

**Hospital-Wide
Adult All-Payer
Readmissions
In Massachusetts:**

SFY 2011-2020

March 2022



Executive Summary

Unplanned hospital readmissions are a costly and potentially preventable problem that impacts patient health and experience of care both nationally and in Massachusetts. Readmissions are a central issue in efforts to improve health care quality and reduce costs. In service of its mission to objectively report reliable and meaningful information about the quality, affordability, utilization, access, and outcomes of the Massachusetts health care system, the Massachusetts Center for Health Information and Analysis (CHIA) annually reports on hospital-wide adult all-payer unplanned readmissions within 30 days of an inpatient discharge.

Massachusetts historically has had readmission rates higher than the national average.¹ To monitor readmissions in the Commonwealth, CHIA adapted the Yale/CMS Hospital-Wide All-Cause Unplanned 30-day Readmission Measure.² Though the Yale/CMS readmission measure was originally developed for use within the Medicare population, CHIA adapted the measure for an all-payer population.³ The readmission

analyses presented in this report are based on data from CHIA's Hospital Inpatient Discharge Database.⁴

This report is the seventh in CHIA's annual series of all-payer readmission reports and updates previous reports with State Fiscal Year (SFY) 2019 and 2020 data (July 1, 2018 – June 30, 2020). The COVID-19 pandemic has greatly disrupted the health care system and affected acute care hospital utilization in historically unprecedented ways. To better understand acute care utilization during this time period, we report both annual and quarterly trends for SFY 2019 to 2020 and include a new section on COVID-19 readmissions.

Additionally, this report provides a significant update to the methodology CHIA uses to compare hospital readmission rates. Guided by recommendations from an expert committee on social risk factors, enhancements were made to the calculation of risk-standardized readmission rates to provide a more fair comparison of hospital performance.⁵ Note that due to technical changes, the historical rates presented in this report differ from earlier publications. •

Key Findings

The unplanned, all-payer readmission rate for Massachusetts increased from 2019 to 2020 (15.6% and 15.9%, respectively).

The number of eligible discharges dropped 7.7%, to 494,712 in 2020, during the COVID-19 pandemic.

Medicare and Medicaid patients had higher readmission rates than patients with commercial insurance (18.1%, 16.9%, and 10.2%, respectively).

In 2020, readmission rates for patients discharged to home or home health agencies increased, while rates for patients discharged to skilled nursing facilities or rehabilitation decreased.

Medicare patients aged 65 and over had the highest total number of readmissions; Medicare patients under 65 had the highest rates of readmission (22.9%).

Frequently hospitalized patients (patients hospitalized four or more times in the previous 12 months) accounted for over half (52%) of all readmissions.

The readmission rate for COVID-19 discharges was 14.7%, compared to 17.2% for non-COVID-19 discharges.

Risk-standardized readmission rates for acute care hospitals in Massachusetts ranged from 13.7% to 17.9% when adjusted for hospital service mix, patient case mix, and patient- and community-level social risk factors.

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Introduction

Unplanned hospital readmissions are a costly and potentially preventable problem that impacts patient health and experience of care both nationally and in Massachusetts. Readmissions are a central issue in efforts to improve health care quality and reduce costs. Massachusetts has historically had higher than average readmission rates compared to the national average for Medicare fee-for-service beneficiaries.⁶

To monitor readmissions in the Commonwealth, the Center for Health Information and Analysis (CHIA) adapted the Yale/CMS Hospital-Wide All-Cause Unplanned 30-day Readmission Measure.⁷ Though initially developed for use within the Medicare population, CHIA adapted the Yale/CMS measure for an all-payer population.⁸ The readmission analyses presented in this report were conducted using CHIA's Hospital Inpatient Discharge Database.⁹ An analysis of statewide and hospital-specific

all-payer, all-cause readmission rates provides the public, providers and policymakers a complete view of adult readmissions in the Commonwealth of Massachusetts. Furthermore, an all-payer analysis is helpful as strategies to control the growing cost of health care remain public policy priorities in Massachusetts.

This report is the seventh in CHIA's annual series of readmission reports. This year's report updates previous reports with State Fiscal Year (SFY) 2019 and 2020 data (July 1, 2018 to June 30, 2020). The study period includes two years of new data that covers periods leading up to and through the first several months of the COVID-19 pandemic. The COVID-19 pandemic has disrupted the health care system in a variety of ways that have impacted hospital utilization. To provide insights into the trends leading up to and during the first months of the COVID-19 pandemic, we provide annual trends in readmission rates

from SFY 2011 to 2020, quarterly trends from SFY 2019 to 2020, and a new section on COVID-19 readmissions.

Additionally, this report provides a significant update to the methodology CHIA uses to compare hospital readmission rates. Guided by recommendations from an expert committee on social risk factors, enhancements were made to the calculation of risk-standardized readmission rates to provide a more fair comparison of hospital performance.¹⁰ Note that due to technical changes,

the historical rates presented in this report differ from earlier publications.

This report presents annual trends in statewide all-payer readmissions for the past 10 years, quarterly trends in statewide all-payer readmissions for SFY 2019 and 2020, readmissions by characteristics of patients and hospitalizations, readmission rates for COVID-19 and non-COVID-19 discharges, and readmission rates for individual hospitals and groups of hospitals. •

Overall Trends in All-Payer Readmissions

This section presents overall trends in all-payer readmissions for acute care hospitals in Massachusetts for the 10-year study period spanning July 1, 2010 to June 30, 2020. A readmission is defined as an unplanned hospitalization for any reason within 30 days of an eligible discharge. This measure excludes certain categories of hospitalizations, such as pediatric, obstetric, and psychiatric admissions. Observed readmission rates are calculated as the number of readmissions that occurred within a given time period as a proportion of all eligible discharges in that time period. With observed hospital readmission rates, some portion of differences among hospitals may be attributable to differing service mix and patient case mix. Observed rates are useful for identifying opportunities for improvement and tracking performance over time within individual hospitals. Unless otherwise noted, the readmission rates presented in this report are observed readmission rates. •

Key Findings:

- Readmission rates increased from 2019 to 2020 (15.6% to 15.9%, respectively).
- The number of eligible discharges dropped 7.7%, to 494,712 in 2020, during the COVID-19 pandemic.
- Readmission rates increased from 15.5% in the first quarter (Q1) of 2020 to 16.8% in Q2 2020.
- The average length of stay for a discharge resulting in a readmission was 1.5 days longer than for discharges that did not result in a readmission.

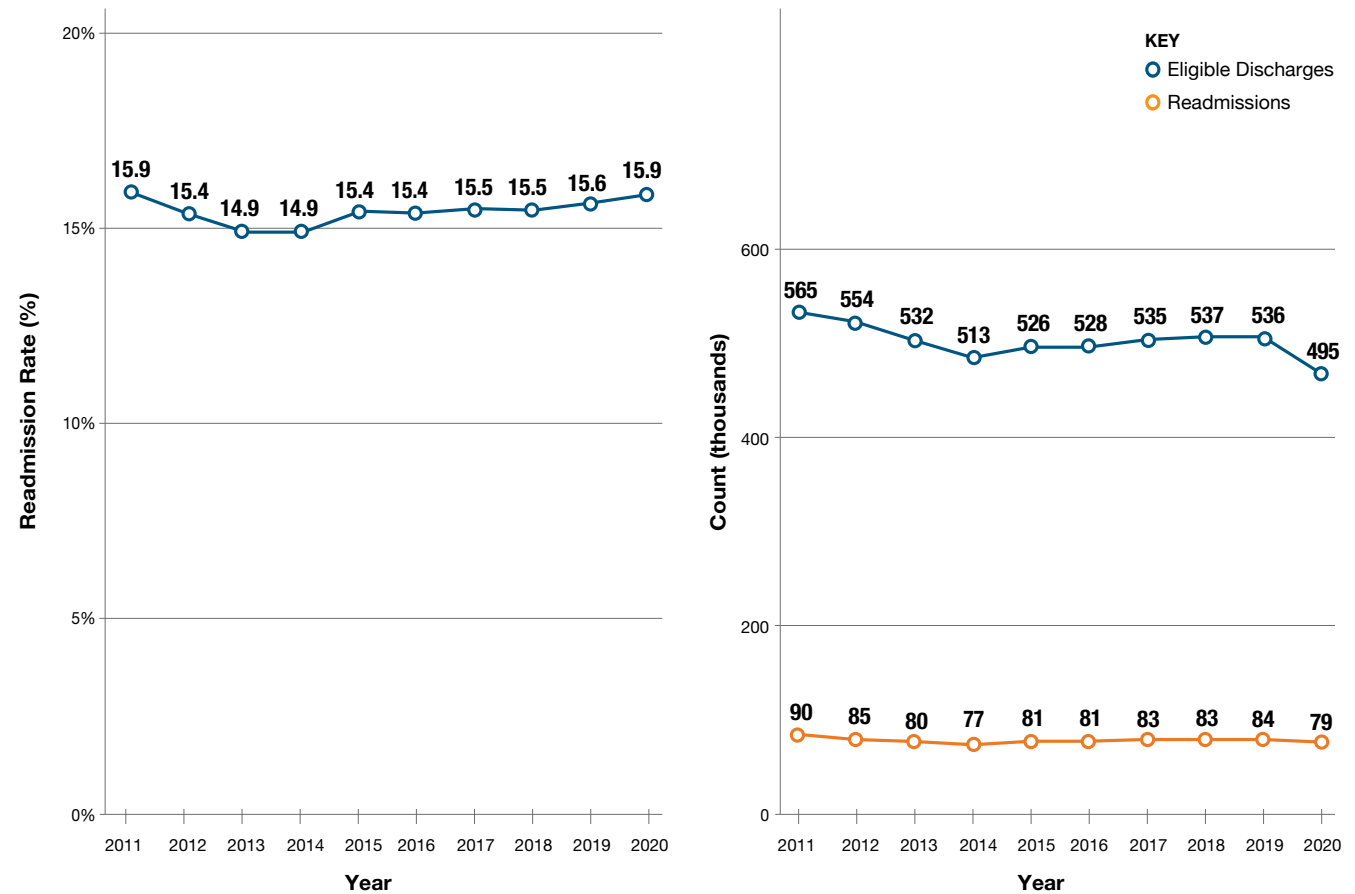
Overall Trends in All-Payer Readmissions

The 10-year trend in all-payer readmission rates shows a decline from 2011-2013, an increase from 2013-2015, and stable readmission rates from 2016-2019. The statewide observed readmission rate increased to 15.9% in 2020, during the COVID-19 pandemic.

The statewide number of eligible discharges followed a similar trend, with the total number of eligible discharges decreasing to 494,712 in 2020.

Annual Trends in Statewide All-Payer Readmission Rate, Discharges, and Readmissions

SFY 2011-2020



Note: Due to technical changes, readmission rates may not match those from earlier reports. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

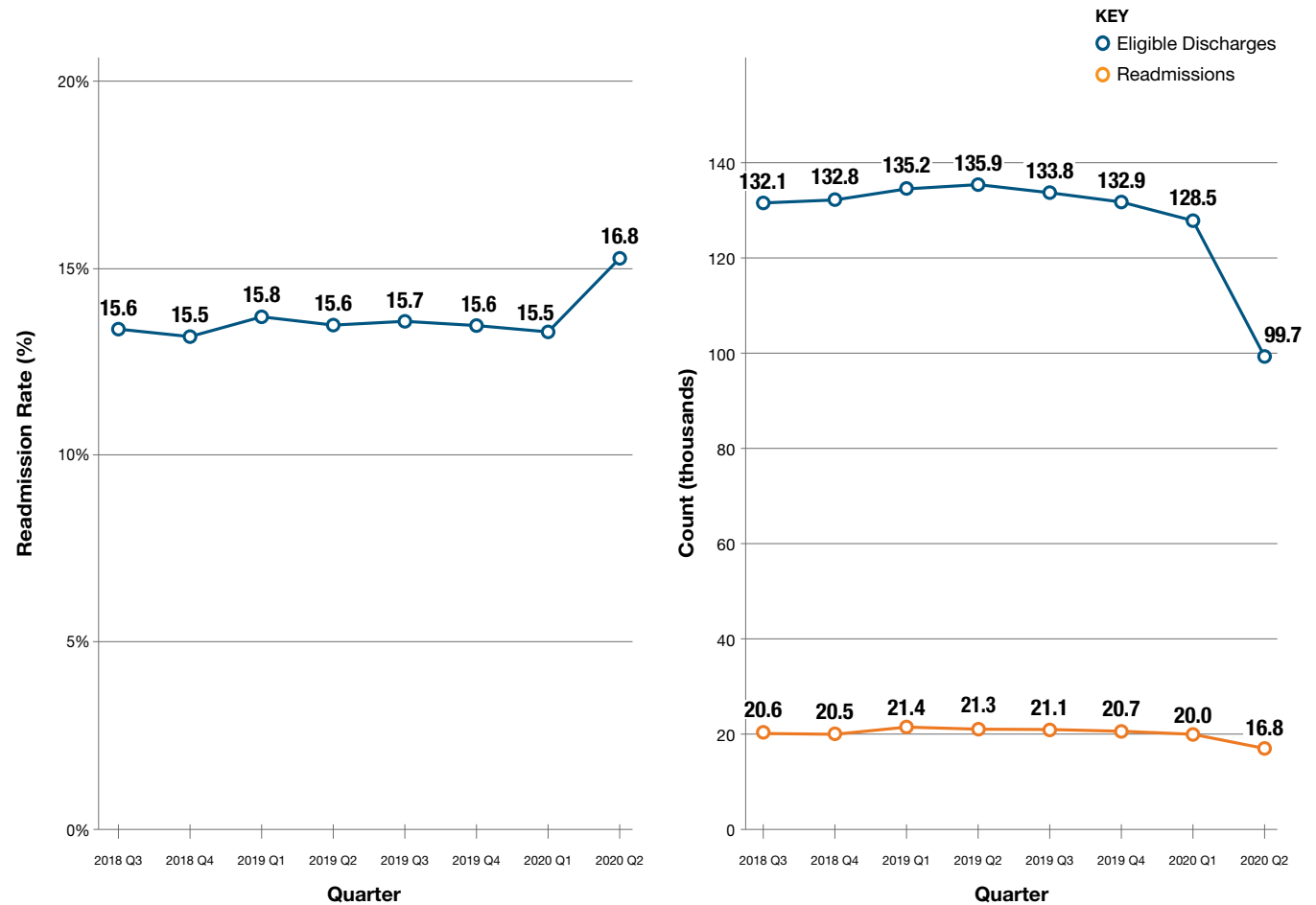
Overall Trends in All-Payer Readmissions

Rates for 2020 reflect the anomaly of the COVID-19 pandemic, which greatly affected hospital utilization during the second quarter of 2020.

