

CENTER FOR HEALTH INFORMATION AND ANALYSIS

**BASELINE REPORT:
TRENDS IN THE MASSACHUSETTS
NURSING FACILITY INDUSTRY
2013-2017**

TECHNICAL APPENDIX

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Nursing Facility Industry Report

(November 2019)

TECHNICAL APPENDIX

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Introduction

This document provides information about the data sources and methodology used for metrics in the *Baseline Report: Trends in the Massachusetts Nursing Facility Industry 2013-2017* publication, including the executive summary, chartbook, interactive dashboard, and databook. The data underlying these metrics was sourced from the following:

(1) Financial Data

■ Nursing Facility Cost Report (Center for Health Information and Analysis)¹

The Nursing Facility Cost Report is submitted each year by nursing facilities and contains data on costs, revenues, and utilization statistics. The cost report reflects a calendar year period.

(2) Quality Data

■ Nursing Home Compare (Centers for Medicare & Medicaid Services)

The quality measures included in this report are sourced from the Centers for Medicare & Medicaid Services (CMS) Nursing Home Compare website. Primarily the report focuses on the CMS Five Star Rating, which is a composite measure made up of a Staffing Rating, registered nurse (RN) Staffing Rating, Quality Measures Rating, and Health Inspection Rating. When evaluating quality and staffing together, the report uses the CMS Health Inspection Rating. These metrics are updated quarterly.²

Cohorts

To facilitate comparison among similar entities, CHIA assigned individual nursing facilities to groups based on a shared attribute within a given year and attribute type. The table below outlines the criteria for inclusion in each analytic cohort. The list of attributes for each nursing facility can be found in the databook.

Classification	Criteria	Number of Facilities/Threshold, 2017
Tax Status: For-Profit	Legal Form = <ul style="list-style-type: none">MA Corporation - Chapter 156BPartnershipSole ProprietorshipOther For-Profit	293 facilities
Tax Status: Non-Profit	Legal Form = <ul style="list-style-type: none">MA Corporation - Chapter 156B with 501 c.3 tax exemptionMA Corporation - Chapter 180Other Non-Profit	98 facilities
Ownership Type: Government	Legal Form = Governmental	2 facilities
Management Company Affiliation: National	Identified as a nursing facility with a management company with a home office outside of New England.	112 facilities

¹ Nursing facilities report data to CHIA in accordance with 957 CMR 7.00: *Nursing Facilities Cost Reporting Requirements*; available at: <http://www.chiamass.gov/assets/docs/g/chia-regs/957-7.pdf>. For more information about the data specifications, please see the [Nursing Facility Cost Report Form](#) and the [filing instructions](#).

² Nursing Home Compare Claims-based Measures Technical Specifications – Updated April 2019; available at: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandCompliance/Downloads/Nursing-Home-Compare-Claims-based-Measures-Technical-Specifications-April-2019.pdf>

Classification	Criteria	Number of Facilities/Threshold, 2017
Management Company Affiliation: Regional	Identified as a nursing facility with a management company with a home office within New England – Massachusetts, Maine, Vermont, New Hampshire, Rhode Island, or Connecticut.	187 facilities
Management Company Affiliation: None	Identified as nursing facilities that did not have a management company in CY 2017 per the HCF-1.	94 facilities
Payer Mix: High Medicaid	Nursing facility's Massachusetts Medicaid payer mix is in the top quartile within a given year	99 facilities had Medicaid payer mix greater than 79.7% of total resident days
Payer Mix: Higher Medicare	Nursing facility's Medicare payer mix is in the top quartile within a given year	99 facilities had Medicare payer mix greater than 16.1% of total resident days
Occupancy Level: Lower Occupancy	Nursing facility's occupancy rate is within the bottom quartile within a given year	98 facilities had an occupancy rate less than or equal to 81.2%
Occupancy Level: Higher Occupancy	Nursing facility's occupancy rate is within the top quartile within a given year	99 facilities had an occupancy rate greater than or equal to 93.2%

Exclusions

To facilitate appropriate comparisons, CHIA excluded several nursing facilities from financial and quality analyses; however, these facilities were included in payer mix and utilization calculations. Facilities were excluded for three main reasons:

- Different funding or business model than a typical nursing facility, i.e., Continuing Care Retirement Communities³ (exclusion reason = CCRC), and government owned facilities.
- Special resident population, i.e., pediatric residents, residents with Multiple Sclerosis
- Special services, i.e. ventilator services, head trauma expertise

Facility Number	Facility Name	Exclusion Reason
209	Beaumont Rehab & Skilled Nursing Ctr - Westboro	CCRC
1170	Benchmark Snr Living At The Commons In Lincoln SNF	CCRC
586	Boston Home	Focus on ALS/MS residents
1025	Brookhaven At Lexington	CCRC
836	Campion Health Center	Facility for retired Jesuits; unique funding streams
289	Carleton-Willard Village Retirement & Nursing Ctr	CCRC
1040	Clark House Nursing Center At Fox Hill	CCRC

³ Continuing Care Retirement Communities were identified from the Executive Office of Elder Affairs website: <https://www.mass.gov/service-details/continuing-care-retirement-communities>.

