

Behavioral Health & Readmissions

In Massachusetts
Acute Care Hospitals
SFY 2020

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Executive Summary

Over the past decade, efforts to reduce readmissions have largely focused on developing strategies to better manage patients' medical or surgical conditions.^{1,2} A growing body of evidence indicates that patients with comorbid behavioral health conditions have higher readmission rates and have higher overall hospital utilization and cost.^{5,6} This emphasizes the importance of addressing behavioral health as a component of readmission reduction interventions in health care settings.^{7,8} Efforts aimed at reducing avoidable readmissions may be improved by recognizing comorbid behavioral health conditions as contributors to readmission risk.

This is the fifth report in the Behavioral Health and Readmissions in Massachusetts Acute Care Hospitals series, updating findings from previous reports with State Fiscal Year (SFY) 2020 data (July 1, 2019 through June 30, 2020). Additional analyses for SFY 2019 (July 1, 2018 to June 30, 2019) are presented in the [databook](#) accompanying this report.

The report provides key estimates of the prevalence of behavioral health comorbidities for the hospitalized adult population in Massachusetts, as well as their association with unplanned readmissions and length of stay. This report is the first in this series to include data covering the beginning of the coronavirus disease 2019 (COVID-19) pandemic. New analyses explore trends in prevalence, length of stay, and readmission rates among patients with behavioral health comorbidities during the first wave of the pandemic (April-June 2020).

The report finds important differences in the prevalence of behavioral health comorbidity by payer type, age, region, and any COVID-19 diagnosis, and differences in readmission rates for patients with and without comorbid behavioral health conditions. This information will assist stakeholders in efforts to improve care for patients with behavioral health comorbidities and present opportunities to reduce the risk of readmission for patients with these conditions. ■

Key Findings

- Almost half (46%) of adults hospitalized in Massachusetts acute care hospitals had at least one comorbid behavioral health condition, representing a majority of discharges (54%) in SFY 2020. This pattern continued during the first wave of the COVID-19 pandemic (April-June 2020).
- Over sixty percent (62%) of hospitalized adult Medicaid patients had a comorbid behavioral health condition.
- Anxiety disorders and mood disorders had the highest prevalence of any comorbid mental health condition, both at 26%.
- Alcohol- and opioid-related disorders had the highest prevalence of comorbid substance use disorders, at 10% and 6%, respectively.
- Patients with any behavioral health comorbidity had inpatient stays that were, on average, 1.4 days longer than patients with no behavioral health comorbidity (6.0 days vs. 4.6 days).
- Readmission rates for patients with any behavioral health comorbidity were nearly double the readmission rates for patients without any comorbid behavioral health condition (20.6% vs. 10.6%).
- Medicaid patients with comorbid co-occurring mental health and substance use conditions had readmission rates more than three times higher than those with no behavioral health comorbidity (26.9% vs. 8.2%).
- Patients aged 45-64 with comorbid behavioral health conditions had readmission rates nearly three times higher than those with no behavioral health comorbidity (20.7% vs. 7.2%).
- From April to June 2020, among discharges with a COVID-19 diagnosis, the presence of a comorbid behavioral health condition was associated with a readmission rate 2.2 times higher than discharges without a behavioral health condition. Among discharges without a COVID-19 diagnosis, the readmission rate was 1.8 times higher when a comorbid behavioral health condition was also present. ■

Introduction

Reducing avoidable readmissions is a central focus of numerous payment reform and delivery system transformation efforts. Until recently, medical and surgical conditions have been the primary focus of hospital readmission reduction efforts, with less attention paid to patients' behavioral health conditions.^{9,10} Given the high hospital utilization and cost associated with comorbid behavioral health conditions,^{11,12} stakeholders share a growing awareness that the provision of quality behavioral health care is integral to any health system improvement program,^{13,14} including readmission reduction. Stakeholders also recognize that patients with comorbid behavioral health conditions have a higher-than-average risk of readmission.^{15,16,17} Therefore, efforts to reduce avoidable readmissions may be improved by focusing on delivering transitional care services to patients with behavioral health comorbidities.

Despite the growing recognition that efforts to reduce avoidable readmissions should include targeting interventions toward patients with comorbid behavioral health conditions, there has been comparatively little information available on the prevalence of behavioral health comorbidity among hospitalized and readmitted patients on an all-payer, all-condition basis. To address the lack of relevant information and analysis, the Center for Health Information and Analysis (CHIA) released the first statewide, all-payer examination of the prevalence of comorbid behavioral health conditions and readmissions among hospitalized adults in Massachusetts acute care hospitals in August 2016. That report, which used data from State Fiscal Year (SFY) 2014, was the first in a series entitled *Behavioral Health and Readmissions in Massachusetts Acute Care Hospitals*.¹⁸

This report, the fifth in CHIA's all-payer readmission reports on behavioral health, updates previous reports with data on inpatient discharges from Massachusetts acute care hospitals in SFY 2020. This is the first report covering data periods since the start of the coronavirus disease 2019 (COVID-19) pandemic, which presents unique challenges across all aspects of the health care system, including disruptions or delays in access to health care and treatment, the loss of

support services, and increased stress, anxiety, and worry during an infectious disease outbreak. New for this cycle, additional analyses focused on the COVID-19 pandemic reporting trends in prevalence, average length of stay, and readmission rates among patients with behavioral health comorbidities during the first wave of the pandemic (April-June 2020) are included. ■

Prevalence of Behavioral Health Comorbidities among Patients in Massachusetts Acute Care Hospitals

This section examines the prevalence of behavioral health comorbidity among adult patients admitted to Massachusetts acute care hospitals. This analysis is based on patients who were discharged from Massachusetts acute care hospitals between July 1, 2019 and June 30, 2020 (SFY 2020). Using discharge diagnosis information, all adult (age 18+) hospitalized patients were identified as having up to eight sub-types of comorbid mental health conditions (MH) and up to eight sub-types of substance use disorders (SUD).¹⁹ From these indicators, patients were categorized into four mutually exclusive groups:

1. Mental health conditions (MH) only
2. Substance use disorders (SUD) only
3. Both MH and SUD or co-occurring conditions (CO)
4. No mention of MH or SUD (None)

Key Findings

- Forty-six percent (46%) of hospitalized patients in Massachusetts acute care hospitals had at least one comorbid behavioral health condition in SFY 2020.
- Sixty-two percent (62%) of hospitalized Medicaid adults had a comorbid behavioral health condition, which was roughly one and a half times as high as the prevalence in Medicare or commercial populations (at 44% and 42%, respectively).
- Anxiety disorders and mood disorders had the highest prevalence of any comorbid mental health condition, both at 26%.
- Alcohol- and opioid-related disorders had the highest prevalence of comorbid substance use disorders, at 10% and 6%, respectively.

- Among patients with any comorbid substance use disorder, more than half (56.5%) had a comorbid alcohol-related disorder.
- Behavioral health comorbidity was most prevalent among patients aged 18-44, at 61%. Among these patients, one in four (25%) had co-occurring mental health conditions and substance use disorders.
- While female patients were nearly twice as likely as male patients to have a comorbid mental health condition (36%

- vs. 21%), male patients were three times as likely to have a comorbid substance use disorder (9% vs. 3%).
- Patients with any behavioral health comorbidity had inpatient stays that were, on average, 1.4 days longer than patients with no behavioral health comorbidity (6.0 days vs. 4.6 days).
 - Fall River and the Berkshires had the highest prevalences of behavioral health comorbidity (over 50% of hospitalized patients) in Massachusetts. ■

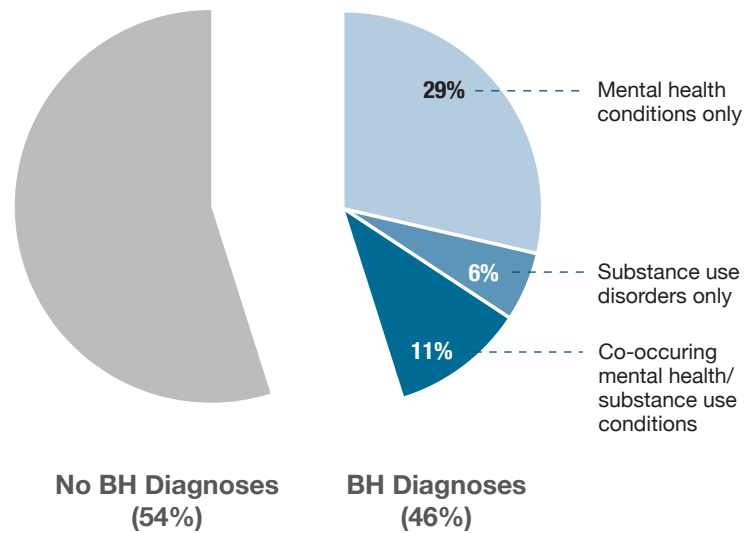
Prevalence

Forty-six percent (46%) of adult patients hospitalized in Massachusetts acute care hospitals between July 2019 and June 2020 had at least one comorbid behavioral health condition.

Twenty-nine percent (29%) of patients had a diagnosis of a mental health condition only, 6% had a diagnosis of substance use disorder only, and 11% had both.

The high prevalence of behavioral health comorbidity highlights the importance of integrating behavioral health into care transition and discharge planning at acute care hospitals.

Statewide Prevalence of Behavioral Health Comorbidity among Patients in Acute Care Hospitals, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health. Percentages may not add up to totals due to rounding. Total patients: N = 355,746.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019–June 2020

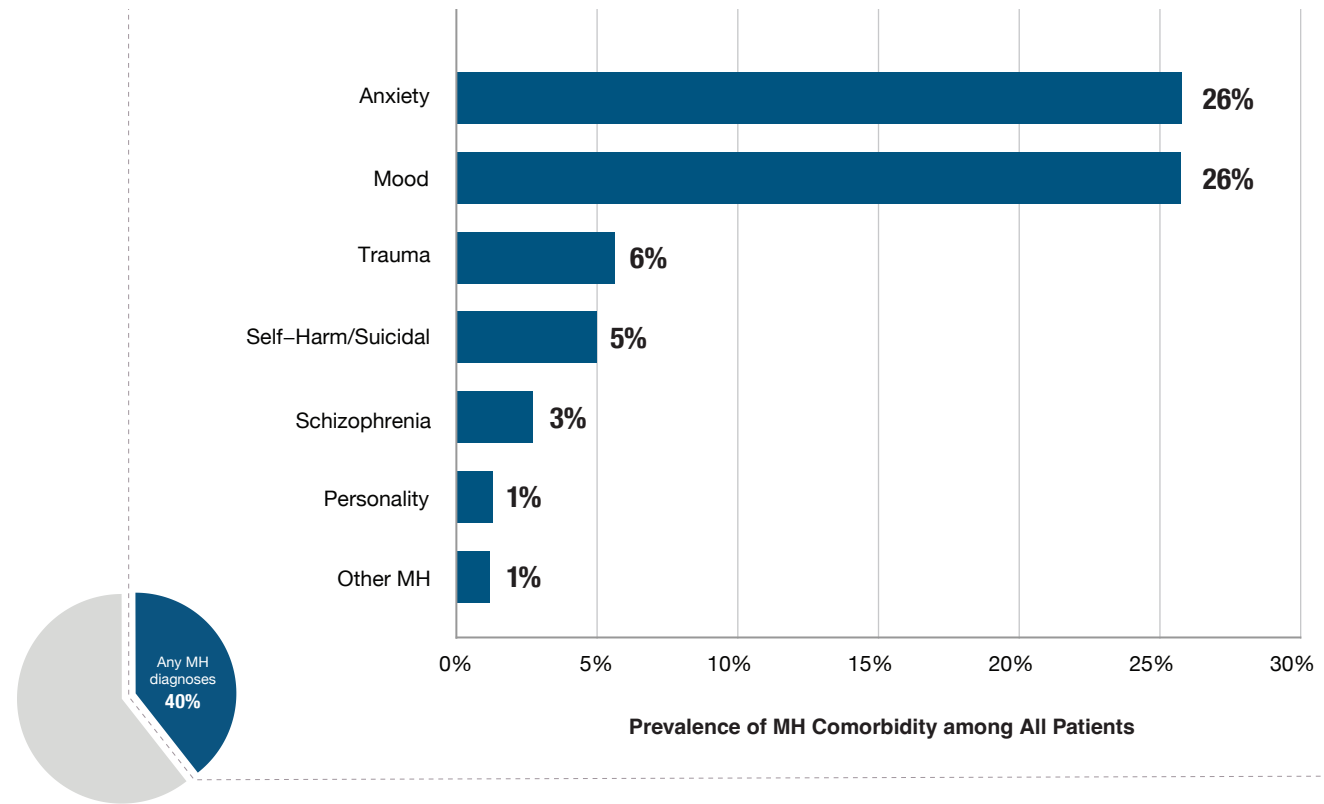
Prevalence

Among hospitalized adults in Massachusetts acute care hospitals, forty percent (40%) had at least one comorbid mental health condition.

The most common comorbid mental health conditions among all patients were anxiety disorders and mood disorders, which include depression and bipolar disorders, both at 26%.

Among patients with any comorbid mental health condition, 78% had an anxiety disorder, a mood disorder, or both (data not shown).

Statewide Prevalence of Mental Health Comorbidity among Patients in Acute Care Hospitals, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Patients with multiple mental health conditions may appear in more than one category. MH = Mental health conditions; See [technical appendix](#) for category definitions. Total patients: N = 355,746.
Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020.

