

Performance of the Massachusetts Health Care System

Provider and Health
System Trends

Technical Appendix
March 2023

Provider and Health System Trends

TECHNICAL APPENDIX

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Hospital Utilization

Notes on Case Mix Databases

Overview

For this report, the Hospital Inpatient Discharge Databases (HIDD) and Emergency Department Databases (EDD) of CHIA's Acute Hospital Case Mix Databases were used as the data sources for reporting on trends in acute hospital utilization. The HIDD and EDD are visit-level files including patient socio-demographics, diagnostic information, treatment and service information, and hospital charges. The data are submitted to CHIA quarterly by all Massachusetts acute care hospitals and undergo a cleaning and verification process at CHIA that includes the feedback of verification reports to hospitals for confirmation of their information. Once quarterly data have been processed and verified, CHIA produces and makes available annual files. For general information about CHIA's Case Mix Databases, please see the [Overview of the Massachusetts Acute Hospital Case Mix Databases](#) and additional information about the Case Mix data on [CHIA's website](#).

Hospital Inpatient Discharge Database (HIDD)

This data source is used for reporting on acute hospital inpatient discharges. Data from the HIDD for Federal Fiscal Year (FFY) 2022 (October 2021 to September 2022) are not considered final and are subject to change. Due to incomplete data in FFY 2021, Sturdy Memorial Hospital, which comprised slightly less than 1% of inpatient discharges in other years, was excluded from analyses using this data source. Please see the [CHIA website](#) for the most up-to-date information on inpatient utilization.

Emergency Department Databases (EDD)

This data source was used for reporting on treat-and-release emergency department (ED) visits in acute hospitals. Treat-and-release ED visits are those ED visits not resulting in an inpatient admission or outpatient observation stay; they represented approximately 75-80% of all ED visits at acute hospitals in the Commonwealth for data years in this report. Data from the EDD for FFY 2022 (October 2021 to September 2022) are not considered final and are subject to change. Please see the [CHIA website](#) for the most up-to-date information on ED utilization.

Case Mix Data Categorizations and Groupings

COVID-19

A discharge was classified as being associated with COVID-19 if it had a primary or secondary ICD-10-CM diagnosis indicating confirmed or suspected COVID-19 and a date of admission on or after April 1, 2020, or a primary or secondary diagnosis of other (not SARS-associated) coronavirus and a date of admission on or before March 31, 2020. For discharges starting on or after January 1, 2021, an additional code related to COVID-19, J12.82 Pneumonia due to coronavirus disease 2019, was added as a diagnosis code to the ICD-10-CM library for clinical use. Additionally, the diagnosis code for Post COVID-19 condition, often referred to colloquially as "Long COVID," was added as a code for clinical use starting in FFY 2022 (October 1, 2021).

ICD-10 CODE	DESCRIPTION
U07.1	COVID-19, virus identified (laboratory confirmed)
U07.2	COVID-19, virus not identified (clinically diagnosed)
U09.9	Post COVID-19 condition, unspecified
B97.29*	Other coronaviruses as the cause of disease classified elsewhere
J12.82	Pneumonia due to coronavirus disease 2019

*If the date of admission was on or before March 31st, 2020.

Payer Type

Payer type is the expected primary payer on the discharge as reported by the hospital. Payer type categories were assigned to one of as follows:

- **Medicare:** Fee-for-service Medicare or managed care Medicare
- **Medicaid:** MassHealth, including Medicaid managed care, or Commonwealth Care
- **Commercial:** Blue Cross and Blue Cross Managed Care, Commercial Insurance and Commercial Managed Care, HMO, PPO/Other managed care plans not elsewhere classified, point-of-service plans, exclusive provider organizations, and other non-managed care plans
- **Other:** Self-Pay (Self-pay, Free Care and Health Safety Net), Worker's Compensation, Other Government Payment, Auto Insurance, and Dental Plans
- **Self-Pay:** Self-Pay, Free Care and Health Safety Net

Discharge Setting

For this analysis, discharge setting information reported by the facility was classified into one of six mutually exclusive categories:

- **Home:** Home or self-care, rest home, or shelter
- **Home with Home Health Agency Care (HHA):** Home under care of organized home health service organization or home under care of a home IV drug therapy provider
- **Skilled Nursing Facility (SNF):** Skilled nursing facilities
- **Rehabilitation:** Intermediate care facility, inpatient rehabilitation facility, rehabilitation hospital or Medicare-certified long-term care hospital
- **Expired:** Died in hospital
- **Other:** Hospice, critical access hospital, psychiatric hospital, federal healthcare facility, another short-term general hospital for inpatient care, another type of institution not defined elsewhere, or other discharge setting

Length of Stay

Length of Stay (LOS) is calculated by subtracting the admission date from the discharge date. Stays for which the admission and discharge dates were the same would be coded as having a LOS of 0 days. Average length of stay (ALOS) is an aggregate measure of the mean LOS within a certain category or group. No outliers were removed when calculating the LOS or ALOS. The number of inpatient discharges with missing LOS due to missing date of admission or discharge was 8 in FFY 2019, 1 in FFY 2020, 8 in FFY 2021, and 7 in FFY 2022.

