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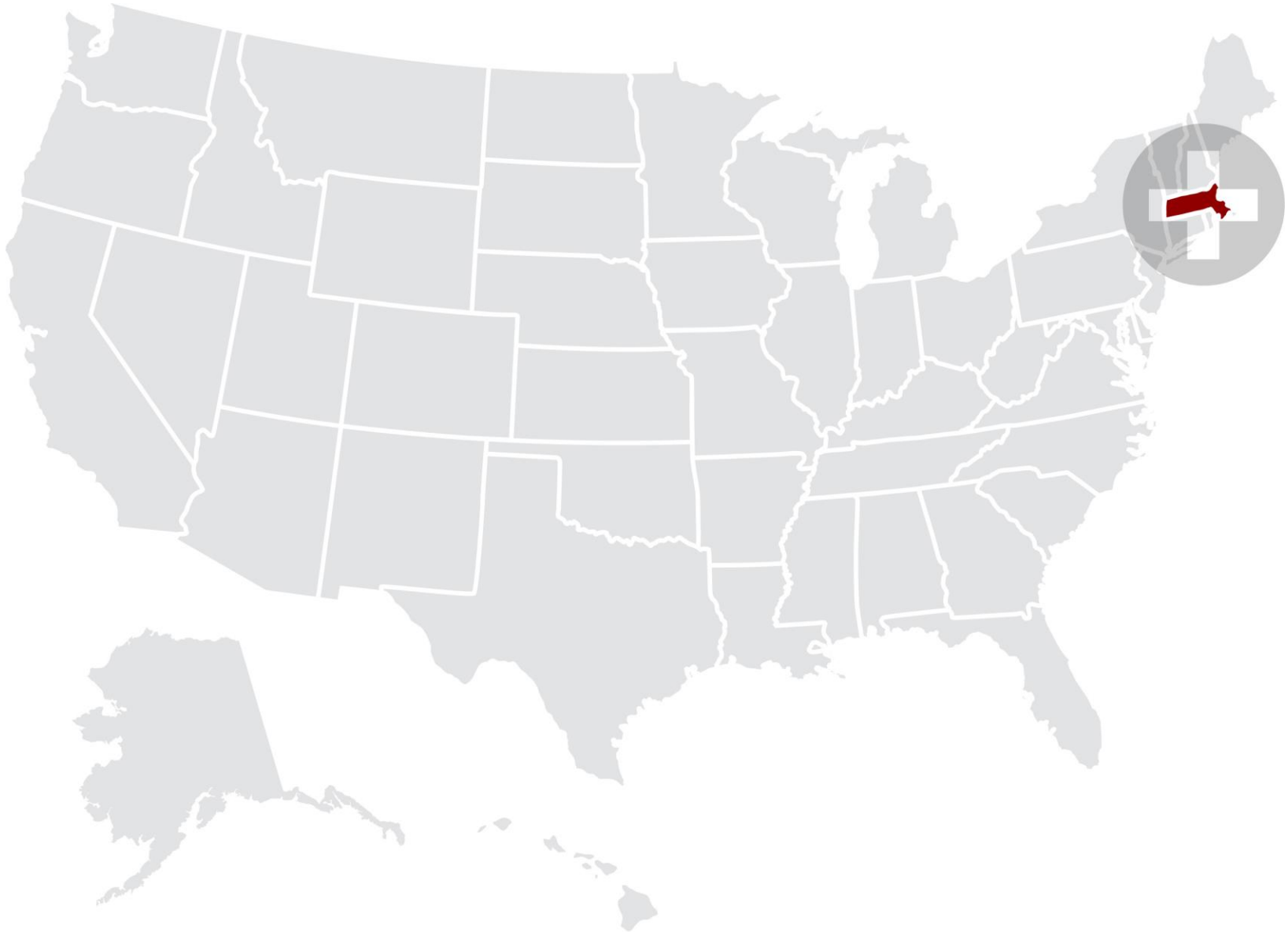
Leonard D. Schaeffer Center
for Health Policy & Economics

THE COST OF MENTAL ILLNESS: MASSACHUSETTS FACTS AND FIGURES

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A series of horizontal stripes in various shades of orange and yellow, creating a decorative background for the bottom half of the slide.

MASSACHUSETTS



INTRODUCTION

Improving access to high-quality medical and behavioral care for patients with mental illness remains one of the most vexing problems facing the health care system in the United States. While Massachusetts' health care system is considered to be among the nation's top regarding access to health care, patients with serious mental health and substance use conditions may find themselves struggling to access care in a fragmented and underfunded system.

This chartbook attempts to quantify the magnitude of the challenges facing Massachusetts in terms of the economic burden associated with behavioral health issues. We describe the size and characteristics of the population with mental illness and show the impact on the health care system based on high rates of hospitalization. We also note the unmet need in terms of behavioral health care professionals, the rates of opioid misuse and overdoses, and discuss the implications for the criminal justice system in Massachusetts.

INTRODUCTION

Key findings include:

- In Massachusetts, patients with hospitalizations for serious mental illness have a relatively long hospital stay duration, which imposes a large cost on the health care system.
- Massachusetts' per capita state mental health agency spending on community-based treatment programs is low relative to the U.S. average.
- Whereas Massachusetts has the highest per capita number of behavioral health care professionals, shortages still exist in certain areas and facilities, particularly in correctional facilities.
- People living with mental illness are more likely to encounter the criminal justice system, resulting in a large number of arrests and incarcerations. The overall annual cost of incarcerating people with serious mental illness in state prisons in Massachusetts reaches exceeds \$250 million.
- During the past decades, opioid misuse and dependency have increased steadily in the U.S., and even more so in Massachusetts, despite a recent reduction in prescription opioid sales. The increase in substance misuse and dependency has resulted in a large increase in fatal overdoses from opioids and heroin in the last several years.

The data presented in this chartbook are publicly available and represent the most recent numbers to which we had access. The term “behavioral health” is used to describe data related to mental illness and substance abuse, whereas “mental health” does not include substance abuse.

The data and methods are described in more detail in the appendix:

http://healthpolicy.usc.edu/Keck_Schaeffer_Initiative.aspx

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QUANTIFYING THE POPULATION LIVING WITH MENTAL ILLNESS IN MASSACHUSETTS AND THE U.S.

