Non-Operating Revenue (row 64.1), Total Expenses (row 73), and Profit / Loss (row 74).

Total Margin measures the subject hospital's overall financial performance compared to the median total margin of the hospitals in its peer cohort.

- **Data Sources:** Financial Statements: Excess of Revenue, Gains, & Other Support (row 74) divided by Total Unrestricted Revenue (row 65)

- **Cohort Calculation:** Calculated median for the cohort group.

Operating Margin measures the subject hospital's financial performance of its primary, patient care activities compared to the median operating margin of the hospitals in its peer cohort.

- **Data Sources:** Financial Statements: Operating Revenue (row 57.2) minus Total Expenses (row 73) divided by Total Unrestricted Revenue (row 65)

- **Cohort Calculation:** Calculated median for the cohort group.

Note: Hospitals may have been assigned to different cohorts in previous years due to payer mix in that given year or other factors. To remain consistent in comparisons between cohorts across multiple years, hospitals were retroactively assigned to their FY 2018 cohort designations for all years examined. The number of hospitals included in a given cohort may vary from year to year due to hospital closures.

The acute hospital cohort profile measures the acute hospital cohorts as composites of the individual hospitals assigned to each cohort. In general, metrics were determined by aggregating the values of all hospitals assigned to the cohort. For comparison purposes, the individual cohorts are compared to one another and all hospitals statewide, including specialties.[3] The analytic metrics are largely the same as the metrics used for the individual hospital profiles, except as noted below. Please see the descriptions and calculation methods described in the Acute Hospital Metric Description section for more information.

Inpatient Severity Distribution measures the percentage of a cohort's discharges that falls into each statewide severity quintile. This metric provides a way to compare the severity levels of the cohort's patients to those of other acute hospitals in Massachusetts.

- **Data Source:** Hospital Discharge Database (HDD) as of August 2019.

- **Data Period:** FY 2018

- **Cohort Calculation:** Every discharge in the state has a Diagnosis Related Group (DRG) code associated with it. Severity quintiles were determined by ranking all possible DRG outputs by case-weight. The cohort

[3] Note that specialty hospitals are not assigned to any cohort due to their unique service mix and/or populations served.

calculation shows the percentage of a cohort's aggregate discharges that falls into each quintile. These proportions were then compared with the proportions of aggregated discharges by severity quintile for all hospitals assigned to other cohorts.

In cases where metrics were similar to the acute hospital profile metrics, data was aggregated to determine cohort measures. For example:

The most common inpatient DRGs for each subject cohort were determined by categorizing all of the hospitals' discharges by cohort using the All Patient Refined Grouper (3M™ APR-DRG 30), which were then summed and ranked. Each of the subject cohort's ten most frequently occurring DRGs were then divided by the statewide count per DRG to obtain the percent of discharges to the statewide total.

*The cohort comparison metric for **payer mix** is different from comparisons among acute hospitals:*

Payer mix was calculated differently from other measures due to the fact that the underlying charges that comprise GPSR differ across hospitals. For this measure, the cohort payer mix was first calculated for each hospital assigned to the cohort in the manner described in the Acute Hospital Profiles section of this Appendix. The mean of the individual cohort hospital's experience was determined and is displayed here. The same method was used to determine the trend in outpatient visits for comparison to all other cohort hospital. Non-acute hospitals in Massachusetts are typically identified as psychiatric, rehabilitation, chronic care facilities and state owned non-acute hospitals including department of mental health / public health hospitals.

Non-Acute Hospital Location and Multi-Hospital System Affiliations

The location for each non-acute hospital in this report was obtained, where possible, from hospital licensing information collected by DPH. The hospital license includes information on a hospital's campuses and satellite offices.

Multi-hospital system membership identifies the health system with which the subject non-acute hospital is a member. This information was derived from the hospital's Audited Financial Statements.