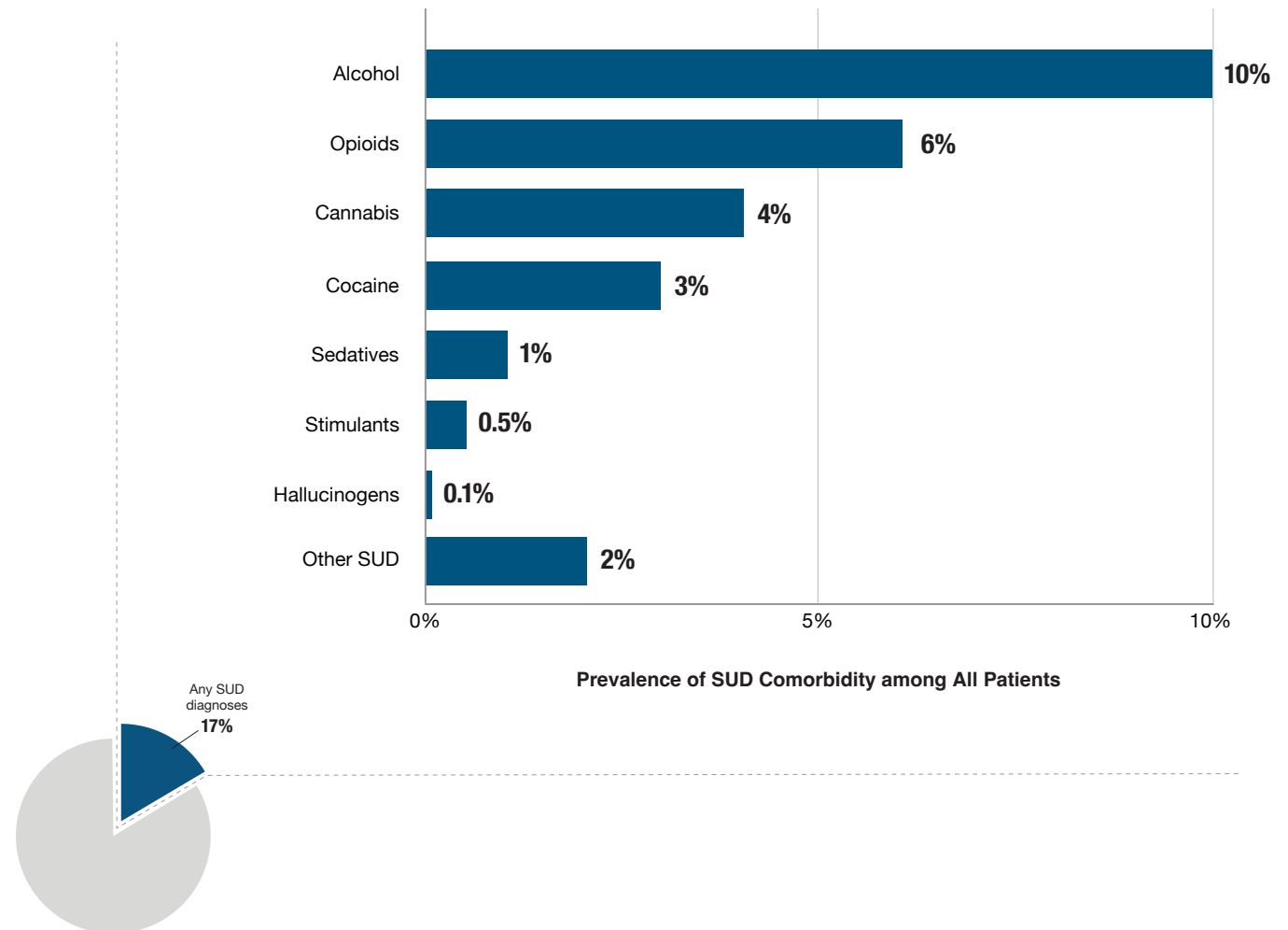
Prevalence

Among hospitalized adults in Massachusetts acute care hospitals, 17% had at least one comorbid substance use disorder.

The most common comorbid substance use disorders were alcohol-related disorders (10%), opioid-related disorders (6%), and cannabis-related disorders (4%).

Among patients with any comorbid substance use disorder, more than half (56.5%) had a comorbid alcohol-related disorder (data not shown).

Statewide Prevalence of Substance Use Disorder Comorbidity among Patients in Acute Care Hospitals, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Patients with multiple comorbid substance use disorders may appear in more than one category. SUD = Substance use disorders; Stimulants = Stimulant-related disorders other than cocaine. See [technical appendix](#) for category definitions. Total patients: N = 355,746.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020.

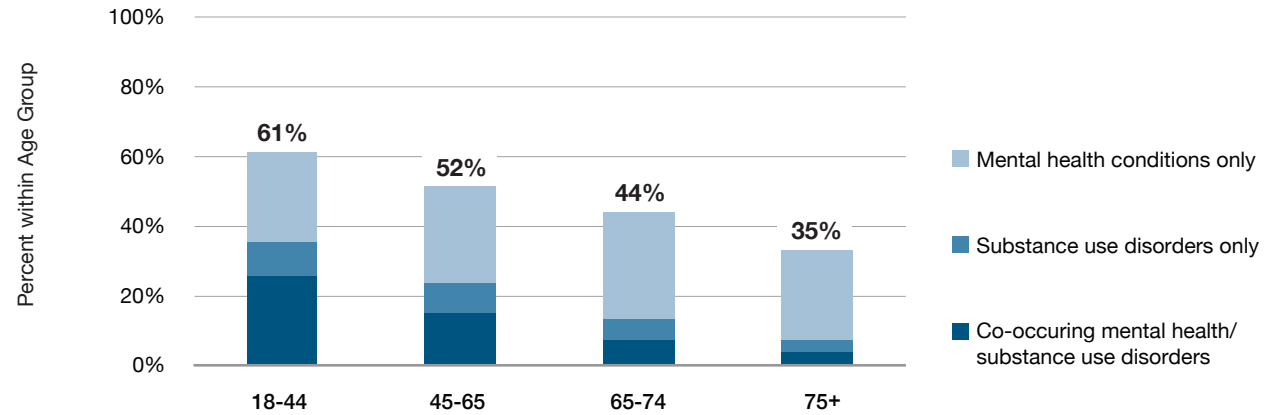
Prevalence

Comorbid behavioral health conditions were more common among younger adults than other age groups, with 61% of patients aged 18-44 having at least one comorbid behavioral health condition.

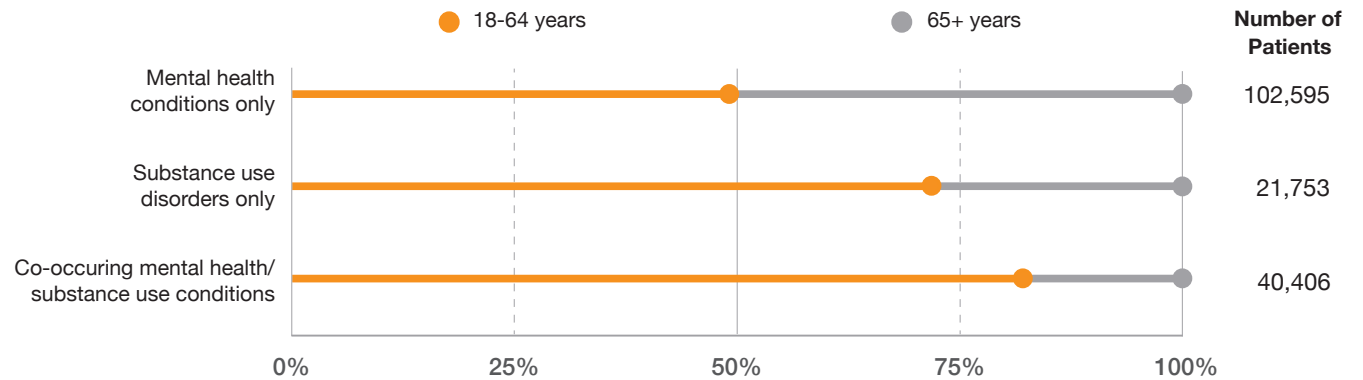
Twenty-five percent (25%) of patients aged 18-44 had co-occurring mental health and substance use conditions.

Over two-thirds (68%) of patients with comorbid substance use disorders only were under age 65. Slightly over half (55%) of patients with comorbid mental health conditions only were patients aged 65 years or older.

Prevalence of Behavioral Health Comorbidity by Age Group, SFY 2020



Number of Patients	18-44	45-65	65-74	75+
	35,804	57,484	33,707	37,759



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2018–June 2020.

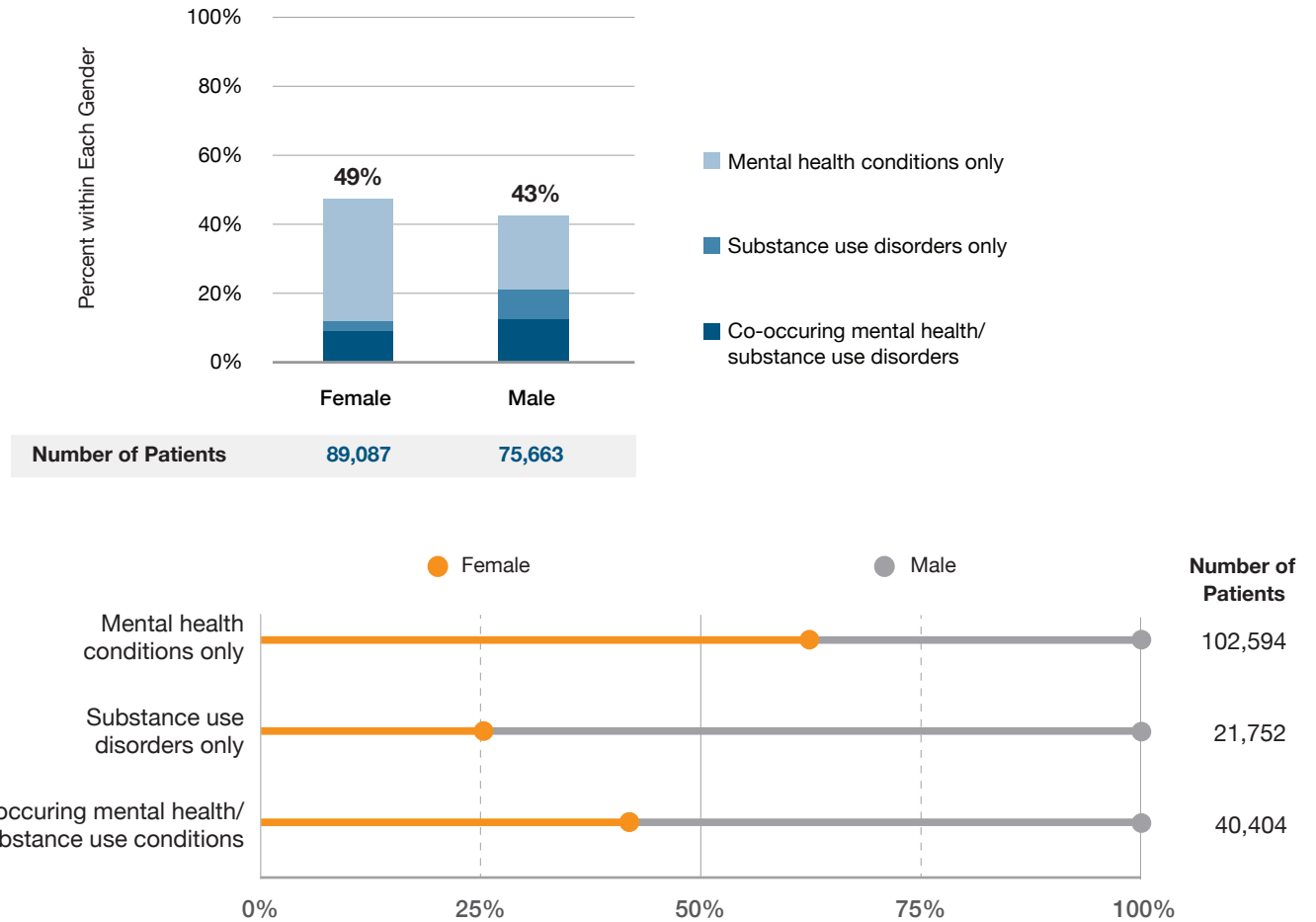
Prevalence

The overall prevalence of comorbid behavioral health conditions was slightly higher for female patients (49%) than for male patients (43%).

Male patients were three times more likely than female patients to have comorbid substance use disorders only (9% vs. 3%).

Among patients with comorbid mental health conditions only, two out of three (64%) were female.