KEY POPULATIONS OF INTEREST

SERIOUS PSYCHOLOGICAL DISTRESS (SPD)

When someone experiences serious psychological distress, he or she may have a diagnosed or undiagnosed mental health condition, such as major depressive disorder, bipolar disorder, or schizophrenia (described below). Serious psychological distress is determined by six questions on the Kessler-6 screening instrument, which measures the frequency of symptoms of depression, anxiety, and emotional distress during a specific time period

MAJOR DEPRESSIVE DISORDER

A mental illness that severely impairs a person's ability to function, characterized by the presence of depressed mood, feelings of worthlessness, guilt, or helplessness, reduced concentration, ability to think, sleep problems, loss of interest or pleasure in activities, and/or recurrent thoughts of suicide

BIPOLAR DISORDER

A mental illness characterized by extreme shifts in mood and energy levels. During manic episodes, a patient has abnormally high energy and activity levels that lead to impairment in daily functioning or requires hospitalization to prevent harm to self or others. Delusions or hallucinations can also occur. Manic episodes may be alternated with major depressive episodes

SCHIZOPHRENIA

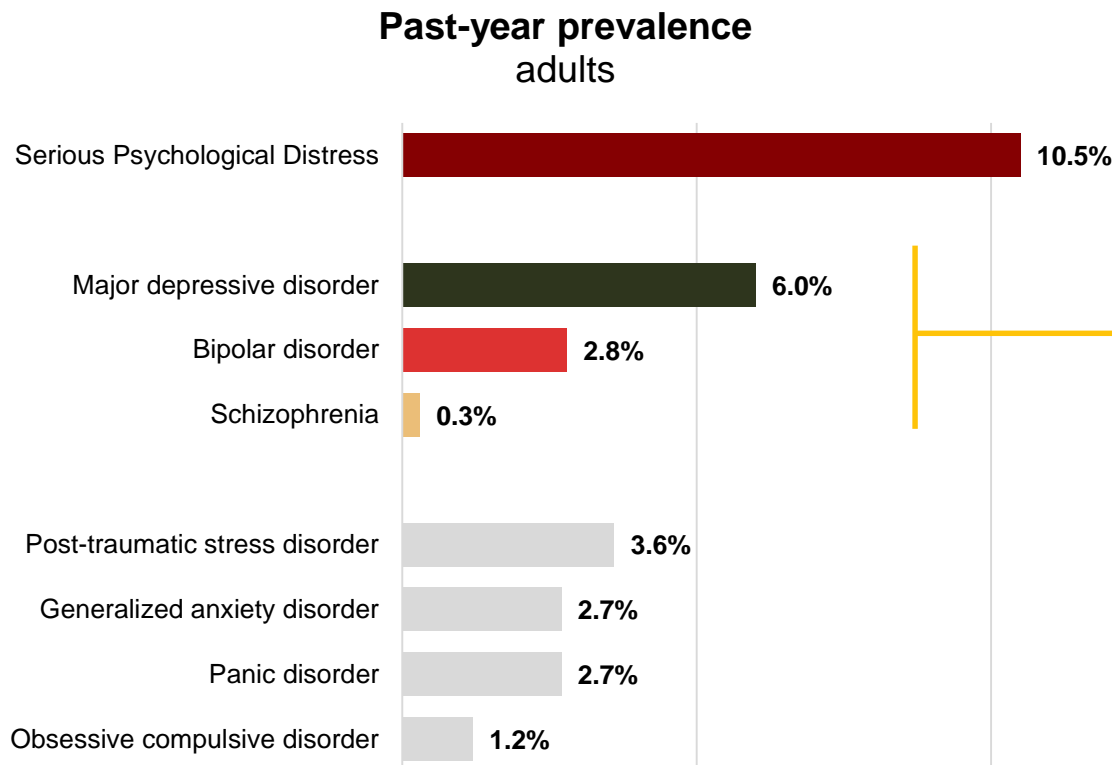
A debilitating mental illness that distorts a patient's sense of reality. Symptoms of schizophrenia include hallucinations, delusions, confusion, cognitive and mood impairments, and extremely disorganized thinking

RISK FACTORS: GENETIC & EXTERNAL FACTORS

Many different genetic factors may increase risk, but no single genetic variation causes a mental illness by itself; Specific interactions between the individual's genes and environment are necessary for a mental illness to develop

Prevalence of mental illness

UNITED STATES 2016



Many mental health conditions are fairly common in the general population.

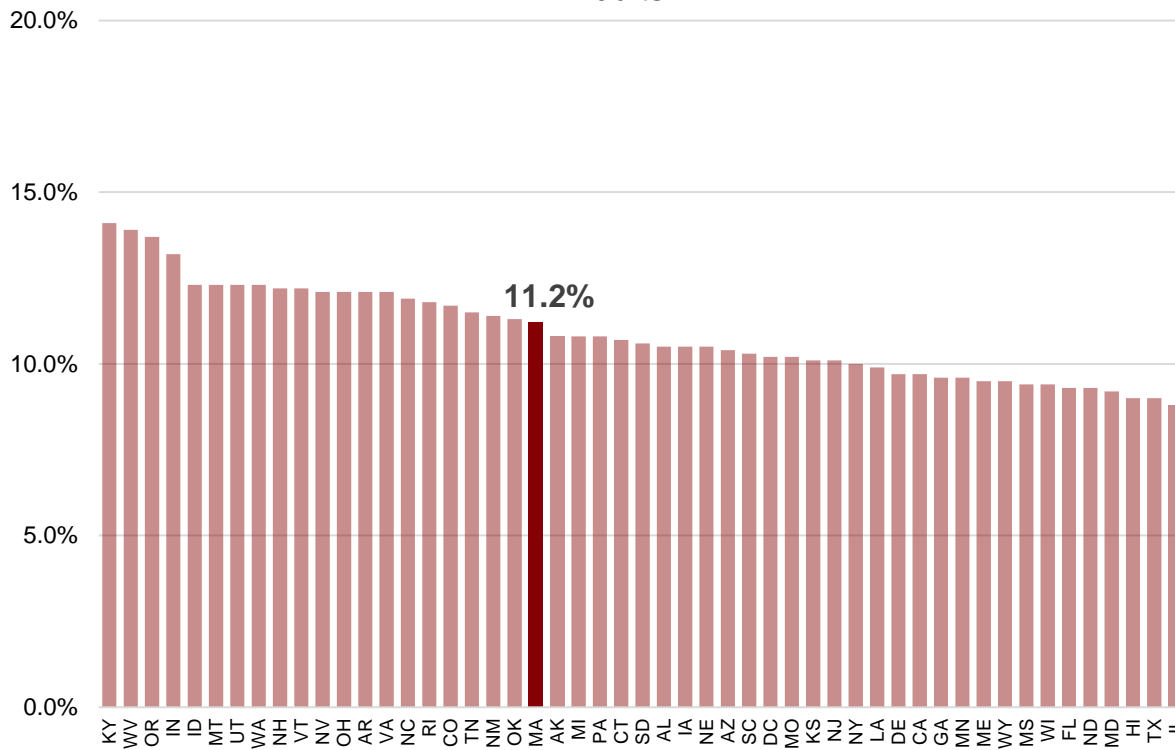
*Whereas any of these conditions can severely limit someone's normal daily activities, three disorders are often labeled as **serious mental illness**: **major depressive disorder, bipolar disorder and schizophrenia**. These three disorders will be the focus of this chartbook.*