Below is a list of Massachusetts multi-hospital systems and their non-acute hospital members:

MULTI-HOSPITAL SYSTEM	NON-ACUTE HOSPITAL MEMBER
Universal Health Service	Arbour Hospital Arbour-Fuller Memorial Arbour-HRI Hospital Westwood Pembroke Hospital
Encompass	Braintree Rehabilitation Hospital HealthSouth Rehabilitation of Western MA Fairlawn Rehabilitation Hospital New England Rehabilitation Hospital
Partners Health Care System	McLean Hospital Spaulding Rehabilitation Hospital Boston Spaulding Rehabilitation Hospital Cape Cod Spaulding Hospital Cambridge
Signature HealthCare	Westborough Behavioral Healthcare Hospital
Vibra HealthCare	Vibra Hospital of Western MA New Bedford Rehabilitation Hospital
Steward Health Care System	New England Sinai Hospital
Whittier Health System	Whittier Pavilion Whittier Rehabilitation Hospital Bradford Whittier Rehabilitation Hospital Westborough

Non-Acute Hospital Cohorts

Non-acute hospitals were assigned to peer cohorts based upon MassHealth regulatory designations, defined by the criteria below[4]:

Psychiatric hospitals are licensed by the DMH for psychiatric services, and by DPH for substance abuse services.

Rehabilitation hospitals provide intensive post-acute rehabilitation services, such as physical, occupational, and speech therapy services. For Medicare payment purposes, the federal government classifies hospitals as rehabilitation hospitals if they provide more than 60% of their inpatient services to patients with one or more of 13 diagnoses listed in federal regulations.[5]

Chronic care hospitals are hospitals with an average length of stay greater than 25 days. These hospitals typically provide longer-term care, such as ventilator-dependent care. Medicare classifies chronic hospitals as Long-Term Care Hospitals, using the same 25-day threshold.

Non-acute specialty hospitals were not included in any cohort comparison analysis due the unique patient populations they serve and/or the unique sets of services they provide. Non-acute hospitals that were considered specialty hospitals include:

- AdCare Hospital of Worcester - provides substance abuse services
- Franciscan Hospital for Children - provides specialized children's services
- Hebrew Rehabilitation Hospital - specializes in providing longer term care than other chronic hospitals

Department of Mental Health Hospitals are state owned non-acute hospital provides psychiatric and mental health care for those with otherwise limited access to facilities providing such care.

Department of Public Health Hospitals are multi-specialty hospitals that provides acute and chronic care to those for whom community facilities are not available or access to health care is restricted.

Below is a list of non-acute hospital cohorts and the hospitals assigned to each:

COHORT DESIGNATION	NON-ACUTE HOSPITAL
Psychiatric Hospitals	Arbour Hospital
	Arbour-Fuller Memorial
	Arbour-HRI Hospital
	Bournewood Hospital
	High Point Hospital
	McLean Hospital
	Southcoast Behavioral Hospital
	Taravista Health Center
	Walden Behavioral Care
	Westborough Behavioral Healthcare Hospital^
	Westwood Pembroke Hospital

[4] State-owned non-acute hospitals are included in this publication started with the 2018 report.

[5] Code of Federal Regulations: 42 CFR 412.29(b)(2)

^ Westborough Behavioral Healthcare Hospital is a new provider in 2018

COHORT DESIGNATION	NON-ACUTE HOSPITAL
	Whittier Pavilion
Rehabilitation Hospitals	Braintree Rehabilitation Hospital HealthSouth Fairlawn Rehabilitation Hospital HealthSouth Rehabilitation Hospital of Western MA New Bedford Rehabilitation Hospital New England Rehabilitation Hospital Spaulding Rehabilitation Hospital Boston Spaulding Rehabilitation Hospital Cape Cod Whittier Rehabilitation Hospital Bradford Whittier Rehabilitation Hospital Westborough
Chronic Care Hospitals	Curahealth Stoughton New England Sinai Hospital Spaulding Hospital Cambridge Vibra Hospital of Western MA
Specialty Non-Acute Hospitals	AdCare Hospital of Worcester Franciscan Hospital for Children Hebrew Rehabilitation Hospital
Department of Mental Health Hospitals	Cape Cod & Islands Community Mental Health Center Corrigan Mental Health Center Solomon Carter Fuller Mental Health Center Taunton State Hospital Worcester State Hospital
Department of Public Health Hospitals	Lemuel Shattuck Hospital Pappas Rehabilitation Hospital for Children Tewksbury Hospital Western Massachusetts Hospital

Total staffed beds are the average number of beds during the fiscal year that were in service and staffed for patient use. Beds ordinarily occupied for less than 24 hours are usually not included.