Prevalence of Behavioral Health Comorbidity by Gender, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Figures for male and female do not sum to total due to rounding and because they exclude four patients (<0.01%) and four discharges (<0.01%) with the Other Gender category.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020

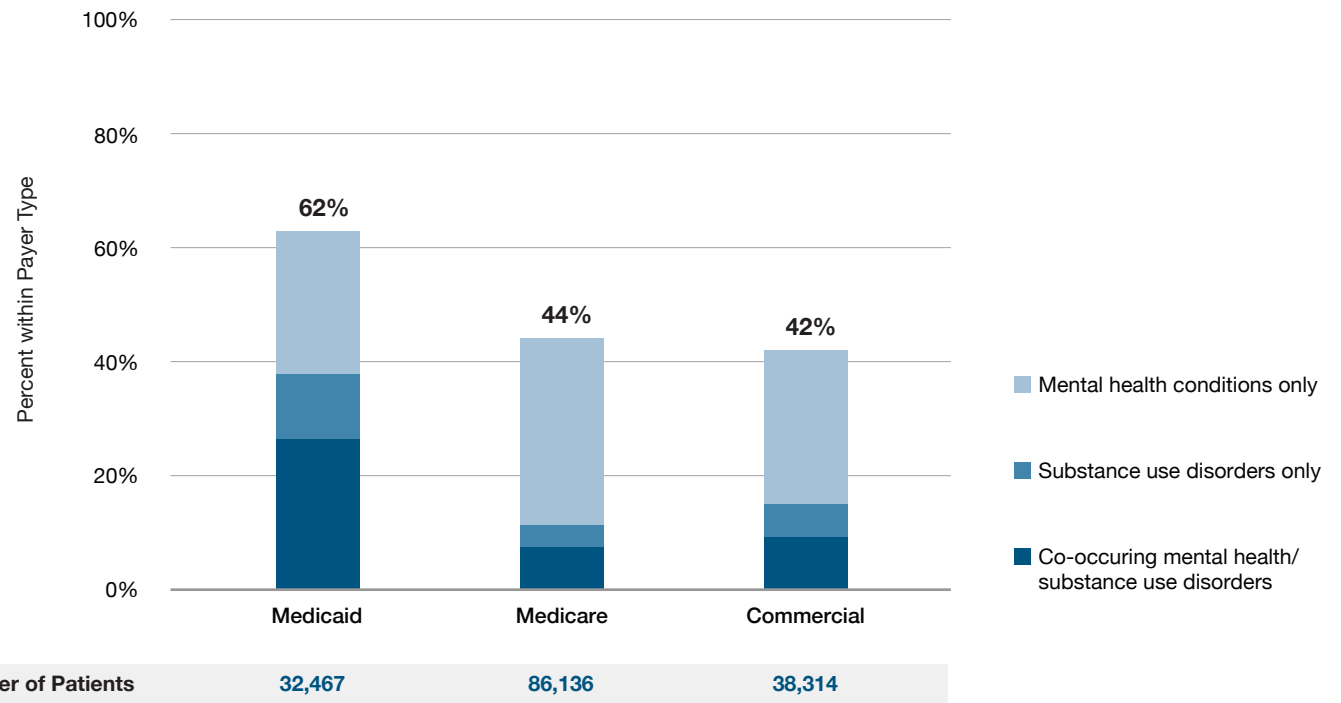
Prevalence

Nearly two out of three (62%) patients with Medicaid had a comorbid behavioral health condition. Among patients with Medicare or commercial insurance, 44% and 42% had a comorbid behavioral health condition, respectively.

Compared to Medicare patients, Medicaid patients were three times as likely to have comorbid substance use disorders only (12% vs. 4%), and three times as likely to have comorbid co-occurring mental health and substance use conditions (26% vs. 8%).

Compared to patients with commercial insurance, Medicaid patients were twice as likely to have comorbid substance use disorders only (12% vs. 6%), and nearly three times as likely to have comorbid co-occurring mental health and substance use conditions (26% vs. 9%).

Prevalence of Behavioral Health Comorbidity by Payer Type, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Self-pay and other categories, which together account for 5% of patients, as well as a small number of discharges with missing payer information are excluded in this chart.

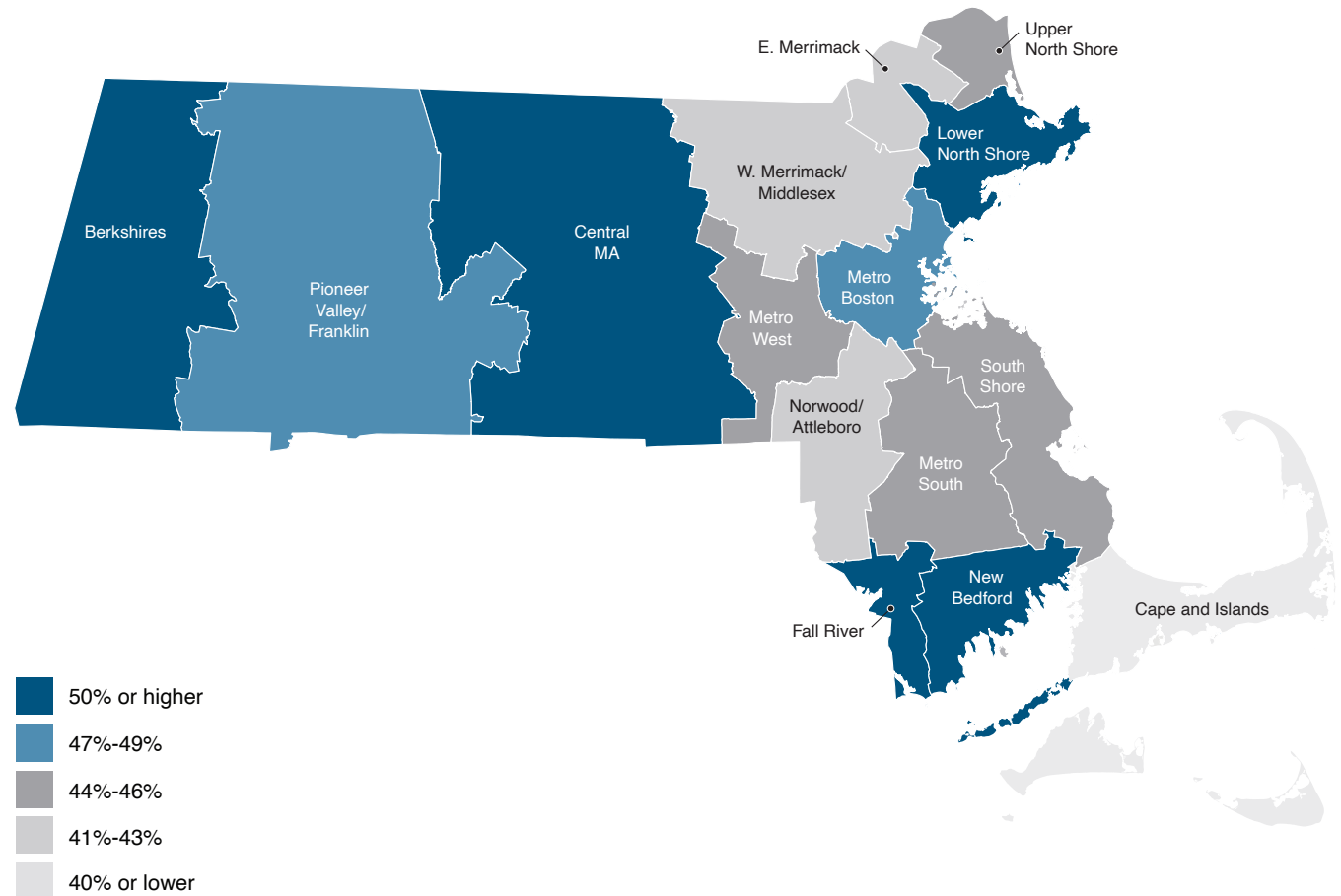
Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020

Prevalence

The prevalence of behavioral health comorbidity among hospitalized adults varied by region from 40% of patients in the Cape and Islands to 54% of patients in Fall River.

Fall River (54%) and the Berkshires (53%) had the highest prevalence of behavioral health comorbidity; these were much higher than the state overall (46%).

Prevalence of Behavioral Health Comorbidity by Region of Patient Residence, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Regions are defined by the Massachusetts Health Policy Commission.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020

Prevalence

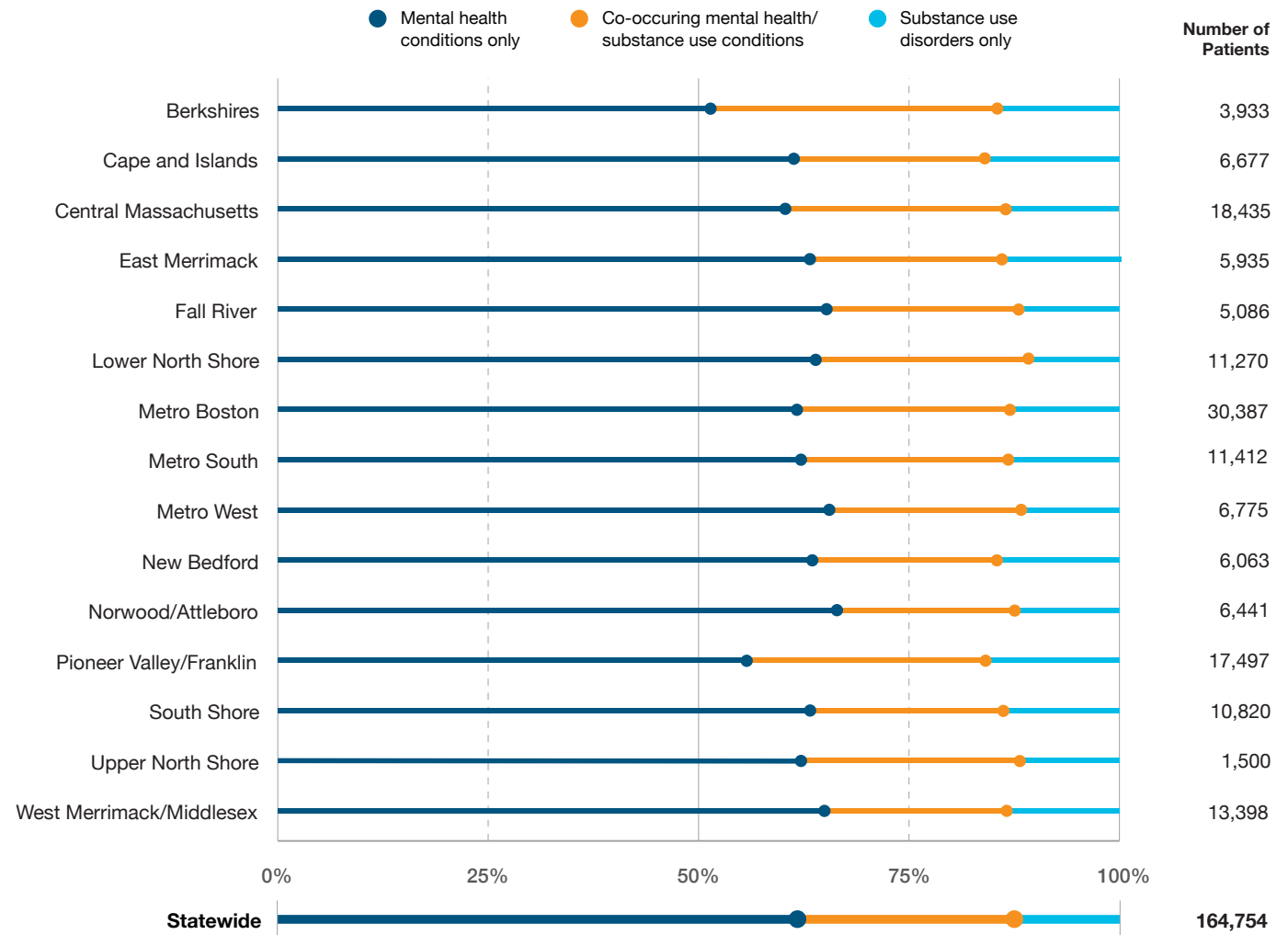
The types of comorbid behavioral health conditions varied by region.

Norwood/Attleboro and Metro West had the highest proportion of patients with comorbid mental health conditions only, at 67% and 66%, respectively.

The Berkshires and Pioneer Valley/Franklin had the highest proportion of patients with comorbid co-occurring mental health and substance use conditions, at 34% and 29%, respectively.

Pioneer Valley/Franklin and the Cape and Islands had the greatest proportion of patients with comorbid substance use disorders only, at 15% and 16%, respectively.

Types of Behavioral Health Comorbidity by Region of Patient Residence, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Regions are defined by the Massachusetts Health Policy Commission.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020

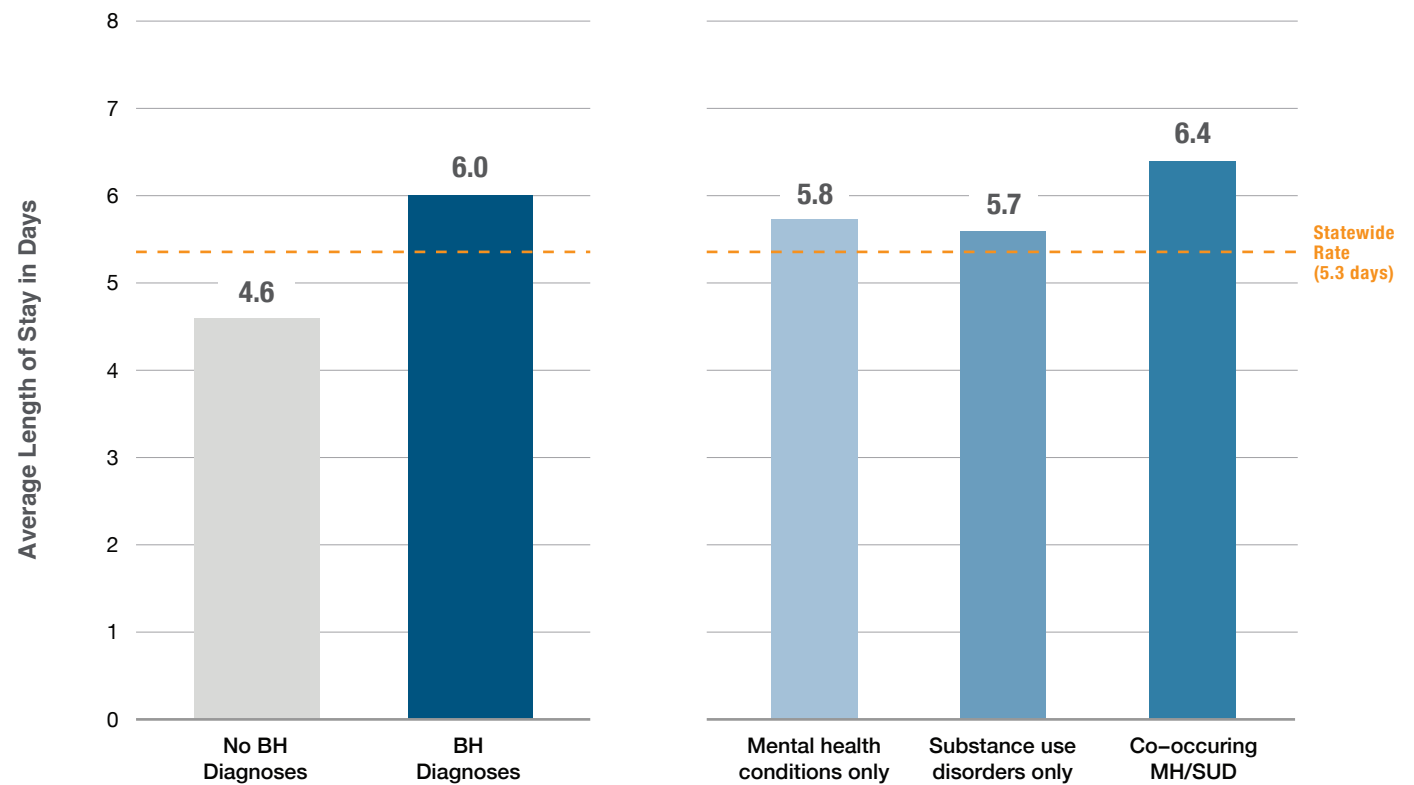
Prevalence

Patients with comorbid behavioral health conditions stayed in the hospital an average of 1.4 days longer than patients without any behavioral health comorbidity (6.0 days vs. 4.6 days).