Hospital and Health System Financial Performance

Description of Financial Metrics

Financial ratio analysis is one critical component of assessing an entity's financial condition. These measures are used for hospitals and their affiliated health systems.

Profitability

This category evaluates the ability of an entity to generate a surplus.

Operating Margin

Operating income is income from normal operations of an entity, including patient care and other activities, such as research, gift shops, parking, and cafeteria, minus the expenses associated with such activities. Operating Margin is a critical ratio that measures how profitable the entity is when looking at the performance of its primary activities. In HFY 2020 and HFY 2021, these margins include COVID-19 relief funding reported as operating revenue.

Operating Margin = (Total Operating Revenue – Total Expenses Including Nonrecurring Gains or Losses) / Total Unrestricted Revenue, Gains and Other Support

Non-Operating Margin

Non-operating income includes items that are not related to operations, such as investment income, contributions, gains from the sale of assets and other unrelated business activities.

Non-Operating Margin = Total Non-Operating Revenue / Total Unrestricted Revenue, Gains and Other Support

Total Margin

This ratio evaluates the overall profitability of the entity using both operating surplus (or loss) and non-operating surplus (or loss). In HFY 2020 and HFY 2021, these margins include COVID-19 relief funding reported as operating revenue.

Total Margin = Total Excess of Revenue, Gains and Other Support Over Expenses / Total Unrestricted Revenue, Gains and Other Support

Other Measures

The following are individual line items from the Standardized Financial Filing.

- **Net Patient Service Revenue (NPSR):** Revenue an entity would expect to collect for services provided, including premium revenue, less contractual allowances. NPSR is the primary source of revenue for an entity.
- **Other Operating Revenue:** Includes revenue from services other than health care provided to patients, as well as sales and services to non-patients.
- **Federal COVID-19 Relief Funds:** Total funds an entity received related to the COVID-19 pandemic from federal sources that was reported as operating revenue.

- **State & Other COVID-19 Relief Funds:** Total funds an entity received related to the COVID-19 pandemic from state or other sources, such as private grants or contributions, that was reported as operating revenue.
- **Total Expenses:** Includes all expenses reported by the entity, including but not limited to salary and benefits, depreciation, interest, health safety net assessment, and other operating expenses.

General Data Caveats

Data Sources

Acute hospital and hospital health system financial data is drawn from the CHIA Annual Standardized Financial Filings submitted by the health system. Standardized Financial Filings may not reflect all of the financial resources available to the entity, such as resources available through associations with foundations or parents/affiliates. Financial information must be interpreted within the context of other factors, including, but not limited to, management plans, payment changes, market behavior and other factors affecting performance.

Profitability percentages may not add due to rounding.

Hospital Type Definitions

Academic medical centers (AMCs) are a subset of teaching hospitals. AMCs are characterized by (1) extensive research and teaching programs; (2) extensive resources for tertiary and quaternary care; (3) are principal teaching hospitals for their respective medical schools; and (4) are 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 do not meet the 25 full-time equivalent medical school residents per one hundred beds criteria to be classified as teaching hospitals and have a public payer mix of less than 63%.

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

Specialty hospitals are not included in any cohort comparison analysis due to the unique patient populations they serve and/or the unique sets of services they provide. However, specialty hospitals are included in all statewide median calculations.

Note: Some AMCs and teaching hospitals have HPP status. For HFY 2021, hospitals are assigned based on data reported in the FY 2020 Massachusetts Hospital Cost Report.

Annual Reporting

Annual financial performance reports display twelve months of financial data for each health system and acute hospital regardless of an entity's fiscal year end date. Most entities' fiscal year end is September 30, with the exception of Steward Health Care, Trinity Health, Cambridge Health Alliance, Tenet Healthcare, and Shriners Hospitals for Children. Steward Health Care, Tenet Healthcare, and Shriners Hospitals for Children have a fiscal year end of December 31. Trinity Health and Cambridge Health Alliance have a fiscal year end of June 30.

Data Caveats

Steward Health Care's system level data are not included in HFYs 2017, 2019, and 2021 as they did not submit audited or standardized financial statements those years. In HFY 2018 and 2020 they did not submit audited or standardized financial statements, but their data was derived from a publicly available source and is included. Additionally, Steward Health Care did not report any of the COVID-19 relief funding received by their eight hospitals in HFY 2020 as operating revenue. After obtaining the publicly available audited financial statements, their HFY 2020 data was revised by CHIA to include the Provider Relief Funds reported by each of the hospitals in their operating revenue.

Heywood Healthcare was not able to submit HFY 2021 financial data in time to be included in this publication. Their data was included in prior years.

Beth Israel Lahey Health became financially consolidated in March 2019. Due to this, seven months of financial data was reported for the system and its affiliated hospitals and physician organizations representing the period from March 1 through September 30, 2019. For comparative purposes, its HFY 2019 revenue and expenses were annualized to represent 12 months of data in the aggregate operating revenue and expense trends.