Facility Number	Facility Name	Exclusion Reason
1096	Commons Residence At Orchard Cove	CCRC
1163	Continuing Care At Brooksby Village	CCRC
1161	Continuing Care at Brooksby Village II	Special Contract
1116	Hillcrest Commons	Ventilator
186	Holden Rehabilitation and Nursing Center	Ventilator
672	Jeanne Jugan Residence	Charity organization; unique funding streams
107	Kimball Farms Nursing Care Center	CCRC
248	Knollwood Nursing Center	CCRC
1155	Lasell House	CCRC
1166	Leonard Florence	Focus on ALS/MS residents
1165	Linden Ponds	CCRC
28	Loomis House Nursing Center	CCRC
1117	Loomis Lakeside At Reeds Landing	CCRC
904	Marquadt Nursing Facility	Government-owned Facility
1029	Mayflower Place Nursing & Rehabilitation Center	CCRC
1110	Meadows, The	CCRC
466	New England Home for the Deaf	Deaf residents, higher costs and specialized population
389	New England Pediatric	Pediatric
1167	Newbridge On The Charles Skilled Nursing Facility	CCRC
1101	Our Island Home	Government Facility
178	Overlook Masonic Health Center	CCRC
865	Plymouth Rehab & Healthcare Center	Pediatric - Over 22
292	Rivercrest Long Term Care	CCRC
923	Seashore Point And Wellness Rehabilitation	CCRC
161	Seven Hills Pediatric	Pediatric/Ventilator
202	Shrewsbury Nursing & Rehabilitation Center	CCRC
832	Skilled Nursing Facility At North Hill (The)	CCRC
986	Taunton Nursing Home	Government-owned Facility
1100	Windemere Nursing & Rehab Center	Geographically Isolated (Martha's Vineyard)
998	Wingate @ E. Longmeadow	Ventilator
232	Wingate @ Worcester	Ventilator/Head Trauma

Facility Number	Facility Name	Exclusion Reason
1053	Wingate At Silver Lake Rehab & Skilled Nursing Res	CCRC

Measures: Overview

The data underlying the overview metrics includes all nursing facilities reporting cost report data to CHIA in each calendar year 2013–2017.

Overall Resident Days

This metric aggregates a nursing facility's daily census over a calendar year period to measure utilization. This measure includes residents in residential care beds. Total resident days reported in the Nursing Facility Cost Report were adjusted to account for facilities that reported partial-year data for the reporting period due to a change in ownership of the facility. To compute adjusted total resident days, each facility's total resident days for a given year were divided by the number of operating days and multiplied by the number of days in that calendar year.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013–2017

Resident Days = [Total Grand Annual Total Patient Days R01000]

Overall Resident Days by Payer Type

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 multiplied by the number of days in that calendar year.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013–2017

Medicare = [Medicare Non-managed Care Grand Annual Total Patient Days R85200]
+ [Medicare Managed Care Grand Annual Total Patient Days R85250]

Medicaid = [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]

Self-Pay = Self Pay Grand Annual Total Patient Days R85050

Commercial = [Non-Managed Care Grand Annual Total Patient Days R85150] + [Managed Care Grand Annual Total Patient Days R85100]

Non-MA Medicaid = Non Ma Medicaid Grand Annual Total Patient Days R85450

VA, DTA, and Other Public Payers = VA DTA Other Public Grand Annual Total Patient Days R85500

Other = Other Grand Annual Total Patient Days R85550

Distribution of Resident Days by Management Company Affiliation

Nursing facility “systems” were identified as the management companies reported on the HCF-1 Nursing Facility Cost Report. Nursing facilities that did not have a management company were classified as “no management company.” Nursing facilities that reported having a management company on page 1 of the Nursing Facility Cost Report (HCF-1) were classified as having a management company. Management companies were classified as “regional” if headquartered in New England. Management companies were classified as “national” if headquartered outside of New England.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2017

Occupancy Rate

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

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013 – 2017
- **Calculation:**

$$\text{Occupancy} = \frac{\text{Total Patient Days R01000}}{\text{Mean Operating Beds Levels 1, 2, 3, 4 * Days in Year}}$$

Measures: Financial Trends

The data underlying the financial metrics includes all nursing facilities reporting to CHIA in each calendar year 2013 – 2017, except those facilities listed in the exclusion list appearing in this appendix.