Patients with comorbid co-occurring mental health and substance use conditions had the longest length of stay, at 6.4 days. This was 28% longer than the length of stay for patients with no behavioral health comorbidity.

The average length of stay was also longer for patients with comorbid mental health conditions only (5.8 days) and comorbid substance use disorders only (5.7 days) than those without any behavioral health comorbidity (4.6 days).

Presence of Behavioral Health Comorbidity and Average Length of Stay, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health, MH/SUD = Mental Health Conditions/Substance Use Disorders. The statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts; SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020.

Statewide Readmissions and Behavioral Health Comorbidity among Patients in Massachusetts Acute Care Hospitals

This section examines the readmission rates among patients with and without comorbid behavioral health conditions. To better understand the impact of behavioral health comorbidity on readmission rates, readmission rates are first examined at the statewide level, and then analyzed by age, payer type, region of patient residence, discharge setting, and discharge diagnosis.

Key Findings

- Hospitalized adults who had any behavioral health comorbidity accounted for 46% of patients, 53% of hospitalizations, and 69% of all readmissions.
- Patients with any behavioral health comorbidity were nearly twice as likely to be readmitted as those without any behavioral health comorbidity (20.6% vs. 10.6%).
- Patients with comorbid co-occurring mental health and substance use conditions had the highest readmission rate at 27.9% which is higher than the readmission rate for heart failure—the most common current clinical focus of readmission reduction efforts²⁰—at 23.9%.
- Younger adults (age 18-44) with behavioral health comorbidity had readmission rates over three times higher than younger adults without any behavioral health comorbidity (17.8% vs. 5.5%).
- Medicaid patients with comorbid co-occurring mental health and substance use conditions had readmission rates that were over three times higher than Medicaid patients without any behavioral health comorbidity (26.9% vs. 8.2%).
- Among patients discharged to home, 53% had a comorbid behavioral health condition. The readmission rate among patients with any co-occurring mental health and substance use conditions discharged to home was over three times as high as those with no behavioral health comorbidity (25.4% vs. 7.3%).
- For all of the top five discharge diagnoses leading to the most readmissions, the presence of a comorbid behavioral health condition was associated with an increase in the readmission rate of at least 56%. ■

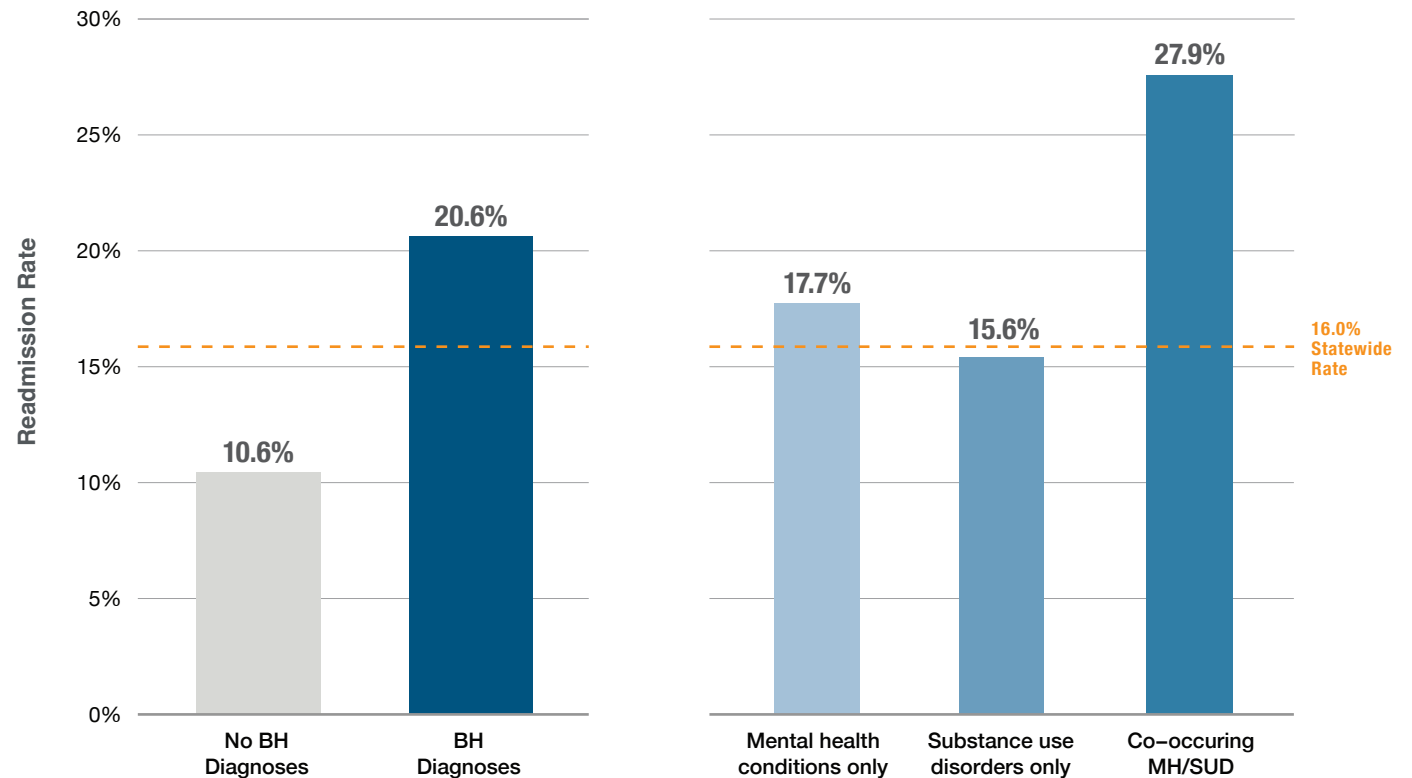
Readmissions Rates

The readmission rate for patients with behavioral health comorbidities was nearly twice as high as the readmission rate for patients without any behavioral health comorbidity (20.6% vs. 10.6%).

Patients with comorbid co-occurring mental health and substance use conditions had the highest readmission rate (27.9%), which was more than two and a half times the rate of patients with no behavioral health comorbidity (10.6%). This was higher than the readmission rate for heart failure – the most common current clinical focus of readmission reduction efforts²¹ – at 23.9%.

Relative to patients without any behavioral health comorbidity, patients with comorbid mental health conditions only and substance use disorders only had higher readmission rates, at 17.7% and 15.6%, respectively.

Statewide Readmission Rates and Behavioral Health Comorbidity, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health, MH/SUD = Mental Health Conditions/Substance Use Disorders. The statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis.

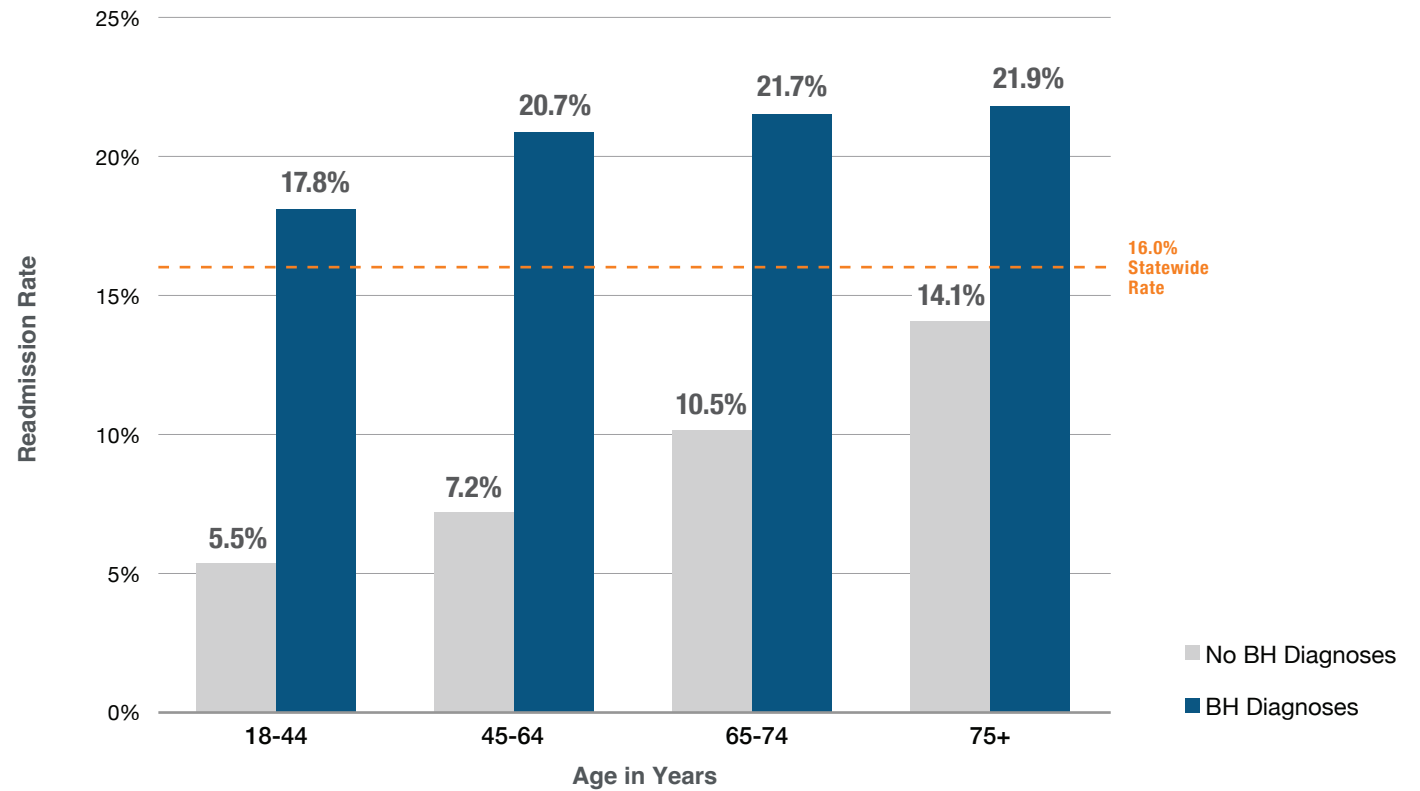
Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020.

Readmissions Rates

For every age group, readmission rates were higher with comorbid behavioral health conditions than without, and the difference in the rates was more pronounced among non-elderly adults.

The difference in readmission rates between those with and without comorbid behavioral health conditions was greatest for adults aged 45-64. Those with any behavioral health comorbidity had readmission rates nearly three times higher than those without (20.7% vs. 7.2%).

Readmission Rates and Behavioral Health Comorbidity by Age Group, SFY 2020



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. The statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis. BH = Behavioral Health.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2018-June 2020

Readmissions Rates

Across payer types, patients with any behavioral health comorbidity had higher readmission rates than those without any behavioral health comorbidity. Comorbid co-occurring mental health and substance use conditions were consistently associated with higher readmission rates than other types of behavioral health comorbidities.

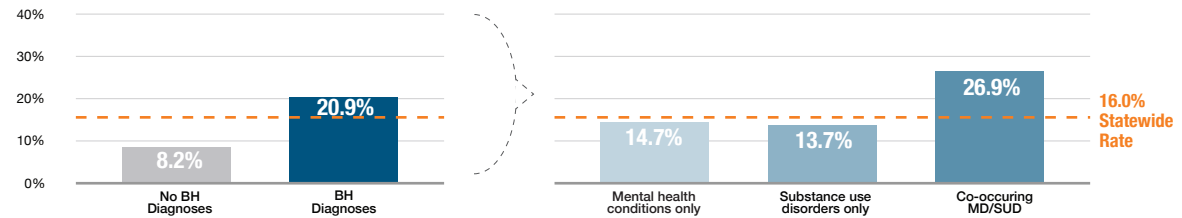
Medicaid patients with comorbid co-occurring mental health and substance use conditions had readmission rates that were more than three times higher than those without any behavioral health comorbidity: 26.9% vs. 8.2%.