Percent occupancy rate is the median percent of staffed inpatient beds occupied during the reporting period. Percentage of occupancy is calculated as follows: Inpatient Days divided by Weighted Average Staffed Beds times 365 (or the number of days in the reporting period).

Total inpatient days include all days of care for all patients admitted to each unit. Measure includes the day of admission but not the day of discharge or death. If both admission and discharge or death occur on the same day, the day is considered a day of admission and is counted as one patient day.

Total inpatient discharge information was sourced from Schedule 3 of the FY 2014 403 Cost Report and Tab 3 of the FY 2015 and subsequent years Massachusetts Hospital Cost Report.

Public payer mix was determined based upon the hospital's reported GPSR. See Payer Mix metric description for more information.

Total revenue was sourced from the hospital's Hospital Cost Report.

Inpatient – outpatient revenue is derived from the amount of GPSR reported for inpatient and outpatient services in the hospital's Hospital Cost Report.

Non-Acute Hospital Profiles: Services

Types of inpatient services are defined by Discharges.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 3, Column 12, Rows 1 through 21.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 3, Column 5, Lines 1 to 19.

- **Hospital calculation:** Hospital's absolute count of discharges by specific bed type.

- **Cohort calculation:** Hospital's absolute discharge count divided by cohort's total discharges by that specific bed type.

Payer Mix measures the distribution of total GPSR for across the major payer categories. This provides information regarding the proportion of services, as measured by gross charges, which a hospital provides to patients from each category of payer.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 5a, Row 44, Columns 3 through 14.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 5, Line 302, Column 2 through 13

- **Payer Category Definitions:** State Programs = Medicaid Managed + Medicaid Non-Managed + Health Safety Net (HSN); Federal Programs = Medicare Managed + Medicare Non-Managed + Other Government; Commercial & Other = Managed Care + Non-Managed Care + Self Pay + Workers Comp + Other + Connector Care. Dividing each of the above by Total GPSR results in the percentages displayed for each of the three categories.

- **Cohort Calculation**: Displays the mean of the percentages in each of the above payer categories across all hospitals in the cohort.

- **Average Hospital Calculation:** Displays the mean of the percentages in each of the payer categories to get each of the component percentages for the average non-acute hospital.
  - Note: "Average Hospital" group includes specialty hospitals.

Change in Volume of Inpatient Days includes all days of care for all patients admitted to each unit. Measure includes the day of admission but not the day of discharge or death. If both admission and discharge or death occur on the same day, the day is considered a day of admission and is counted as one patient day.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 3, Column 6, Row 22.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 3, Column 4, Line 500

- **Hospital Index calculation:** Calculated percent change in Inpatient Days for each year, using FY 2014 as the base year. FY 2015: (FY 2015-FY 2014)/FY 2014, FY 2016: (FY 2016-FY 2014)/FY 2014, FY 2017: (FY 2017-FY 2014)/FY 2014, FY 2018: (FY 2018-FY 2014)/FY 2014.
- **Cohort calculation:** Represents the median of the percent change across all hospitals in the cohort for each year. For example Cohort for FY15 = median of (% change for hospital A, % change for hospital B, % change for hospital C…)

Median Average Length of Stay (ALOS) measures the average duration of an inpatient admission.

- **Data Sources:**

  FY 2014, 403 Cost Report, Schedule 3, Column 13, Row 22.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 3, Column 8, Line 500

- **Cohort calculation:** The growth in median ALOS for each cohort is calculated relative to FY 2014 as the base year. FY 2015: (FY 2015-FY 2014)/FY 2014, FY 2016: (FY 2016-FY 2014)/FY 2014, FY 2017: (FY 2017-FY 2014)/FY 2014, FY 2018: (FY 2018-FY 2014)/FY 2014.

- This is plotted against the growth in median ALOS among all non-acute hospitals, including specialties, relative to FY 2014.