Nursing Facility Utilization and Financial Performance

Data Source

The data underlying the metrics in the nursing facility-related slides is from the Nursing Facility Cost Reports (HCF-1 in 2019 and 2020; SNF-CR in 2021) submitted to CHIA for each calendar year 2019-2021.

Nursing Facility Utilization, by Payer Type

Nursing Facility Resident Days

This metric measures the distribution of resident days by payer type: Medicaid, Medicare, Self-Pay, Commercial, other public programs, and other payer types. To compute adjusted resident days by payer type, each facility's total resident days for a given payer type within a given year were divided by the number of operating days then multiplied by the number of days in that calendar year.

Medicaid (2019, 2020 HCF-1) = [Ma Medicaid Non-managed Care Grand Annual Total Patient Days R85300] + [Ma Medicaid Managed Care Grand Annual Total Patient Days R85350] + [SCO and PACE Grand Annual Total Patient Days R85400]

Medicaid (2021 SNF-CR) = [Total MassHealth Fee-for-Service Days] + [Total MassHealth Managed Care Days] + [Total Senior Care Options Days] + [Total OneCare Days] + [Total PACE Days]

Medicare (2019, 2020 HCF-1) = [Medicare Non-managed Care Grand Annual Total Patient Days R85200] + [Medicare Managed Care Grand Annual Total Patient Days R85250]

Medicare (2021 SNF-CR) = [Total Medicare Fee-for-Service Days] + [Total Medicare Managed Care (Part C) Days]

Self-Pay (2019, 2020 HCF-1) = Self Pay Grand Annual Total Patient Days R85050

Self-Pay (2021 SNF-CR) = Total Private Pay Days

VA, DTA, and Other Public Payers (2019, 2020 HCF-1) = VA DTA Other Public Grand Annual Total Patient Days R85500

VA, DTA, and Other Public Payers (2021 SNF-CR) = [Total Veteran's Affairs & Other Public Days] + [Total DTA & EAEDC Days]

Commercial (2019, 2020 HCF-1) = [Non-Managed Care Grand Annual Total Patient Days R85150] + [Managed Care Grand Annual Total Patient Days R85100]

Commercial (2021 SNF-CR) = [Total Commercial Non-Managed Care Days] + [Total Commercial Managed Care Days]

Non-MA Medicaid (2019, 2020 HCF-1) = Non Ma Medicaid Grand Annual Total Patient Days R85450

Non-MA Medicaid (2021 SNF-CR) = Total Out-of-State Medicaid Days

Other (2019, 2020 HCF-1) = Other Grand Annual Total Patient Days R85550

Other (2021 SNF-CR) = Total Other Days

Nursing Facility Annual Occupancy Rates

Occupancy Rate

This metric measures the proportion of all nursing facility beds that were filled during the year.

Mean Licensed Beds = Mean **Licensed Beds** Level 1 + Mean **Licensed Beds** Level 2 + Mean **Licensed Beds** Level 3 + Mean **Licensed Beds** Level 4

$$\text{Occupancy} = \frac{\text{Total Patient Days}}{\text{Mean Licensed Beds} * \text{Days in Cost Report Year}}$$

Total Facilities, Total Operating Beds, and Occupancy by County, 2021

Total Facilities, 2021

This metric counts the number of nursing facilities which submitted a 2021 cost report to CHIA, total and in each county.

Total Licensed Beds, 2021

This metric counts the number of licensed beds in nursing facilities which submitted a 2021 cost report to CHIA, total and in each county.

Median Occupancy Rate, 2021

For this metric, the occupancy rate was calculated for each facility as described above, and the median value was determined, across all facilities and in each county.

Nursing Facility Median Total Margin

Median Total Margin

Total margin measures the nursing facility's financial performance across all of its income and expenses. The total margin was calculated for each nursing facility, then the 75th percentile, median, and 25th percentile were determined across all facilities.

Total Revenue (2019, 2020 HCF-1) = Total Gross Income R30000

Total Revenue (2021 SNF-CR) = Total Revenue

Total Expenses (2019, 2020 HCF-1) = Total Operating Expenses R40000

Total Expenses (2021 SNF-CR) = [Reported Expenses: Total Combined Expenses Before Recoverable Income] + [Reported Expenses: Total Other Business Expense]

Total Margin =
$$\frac{\text{Total Revenue} - \text{Total Expenses}}{\text{Total Revenue}}$$

Nursing Facility Total Revenue and Expenses

Nursing facility total revenue and expenses are aggregate measures across all nursing facilities which submitted a cost report to CHIA for the given reporting year. To compute adjusted total revenue and total expenses, each facility's total revenue and expenses within a given year were divided by the number of operating days then multiplied by the number of days in that calendar year.

Total Revenue (2019, 2020 HCF-1) = Total Gross Income R30000

Total Revenue (2021 SNF-CR) = Total Revenue

Total Expenses (2019, 2020 HCF-1) = Total Operating Expenses R40000

Total Expenses (2021 SNF-CR) = [Reported Expenses: Total Combined Expenses Before Recoverable Income] + [Reported Expenses: Total Other Business Expense]