*NB: Due to symptom overlap, diagnoses of mental illnesses are not mutually exclusive
Source: National Survey on Drug Use and Health (NSDUH, R-DAS) 2015-2016 (SPD),
NSDUH Mental Health Surveillance Study 2008-2012 (major depressive disorder) and
National Institutes of Mental Health (other conditions – see appendix for original sources)*

State variation in prevalence of serious psychological distress

MASSACHUSETTS AND UNITED STATES 2016

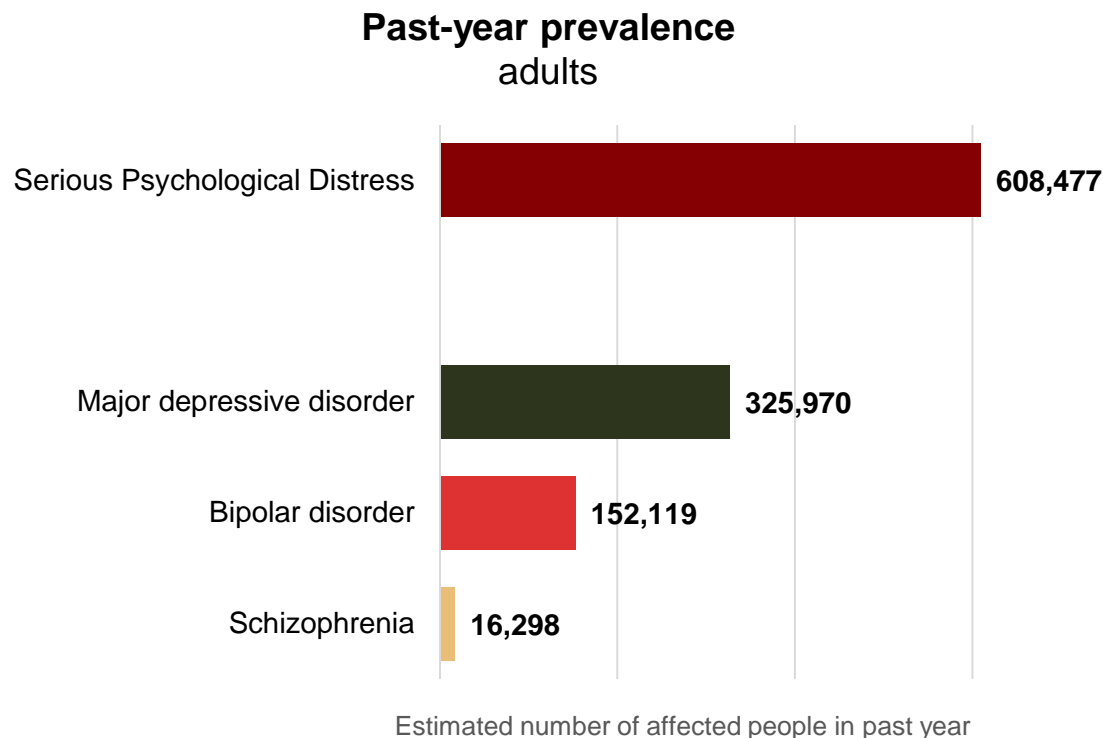
Past-year prevalence of serious psychological distress
Adults



The prevalence of serious psychological distress in the past year in Massachusetts is estimated at 11.2%, which is average compared to other states in the U.S.

Estimated number of people living with mental illness

MASSACHUSETTS 2016



We estimate that more than half a million adults in Massachusetts experienced Serious Psychological Distress in the past 12 months.

Note that a patient can receive multiple serious mental illness diagnoses due to a high degree of overlap between mental health conditions.

Source: Source: National Institutes of Mental Health, National Survey on Drug Use and Health (NSDUH, R-DAS) 2015-2016, and NSDUH-MHSS 2008-2012. Estimated number of people affected based on total state population of 5,432,832 (18 years and over), Census Bureau data (2016)

MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

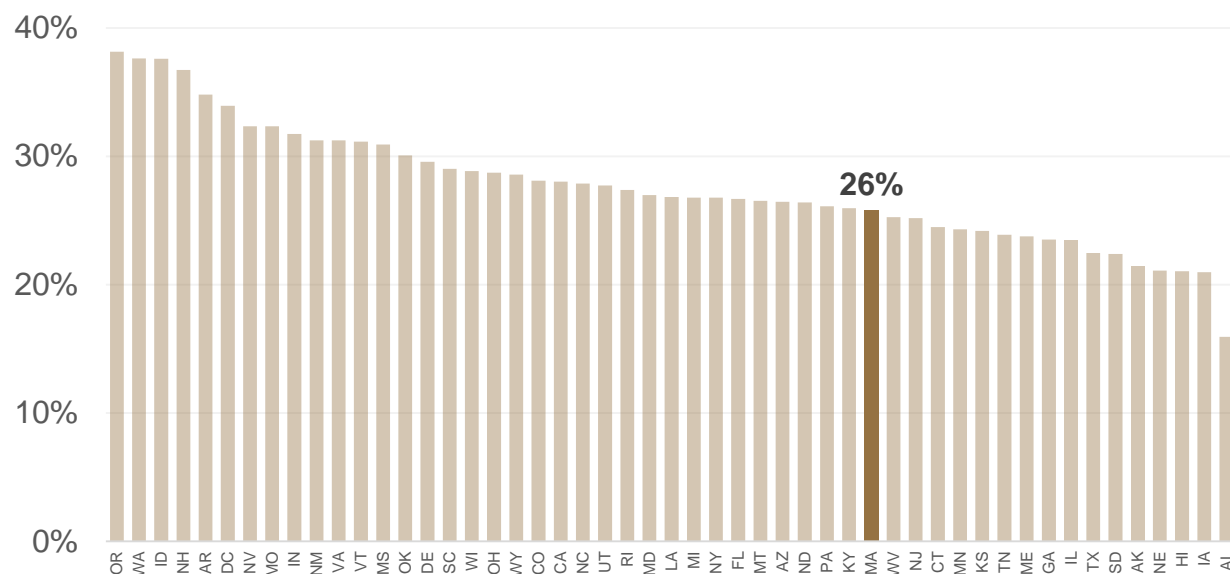
Unmet mental health care needs

Almost a quarter of adults with serious psychological distress in the past year reported an unmet need for mental health care. A common reason for not receiving care was the inability to afford mental health treatment, especially for people who do not have health insurance.