Non-Acute Hospital Profiles: Utilization

Volume of Inpatient Days includes all days of care for all patients admitted to each unit. Measure includes the day of admission but not the day of discharge or death. If both admission and discharge or death occur on the same day, the day is considered a day of admission and is counted as one patient day.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 3, Column 6, Row 22.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 3, Column 4, Line 500

Average Length of Stay (ALOS) measures the average duration of an inpatient admission.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 3, Column 13, Row 22.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 3, Column 8, Line 500

Volume of Outpatient Visits measures the total outpatient visits to a hospital.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 5a, Column 2, Row 39.

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 5, Column 1, Line 301

Non-Acute Hospital Profiles: Patient Revenue Trends

Inpatient Revenue per Day is the hospital's net inpatient service revenue (NPSR) divided by its total inpatient days.

- **Data Sources:**

  FY 2014, 403 Cost Report: NPSR was sourced from Schedule 5a, Column 2, Rows 65.01 (net inpatient revenue) and 65.02 (inpatient premium revenue). Inpatient days were sourced from Schedule 3, Column 6, Row 22 of the 403 Cost Report.

  FY 2015 and subsequent years: Massachusetts Hospital Cost Report: NPSR including premium revenue was sourced from Tab 5, Column 1, Line 208. Inpatient days were sourced from Tab 5, Column 1, Line 300.

Total Outpatient Revenue measures a hospital's reported net revenue for outpatient services. Note that this measure examines the growth in total outpatient revenue and is not adjusted for patient volume. In addition, several non-acute hospitals do not provide outpatient services.

- **Data Sources:**

  FY 2014, 403 Cost Report, Schedule 5a, Column 2, Rows 78.01 (net outpatient revenue) and 78.02 (outpatient premium revenue)

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report: Tab 5, Line 209 (outpatient NPSR including premium revenue)

Non-Acute Hospital Profiles: Financial Performance

Operating Revenue, Total Revenue, Total Costs and Profit / Loss displays the amount of each hospital's Total Revenue, Operating Revenue, Total Costs, and Total Profit or Loss.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 23B, Column 2, Total Unrestricted Revenue (Row 65), Operating Revenue (Rows 55 + 56 + 57+ 60 + 64, Total Expenses Row 73, Total Profit or Loss Row 74

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report, Tab 11, Column 1, Total Unrestricted Revenue (Row 65), Total Expenses (Row 73), and Profit / Loss: (Row 74).

Total Margin measures the subject hospital's overall financial performance.

- **Data Sources:**
  FY 2014, 403 Cost Report, Schedule 23E, Row 173

  FY 2015 and subsequent years, Massachusetts Hospital Cost Report, Tab 11, Column 1, Line 74 (Excess of Revenue, Gains& other support Over Expenses) divided by Tab 11, Column 1, Line 65 (Total Unrestricted Revenue, Gains and Other Supports)

Note: Some for-profit hospitals are organized as S corporations. For-profit entities that are organized as S corporations, in accordance with Internal Revenue Code, do not pay federal income tax on their taxable income. Instead, the shareholders are liable for individual federal income taxes on their portion of the hospital's taxable income. Therefore, these hospitals may have income that appears higher than hospitals organized as a C corporation, which are taxed separately from their owners.

Patient Origins

The Massachusetts Patient Origins map lets users identify the areas from which hospitals and hospital systems draw their patients by illustrating the distribution of hospital inpatient discharges in 2018 by patient zip code, for each acute care hospital and 11 hospital systems in Massachusetts.

Using the Hospital Inpatient Discharge Database (HIDD) Case Mix data, areas in dark blue represent ZIP codes with a high number of discharges, while light blue or gray areas represent ZIP codes with low numbers of discharges for each hospital or hospital system. Hospitals are shown as orange circles.

Please note that discharge densities are relative and hospital-specific; therefore it is not possible to directly compare the size and intensity of shaded areas across hospitals or hospital systems.

Notes about Patient Origins Map Data
Only Massachusetts ZIP codes are included in the map.

ZIP codes with fewer than 26 total discharges are not displayed to preserve data confidentiality.

Relative density scales are hospital-specific, and vary across hospitals and hospital systems (i.e., “high” and “low” densities may represent different discharge counts for different hospitals). Therefore, while it is possible to display multiple hospitals and/or systems at a time on the map, densities are not comparable and it is recommended that users select only one hospital or system at a time.
Shaded areas are positioned according to calculated center points (centroids) for each 5-digit ZIP Code. Points do not represent specific street addresses.