Readmission rates, discharge volume, and total readmissions were stable from the third quarter of 2018 through the first quarter of 2020. In the second quarter of 2020, discharge volume decreased more than readmission volume, leading to an increase in the observed readmission rate.

Quarterly Trends in Statewide All-Payer Readmission Rate, Discharges, and Readmissions

SFY 2019-2020



Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

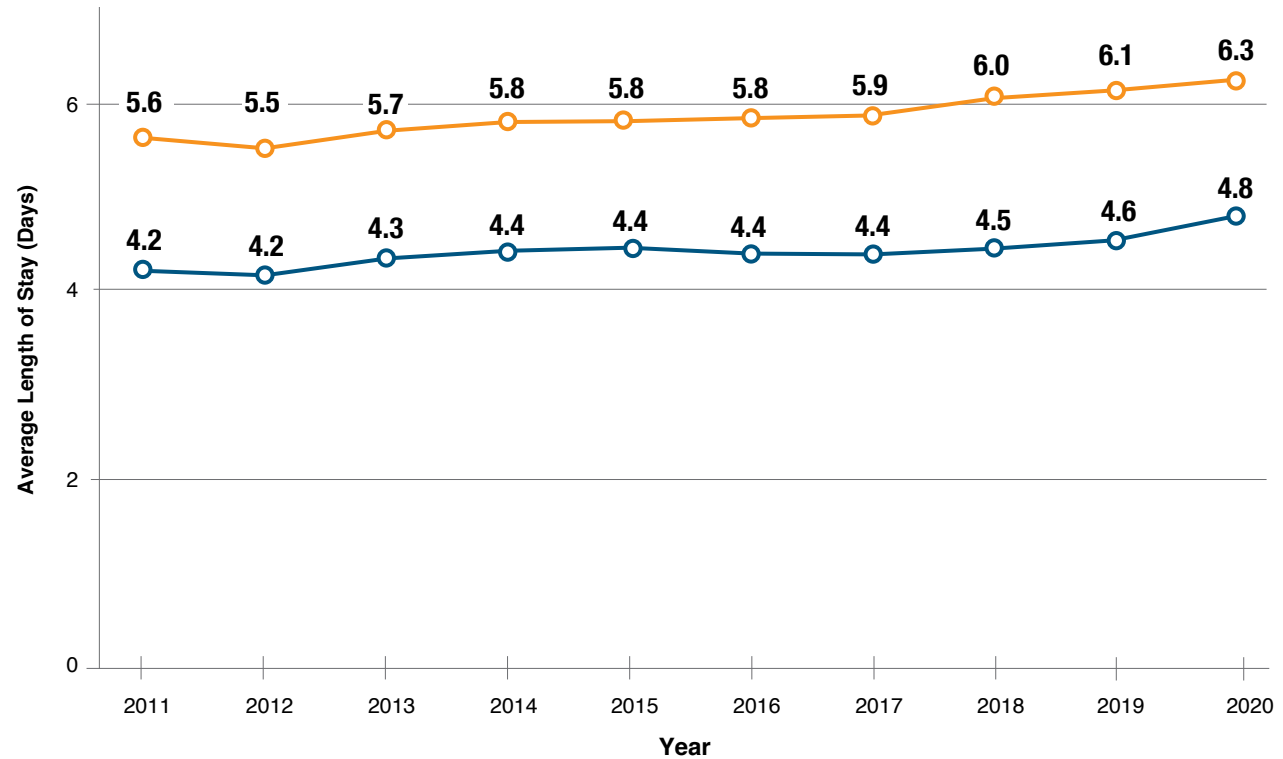
Data source: Massachusetts Hospital Inpatient Discharge Database, July 2018 to June 2020.

Overall Trends in All-Payer Readmissions

The average length of stay (ALOS) for discharges with a subsequent readmission was 6.3 days in 2020, 1.5 days longer than discharges without a readmission. ALOS has increased since 2017.

Annual Trend in Average Length of Stay (ALOS) by Readmission Status

SFY 2011-2020



KEY

- Discharges with Readmission
- Discharges with No Readmission

Note: The average length of stay (ALOS) was calculated as the difference in the number of days between the discharge date and the admission date.

Due to technical changes, readmission rates may not match those from earlier reports. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

All-Payer Readmissions by Characteristics of Patients and Hospitalizations

This section presents observed readmission rates by several characteristics of patients and hospitalizations, such as patient age, expected payer type, discharge setting, primary discharge diagnosis, and prior inpatient utilization. •

Key Findings:

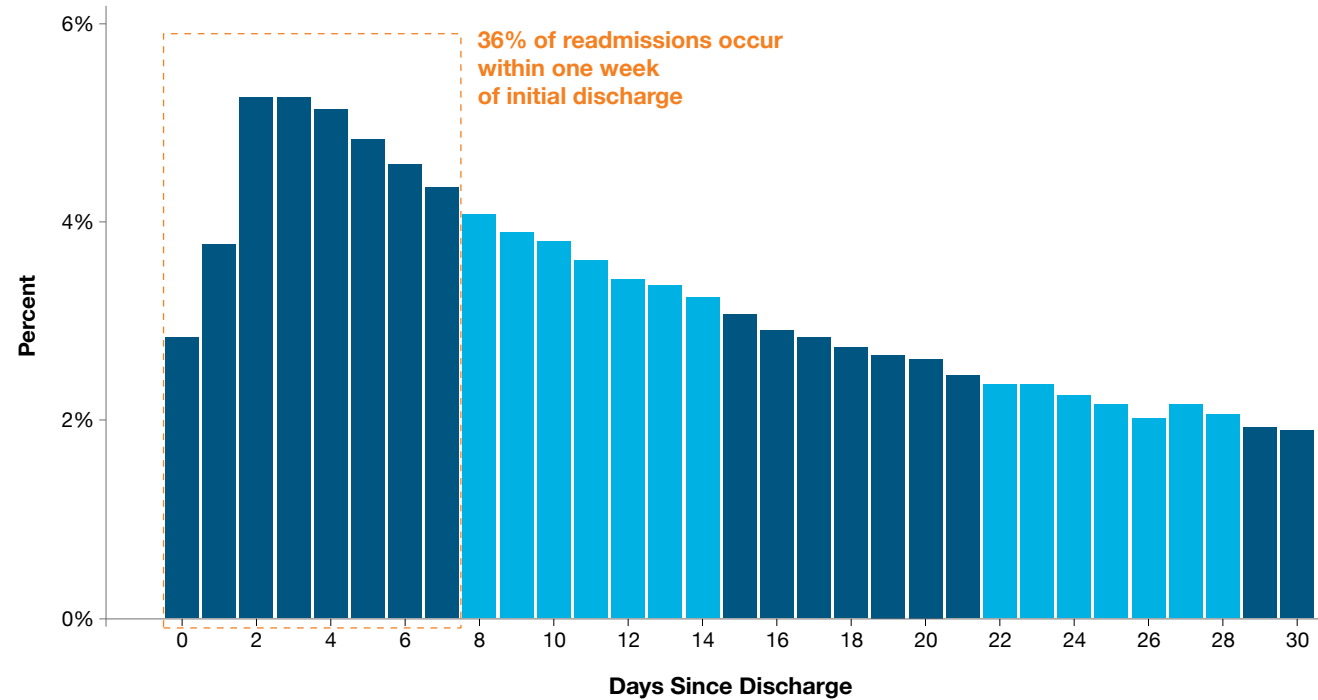
- Medicare and Medicaid patients had higher readmission rates than patients with commercial insurance (18.1%, 16.9% and 10.2%, respectively).

- Medicare patients 65 and over had the highest number of readmissions; Medicare patients under age 65 had the highest readmission rate in 2020 (22.9%).
- Frequently hospitalized patients, defined as those with four or more hospitalizations within 12 months, represented 6% of the patient population, but accounted for 19% of all discharges and 52% of all readmissions.

All-Payer Readmissions by Days Since Discharge

SFY 2020

Consistent with prior years, over one-third (36%) of readmissions occurred within seven days of the initial discharge.



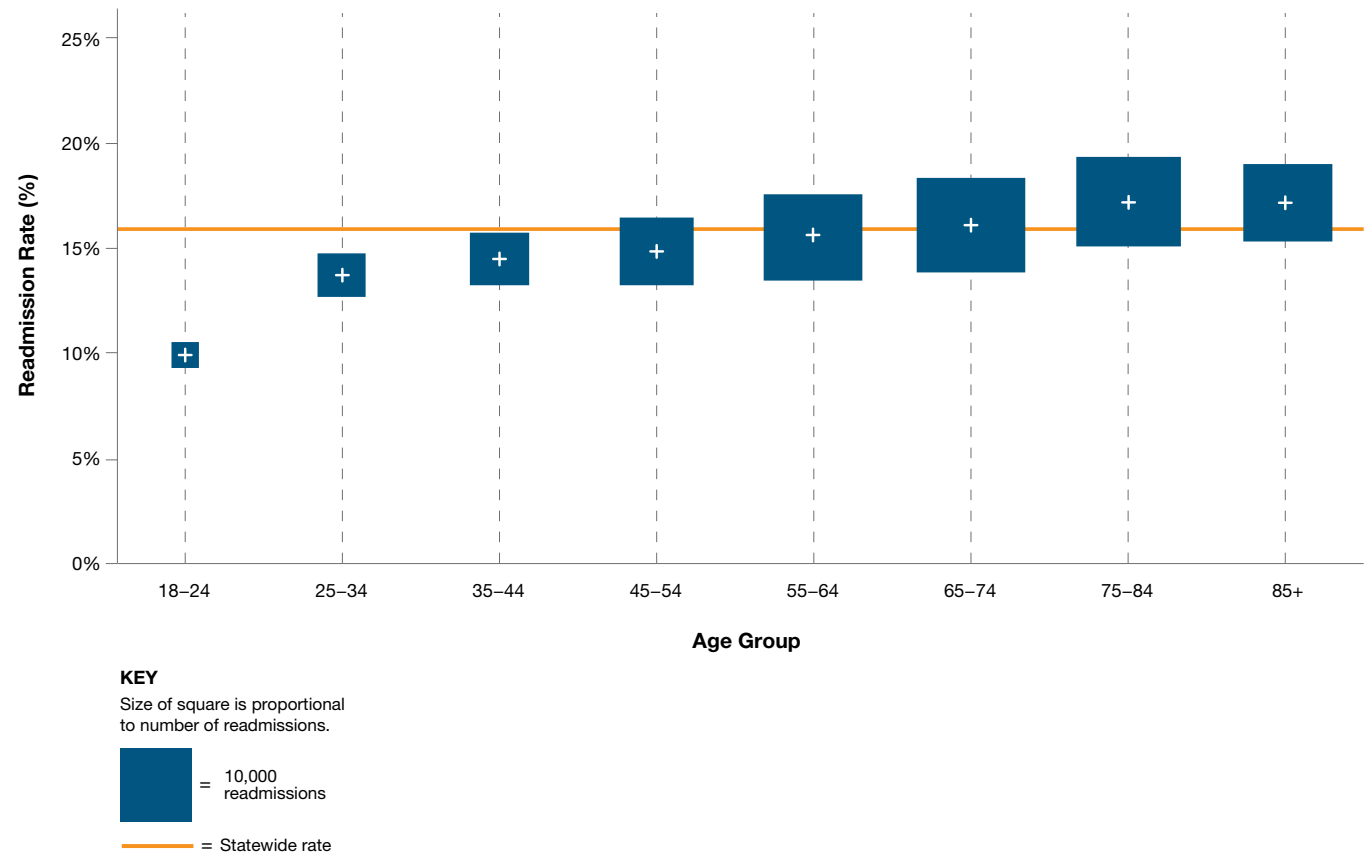
Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

All-Payer Readmissions by Patient Age Group

SFY 2020

The total numbers and rates of readmission increase with patient age. Patients aged 65 and over accounted for almost 60% of all readmissions in the state. Additionally, patients over age 75 had the highest readmission rates in 2020.



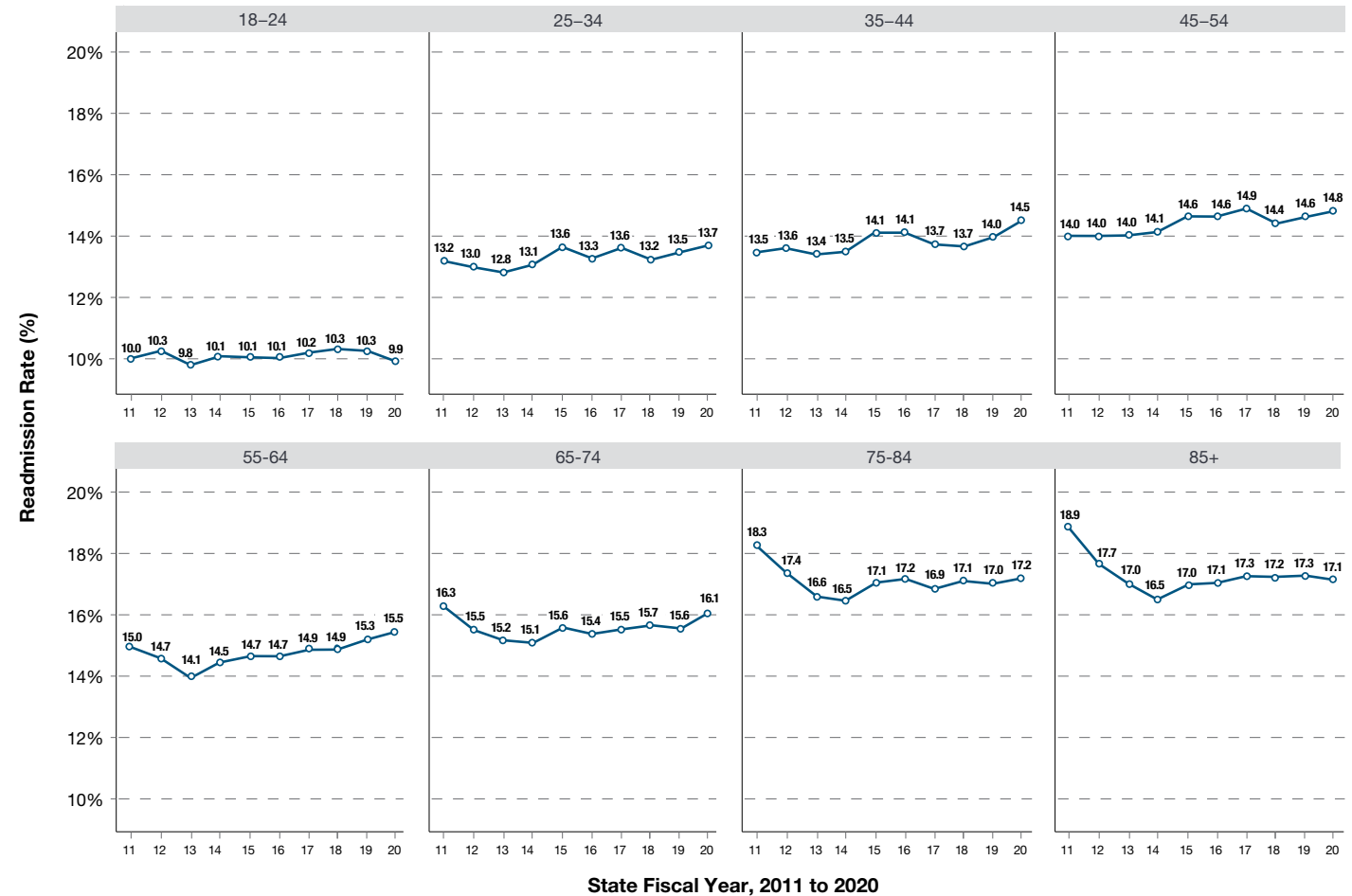
Note: The size of the squares is proportional to the number of readmissions.

Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

Annual Trends in All-Payer Readmissions by Patient Age Group SFY 2011-2020

The trend in readmission rates varies by patient age group. For patients aged 25-64, readmission rates have increased since 2018. Readmission rates decreased for patients aged 65-84 from 2018 to 2019 but increased in 2020. Readmission rates for patients aged 18-24 and 85+ decreased from 2019 to 2020.



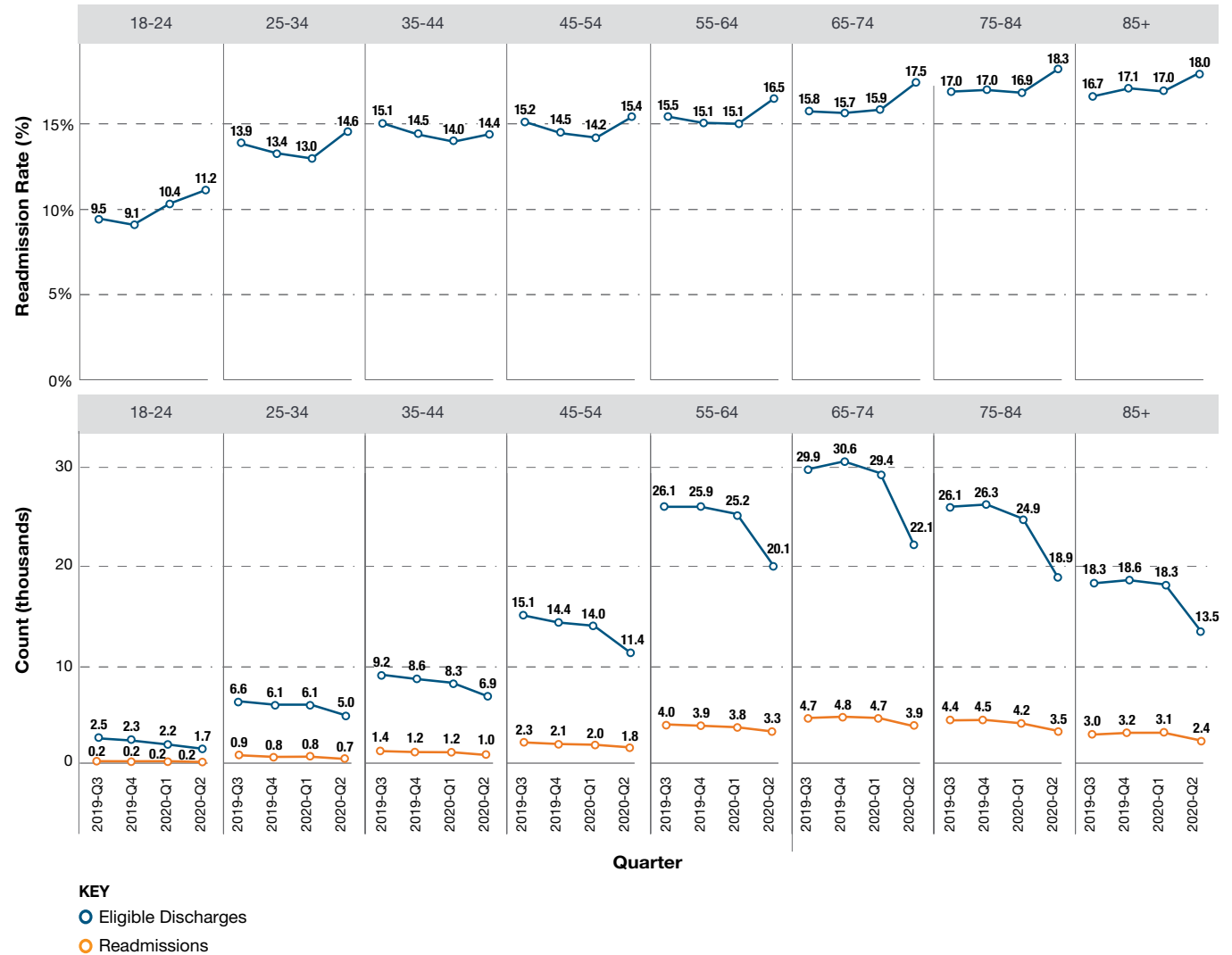
Note: Due to technical changes, readmission rates may not match those from earlier reports. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

Quarterly Trends in All-Payer Readmissions by Patient Age Group

SFY 2020

The number of discharges decreased across all age groups in the second quarter of 2020, with the largest decreases for patients over age 55. Additionally, discharges decreased more than readmissions for all age groups in the second quarter of 2020, leading to an increase in the observed readmission rate in that quarter.

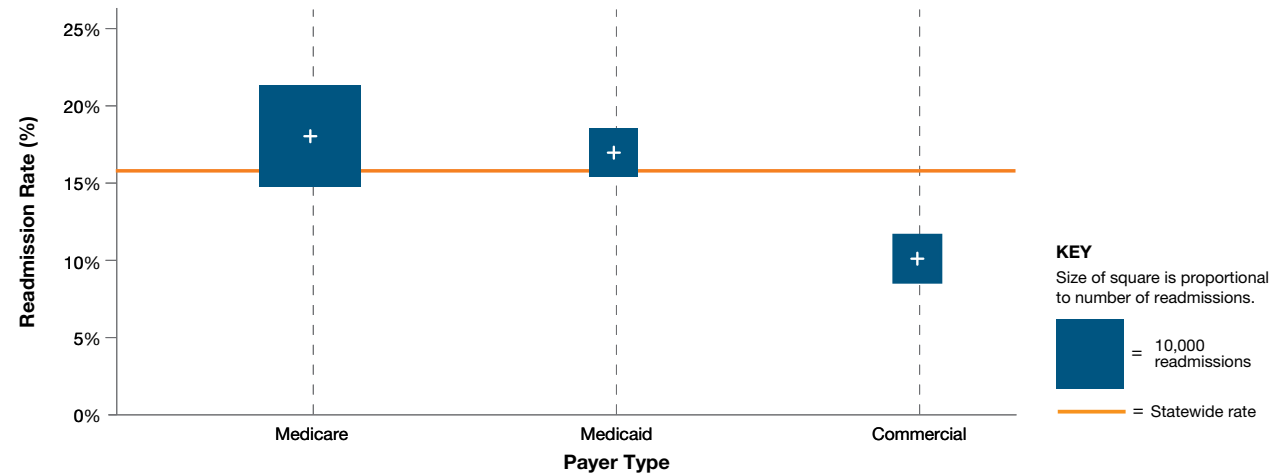


Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.
 Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

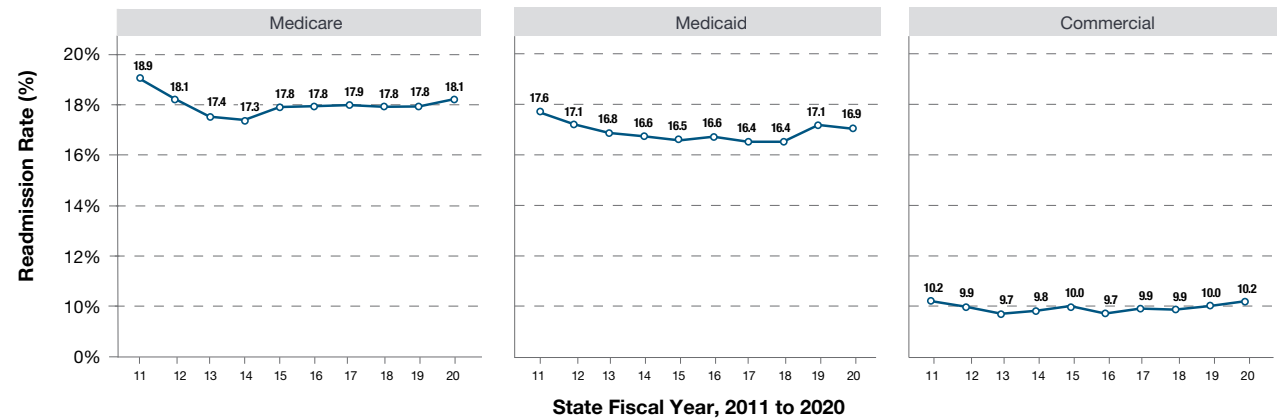
Medicare patients had the highest number and rate of readmission in 2020, as in previous years. Rates for Medicare and Medicaid patients, 18.1% and 16.9%, respectively, were higher than the rate for patients with commercial coverage (10.2%).

All-Payer Readmissions by Payer Type

SFY 2020



Ten-Year Trend



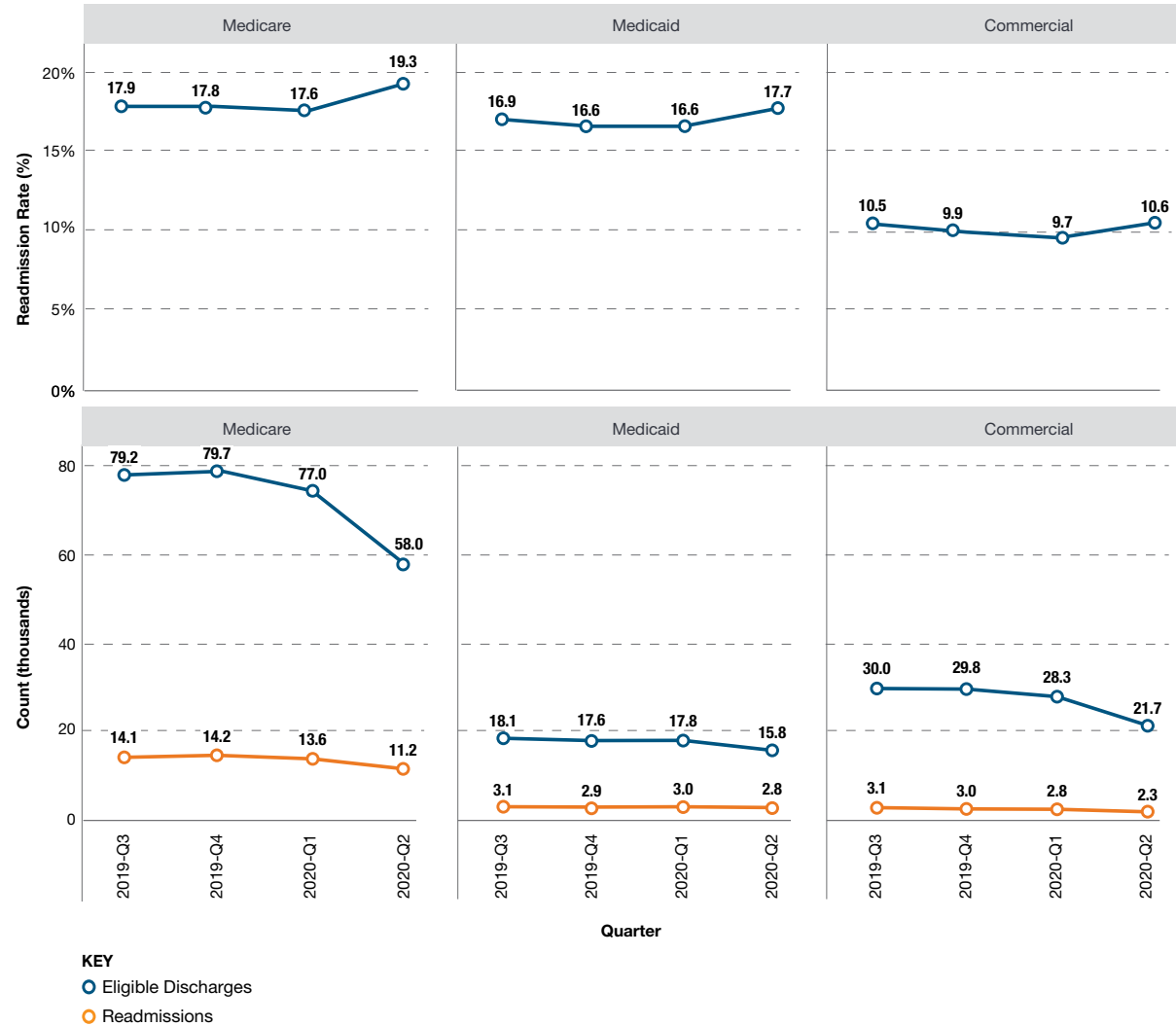
Note: The size of the squares in the top figure is proportional to the number of readmissions. Self-pay and other payer type categories were not included due to small number of discharges. Due to technical changes, readmission rates may not match those from earlier reports. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.
 Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

Quarterly Trends in All-Payer Readmissions by Payer Type

SFY 2020

The discharge volume decreased more than the readmission volume for all payers during the second quarter of 2020, leading to an increase in readmission rates.

Medicare beneficiaries had the largest decline in discharge volume and the largest increase in readmission rate.