Medicaid and commercial patients without any behavioral health comorbidity had relatively similar readmission rates at 8.2% and 6.7%, respectively.

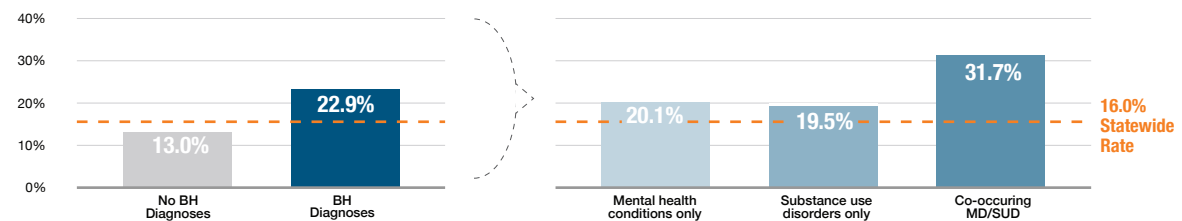
Medicare patients with comorbid co-occurring mental and substance use conditions had the highest readmission rate at 31.7%.

Readmission Rates and Behavioral Health Comorbidity by Payer Type, SFY 2020

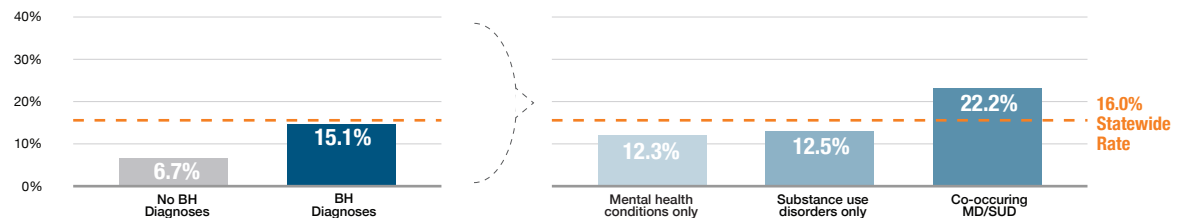
Medicaid



Medicare



Commercial



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health, MH/SUD = Mental Health Conditions/Substance Use Disorders. Figure excludes self-pay and other categories, which together account for 5% of patients and 4% of discharges. A small number of discharges with missing payer information is also excluded. The statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019–June 2020.

Readmissions Rates

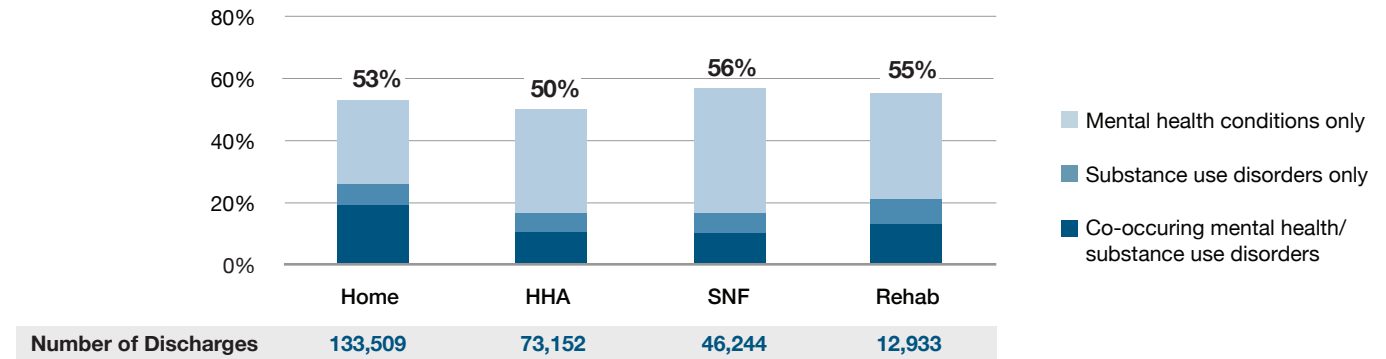
The prevalence of behavioral health comorbidity was similar among patients discharged home compared to those discharged to other settings: regardless of setting, comorbid behavioral health conditions were present on slightly over half (50-56%) of all discharges.

More than half of all discharges to home (53%) had any comorbid behavioral health condition, and nearly one in five discharges to home had co-occurring mental health and substance use conditions (20%).

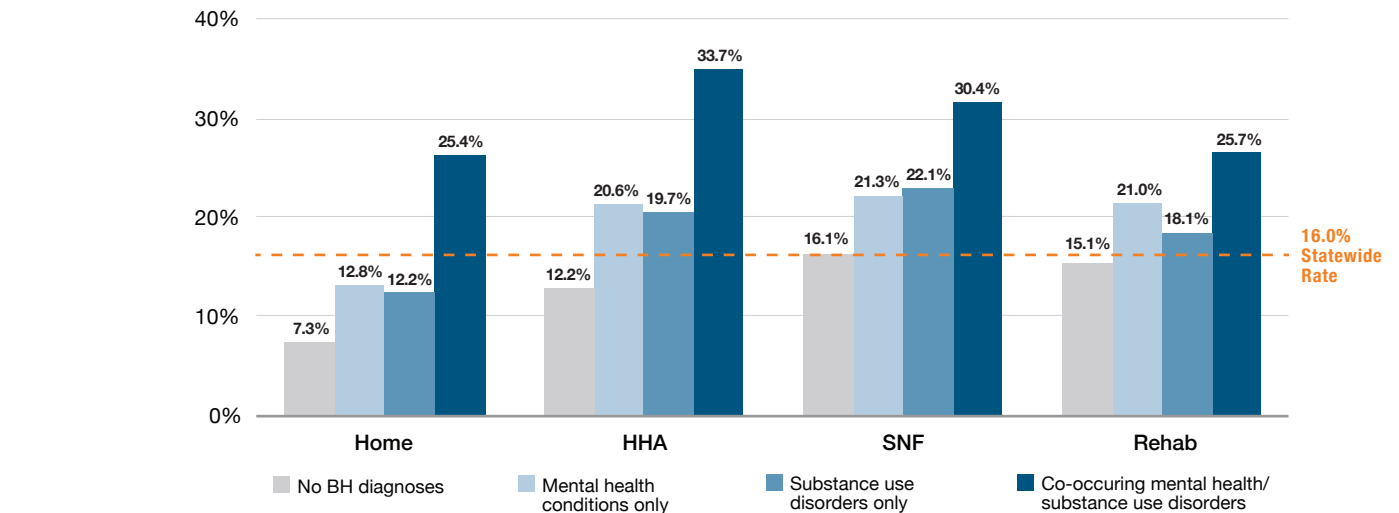
Readmission rates were higher with the presence of behavioral health comorbidity for patients discharged to all post-acute care settings. The readmission rate for patients discharged to home with co-occurring mental health and substance use conditions was three and a half times the rate for those without any behavioral health comorbidity (25.4% vs. 7.3%).

Rates and Behavioral Health Comorbidity by Common Discharge Setting, SFY 2020

Percent of Discharges



Readmissions Rate



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. The unit of this analysis is discharges. HHA= Home with home health agency care; SNF = Skilled nursing facility; Rehab = Rehabilitation facility. Hospice and other categories are excluded, which account for 3.9% of discharges. Discharges with missing discharge setting information are also excluded. For full category definitions, please see [technical appendix](#). Note the statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis. BH = Behavioral Health.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019–June 2020.

Readmissions Rates

In all regions, readmission rates were 76-112% higher among patients with comorbid behavioral health conditions than those without.

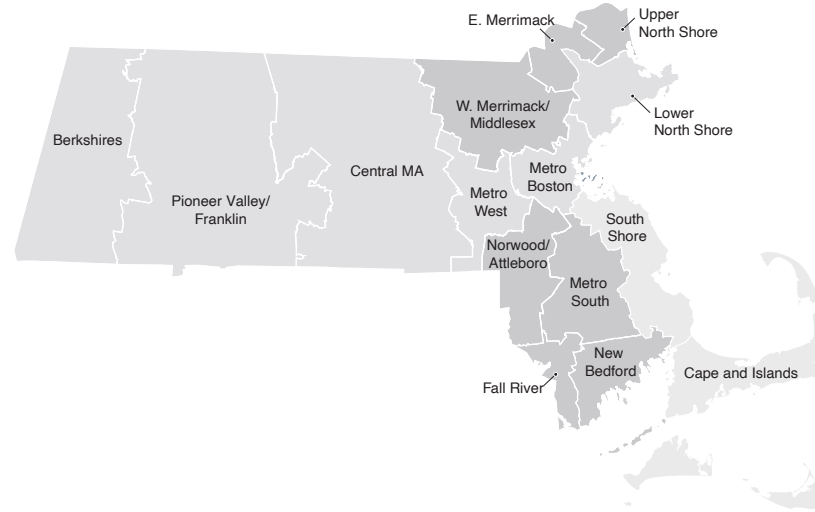
Readmission rates for patients without behavioral health conditions ranged from 9.1% in the Cape and Islands to 12.8% in Fall River.

Readmission rates for patients with comorbid behavioral health conditions varied from 17.5% in the Cape and Islands to 22.8% in Fall River. Differences between readmission rates with and without behavioral health comorbidities were particularly pronounced for South Shore, Metro Boston, and Metro South; readmission rates were around twice as high in these regions among patients with behavioral health comorbidities.

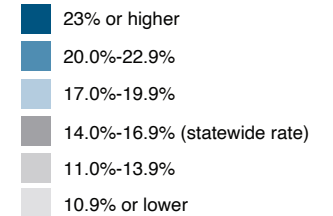
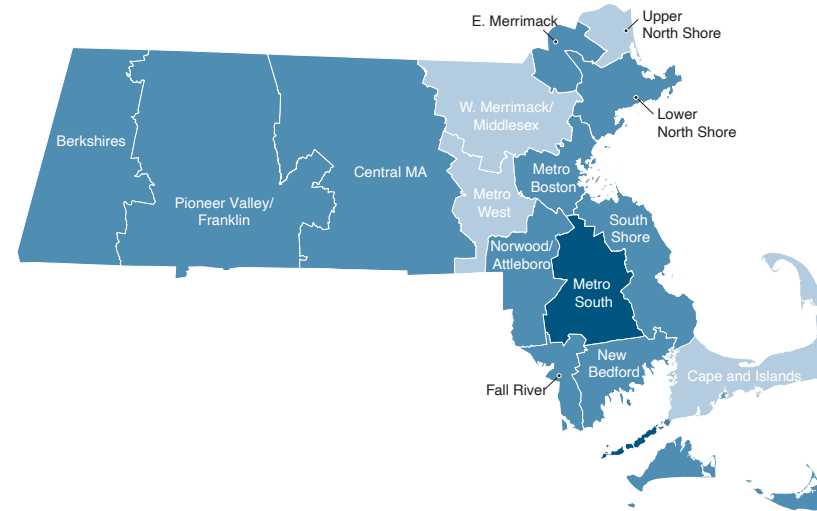
These differences could be due to regional variations in patient demographics and community characteristics including care transition practices, quality of clinical care and community-based resources. However, these differences also highlight potential opportunities for interventions.

Readmission Rates and Behavioral Health Comorbidity by Region of Patient Residence, SFY 2020

Readmission Rates with No Behavioral Health Comorbidity



Readmission Rates with Behavioral Health Comorbidity



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Regions are defined by the Massachusetts Health Policy Commission.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019–June 2020

Readmissions Rates

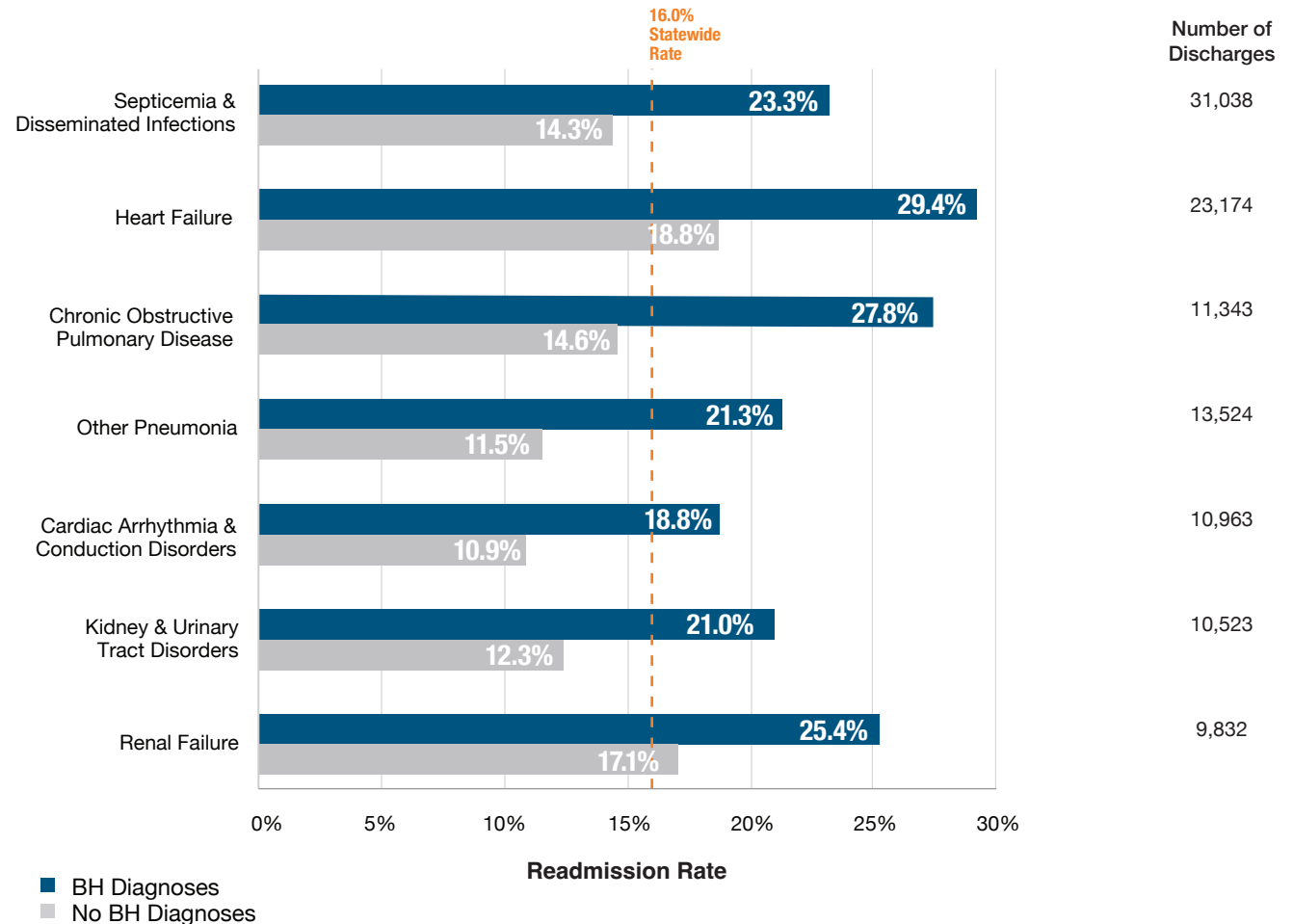
Among the top discharge diagnoses leading to the most readmissions in Massachusetts, readmission rates were 49-90% higher among patients with behavioral health comorbidities than among patients with no behavioral health comorbidities.