Dana-Farber Cancer Institute, Massachusetts Eye and Ear Infirmary, Shriners Hospitals for Children – Boston, and Shriners Hospitals for Children - Springfield are not depicted because all patient origin ZIP codes fell below the 26-discharge threshold.

Hospital system affiliations are based on arrangements as of September 2018.

Patient Origins Map Data Source
Hospital discharge data comes from the Hospital Inpatient Discharge Database (HIDD), Fiscal Year (FY) 2018. HDD data are submitted quarterly by acute hospitals. The HDD contains patient-level data—including zip code of residence—for all acute inpatient discharges. FY 2018 data includes information on discharges occurring between October 1, 2017 and September 30, 2018. Patient origin was determined by each patient’s reported zip code of residence. Discharges were totaled for each zip code in Massachusetts.

For additional information about acute care hospitals in Massachusetts, please see CHIA’s Acute Hospital Profiles. For information about patient discharges by ZIP code, please refer to the FY18 Patient Origins Databook.

Appendix A: Acute Hospitals

Baystate Mary Lane hospital merged with Baystate Wing hospital in FY 2016.

Beth Israel Deaconess Hospital - Plymouth (formerly Jordan Hospital) affiliated with Beth Israel Deaconess Medical Center effective January 1, 2014.

Beth Israel Lahey Health formed in March, 2019 including the following Hospitals: **Addison Gilbert Hospital** (Northeast), **Anna Jaques Hospital**, **BayRidge Hospital** (Northeast), **Beth Israel Deaconess Hospital – Milton, Beth Israel Hospital – Needham**, **Beth Israel Hospital – Plymouth**, **Beth Israel Deaconess Medical Center**, **Beverly Hospital** (Northeast), **Lahey Hospital & Medical Center**, **Lahey Medical Center, Peabody**, **Mount Auburn Hospital**, **New England Baptist Hospital**, and **Winchester Hospital**. This will be reflected in future reports.

Brigham and Women's Hospital reported a 42% decrease in outpatient visits from 645,563 in FY2014 to 375,864 in FY2015. It was noted that outpatient revenue increased during this same period. The hospital indicated the discrepancy was related to a change in internal systems, and expects that future years will be consistent with FY2014.

Boston Medical Center
Outpatient metrics for Boston Medical Center (BMC) include information for the following freestanding community health centers:

1. East Boston Neighborhood Health Center
2. Codman Square Health Center
3. Dorchester House Multi-Service Center
4. South Boston Community Health Center

Boston Medical Center
The supplement payments from federal and state support are included in Net Patient Service Revenue (NPSR) in the calculation of Inpatient Net Patient Service Revenue per Case Mix Adjusted Discharge (CMAD).

Boston Medical Center
The FY2018 cost report includes the physician charges. Physician charges were not included in the Gross Patient Service Revenue (GPSR), Net Patient Service Revenue (NPSR), expenses or statistics of the cost reports in the prior years.

Cambridge Health Alliance
The supplement payments from federal and state support are included in NPSR in the calculation of Inpatient Net Patient Service Revenue (NPSR) per Case Mix Adjusted Discharge (CMAD). CHIA recalculated NPSR for the years FY2014 through FY2018 to include the supplemental payments from federal and state support.

Clinton Hospital merged with HealthAlliance Hospital effective October 1, 2017 to become HealthAlliance-Clinton Hospital.

Dana-Farber Cancer Institute had a substantial increase in the case mix index from 2.13 in FY2016 to 4.04 in FY2017. This increase was the result of the hospital performing more bone marrow transplants in FY2017. The case mix index in FY2018 was 3.28.

Massachusetts Eye and Ear Infirmary joined Partners Healthcare effective April 1, 2018.

MelroseWakefield Hospital was formally Hallmark Health.

Merrimack Valley Hospital, owned by Steward Health Care System, merged with Steward Holy Family Hospital, and became a campus of Steward Holy Family Hospital effective August 2014.

MetroWest Medical Center started included ancillary visits in outpatient visits in FY2015. Ancillary visits are consistently included in outpatient visits in the following years.