Unmet need of mental health treatment

MASSACHUSETTS AND UNITED STATES 2016

Percentage of adults
who have an unmet need of mental health treatment
among those
with past-year serious psychological distress



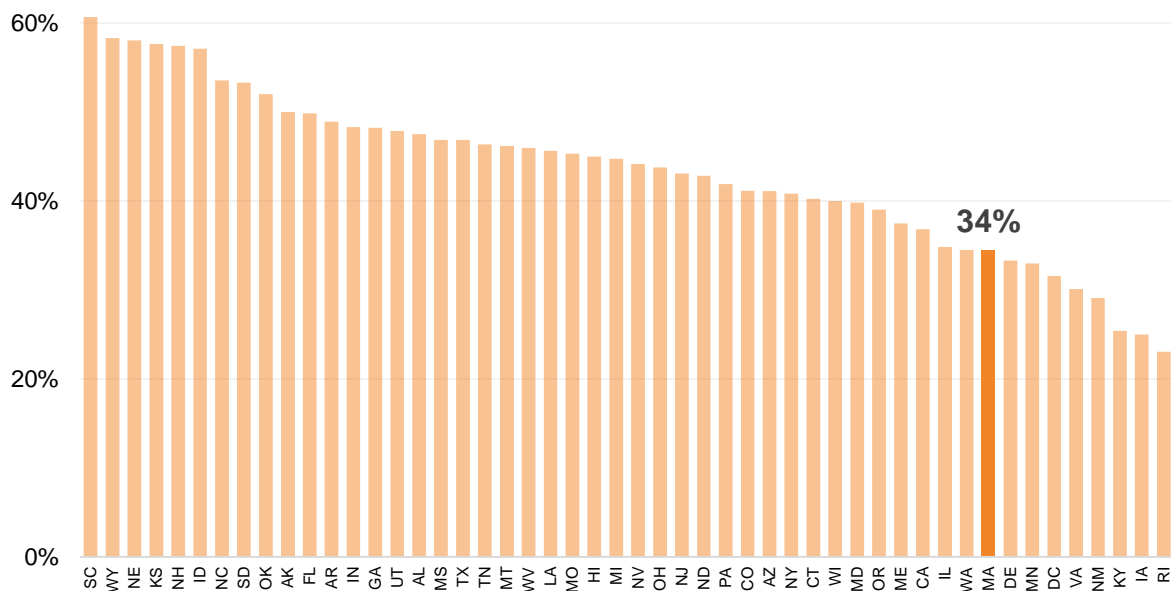
In Massachusetts, more than a quarter of people with serious psychological distress have an unmet need of mental health treatment.

In the general adult population of Massachusetts, 4.6% of people have a unmet need of mental health treatment.

Unmet need of mental health treatment due to costs

MASSACHUSETTS AND UNITED STATES 2016

Percentage of adults
who could not afford mental health care
among those with past-year serious psychological
distress and unmet need of treatment

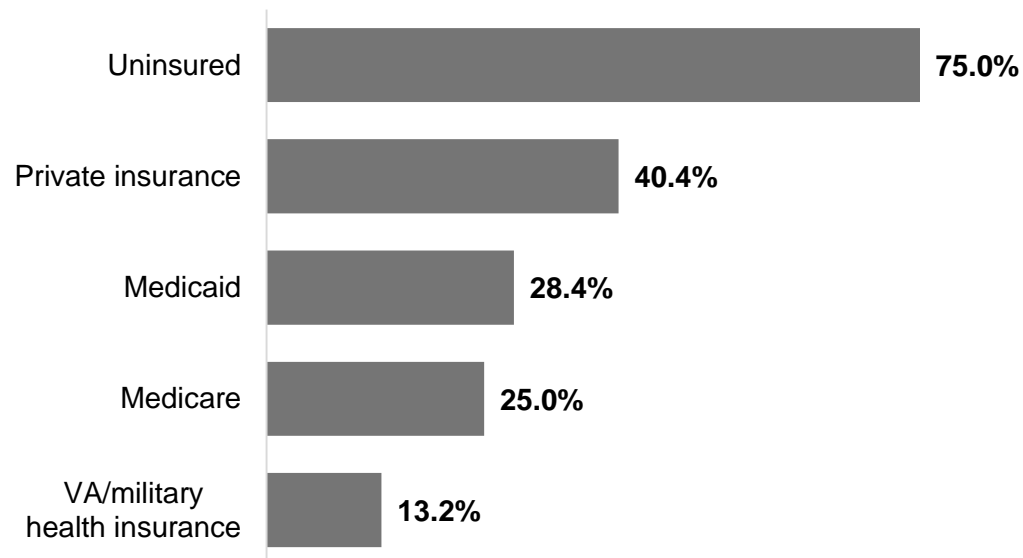


In Massachusetts, more than a third of people with serious psychological distress and an unmet need of mental health treatment, did not receive this treatment due to costs.

Unmet need of mental health treatment due to costs differs by insurance coverage

UNITED STATES 2016

Percentage of adults
who could not afford mental health care
among those with past-year serious psychological distress
and unmet need of treatment

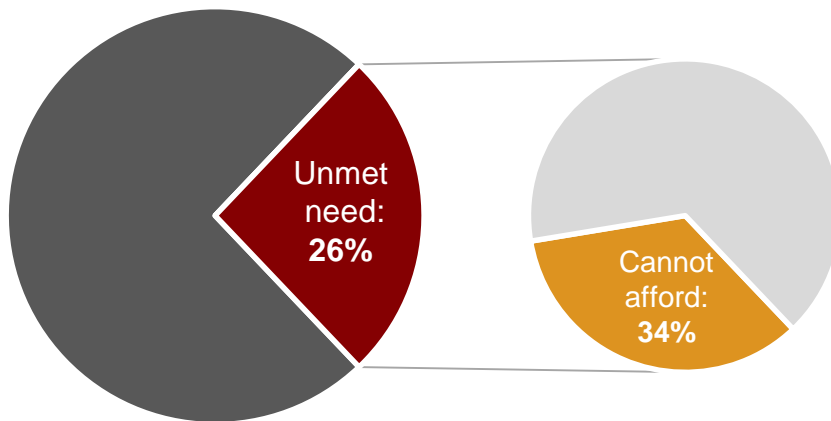


On a national level, the extent to which cost was a factor in driving unmet need for mental health care among those with serious psychological distress, varied by insurance status. People without health insurance were most affected by the inability to afford mental health treatment (75%), while those with VA/military health insurance coverage were least affected (13%).