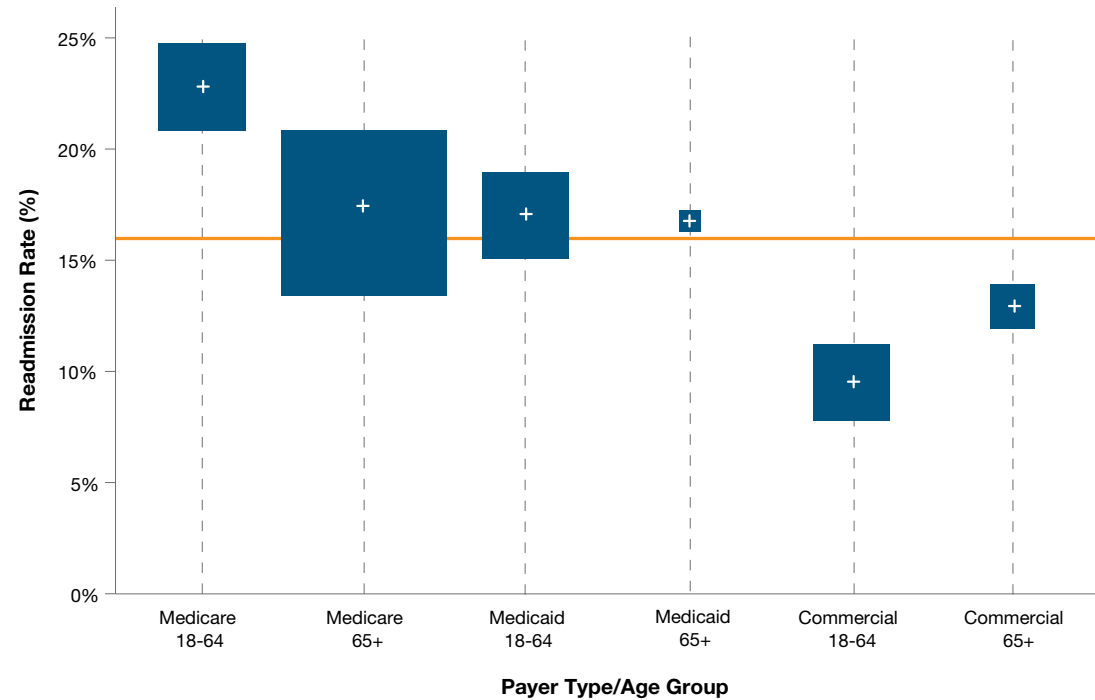
Note: Self-pay and other payer type categories were not included due to small number of discharges. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

All-Payer Readmissions by Payer Type and Patient Age Group

SFY 2020

Medicare beneficiaries aged 65 and over had the highest number of readmissions in 2020. Medicare beneficiaries aged 18-64 had the highest readmission rate, at 22.9%.



KEY

Size of square is proportional to number of readmissions.

-  = 10,000 readmissions
-  = Statewide rate

Note: The size of the squares is proportional to the number of readmissions. Self-pay and other payer type categories were not included due to small number of discharges.

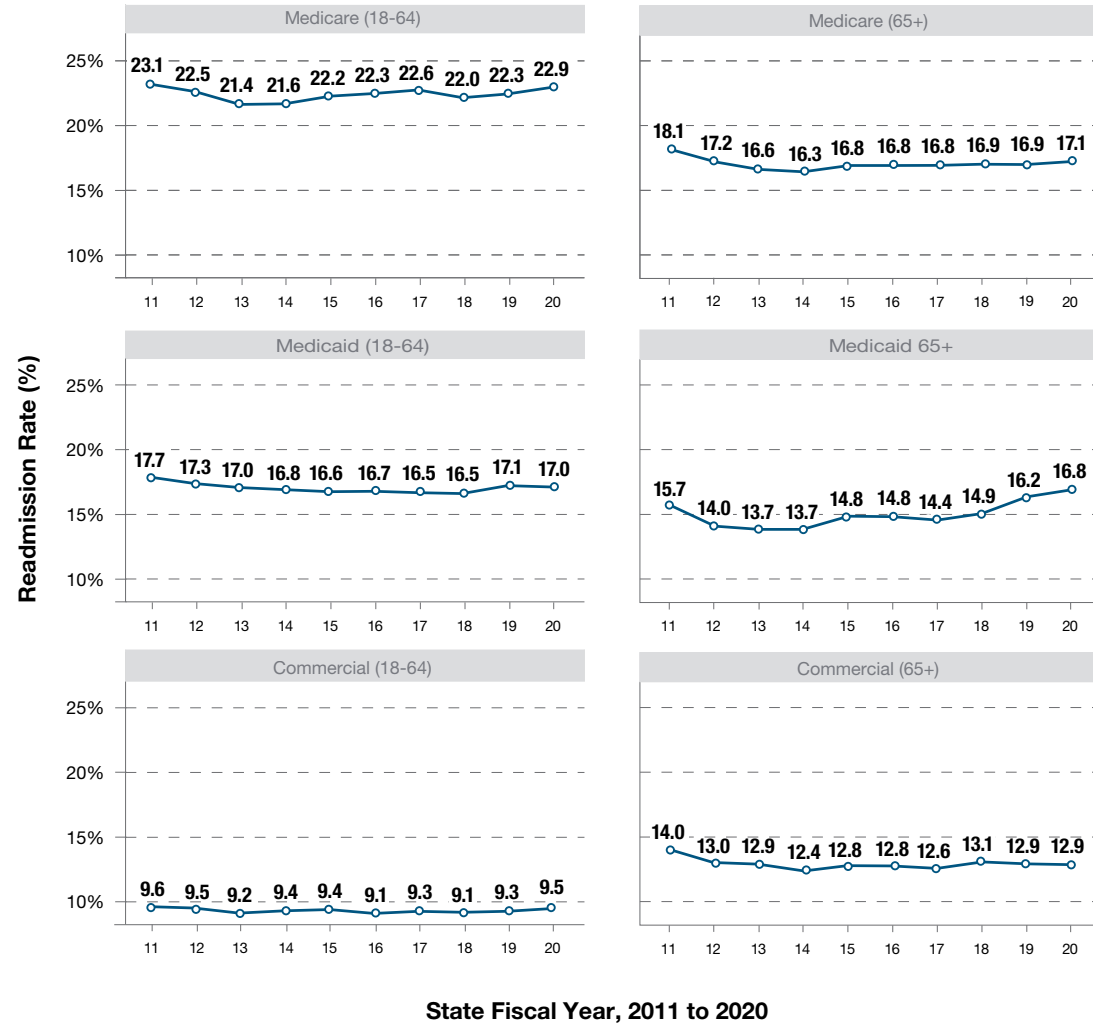
Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

Annual Trends in All-Payer Readmissions by Payer Type and Patient Age Group

SFY 2011-2020

Trends in readmission rates varied by payer type and patient age. Readmission rates for Medicare patients aged 18-64 and Medicaid patients aged 65+ have increased since 2018.



Note: Due to technical changes, readmission rates may not match those from earlier reports. Self-pay and other payer type categories were not included due to small number of discharges. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

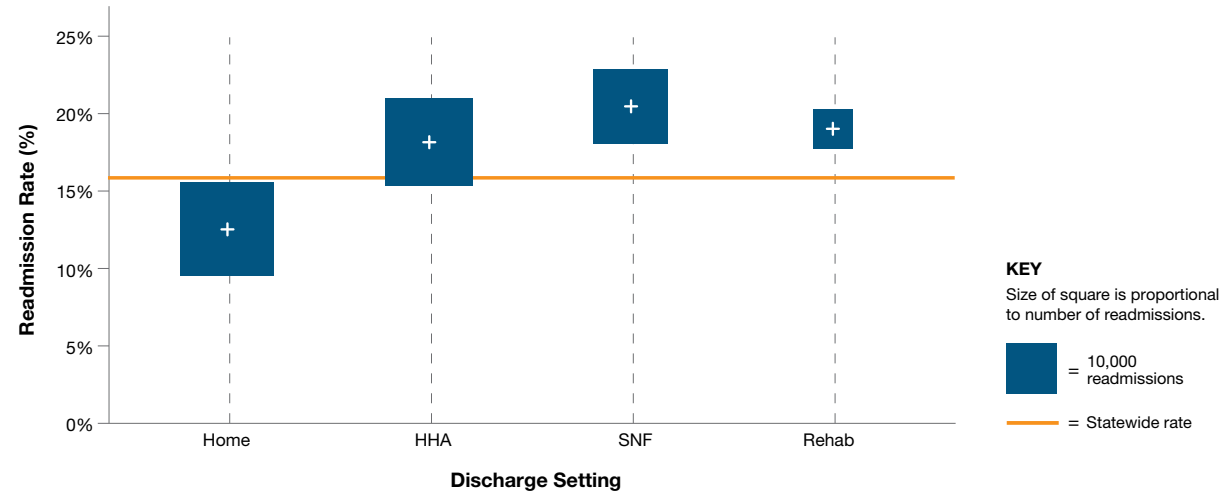
All-Payer Readmissions by Characteristics of Patients and Hospitalizations

Patients discharged to home had the lowest readmission rates (12.4%) in 2020. Patients discharged to post-acute care settings had higher readmission rates: 17.9% for home health agencies (HHA), 20.2% for skilled nursing facilities (SNF), and 18.9% for rehabilitation.

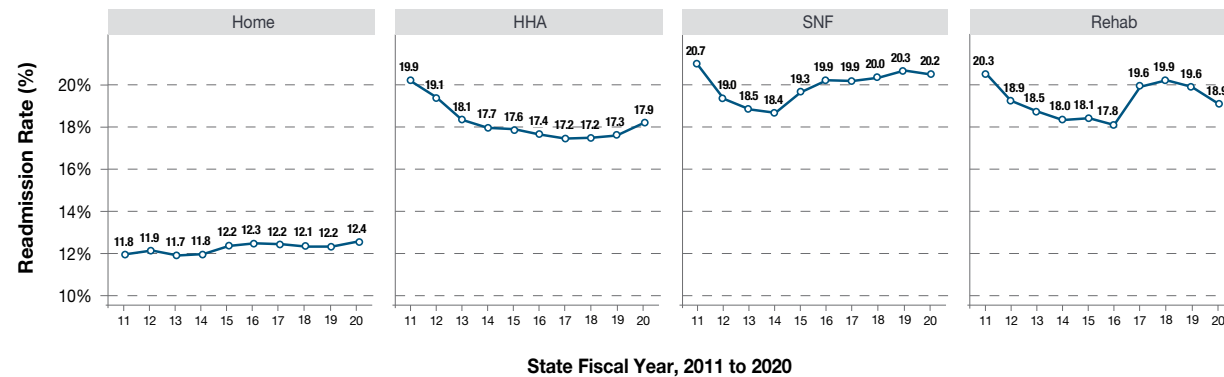
Readmission rates for patients discharged to HHA have decreased since 2011 but increased in 2020. Readmission rates for patients discharged to rehabilitation have decreased over the past few years.

All-Payer Readmissions by Discharge Setting

SFY 2020



Ten-Year Trend



Note: The size of the squares in the top figure is proportional to the number of readmissions. HHA = home with home health agency care, SNF = skilled nursing facility. Hospice discharges were not included due to its small number of discharges.

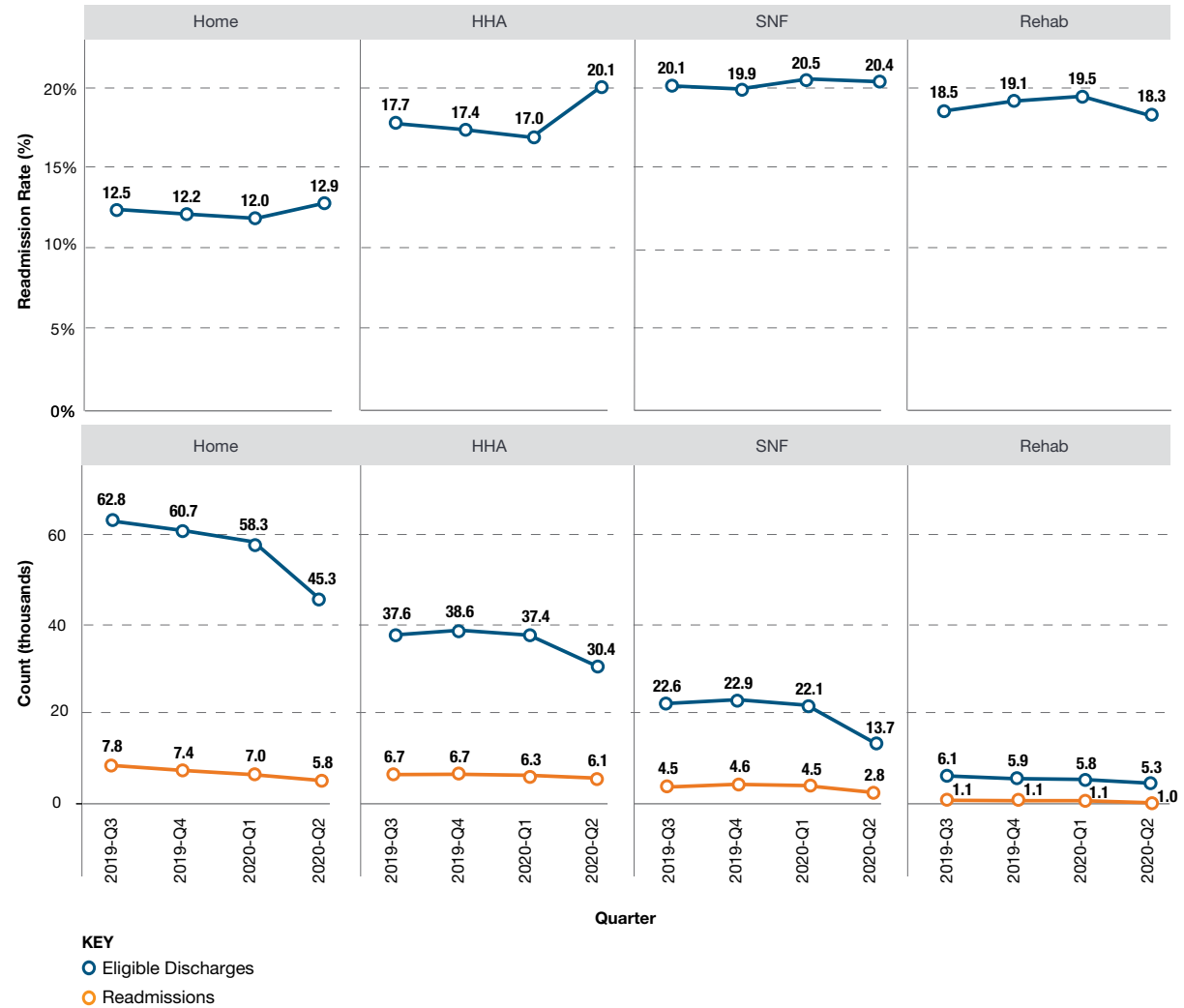
Due to technical changes, readmission rates may not match those from earlier reports. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

Quarterly Trends in All-Payer Readmissions by Discharge Setting

SFY 2020

Readmission rates increased for patients discharged to home and HHA during the second quarter of 2020 and decreased for patients discharged to SNF or rehab. Discharge volume decreased across all discharge settings.