North Adams Regional Hospital announced on March 25, 2014 a closure of the hospital and related health care businesses effective March 28, 2014. The hospital building is now operating as a satellite emergency department for Berkshire Medical Center.

Noble Hospital was acquired by Baystate Health in June 2015. Noble Hospital was renamed Baystate Noble Hospital.

Quincy Medical Center closed on December 26, 2014. The hospital building is now operating as a satellite emergency department for Steward Carney Hospital.

Steward Health Care's hospitals did not provide their audited financial statements, therefor the financial data is as reported or filed.

Shriners Hospitals for Children (both Boston and Springfield locations) began submitting data to CHIA in FY11.

South Shore Hospital reported revenue and total margin data for FY2015 that includes approximately $29 million in a non-operating, nonrecurring sale of investments transaction.

Wellforce - On October 20, 2014, **Tufts Medical Center** and **Lowell General Hospital** combined under a new parent company (**Wellforce**) and created a new multi-acute hospital system. **Hallmark Health** joined Wellforce in FY2017.

Winchester Hospital became a member of Lahey Health in July 2014.

Appendix B: Non-Acute Hospitals

Spaulding Hospital Cambridge: As of 2013, Spaulding Hospital Cambridge no longer provides Outpatient services.

Bournewood Hospital is a sub-chapter S corporation.

Curahealth Hospitals, All the Kindred Hospitals in Massachusetts were bought by Curahealth Hospitals in the Fall of 2016. Curahealth Boston and North Shore subsequently closed after approximately a year into new ownership. Curahealth Stoughton remains open.

High Point Hospital is a new psychiatric hospital opened in 2016.

Radius Specialty Hospital closed its Roxbury and Quincy rehabilitation facilities in October 2014

Southcoast Behavioral Hospital is a new psychiatric hospital opened in 2016.

Taravista Health Center is a new psychiatric hospital opened in 2017.

Westborough Behavioral Healthcare Hospital is a new psychiatric hospital opened in 2017.

Westwood Pembroke Hospital, Westwood Hospital was closed by the Department of Mental Health on 8/25/2017, the Pembroke Hospital site remains open.

Whittier Pavilion began providing outpatient services in FY14. FY14 outpatient data represents a partial year of operation for these services.

Spaulding North Shore discontinued inpatient operations as of July 31, 2015 and subsequently closed.

Appendix C: Diagnosis Related Groups

Diagnosis Related Groups (DRGs) are used to classify the patient illnesses a hospital treats.

The 10 most common DRGs for each hospital were determined by categorizing all of a hospital's discharges into DRGs defined in the All Patient Refined Grouper (3M™ APR-DRG 30) and ranked by the total number of discharges. In most cases, it was necessary for CHIA to abbreviate the DRG name in order to fit the space available.

Below is a list of abbreviated DRG descriptions that appear in the report, and the full name and APR-DRG 30 code for each DRG.

ABBREVIATED DESCRIPTION	DESCRIPTION	APR DRG V.30
3rd Degree Brn w Skn Grft	Extensive 3rd Degree Burns w Skin Graft	841
Acute Leukemia	Acute Leukemia	690
Acute Myocardial Infarct.	Acute Myocardial Infarction	190
Adjust Dis/Neuroses exc DD	Adjustment Disorders & Neuroses Except Depressive Diagnoses	755
Alcohol & Drug w/ Rehab	Alcohol & Drug Dependence w Rehab Or Rehab/Detox Therapy	772
Alcohol Abuse & Dependence	Alcohol Abuse & Dependence	775
Angina Pectoris	Angina Pectoris & Coronary Atherosclerosis	198
Appendectomy	Appendectomy	225
Asthma	Asthma	141
Bacterial Skin Infections	Cellulitis & Other Bacterial Skin Infections	383
Bipolar Disorders	Bipolar Disorders	753
Bone Marrow Transplant	Bone Marrow Transplant	3
Bronchiolitis & RSV Pneumonia	Bronchiolitis & RSV Pneumonia	138
Burns w/ or w/o Skin Grft	Partial Thickness Burns w Or w/o Skin Graft	844
C. Spinal Fusion & Other Procs	Cervical Spinal Fusion & Other Back/Neck Proc Exc Disc Excis/Decomp	321
Card Cath - Heart Disease	Cardiac Catheterization For Ischemic Heart Disease	192
Cardiac Arrhythmia	Cardiac Arrhythmia & Conduction Disorders	201
Cardiac Valve w/o Cath	Cardiac Valve Procedures w/o Cardiac Catheterization	163
CC W Circ Disord Exc IHD	Cardiac Catheterization W Circ Disord Exc Ischemic Heart Disease	191
Cesarean Delivery	Cesarean Delivery	540
Chemotherapy	Chemotherapy	693