There is significant unmet need for mental health care in Massachusetts

MASSACHUSETTS 2016

Among adults who
experienced serious psychological distress
during the past year:



26% indicates an **unmet need of mental health treatment**

And 34% of these people did not receive mental health treatment, **because they could not afford it**

Among adults who experienced serious psychological distress in the previous year in Massachusetts, almost a quarter reported an unmet need for mental health care. More than a third of the people with a perceived unmet need reported that they did not receive treatment because they could not afford it.

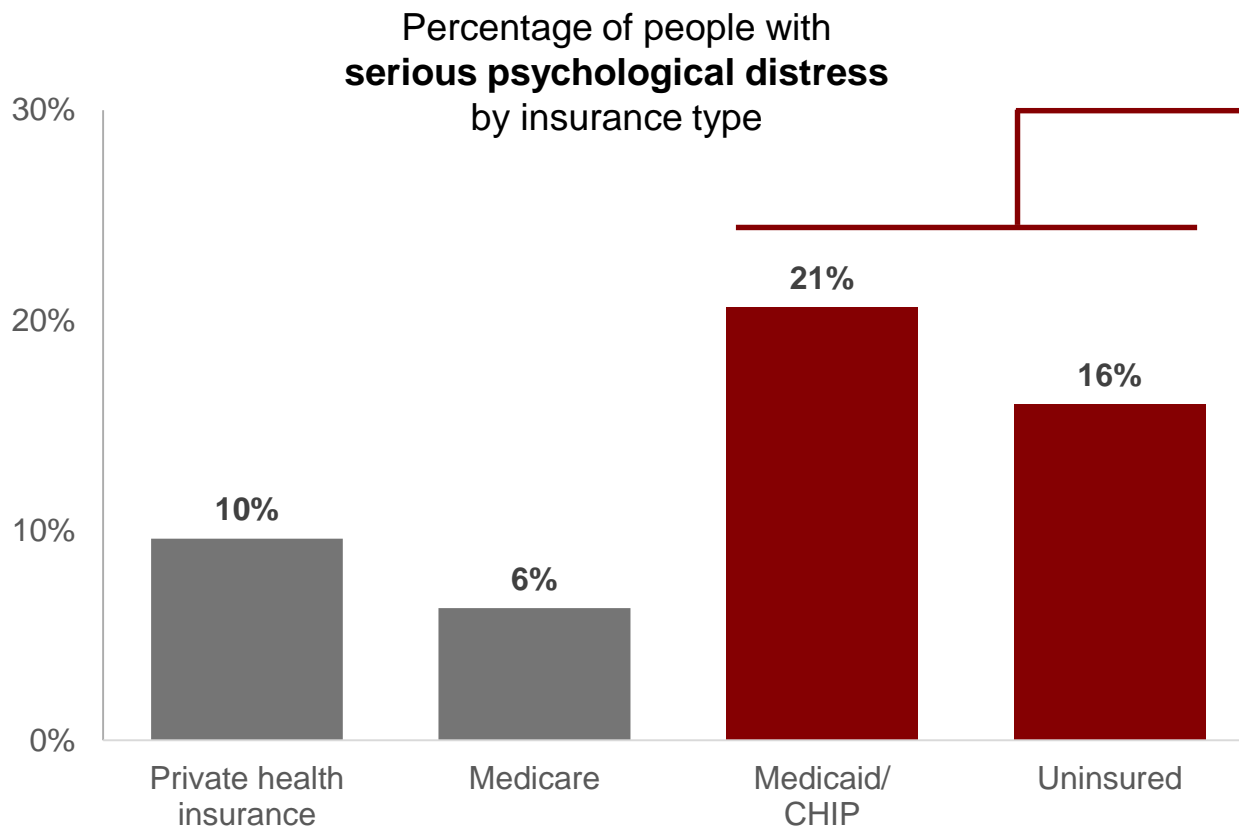
MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

Medicaid & behavioral health care needs

Medicaid provides a safety-net for people with low income or qualifying disabilities, and a large percentage of people with Medicaid coverage experience behavioral health issues. However, it is often a financial burden for physicians to accept Medicaid patients since reimbursement rates are generally lower than for other patients. This can lead to access barriers for patients with Medicaid coverage that prevent them from receiving the behavioral health care they need.

People with mental illness have greater reliance on the safety net

MASSACHUSETTS 2016

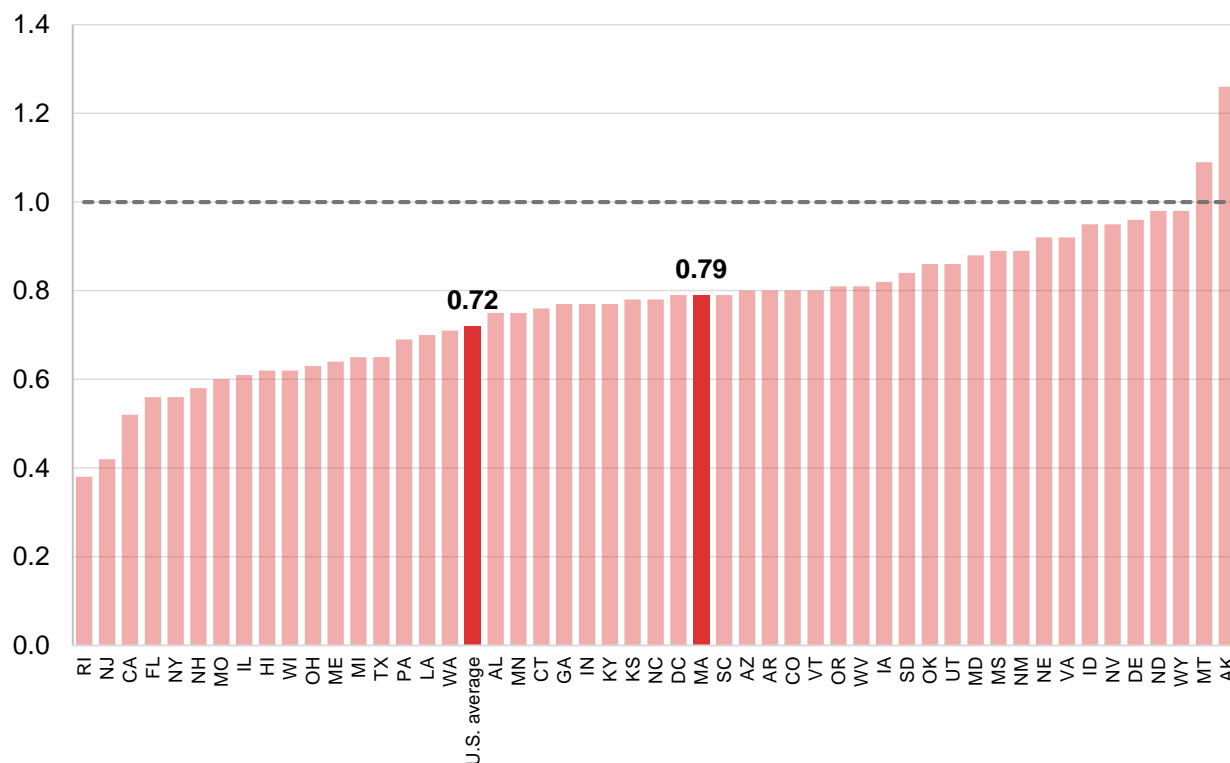


*In the **Medicaid and uninsured population**, a higher percentage of adults in Massachusetts reported serious psychological distress (SPD) during the past year compared to people with Medicare or private health insurance coverage.*