For patients with heart failure—the most commonly targeted medical diagnosis for readmission reduction efforts²²—the presence of behavioral health comorbidity was associated with a 56% increase in the readmission rate (from 18.8% to 29.4%).

The difference in readmission risk associated with the presence of behavioral health comorbidity was even more pronounced for patients discharged with chronic obstructive pulmonary disease (COPD). Having a behavioral health comorbidity nearly doubled the readmission rate for COPD discharges (from 14.6% to 27.8%).

Understanding the impact of behavioral health comorbidity on these and other discharge diagnoses may inform efforts to improve care and present opportunities to reduce the risk of readmission for patients with these conditions.

Readmission Rates and Behavioral Health Comorbidity by Common Discharge Diagnosis, SFY 2020



Notes: : Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Diagnostic categories are defined by the All-Payer Refined Diagnosis-Related Group (APR-DRG, version 30.0). Note the statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis. BH = Behavioral Health.

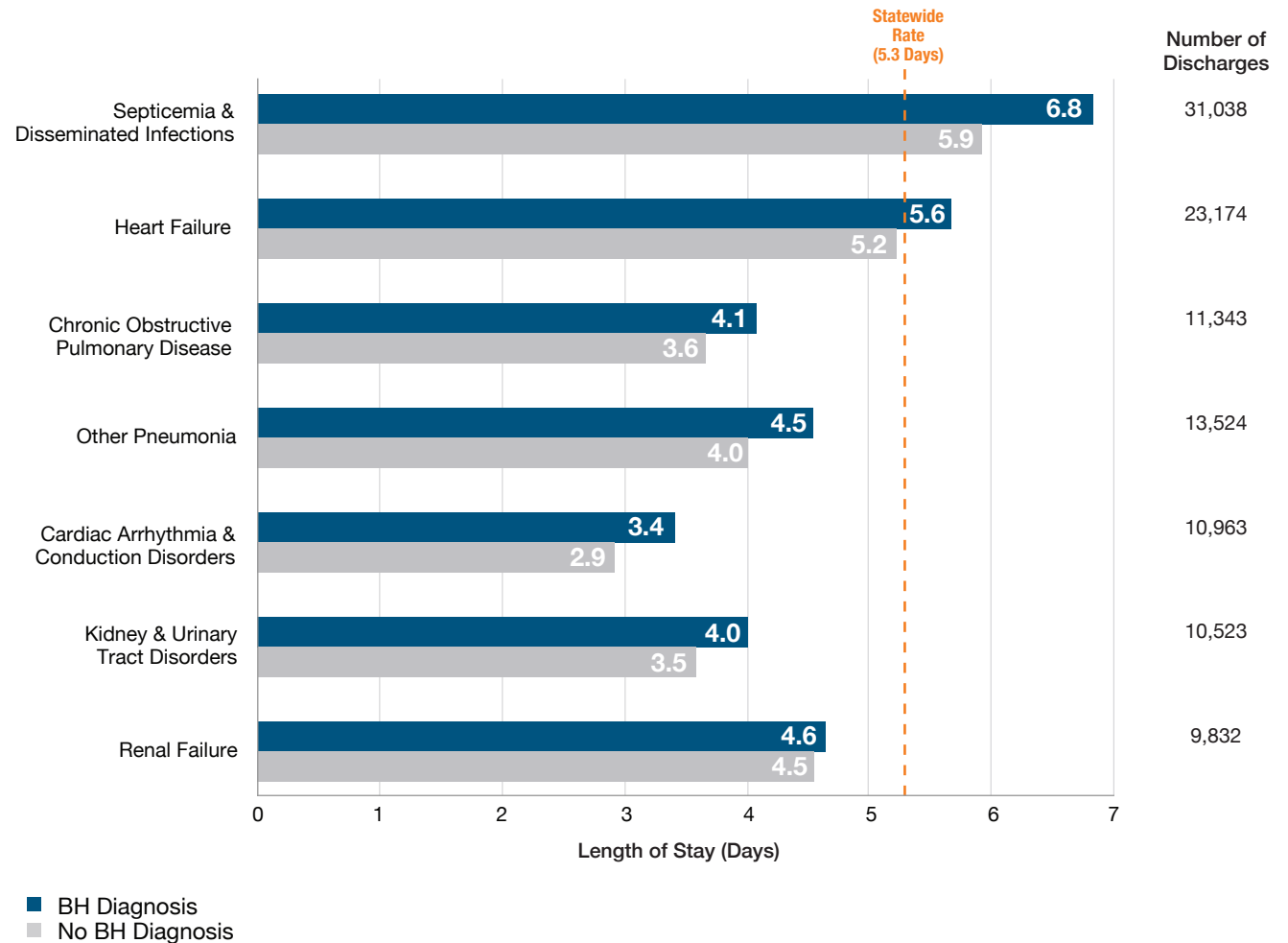
Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019–June 2020.

Average Length of Stay and Behavioral Health Comorbidity by Common Discharge Diagnosis, SFY 2020

Among the top discharge diagnoses leading to the most readmissions in Massachusetts, the average length of hospital stay was between 2-17% higher among patients with comorbid behavioral health conditions than among patients with no behavioral health comorbidity.

The difference in average length of stay with the presence of behavioral health comorbidity was highest for patients discharged with sepsis. Behavioral health comorbidity was associated with almost an additional day in the average length of stay for sepsis (from 5.9 days to 6.8 days).

For patients discharged for heart failure, the presence of behavioral health comorbidity was associated with an 8% increase in length of stay (from 5.2 days to 5.6 days).



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. Diagnostic categories are defined by the All-Payer Refined Diagnosis-Related Group (APR-DRG, version 30.0). Note the statewide average length of stay (ALOS) in this report is not directly comparable to the ALOS presented in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis. BH = Behavioral Health.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2019-June 2020.

Behavioral Health and Readmission During COVID-19 among Patients in Massachusetts Acute Care Hospitals

This report covers data periods during the first wave of the COVID-19 pandemic (April – June 2020), a period in which health care utilization and behavioral health were significantly impacted. During this time, increased stress, anxiety, worry, and loneliness may have provoked new behavioral health challenges, or exacerbated existing ones. Non-essential, elective procedures in Massachusetts acute care hospitals were temporarily postponed per executive order from the Department of Public Health (DPH) due to the COVID-19 pandemic for the first time (March 15 to May 18, 2020), and other in-person health care services were avoided by patients.

To examine the overall impact of COVID-19 on the prevalence of behavioral health comorbidities on discharges and their associations with length of stay and readmission rates, this section presents monthly trends for SFY 2019 and SFY 2020 (July 2018 – June 2020) by

behavioral health comorbidity group through the first wave of the pandemic in Massachusetts. Additionally, the overall rates of these measures are compared for discharges with and without COVID-19 diagnoses during the first wave of the pandemic. 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

- During the first wave of the COVID-19 pandemic (April–June 2020), over half of hospitalizations were associated with a comorbid behavioral health condition, consistent with pre-pandemic level.
- Readmission rates increased in April 2020 among patients with and without behavioral health comorbidities, then began to decline again by June 2020.

- From April to June 2020, patients with COVID-19 were less likely than patients without COVID-19 to have comorbid behavioral health diagnoses (42% vs. 51%), and in particular, less likely to have comorbid co-occurring mental health and substance use conditions (6% vs 15%).
- From April to June 2020, the presence of a behavioral health comorbidity was associated with an average length of stay that was 1.0 days longer for discharges with a COVID-19 diagnosis and 1.3 days longer for discharges without COVID-19.

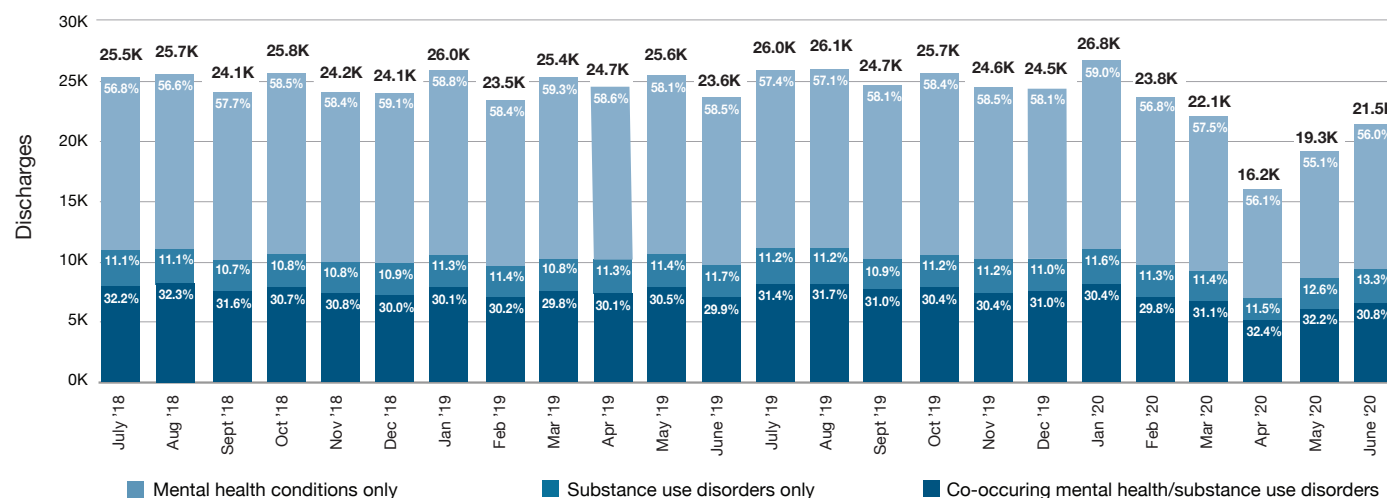
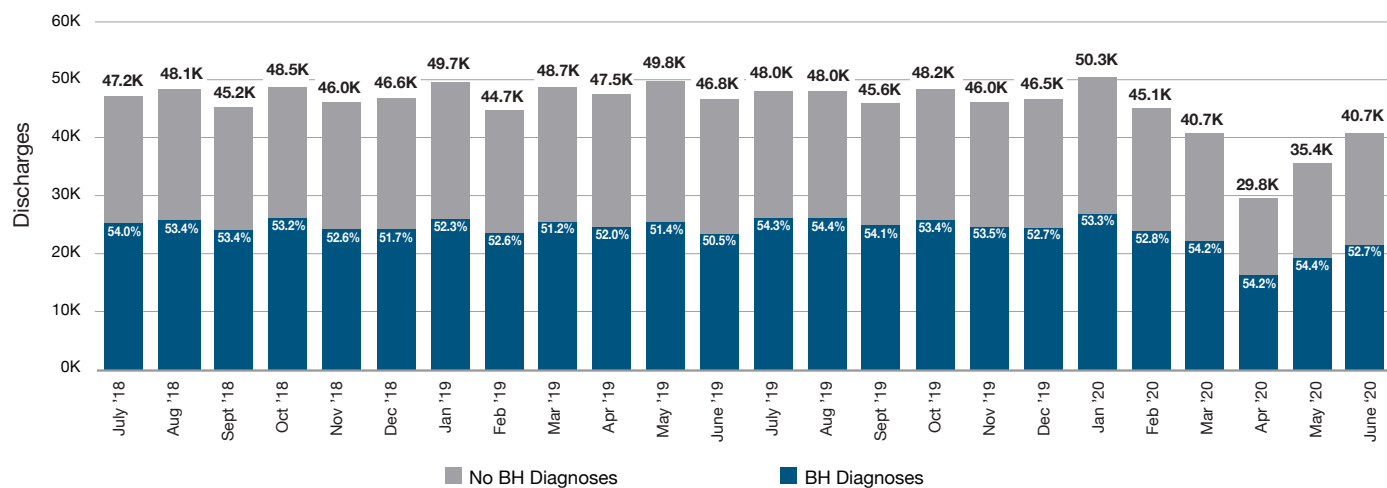
- From April to June 2020, among discharges with a COVID-19 diagnosis, the presence of a comorbid behavioral health condition was associated with a readmission rate 2.2 times higher than discharges without a behavioral health condition. Among discharges without a COVID-19 diagnosis, the readmission rate was 1.8 times higher when a comorbid behavioral health condition was also present. ■

Statewide Prevalence of Behavioral Health Comorbidity among Patients in Acute Care Hospitals, 2019-2020

Patients with any behavioral health comorbidity represented a majority of discharges during the two-year period between SFY 2019-2020. Overall, in SFY 2020, 54% of discharges were for patients with comorbid behavioral health conditions.