ABBREVIATED DESCRIPTION	DESCRIPTION	APR DRG V.30
Chest Pain	Chest Pain	203
Cleft Lip & Palate Repair	Cleft Lip & Palate Repair	95
COPD	Chronic Obstructive Pulmonary Disease	140
Craniotomy; exc Trauma	Craniotomy Except For Trauma	21
CVA Occlusion w/ Infarct	CVA & Precerebral Occlusion W Infarct	45
D&L Fusion exc Curvature	Dorsal & Lumbar Fusion Proc Except For Curvature Of Back	304
D&L Fusion for Curvature	Dorsal & Lumbar Fusion Proc For Curvature Of Back	303
Degen Nrvs Syst exc MS	Degenerative Nervous System Disorders Exc Mult Sclerosis	42
Depression exc MDD	Depression Except Major Depressive Disorder	754
Digestive Malignancy	Digestive Malignancy	240
Diverticulitis/osis	Diverticulitis & Diverticulosis	244
Drug/Alcohol Abuse, LAMA	Drug & Alcohol Abuse Or Dependence, Left Against Medical Advice	770
Eye Procs except Orbit	Eye Procedures Except Orbit	73
Factors Influ Hlth Status	Signs, Symptoms & Other Factors Influencing Health Status	861
Foot & Toe Procedures	Foot & Toe Procedures	314
Full Burns w/ Skin Graft	Full Thickness Burns w Skin Graft	842
Hand & Wrist Procedures	Hand & Wrist Procedures	316
Heart Failure	Heart Failure	194
Hip & Femur; Non-Trauma	Hip & Femur Procedures For Non-Trauma Except Joint Replacement	309
Hip Joint Replacement	Hip Joint Replacement	301
Infects - Upper Resp Tract	Infections Of Upper Respiratory Tract	113
Intervertebral Disc Excis	Intervertebral Disc Excision & Decompression	310
Intestinal Obstruction	Intestinal Obstruction	247
Kidney & UT Infections	Kidney & Urinary Tract Infections	463
Knee & Lower Excpt Foot	Knee & Lower Leg Procedures Except Foot	313
Knee Joint Replacement	Knee Joint Replacement	302
Lymphoma & Non-Acute Leuk	Lymphoma, Myeloma & Non-Acute Leukemia	691
Maj Cranial/Facial Bone	Major Cranial/Facial Bone Procedures	89
Maj HEM/IG Dx exc SC	Major Hematologic/Immunologic Diag Exc Sickle Cell Crisis & Coagul	660
Maj Larynx & Trachea Proc	Major Larynx & Trachea Procedures	90
Maj Male Pelvic Procs	Major Male Pelvic Procedures	480