Medicaid reimbursement rates to physicians are low

MASSACHUSETTS AND UNITED STATES 2016

Medicaid-to-Medicare fee ratio, 2016



Low reimbursement rates are a disincentive for individual physicians to accept patients with Medicaid coverage and mental health problems. Compared to Medicare fee levels, Medicaid reimbursement rates are low in most states. Although Massachusetts' fee ratio is higher than the U.S. average, Medicaid fees are still below Medicare fees. **This can be a barrier for these patients to obtain access to mental health care.**

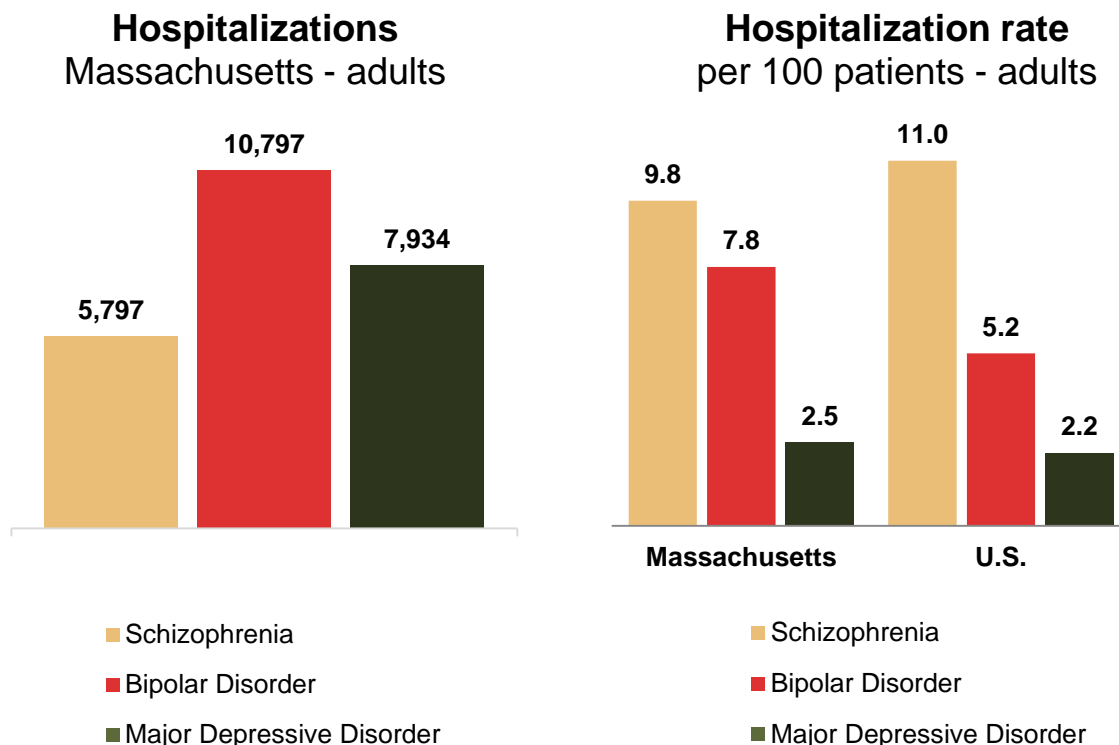
MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

Hospital utilization & costs

For every 100 patients with a serious mental illness, there were approximately 18 hospitalizations in the U.S. and 20 hospitalizations in Massachusetts in 2014. The average length of stay for these hospitalizations is long compared to other hospital stays. Relatively little progress has been made in reducing the length of stay for a serious mental illness over the last decade. This imposes a large financial cost on the health care system and potentially diverts resources away from other sites of care.

Hospitalizations for mental illness

MASSACHUSETTS AND UNITED STATES 2014



In Massachusetts, the number of hospitalizations is highest for adult patients with a principal diagnosis of bipolar disorder. However, patients with schizophrenia have a higher rate of hospitalizations.

The hospitalization rates in Massachusetts for adults with serious mental illness are similar compared to the U.S. average.

3.6% of all hospitalizations in Massachusetts are due to SMI

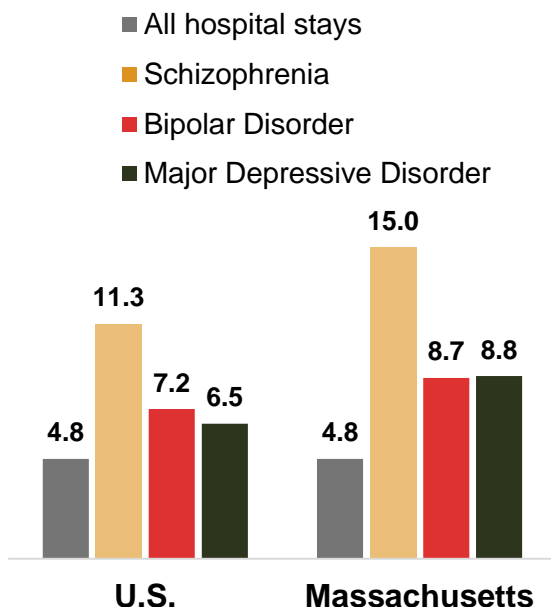
Source: Healthcare Cost and Utilization Project (HCUPnet) 2014

Estimate of hospitalization rate: based on total state population (Census bureau data, 2014) and prevalence estimates reported previously

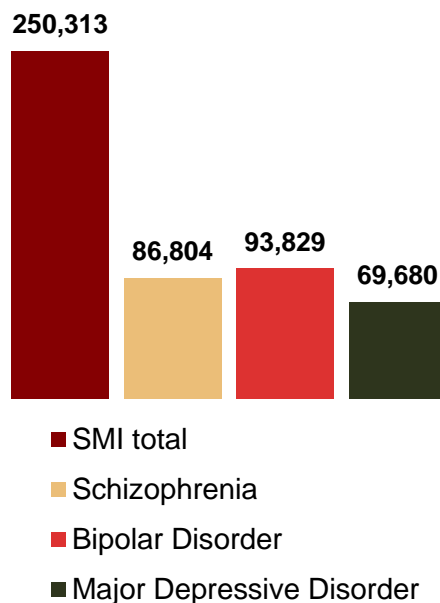
Length of stay for mental illness hospitalizations