Total Margin

This metric measures the nursing facility’s financial performance across all of its income and expenses.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013 – 2017
- **Calculation:**

Total Income = Total Gross Income R30000

Total Expenses = Total Operating Expenses R40000

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

Operating Margin

This metric measures the nursing facility's financial performance of its primary, resident care activities.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013-2017
- **Calculation:**

$$\begin{aligned} \text{Operating Expenses} = & \quad [\text{Reported Total Operating Expenses R40000}] \\ & - [\text{Reported Adult Day Care Expenses R80400}] \\ & - [\text{Reported Assisted Living Expenses R80450}] \\ & - [\text{Chapter 766 Program Expenses R80470}] \\ & - [\text{Outpatient Service Expenses R80460}] \\ & - [\text{Reported Hospital Non NF Expenses R80600}] \\ & - [\text{Other Nonnursing Facility Expenses R80650}] \end{aligned}$$

$$\begin{aligned} \text{Operating Income} = & \quad [\text{Total Gross Income R30000}] \\ & - [\text{Subtotal Nonnursing Facility Income R30260}] \\ & + [\text{Residential Care Income 30263}] \\ & - [\text{Endowment and Other Nonrecoverable Explain Below R31200}] \\ & - [\text{Interest Income R31800}] \end{aligned}$$

$$\text{Operating Margin} = \frac{(\text{Operating Income} - \text{Operating Expenses})}{\text{Operating Income}}$$

Components of Operating Expenses Per Resident Day

This metric illustrates the distribution of expenses across major categories:

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013-2017
- **Calculation:**

Other Expenses Per Resident Day

$$\begin{aligned} & ([\text{Reported Total Bad Accounts Taxes Refunds Other R49600}] \\ & \quad - [\text{Reported Adult Day Care Expenses R80400}] \\ & \quad - [\text{Reported Assisted Living Expenses R80450}] \\ & \quad - [\text{Reported Chapter 766 Program Expenses R80470}] \\ & \quad - [\text{Reported Outpatient Service Expenses R80460}] \\ & \quad - [\text{Reported Hospital Non NF Expenses R80600}] \\ & - [\text{Reported Other Non - nursing Facility Expenses R80650}]) \\ = & \frac{\quad}{\text{Reported Total Grand Annual Total Patient Days R01000}} \end{aligned}$$

Fixed Expenses Per Resident Day

$$= \frac{\text{Reported Total HCF1 Fixed Expenses R99501}}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Administrative & General Expenses Per Resident Day

$$= \frac{\text{Reported Total Administrative and General Expenses R47100}}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Variable Expenses Per Resident Day

$$= \frac{\text{Reported Total Variable Expenses R48100}}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Nursing Expenses Per Resident Day

$$= \frac{\text{Reported Total Nursing Expenses R46100}}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Nursing Expenses per Resident Day

This metric examines - on a resident day basis - all expenses related to the provision of care by all types of nursing staff, including RNs, Certified Nursing Aides (CNAs), Licensed Practical Nurses (LPNs), and Directors of Nursing.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013-2017
- **Calculation:**

$$\text{Nursing Expenses per Patient Day} = \frac{\text{Reported Total Nursing Expenses R46100}}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Total Facilities, Total Operating Beds, and Occupancy by County

This metric counts the total nursing facilities and operating beds for each county in 2017. The table also includes the overall occupancy rate for each county in 2017.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2017
- **Calculation:**

Mean Operating Beds = Mean Operating Beds Level 1 + Mean Operating Beds Level 2 + Mean Operating Beds Level 3 + Mean Operating Beds Level 4

$$\text{Occupancy} = \frac{\text{Reported Total Grand Annual Total Patient Days R01000}}{(\text{Mean Operating Beds} * \text{Days in Cost Report Year})}$$

Revenue by Payer Per Resident Day

This metric measures the distribution of nursing facility income by payer type: Medicaid, Medicare, Self-Pay, Commercial, Other Public Programs, and Other Payers.