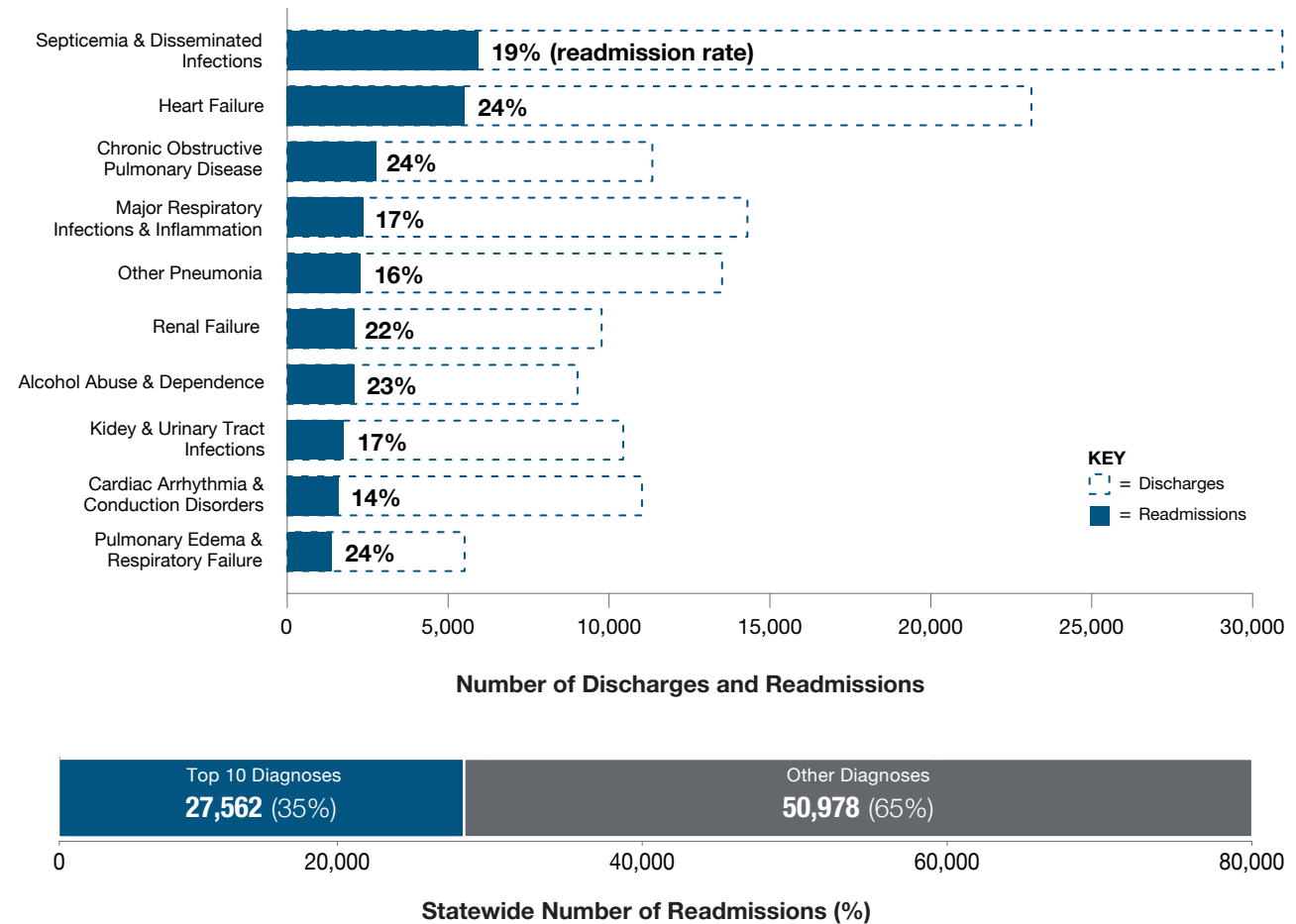
Note: HHA = home with home health agency care, SNF = skilled nursing facility. Hospice discharges were not included due to its small number of discharges. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

Discharge Diagnoses with the Highest Numbers of Readmissions SFY 2020

Hospitalizations for sepsis resulted in the highest number of readmissions in 2020, consistent with previous years.

The top 10 discharge diagnoses leading to the highest numbers of readmissions only account for 35% of total readmissions.



Note: The discharge diagnosis is based on APR DRG version 30.0. Some discontinuity in trend by diagnosis may be attributed to the change in diagnostic coding from ICD-9-CM to ICD-10-CM in October 2015.

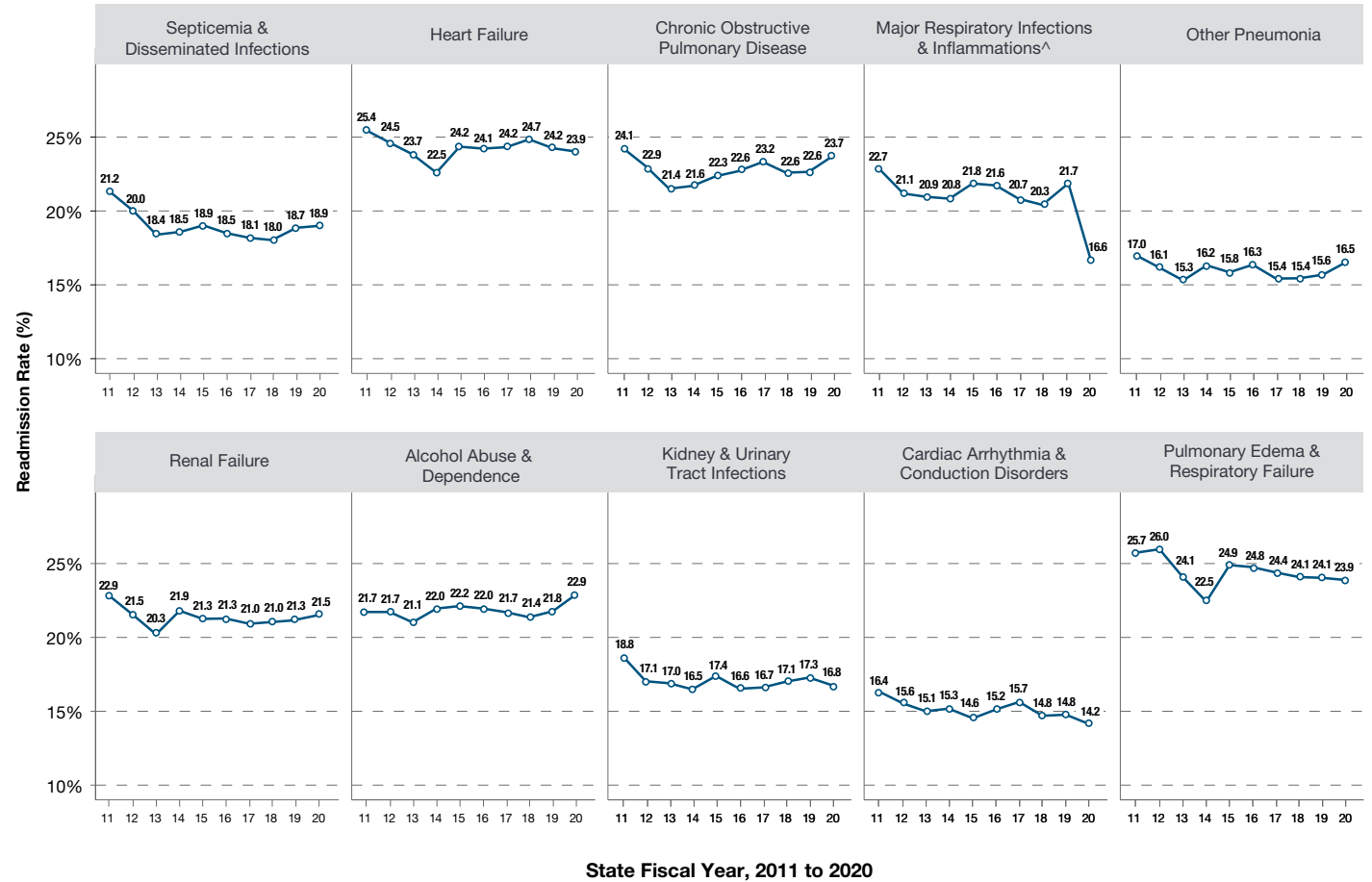
Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

Annual Trends in Discharge Diagnoses with the Highest Numbers of Readmissions

SFY 2011-2020

The 10-year trend in readmissions varied greatly for the top 10 discharge diagnoses with the highest numbers of readmissions. Readmission rates for major respiratory infections, which includes COVID-19 discharges, decreased in 2020.



[^]Contains COVID-19 discharges

Note: The discharge diagnosis is based on APR DRG version 30.0. Some discontinuity in trend by diagnosis may be attributed to the change in diagnostic coding from ICD-9-CM to ICD-10-CM in October 2015.

Due to technical changes, readmission rates may not match those from earlier reports. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

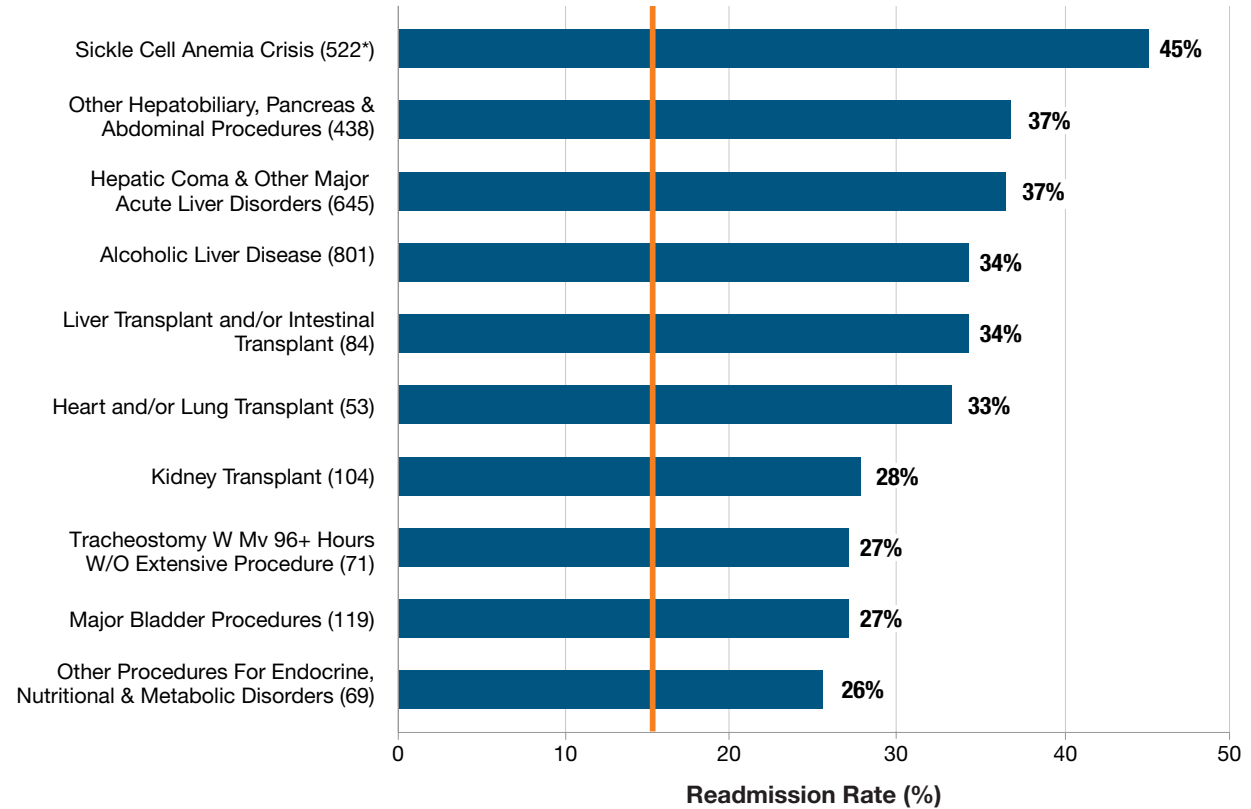
Data source: Massachusetts Hospital Inpatient Discharge Database, July 2010 to June 2020.

Discharge Diagnoses with the Highest Readmission Rates

SFY 2020

As in previous years, sickle cell anemia, transplants, and liver disease are among the discharge diagnoses with the highest readmission rates.

While the overall number of readmissions attributed to these diagnoses is relatively small—about four percent of all readmissions—patients with these diagnoses have a very high risk of readmission.



KEY
| = Statewide rate

* Number of readmissions

Note: The discharge diagnosis is based on APR DRG version 30.0. Some discontinuity in trend by diagnosis may be attributed to the change in diagnostic coding from ICD-9-CM to ICD-10-CM in October 2015.

Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

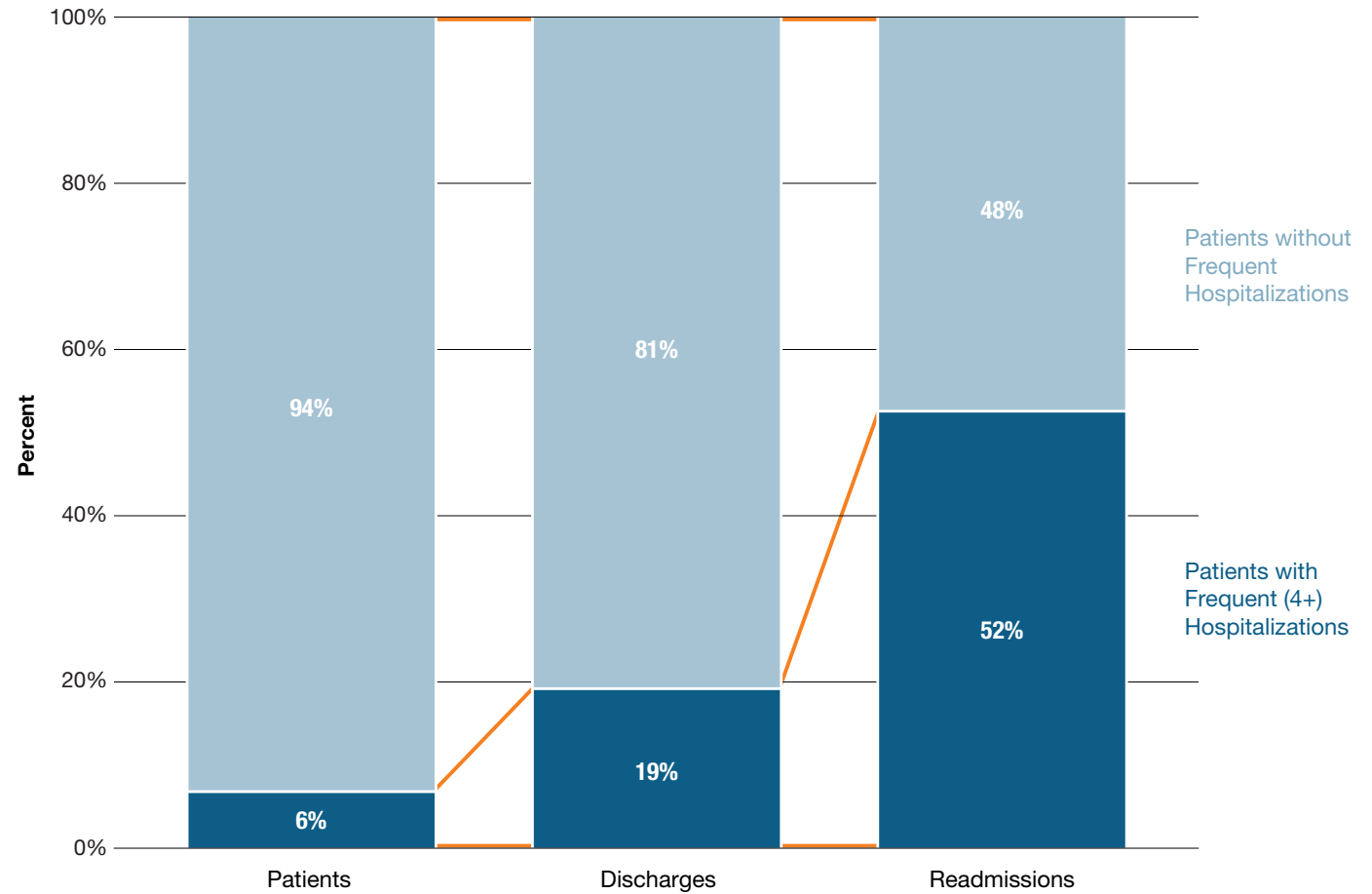
All-Payer Readmissions by Characteristics of Patients and Hospitalizations

Frequently hospitalized patients are defined as those with four or more hospitalizations within 12 months of their most recent discharge.

In 2020, six percent of patients were hospitalized four or more times in the previous 12 months. This group of patients accounted for 19% of discharges and over half (52%) of readmissions.

The readmission rate for frequently hospitalized patients was 43.6%, compared to 9.3% for patients who were not frequently hospitalized.

All-Payer Readmissions Among Frequently Hospitalized Patients SFY 2020

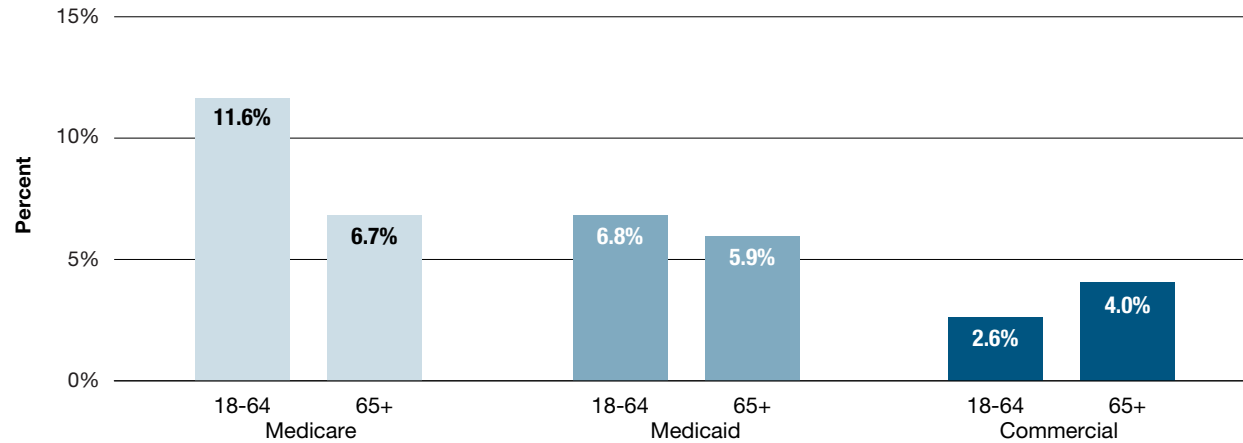


Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.
Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

Frequently Hospitalized Patients by Payer Type and Age Group SFY 2020

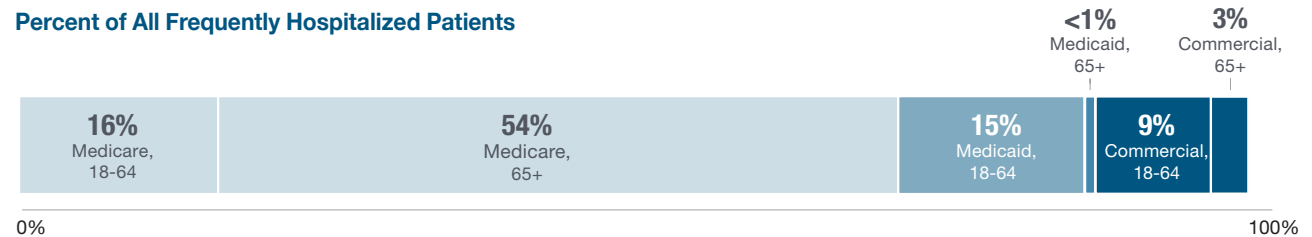
Almost 12% of Medicare beneficiaries aged 18-64 were frequently hospitalized patients in 2020. In contrast, less than 3% of patients aged 18-64 with commercial insurance were frequently hospitalized patients.

Among frequently hospitalized patients, the majority were Medicare beneficiaries (70%). Patients with either Medicare or Medicaid coverage made up 85% of all frequently hospitalized patients.



Number of Frequently Hospitalized Patients	3,166	10,946	2,981	169	1,853	634
Number of all Patients	27,251	162,627	44,004	2,859	70,324	15,657

Percent of All Frequently Hospitalized Patients



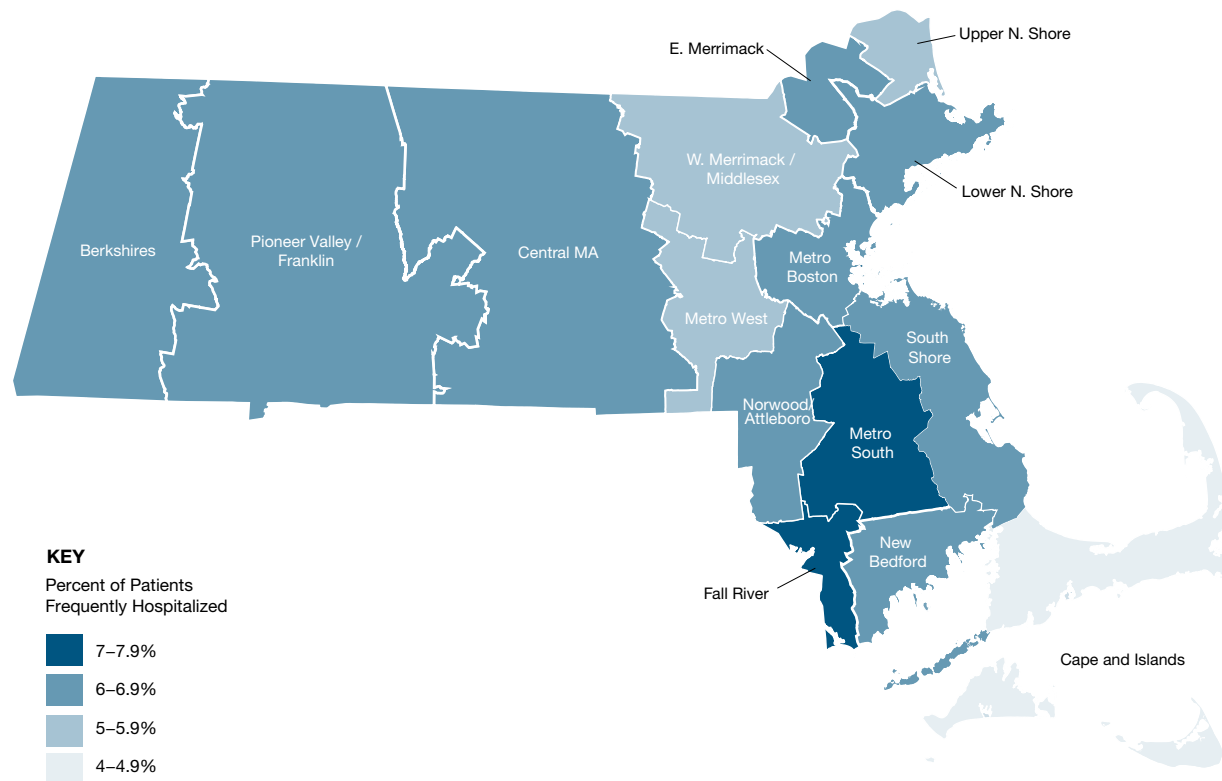
Note: Self-pay and other payer type categories were not included due to small number of discharges. Percentages may not add up to 100% due to rounding.

Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

Percentage of Patients Frequently Hospitalized by Patient Region SFY 2020

The highest proportion of frequently hospitalized patients were in Fall River, followed by the Metro South region in 2020. The lowest proportion of frequently hospitalized patients were in the Cape and Islands region.



Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.
Data source: Massachusetts Hospital Inpatient Discharge Database, July 2019 to June 2020.

All-Payer Readmissions and COVID-19

The COVID-19 pandemic has disrupted the health care system in a variety of ways that have impacted hospital utilization. This section presents readmission rates for COVID-19 and non-COVID-19 discharges overall, as well as by patient age group and payer type.

This section reports readmission rates only from the time period where COVID-19 discharges were seen, April – June 2020. For the purposes of this analysis, 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. •

Key Findings:

- From April to June 2020, the readmission rate for COVID-19 discharges was 14.7%, compared to 17.2% for non-COVID-19 discharges.
- The readmission rate for non-COVID-19 discharges was higher than that for COVID-19 discharges for all age groups except for patients aged 75 and up.
- Among Medicaid patients, the rate for non-COVID-19 discharges was nearly two times that of COVID-19 discharges (19.0% and 10.7%, respectively).

All-Payer Readmissions and COVID-19

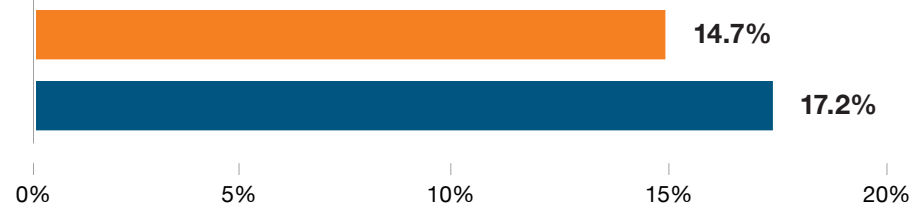
The readmission rate among COVID-19 discharges was 14.7%, compared to the rate for non-COVID-19 discharges at 17.2%.

COVID-19 discharges accounted for 14% of total eligible discharges and 12% of total readmissions during the second quarter of 2020.

All-Payer Readmissions by COVID-19 Status

April - June 2020

Readmission Rate (%)



KEY

- COVID-19
- non-COVID-19

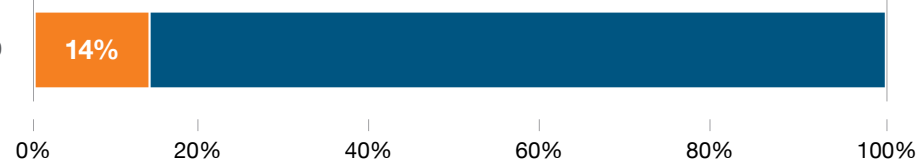
Readmissions

Number of Readmissions 16,767



Discharges

Number of Discharges 99,660



Distribution by COVID-19/non-COVID-19

Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

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.

Data source: Massachusetts Hospital Inpatient Discharge Database, April 2020 to June 2020.

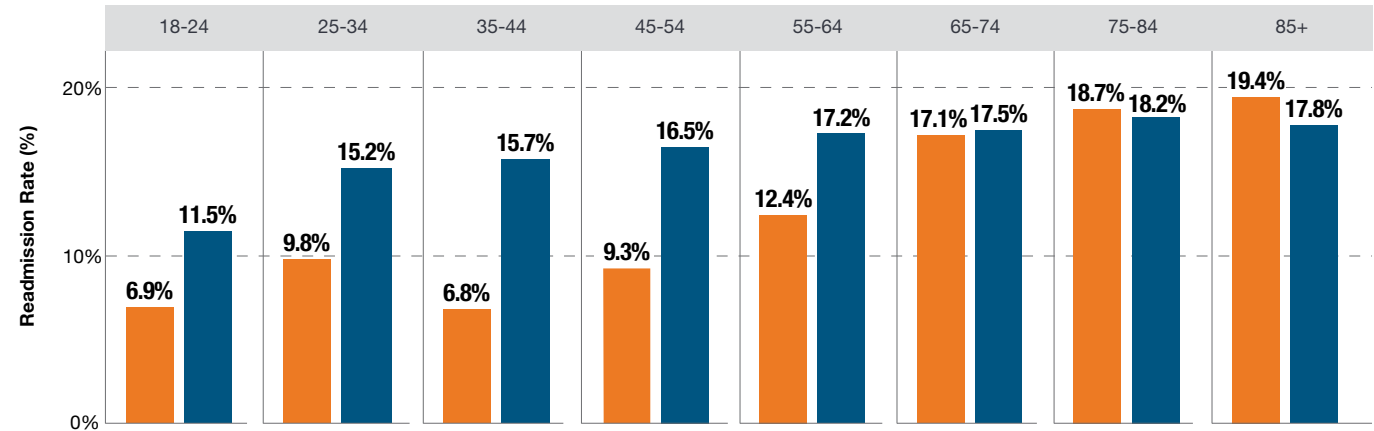
All-Payer Readmissions and COVID-19

The readmission rate for COVID-19 discharges increases with age. For all age groups except patients aged 75 and older, readmission rates were lower for COVID-19 discharges than non-COVID-19 discharges.