MASSACHUSETTS AND UNITED STATES 2014

Average length of hospital stays (days) adults



**Total number of hospital days in 2014
Massachusetts - adults**



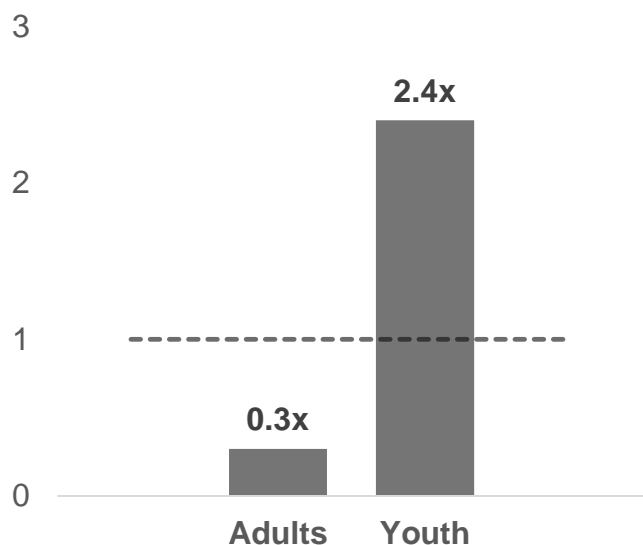
The average hospital stay duration for adult patients with serious mental illness is relatively high in Massachusetts, and compared to all hospital stays, especially for patients diagnosed with schizophrenia.

The total time spent in the hospital by adults with a primary diagnosis of schizophrenia, bipolar disorder or major depressive disorder exceeds a quarter million days each year in Massachusetts.

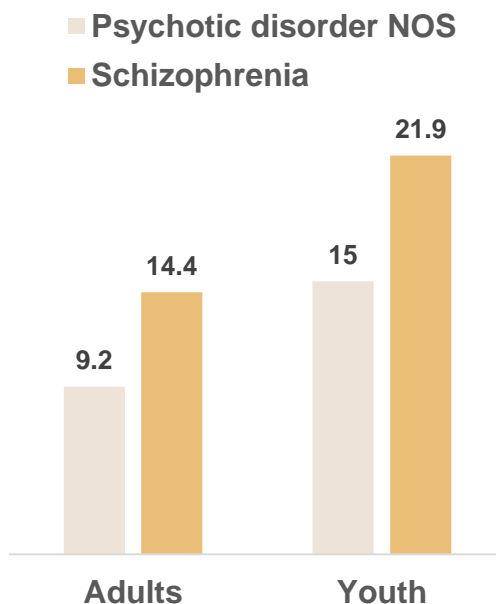
Hospitalizations of young patients with psychosis

MASSACHUSETTS 2014

Number of hospitalizations for
psychotic disorder NOS
relative to **schizophrenia**



Average length of
hospital stay (days)



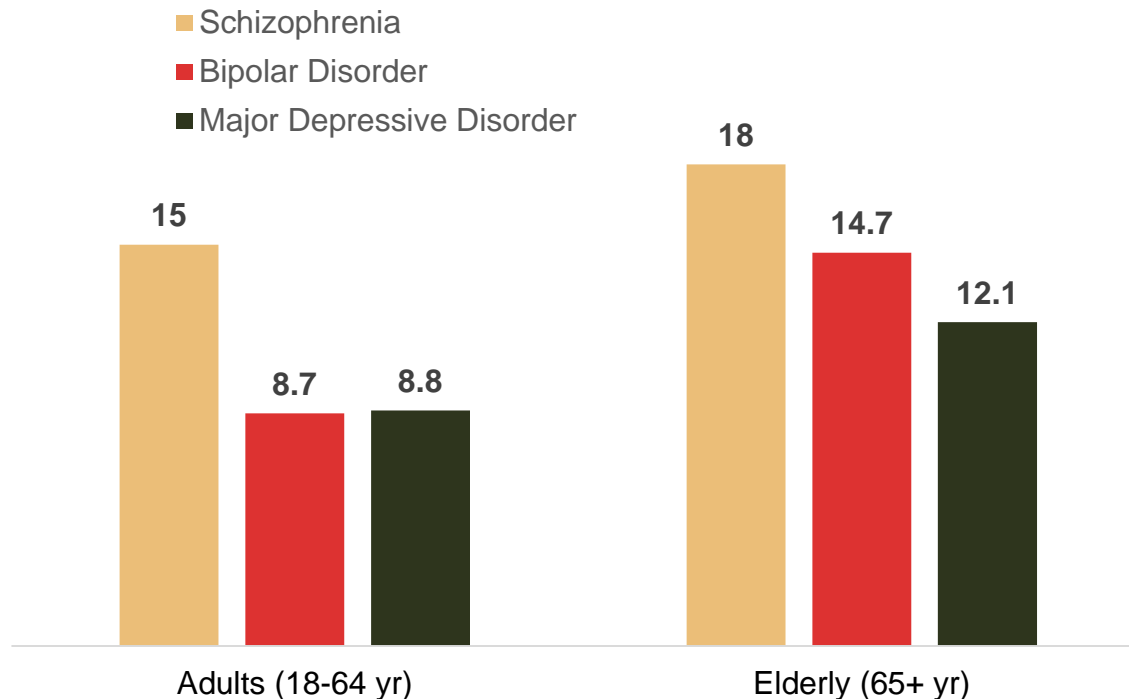
In contrast to in adults, “psychotic disorder, not otherwise specified (NOS)” is diagnosed more often than schizophrenia in the younger population (1-17 years) during hospitalizations, possibly to prevent stigmatization.

Regardless of the primary reason for a hospitalization, the average length of stay for younger people in Massachusetts is approximately one week longer than for adults, illustrating the challenges in treating and establishing an environment with appropriate follow-up care for this especially vulnerable population.