ABBREVIATED DESCRIPTION	DESCRIPTION	APR DRG V.30
Maj Resp & Chest Proc	Major Respiratory & Chest Procedures	120
Maj Resp Infect & Inflam	Major Respiratory Infections & Inflammations	137
Maj Sml & Lrg Bowel Procs	Major Small & Large Bowel Procedures	221
Maj. Depressive Disorders	Major Depressive Disorders & Other/Unspecified Psychoses	751
Malignancy- Hept/Pancreas	Malignancy Of Hepatobiliary System & Pancreas	281
Mastectomy Procedures	Mastectomy Procedures	362
Normal Neonate Birth	Neonate Birthwt>2499G, Normal Newborn or Neonate w Other Problem	640
Non-Bact Gastro, Nausea	Non-Bacterial Gastroenteritis, Nausea & Vomiting	249
O.R. Proc for Tx Comp	O.R. Procedure For Other Complications Of Treatment	791
Opioid Abuse & Dependence	Opioid Abuse & Dependence	773
Org Mental Hlth Disturb	Organic Mental Health Disturbances	757
Other Anemia and Blood Dis	Other Anemia & Disorders of Blood & Blood-Forming Organs	663
Other Antepartum Dxs	Other Antepartum Diagnoses	566
Other Digestive System Dx	Other Digestive System Diagnoses	254
Other ENT & Cranial Dxs	Other Ear, Nose, Mouth, Throat & Cranial/Facial Diagnoses	115
Other ENT Procedures	Other Ear, Nose, Mouth & Throat Procedures	98
Other Nervous Syst Procs	Other Nervous System & Related Procedures	26
Other Pneumonia	Other Pneumonia	139
Other Resp & Chest Procs	Other Respiratory & Chest Procedures	121
Othr Back & Neck Disorder	Other Back & Neck Disorders, Fractures & Injuries	347
Othr Maj Head/Neck procs	Other Major Head & Neck Procedures	91
Othr Muscl Sys & Tis Proc	Other Musculoskeletal System & Connective Tissue Procedures	320
Othr Muscl Sys & Tis Dx	Other Musculoskeletal System & Connective Tissue Diagnoses	351
Othr O.R. Procs for Lymph/HEM	Other O.R. Procedures For Lymphatic/Hematopoietic/Other Neoplasms	681
Othr Skin & Breast Dis	Other Skin, Subcutaneous Tissue & Breast Disorders	385
Othr Skin, Tis & Rel Procs	Other Skin, Subcutaneous Tissue & Related Procedures	364
Pancreas Dis exc Malig	Disorders Of Pancreas Except Malignancy	282
Per Cardio procs w/ AMI	Percutaneous Cardiovascular Procedures w AMI	174

ABBREVIATED DESCRIPTION	DESCRIPTION	APR DRG V.30
Per Cardio procs w/o AMI	Percutaneous Cardiovascular Procedures w/o AMI	175
Post-Op, Oth Device Infect	Post-Operative, Post-Traumatic, Other Device Infections	721
Procedures for Obesity	Procedures For Obesity	403
Proc W Diag Of Rehab, Aftercare	Procedure W Diag of Rehab, Aftercare or Other Contact W Health Service	850
Pulm Edema & Resp Failure	Pulmonary Edema & Respiratory Failure	133
Rehabilitation	Rehabilitation	860
Renal Failure	Renal Failure	460
Respiratory Malignancy	Respiratory Malignancy	136
Schizophrenia	Schizophrenia	750
Seizure	Seizure	53
Septicemia Infections	Septicemia & Disseminated Infections	720
Shoulder & Arm Procs	Shoulder, Upper Arm & Forearm Procedures	315
Sickle Cell Anemia Crisis	Sickle Cell Anemia Crisis	662
Skin Graft for Skin Dxs	Skin Graft For Skin & Subcutaneous Tissue Diagnoses	361
Syncope & Collapse	Syncope & Collapse	204
Tendon, Muscle, Soft Tis	Tendon, Muscle & Other Soft Tissue Procedures	317
Thyroid & Other Procs	Thyroid, Parathyroid & Thyroglossal Procedures	404
Vaginal Delivery	Vaginal Delivery	560

Appendix D: Special Public Funding

Infrastructure & Capacity Building (ICB) program is a federal and state-funded program administered by MassHealth to help hospitals transition to integrated delivery systems that provide more effective and cost-efficient care to patients in need.

The Community Hospital Acceleration, Revitalization, and Transformation Investment Program (CHART) is a four-year, $120M program funded by an industry assessment of select providers and insurers and administered by the Health Policy Commission that makes phased investments to promote efficient, effective care delivery in non-profit, non-teaching, lower cost community hospitals. For more information and amounts, see the Health Policy Commission website.

The Health Care Innovation Investment (HCII) program is a unique opportunity for Massachusetts providers, health plans, and their partners to implement innovative models that deliver better health and better care at a lower cost. Chapter 224 of the Acts of 2012, the state's landmark cost containment law, established this competitive investment program to support health care innovation and transformation.