Discharges with and without behavioral health comorbidities both dropped sharply in early 2020, associated with the COVID-19 pandemic.

There were similar, proportional changes in discharges among each of the three behavioral health sub-groups during the pandemic.



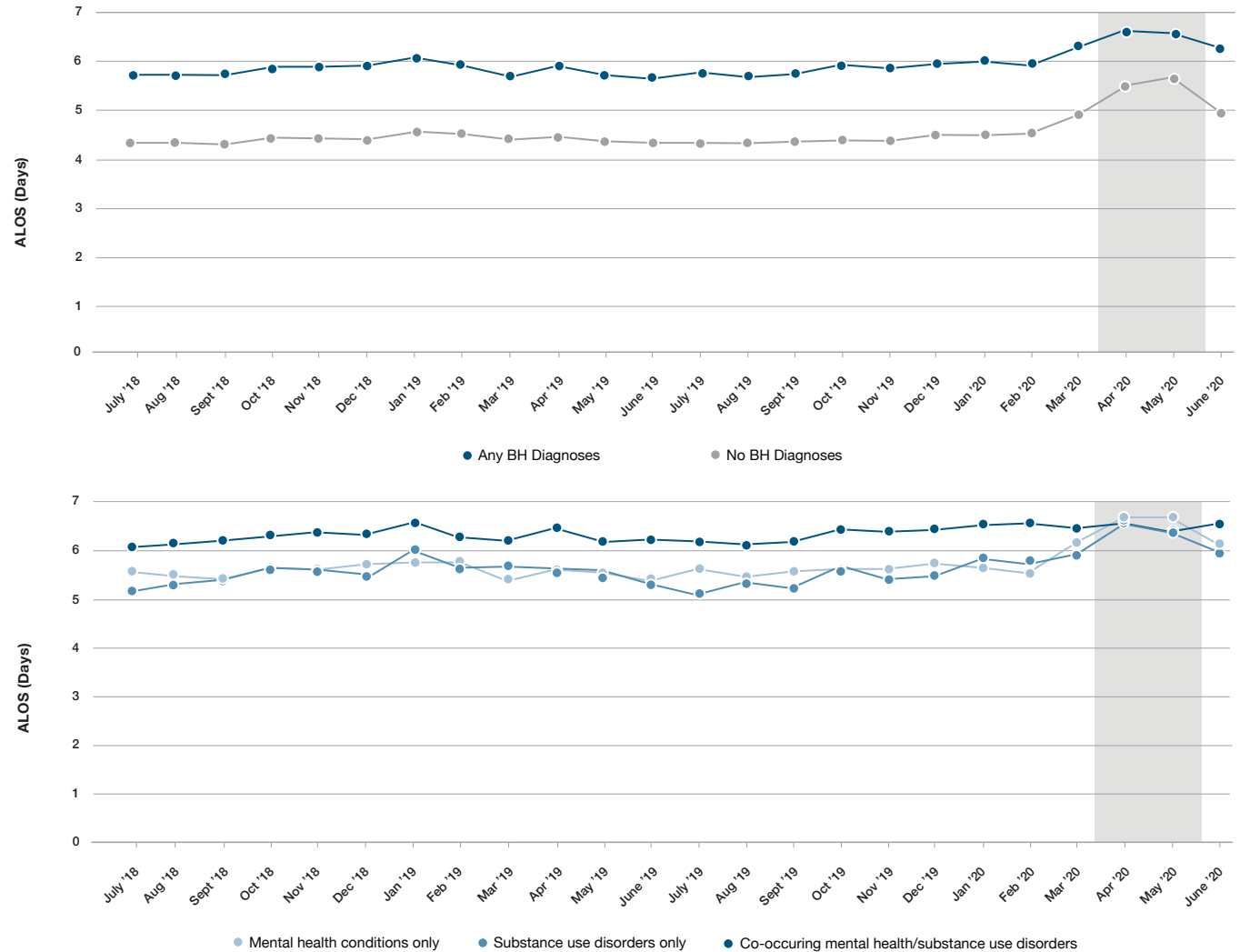
Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health. In response to the COVID-19 pandemic, elective procedures were postponed per Department of Public Health (DPH) order from March 15 to May 18, 2020. Source: Massachusetts Hospital Inpatient Discharge Databases, July 2018–June 2020.

Presence of Behavioral Health Comorbidity and Average Length of Stay, 2019-2020

Average length of stay was relatively stable prior to the COVID-19 pandemic for both patients with and without behavioral health comorbidities.

Starting in March 2020, length of stay increased among both discharges with and without behavioral health comorbidities, and then began to decline again in June 2020. The rise from May to June 2020 was somewhat sharper among patients without comorbid behavioral health conditions (BH: 0.3 days; non-BH: 0.7 days).

Average length of stay among patients with comorbid co-occurring mental health and substance use conditions was the highest before and during the height of the pandemic, hovering above six days between March and June 2020.



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health. The unit of this analysis is discharges. The statewide average length of stay (ALOS) in this report is not directly comparable to the ALOS presented in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis. In response to the COVID-19 pandemic, elective procedures were postponed per Department of Public Health (DPH) order from March 15 to May 18, 2020, represented by the grey shaded area.

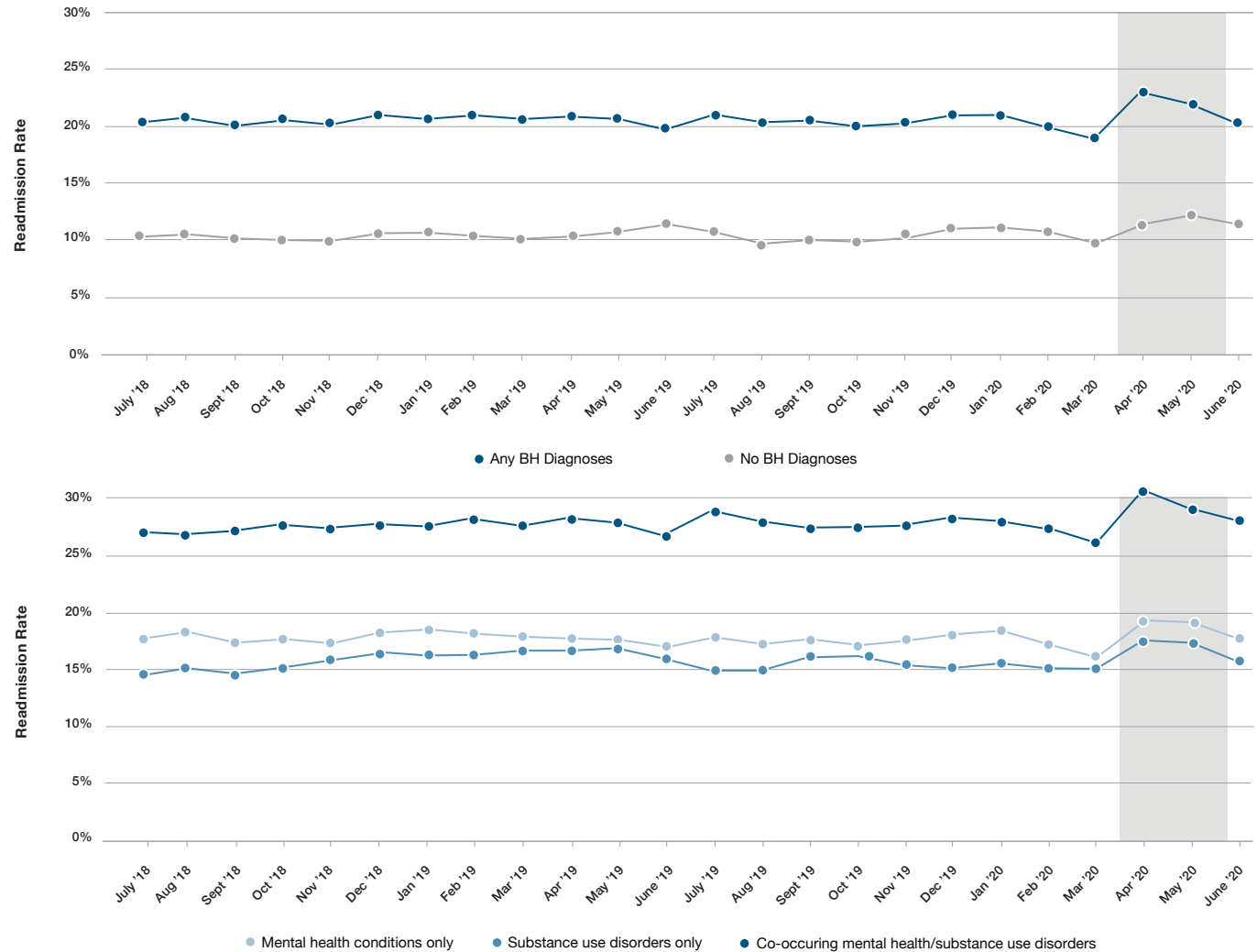
Source: Massachusetts Hospital Inpatient Discharge Databases, July 2018–June 2020.

Statewide Readmission Rates and Behavioral Health Comorbidity, 2019-2020

Prior to the COVID-19 pandemic, readmission rates were relatively stable among patients with and without behavioral health comorbidities.

In April of 2020, readmission rates rose both among discharges with and without comorbid behavioral health conditions present (BH: 21%; non-BH: 16%). These began to decline again by June 2020 to nearly pre-pandemic readmission rates.

Similar patterns were observed for patients with comorbid mental health conditions only, substance use disorders only, and co-occurring mental health and substance use conditions.



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health. The statewide readmission rate in this report is not directly comparable to the rate in CHIA's annual report on readmissions, Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2020, due to the inclusion of discharges with a primary psychiatric diagnosis. In response to the COVID-19 pandemic, elective procedures were postponed per Department of Public Health (DPH) order from March 15 to May 18, 2020, represented by the gray shaded area.

Source: Massachusetts Hospital Inpatient Discharge Databases, July 2018-June 2020.

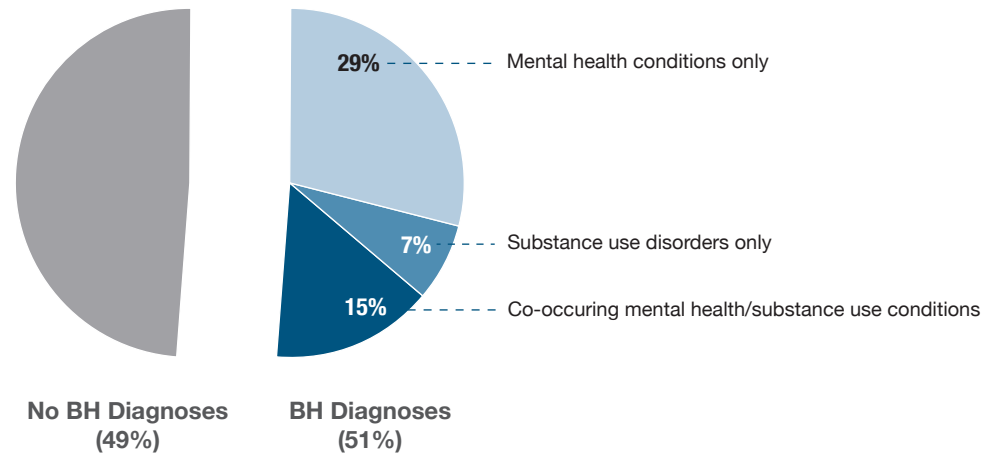
Prevalence of Behavioral Health Comorbidity among Patients in Acute Care Hospitals by any COVID-19 Diagnosis, April–June 2020

During the first wave of the COVID-19 pandemic, more than half (51%) of patients without any COVID-19 diagnosis had a behavioral health comorbidity, while 42% of patients with any COVID-19 diagnosis had a behavioral health comorbidity.

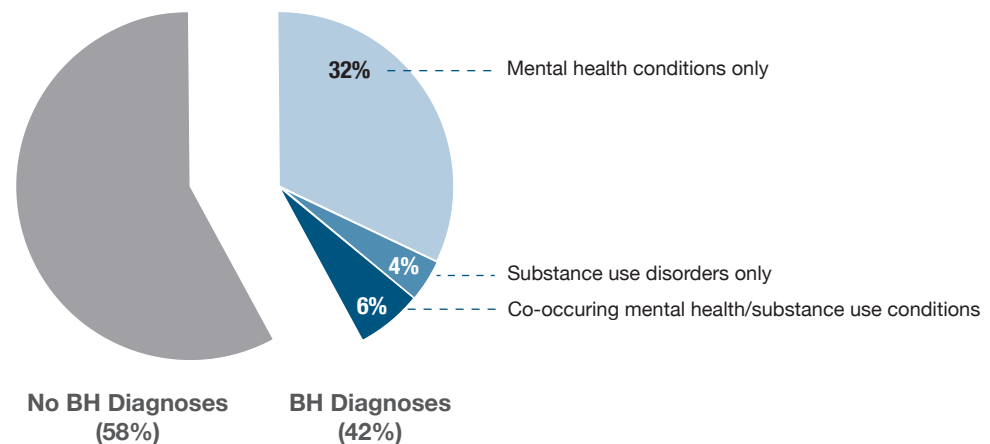
In particular, substance use disorders only were less common among those with COVID-19 than those without it (4% vs. 7%), while a slightly higher proportion of those with COVID-19 had a mental health comorbidity only compared to patients with no COVID-19 diagnosis (32% vs. 29%).