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)

- **Data Period:** 2013–2017

Medicare Income = Reported Total Income Medicare Managed Care Routine Ancillary R30015
+ Reported Total Income Medicare Non Managed Care Routine Ancillary R30014

$$\text{Medicare Income Per Resident Day} = \frac{\text{Medicare Income}}{\text{Medicare Resident Days}}$$

Medicaid Income =

[Reported Total Income Massachusetts Medicaid Managed Care Routine Ancillary R30017]
+ [Reported Total Income Massachusetts Medicaid Non-managed Care Routine Ancillary R30016]
+ [Reported Total Income MA Medicaid Patient Resource Income Routine Ancillary R30019]
+ [Reported Total Income Senior Care Options & PACE Routine Ancillary R30018]

$$\text{Medicaid Income Per Resident Day} = \frac{\text{Medicaid Income}}{\text{Medicaid Resident Days}}$$

Self-Pay Income = Reported Total Income Routine Self Pay Routine Ancillary R30011

$$\text{Self – Pay Income Per Resident Day} = \frac{\text{SelfPay Income}}{(\text{Reported Self Pay Grand Annual Total Patient Days R85050} - [\text{Reported Self Pay Resident Care Patient Days R85052}])}$$

Measures: Quality Trends

Nursing Hours per Resident Day (by CNA, LPN, RN)

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1)
- **Data Period:** 2013 - 2017
- **Calculation:**

Certified Nursing Assistant (CNA) Hours per Resident Day

$$= \frac{(\text{Reported CNA Purchased Service Nursing Hours R73422} + \text{Reported CNA Total Hours R73312})}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Licensed Practical Nurse (LPN) Hours per Resident Day

$$= \frac{(\text{Reported LPN Purchased Service Nursing Hours R73412} + \text{Reported LPN Total Hours R73302})}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Registered Nurse (RN) Hours per Resident Day

$$= \frac{(\text{Reported RN Purchased Service Nursing Hours R73402} + \text{Reported RN Total Hours R73292})}{\text{Reported Total Grand Annual Total Patient Days R01000}}$$

Share of Resident Days by CMS Quality Rating, 2017

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1); [CMS Nursing Home Compare](#)
- **Data Period:** 2017; CHIA used the latest survey completed in calendar year 2017 to identify the “2017” rating.

Nursing Expenses per Resident Day by Health Inspection Rating, 2017

- **Data Source:** Nursing Facility Cost Reports filed with CHIA (HCF-1); [CMS Nursing Home Compare](#)
- **Data Period:** 2017; CHIA used the latest survey completed in calendar year 2017 to identify the “2017” rating.

The following information about the CMS Nursing Home Compare five star rating is excerpted from the Nursing Home Compare Claims-based Measures Technical Specifications – Updated April 2019 document. For more detail about the three domains listed below and the overall five star rating, please consult the full document at: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandCompliance/Downloads/Nursing-Home-Compare-Claims-based-Measures-Technical-Specifications-April-2019.pdf>.

The Nursing Home Compare five star rating system features an Overall Quality Rating of one to five stars based on nursing home performance on three domains, each of which has its own rating:

Health Inspections - Measures based on outcomes from state health inspections: Ratings for the health inspection domain are based on the number, scope, and severity of deficiencies identified during the three most recent annual inspection surveys, as well as substantiated findings from the most recent 36 months of complaint investigations. All deficiency findings are weighted by scope and severity. This measure also takes into account the number of revisits required to ensure that deficiencies identified during the health inspection survey have been corrected.

Staffing - Measures based on nursing home staffing levels: Ratings on the staffing domain are based on two measures: 1) Registered nurse (RN) hours per resident day; and 2) total nurse staffing (the sum of RN, licensed practical nurse (LPN), and nurse aide) hours per resident per day. Other types of nursing home staff, such as clerical or housekeeping staff, are not included in the staffing rating calculation. The staffing measures are derived from data submitted each quarter through the Payroll-Based Journal (PBJ) System, along with daily resident census derived from Minimum Data Set, Version 3.0 (MDS 3.0) assessments, and are case-mix adjusted based on the distribution of MDS 3.0 assessments by Resource Utilization Groups, version IV (RUG-IV group). In addition to the overall staffing rating, a separate rating for RN staffing is also reported.

Quality Measures - Measures based on MDS and claims-based quality measures (QMs): Ratings for the quality measures are based on performance on 17 of the QMs that are currently posted on the *Nursing Home Compare* website. These include ten long-stay measures and seven short-stay measures. Note that not all of the quality measures that are reported on *Nursing Home Compare* are included in the rating calculations. In addition to an overall quality of resident care rating, separate ratings for the quality of resident care for short-stay residents and long-stay residents are also reported.



For more information, please contact:

CENTER FOR HEALTH INFORMATION AND ANALYSIS

501 Boylston Street
Boston, MA 02116

www.chiamass.gov
[@Mass_CHIA](https://twitter.com/Mass_CHIA)

(617) 701-8100