COVID-19 discharges made up 8% of discharges for patients aged 18-24, and 12-16% of discharges for all other age groups.

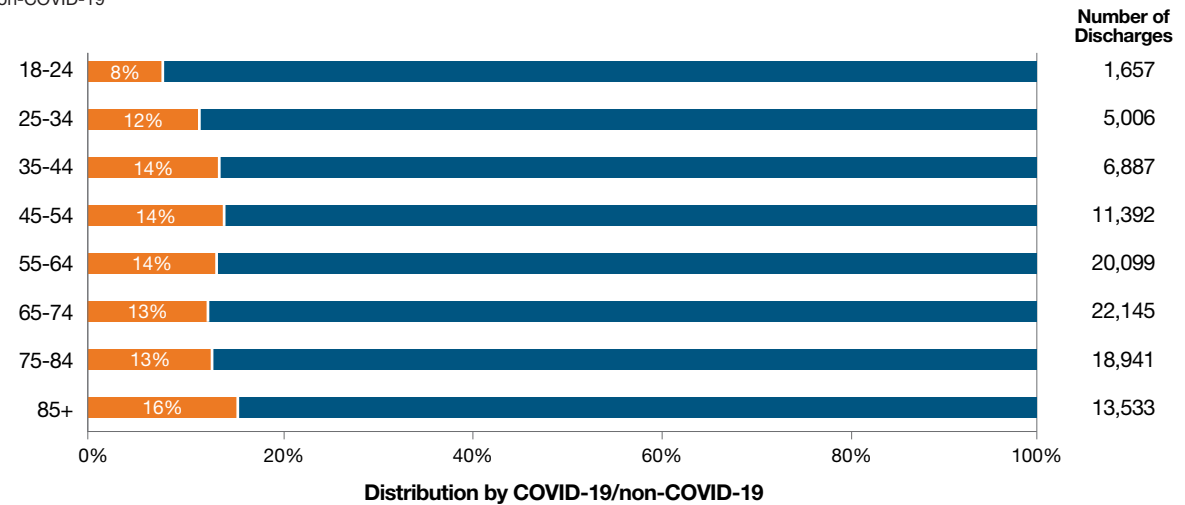
All-Payer Readmissions by Patient Age Group and COVID-19 Status

April - June 2020



KEY

- COVID-19
- non-COVID-19



Note: Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information. 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.

Data source: Massachusetts Hospital Inpatient Discharge Database, April 2020 to June 2020.

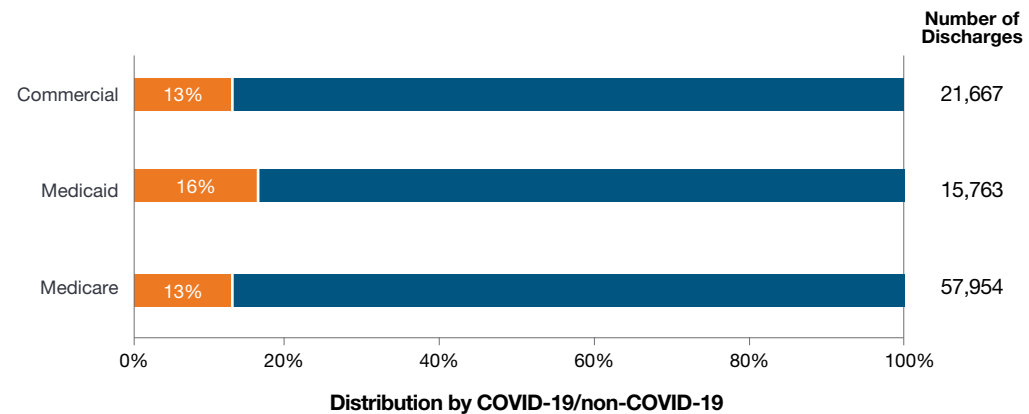
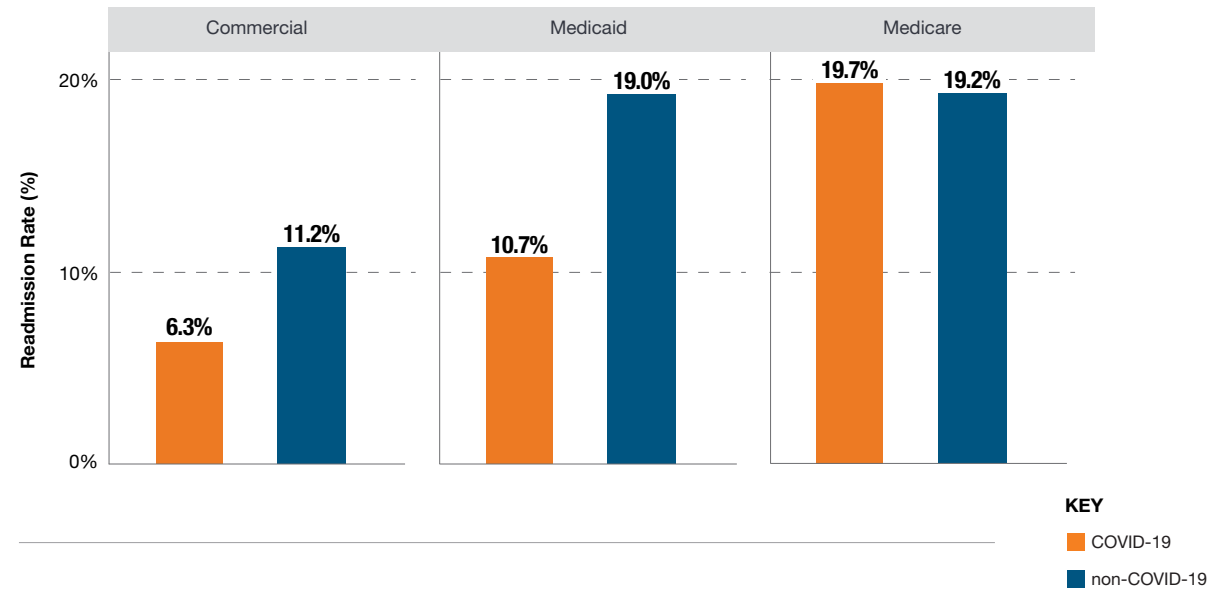
All-Payer Readmissions and COVID-19

Readmission rates for COVID-19 discharges were lower than non-COVID-19 discharges for Medicaid and commercial patients. For Medicaid patients, the readmission rate for non-COVID-19 discharges was nearly two times the rate for COVID-19 discharges (19.0% vs. 10.7%, respectively).

COVID-19 made up 16% of Medicaid discharges compared to 13% for both commercial and Medicare patients.

All-Payer Readmissions by Payer Type and COVID-19 Status

April - June 2020



Note: Self-pay and other payer type categories were not included due to small number of discharges. Analyses include eligible discharges for adults with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information. 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.

Data source: Massachusetts Hospital Inpatient Discharge Database, April 2020 to June 2020.

All-Payer Readmissions by Hospital

This section contains analyses of observed readmission rates and risk-standardized readmission rates (RSRRs) for individual hospitals and for groups of hospitals. RSRRs control for differences across hospitals that may influence readmission rates but are not indicators of health care quality. In previous reports, CHIA used the Yale/CMS risk-adjustment model, which accounts for patient age, patient case mix and hospital service mix. Following the recommendations from an expert committee on social risk factors,¹⁰ CHIA has since enhanced the risk-adjustment model to additionally adjust for patient- and community-level social risk factors. Patient-level factors include sex, race and ethnicity, homeless status, and dual-eligibility, and community-level factors include indicators of poverty, food insecurity, housing instability, education and employment. By adjusting for differences in the patient populations served at each acute care hospital, the

enhanced RSRRs allow for a fairer comparison of hospital performance. These rates include eligible discharges for residents of New England and New York only, equivalent to 99% of all eligible discharges. For more details about the enhanced RSRRs, please see the [technical appendix](#). •

Key Findings:

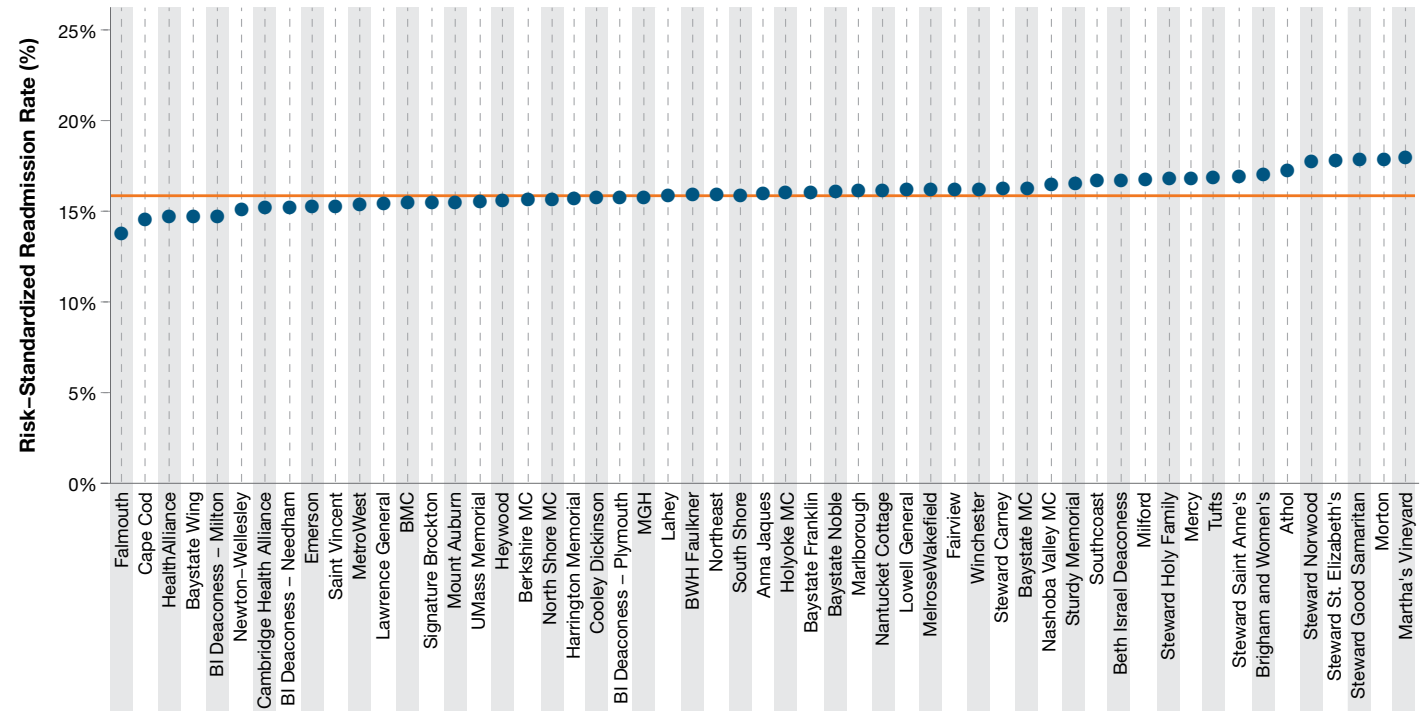
- RSRRs for acute care hospitals ranged from 13.7% to 17.9% in 2020.
- Variation in RSRRs by hospital type was small, from a low of 15.8% for community hospitals to a high of 16.2% for the Academic Medical Centers.
- RSRRs varied by hospital system, from a low of 14.3% for Cape Cod Healthcare to a high of 17.4% for the Steward Health Care System.

All-Payer Readmissions by Hospital

Hospital RSRRs ranged from a low of 13.7% at Falmouth Hospital to a high of 17.9% at Martha's Vineyard Hospital.

The range of RSRRs was 4.2 percentage points.

All-Payer Risk-Standardized Readmission Rates of Acute Care Hospitals SFY 2020



Note: The risk-standardized readmission rates (RSRRs) shown in this figure account for patient case mix, hospital service mix, as well as patient-level and community-level social risk factors. This figure excludes specialty hospitals (New England Baptist and the Massachusetts Eye and Ear Infirmary).

Analyses include eligible discharges for adults residing in New England and New York and with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

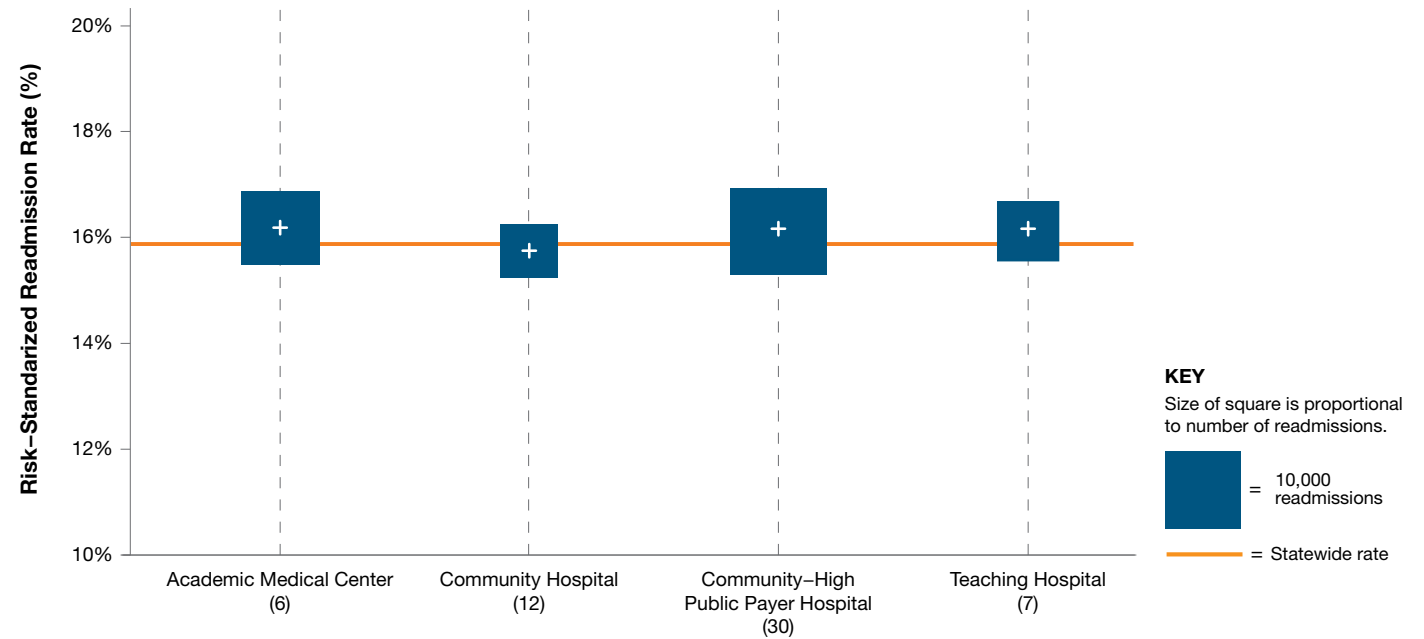
Data source: Massachusetts Hospital Inpatient Discharge Database, July 2017 to June 2020.