Co-occurring mental health and substance use conditions were two and a half times more prevalent among patients with no COVID-19 diagnosis compared to patients with a COVID-19 diagnosis (15% vs. 6%).

No COVID-19 Diagnoses



Any COVID-19 Diagnoses



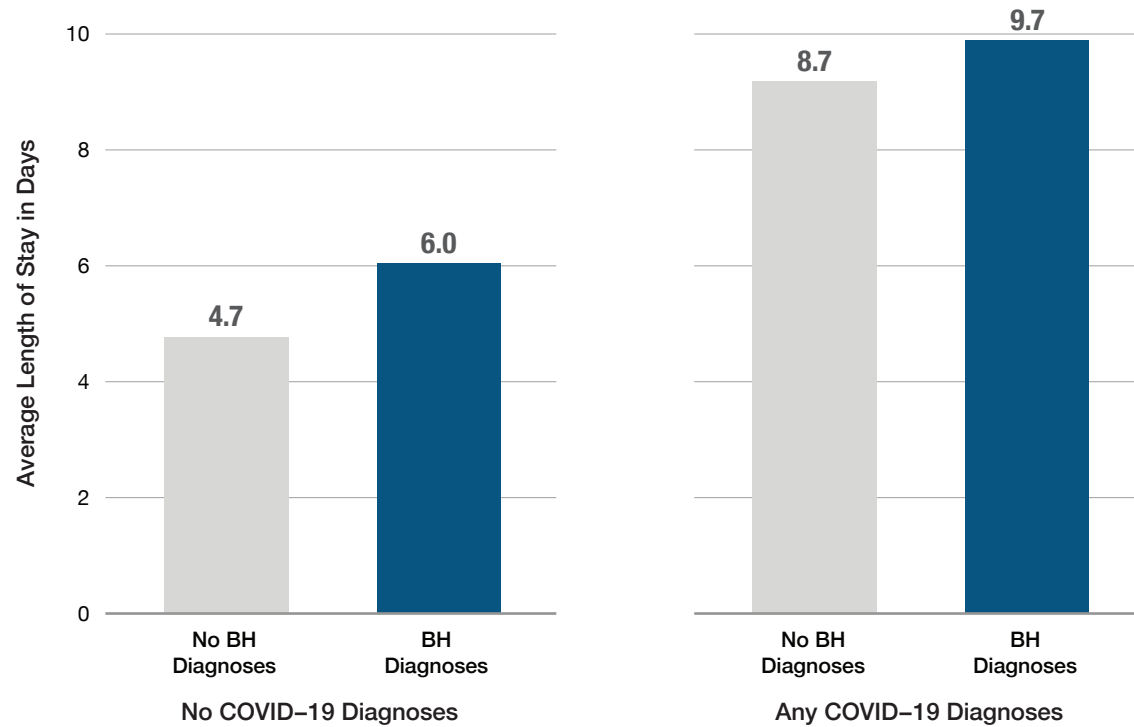
Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health. Percentages may not add up to totals due to rounding. Total patients: N = 355,746.

Source: Massachusetts Hospital Inpatient Discharge Databases, April–June 2020.

Average Length of Stay and Behavioral Health Comorbidity by any COVID-19 Diagnosis, April–June 2020

Discharges with any COVID-19 diagnosis had longer lengths of stay among patients both with and without behavioral health comorbidities during the first wave of the pandemic.

Average lengths of stay were at least one day longer among patients with behavioral health comorbidities compared to patients without behavioral health comorbidities both with and without the presence of a COVID-19 diagnosis (no COVID-19: 1.3 days; COVID-19: 1 day).

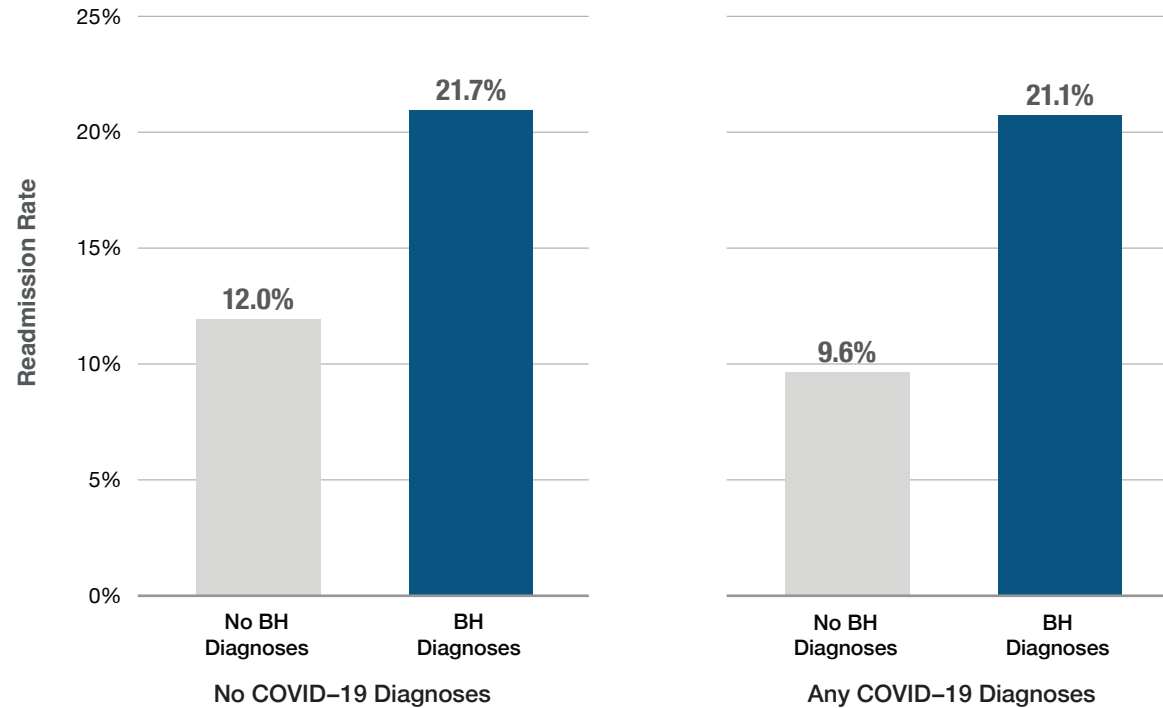


Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health. The unit of this analysis is discharges

Source: Massachusetts Hospital Inpatient Discharge Databases, April–June 2020.

Readmission Rates and Behavioral Health Comorbidity by any COVID-19 Diagnosis, April–June 2020

During the first wave of the pandemic, readmission rates among patients with and without any COVID-19 diagnosis were much higher with the presence of a behavioral health comorbidity. The presence of a comorbid behavioral health condition was associated with a readmission rate 2.2 times higher for COVID-19 patients and 1.8 times higher for patients without COVID-19.



Notes: Analyses include discharges for adults (age 18+) with any payer and exclude the following discharges: obstetric admission, treatment for cancer, leave against medical advice, and rehabilitative admission. BH = Behavioral Health.

Source: Massachusetts Hospital Inpatient Discharge Databases, April-June 2020.

Conclusion

This report is the fifth, statewide, all-payer examination of the prevalence of behavioral health comorbidity and readmission rates among hospitalized adults in Massachusetts acute care hospitals.

Additionally, this report is the first in this series to include data collected since the beginning of the COVID-19 pandemic and includes new analyses exploring the impact of the pandemic on prevalence, average length of stay, and readmission rates among patients with behavioral health comorbidities during the first wave of the pandemic (April-June 2020).

Despite the limitations of using hospital administrative data to identify the presence or absence of a behavioral health condition—for instance, many behavioral health conditions may be undiagnosed or under-coded in the

medical record or billing codes—there is a high prevalence of behavioral health comorbidity among hospitalized adults in Massachusetts acute care hospitals.

Important differences in the prevalence of behavioral health comorbidity by payer type exist. Medicaid adults were at least 30% more likely to have any behavioral health comorbidity than patients covered by either Medicare or commercial insurance. Age was also found to be an important factor—younger adults have nearly twice the prevalence of comorbid behavioral health conditions as older adults. Additionally, the prevalence of behavioral health comorbidity among hospitalized adults varies regionally across the Commonwealth.

Hospitalized patients with a comorbid behavioral health condition had inpatient stays that were on average 1.4

days longer and had a readmission rate that was nearly twice as high as the rate for patients without any comorbid behavioral health conditions. Hospitalized patients with comorbid co-occurring mental health and substance use conditions had the highest readmission rate among all patients with behavioral health conditions. For each of the most common discharge diagnoses that result in readmissions, the presence of any behavioral health comorbidity was associated with higher readmission rates. These findings suggest that a greater awareness is needed among providers, payers,

policymakers, patients, and families or advocates of the increased readmission risk for any hospitalized patient with comorbid behavioral health conditions.

Changes in prevalence, average length of stay, and readmission rates among patients with behavioral health comorbidities were observed during the height of the COVID-19 pandemic, and between patients with a COVID-19 diagnosis. This emphasizes the impact of the pandemic on patients with behavioral health comorbidities and hospital utilization overall. ■

Notes

- 1** Massachusetts Hospital Association. 2016. State of the State: Reducing Readmissions in Massachusetts. Burlington, MA: Massachusetts Hospital Association. Available from <https://www.mhalink.org/MHADocs/Resources/2018/16-03-15MHAREADMISSIONSpaperFINAL.pdf>
- 2** Benjenk, I., & Chen, J. 2018. Effective mental health interventions to reduce hospital readmission rates: a systematic review. *Journal of hospital management and health policy*, Vol. 2, No. 45. doi:10.21037/jhmhp.2018.08.05
- 3** Silow-Carroll, S., Edwards, J. N., Lashbrook, A. 2011. "Reducing Hospital Readmissions: Lessons from Top-Performing Hospitals." New York, NY: Commonwealth Fund, Pub 1473, Vol 5. Available from https://www.commonwealthfund.org/sites/default/files/documents/___media_files_publications_case_study_2011_apr_1473_silowcarroll_readmissions_synthesis_web_version.pdf
- 4** Bailey, M.K., Weiss, A.J., Barrett, M.L. & Jiang, H.J. 2019. HCUP Statistical Brief #248: Characteristics of 30-day all-cause hospital readmissions. Available from: <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb248-Hospital-Readmissions-2010-2016.pdf>
- 5** Owens, P. L., Fingar, K. R., McDermott, K. W., et al. 2019. Inpatient Stays Involving Mental and Substance Use Disorders, 2016. HCUP Statistical Brief #249. Rockville, MD: Agency for Healthcare Research and Quality. Available from <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb249-Mental-Substance-Use-Disorder-Hospital-Stays-2016.jsp>
- 6** Massachusetts Health Policy Commission. 2019. 2018 Report on Health Care Cost Trends. Boston, MA: Health Policy Commission. Available from <https://www.mass.gov/files/documents/2019/02/20/2018%20Cost%20Trends%20Report.pdf>
- 7** Ahmedani, B. K., Solberg, L. I., Copeland, L. A., et al. 2015. Influence of psychiatric comorbidity and 30-day readmissions after hospitalization for heart failure, AMI, and pneumonia. *Washington, D.C.: Psychiatric services*. Vol.66, No. 2, pp. 134–140. doi:10.1176/appi.ps.201300518
- 8** Pourat, N, Chen, X, Wu, S.-H., & Davis, A. C. 2019. Timely Outpatient Follow-up Is Associated with Fewer Hospital Readmissions among Patients with Behavioral Health Conditions. *The Journal of the American Board of Family Medicine*. Vol. 32, No. 3, pp. 353–361. doi: 10.3122/jabfm.2019.03.180244
- 9** See note 2 above.
- 10** See note 3 above.
- 11** See note 4 above.
- 12** See note 5 above.
- 13** See note 2 above.
- 14** Anthony, S., Boozang, P., Chu, B, Striar, A., Manatt Health. 2019. Ready for reform: Behavioral health care in Massachusetts. Boston, MA: Blue Cross Foundation of Massachusetts, Manatt Health. Available from: https://www.bluecrossmafoundation.org/sites/g/files/cspkhw2101/files/2020-09/Model_BH_ExecSummary_January2019_Final.pdf
- 15** See note 7 above.
- 16** See note 8 above.
- 17** Reif, Sharon, Acevedo, Andrea, Garnick, Deborah W., & Fullerton, Catherine. 2017. Reducing behavioral health inpatient readmissions for people with substance use disorders: Do follow-up services matter? *Washington, D.C.: Psychiatric Services*. Vol. 68, No. 8, pp. 810–818. doi:10.1176/appi.ps.201600339
- 18** Massachusetts Center for Health Information and Analysis. 2016. Behavioral Health and Readmissions in Massachusetts Acute Care Hospitals. Boston, MA: Center for Health Information and Analysis. Available from: <https://www.chiamass.gov/behavioral-health-and-readmissions-in-massachusetts-acute-care-hospitals/>
- 19** Please see [technical appendix](#) for more information.
- 20** See note 3 above.
- 21** See note 3 above.
- 22** See note 3 above.



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