All-Payer Readmissions by Hospital

Variation in RSRRs by hospital type was small, from a low of 15.8% for community hospitals to a high of 16.2% for the Academic Medical Centers.

All-Payer Risk-Standardized Readmission Rates by Hospital Type

SFY 2020



Note: The size of the squares is proportional to the number of readmissions.

The risk-standardized readmission rates (RSRRs) shown in this figure account for patient case mix, hospital service mix, as well as patient-level and community-level social risk factors.

Analyses include eligible discharges for adults residing in New England and New York and with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

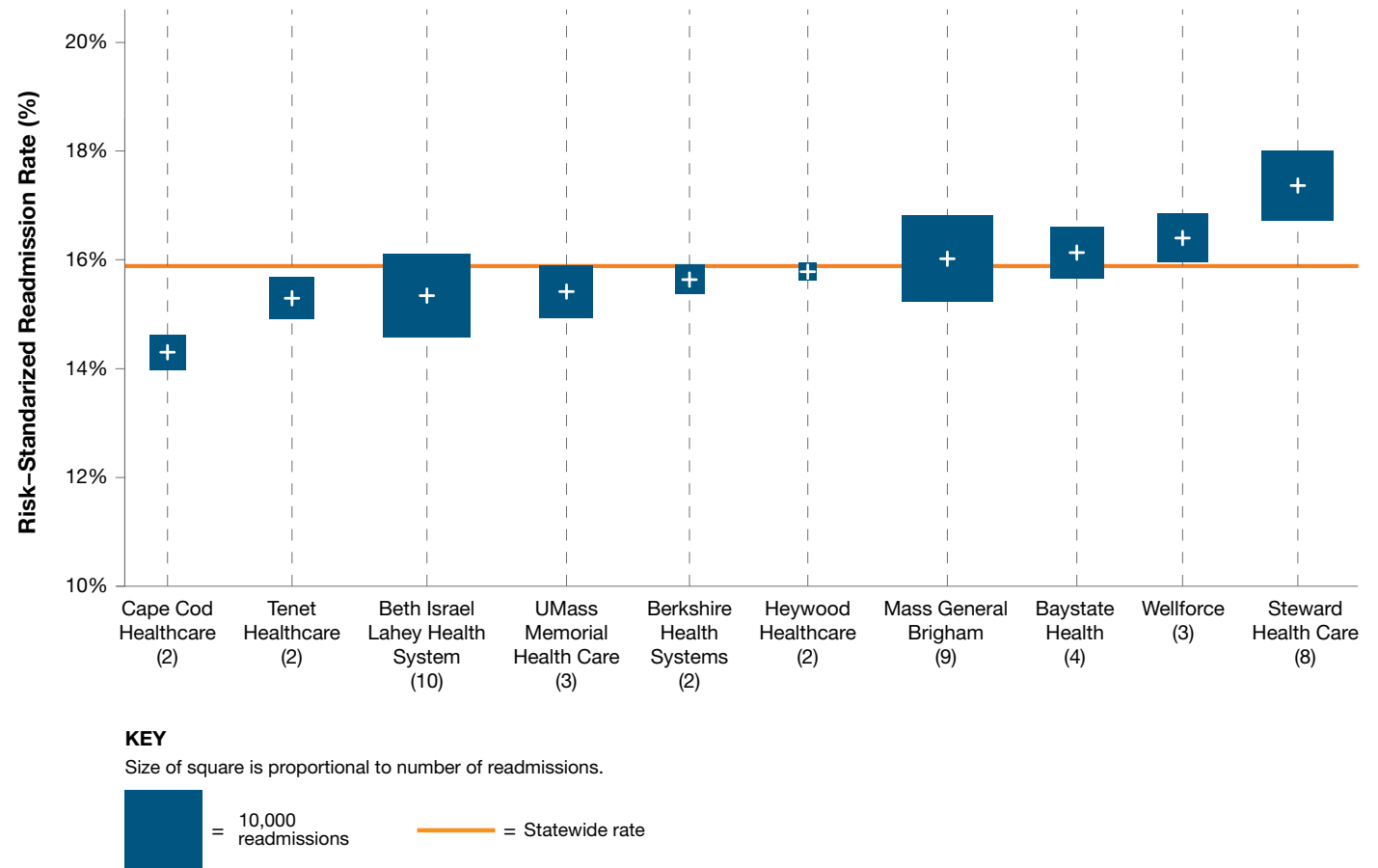
Data source: Massachusetts Hospital Inpatient Discharge Database, July 2017 to June 2020.

All-Payer Readmissions by Hospital

RSRRs varied by hospital system, from a low of 14.3% for Cape Cod Healthcare to a high of 17.4% for Steward Health Care System. The largest hospital system—Mass General Brigham—had an RSRR of 16.0% and accounted for 19% of all discharges and 19% of all readmissions.

See the [technical appendix](#) for a list of hospitals with their system affiliation.

All-Payer Risk-Standardized Readmission Rates by Hospital System SFY 2020



Note: The size of the squares is proportional to the number of readmissions.

The risk-standardized readmission rates (RSRRs) shown in this figure account for patient case mix, hospital service mix, as well as patient-level and community-level social risk factors.

Analyses include eligible discharges for adults residing in New England and New York and with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2017 to June 2020.

All-Payer Readmissions by Hospital

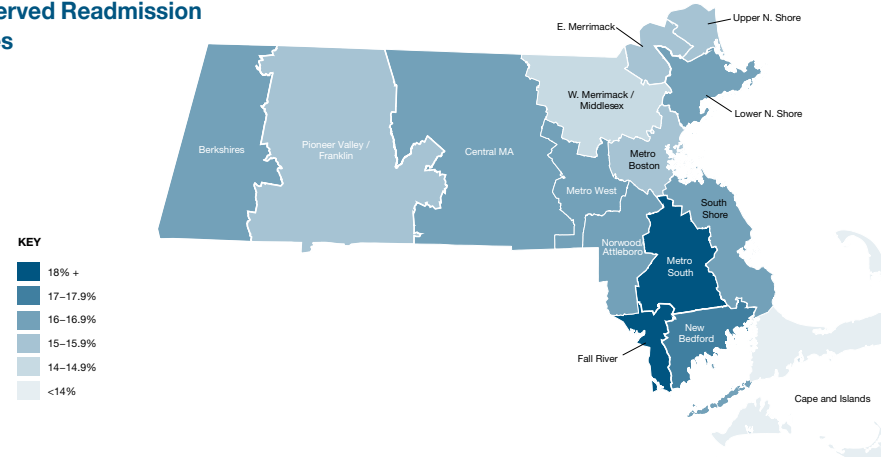
The top figure shows geographic variation in observed readmission rates, while the bottom figure shows variation in RSRRs.

The observed rates varied considerably from a low of 12.9% on the Cape and Islands to 18.7% in Metro South. Once differences in patient populations, hospital service mix, and patient- and community-level social risk factors were accounted for by risk-standardization (bottom figure), the geographic variation narrowed, ranging from 14.5% to 17.2%.

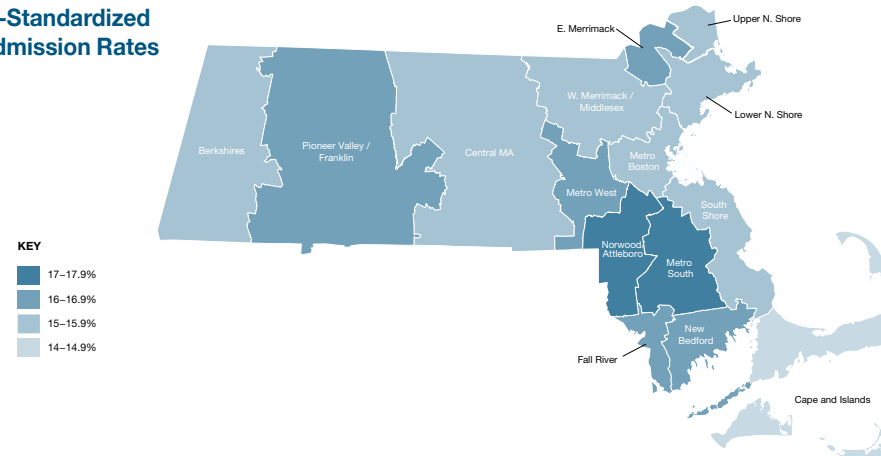
All-Payer Observed and Risk-Standardized Readmission Rates by Hospital Region

SFY 2020

Observed Readmission Rates



Risk-Standardized Readmission Rates



Note: The risk-standardized readmission rates (RSRRs) shown in this figure account for patient case mix, hospital service mix, as well as patient-level and community-level social risk factors. Analyses include eligible discharges for adults residing in New England and New York and with any payer, excluding discharges for obstetric or primary psychiatric care. See [technical appendix](#) for more information.

Data source: Massachusetts Hospital Inpatient Discharge Database, July 2017 to June 2020.

About the Readmissions Methodology

CHIA has adapted the Hospital-Wide All-Cause Unplanned 30-day Readmission Measure (NQF #1789) developed by CMS and the Yale Center for Outcomes Research and Evaluation to report on all-payer readmissions in the Commonwealth. The measure was applied to CHIA's Hospital Inpatient Discharge Database, which is collected from all non-federal acute care hospitals in Massachusetts.¹¹ This year's report uses the 2021 CMS readmission measure methodology (version 10.0), which updates the planned readmissions algorithm.¹² Some discontinuity in trends may be attributable to the change in diagnostic coding from ICD-9-CM to ICD-10-CM.

A readmission is defined as an inpatient admission to an acute care facility in Massachusetts occurring within 30 days of an eligible index discharge. All readmissions are counted except for those that are considered planned.

Readmission rates are calculated in four broad steps. First, eligible hospital discharges are defined. Second,

from among this set of eligible discharges, the number of eligible readmissions within 30 days is derived. Then, the latter is divided by the former and turned into a percentage to calculate the observed readmission rate. In step four, the risk-standardized readmission rate (RSRR) is derived from the volume-weighted results of five different statistical models, one for each of the following clinically-defined patient cohorts: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. These risk-standardized readmission rates account for differences between hospitals in patient case mix, hospital service mix, as well as patient-level and community-level social risk factors.

The [technical appendix](#) has further details on the readmissions methodology, including the categories of discharges that are excluded from the readmissions analyses.

1
Count of eligible discharges*

2
Count # of eligible readmissions** within 30 days

3
Observed Readmission Rate = $\frac{\text{\# of eligible readmissions}}{\text{\# of eligible discharges}} * 100$

4

Enhanced Risk-Standardized Readmission Rate =

Observed rate adjusted for:

- Patient age
- Patient comorbidities
- Discharge condition
- Patient race
- Patient gender
- Patient dual-eligibility status
- Patient homelessness status
- Median family income[^]
- Median home value[^]
- Percent of civilian labor force aged 16+ that is unemployed[^]
- Percent of single parents in family households with people less than 18 years old[^]
- Percent of population aged 25+ with at least a high school education[^]
- Percent of white-collar workers of all civilian workers aged 16+[^]
- Percent of households with cash public assistance or SNAP[^]
- Percent of population living in same house as one year ago[^]

*Eligible discharges are discharges for adults during the study period from non-federal acute-care hospitals in Massachusetts. Analyses exclude obstetric and primary psychiatric discharges. Eleven further exclusions are made. See the [technical appendix](#) for further details.

**Eligible readmissions are admissions for any reason that occur within 30 days of an eligible discharge and are not planned.

[^]Sourced from the Census and American Community Survey.

Notes

- 1** See the 2020 Scorecard on State Health System Performance by the Commonwealth Fund at <https://2020scorecard.commonwealthfund.org/state/massachusetts>.
- 2** For the original measure technical report see: Horwitz, L., C. Partovian, Z. Lin, J. Herrin, J. Grady, M. Conover, J. Montague et al. "Hospital-wide all-cause unplanned readmission measure: final technical report." *Centers for Medicare and Medicaid Services* (2012).
- 3** For this report, CHIA used the 2021, version 10.0, readmission measure specification. Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation (YNHHSC/CORE). "2021 Hospital-Wide Readmission Measure Updates and Specifications – Version 10.0" (April 2021). Accessed 8/6/2021. <https://qualitynet.cms.gov/inpatient/measures/readmission/methodology>.
- 4** Information on the Massachusetts Hospital Inpatient Discharge Database is available at <http://www.chiamass.gov/case-mix-data/>. The FY2020 Hospital Inpatient Discharge Dataset processed by CHIA in June of 2021 was used for all analyses published in this year's annual statewide report. CHIA's readmission measure is based on inpatient data only. Observation stay data, which is reported by acute care hospitals to CHIA in a separate data file, was not included in the readmission measure.
- 5** Accounting for Social Risk Factors in Public Reporting on Unplanned Hospital Readmissions in Massachusetts: A Workgroup Report. CHIA (February 2020). <https://www.chiamass.gov/assets/docs/r/pubs/2020/Social-Risk-Factors-and-Readmissions-report-February-2020.pdf>.
- 6** See note 1.
- 7** See note 2.
- 8** See note 3.
- 9** See note 4.
- 10** See note 5.
- 11** See note 4.
- 12** See note 3.



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