Hospitalizations of elderly patients with serious mental illness

MASSACHUSETTS 2014

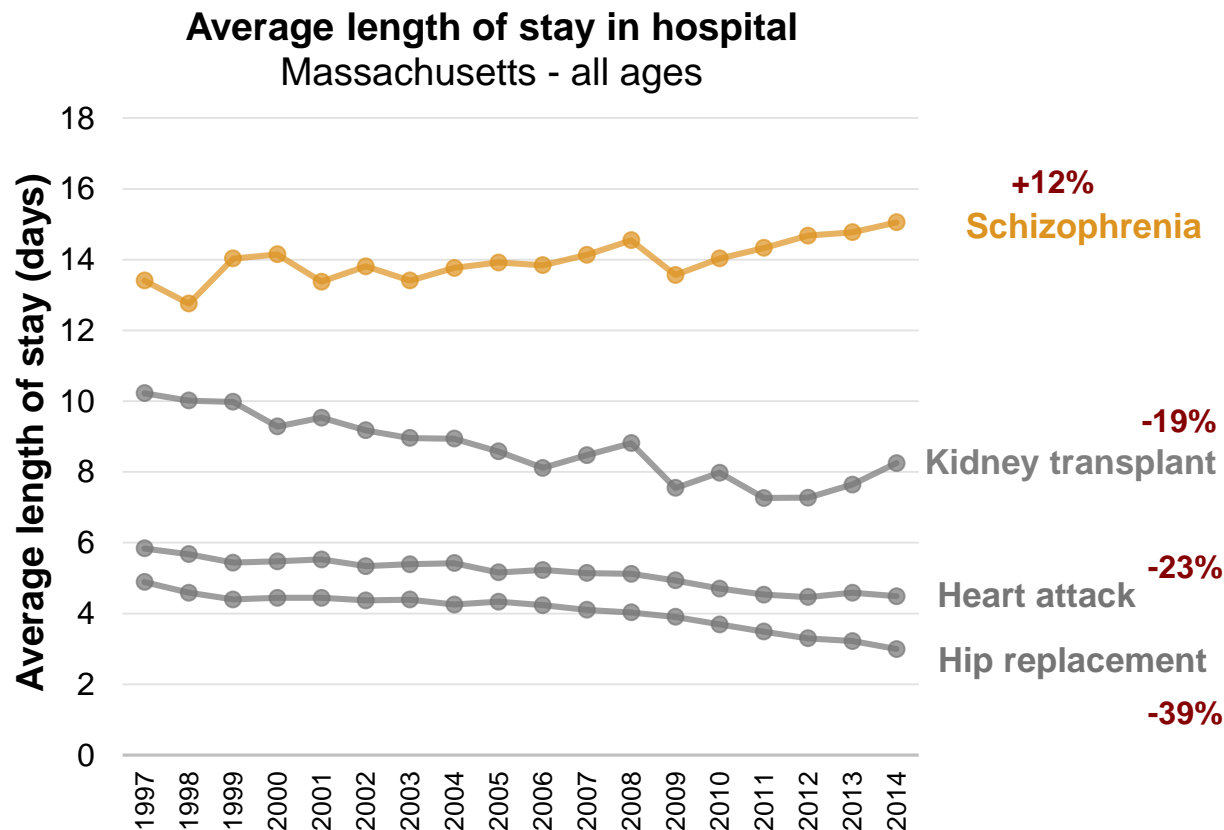
Average duration of hospital stays (days) Elderly (65+ yr)



The length of stay in the hospital for serious mental illness in elderly patients is at least 20% higher on average than for younger adults with a similar diagnosis. Treatment of medical comorbidities due to aging, as well as difficulty finding long-term care environments may be at the root of this disparity.

Trends in length of stay for schizophrenia hospitalizations

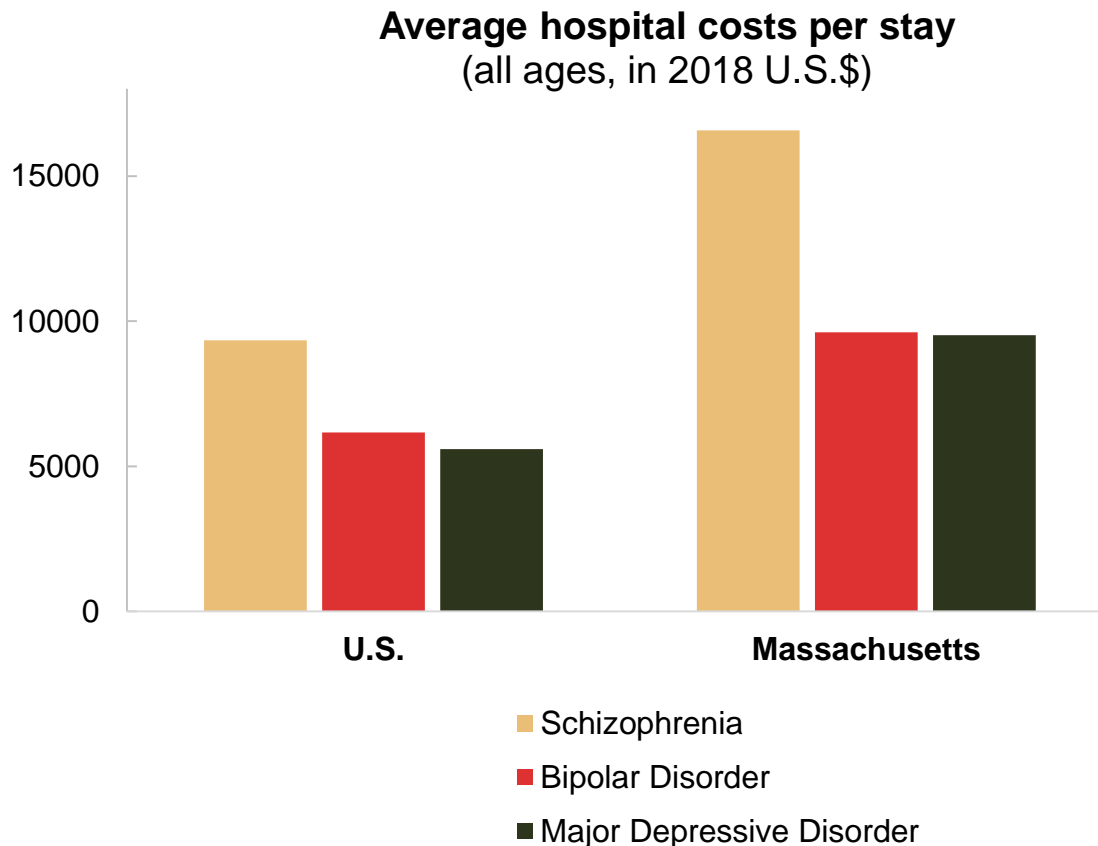
MASSACHUSETTS 1997-2014



The average length of stay for a schizophrenia hospitalization in Massachusetts was longer than those for kidney transplants, heart attacks and hip replacements. Moreover, the average duration for these three other conditions declined by at least 19% during the last two decades, while for schizophrenia the duration increased by 12%.

Average hospital costs for mental illness hospitalizations

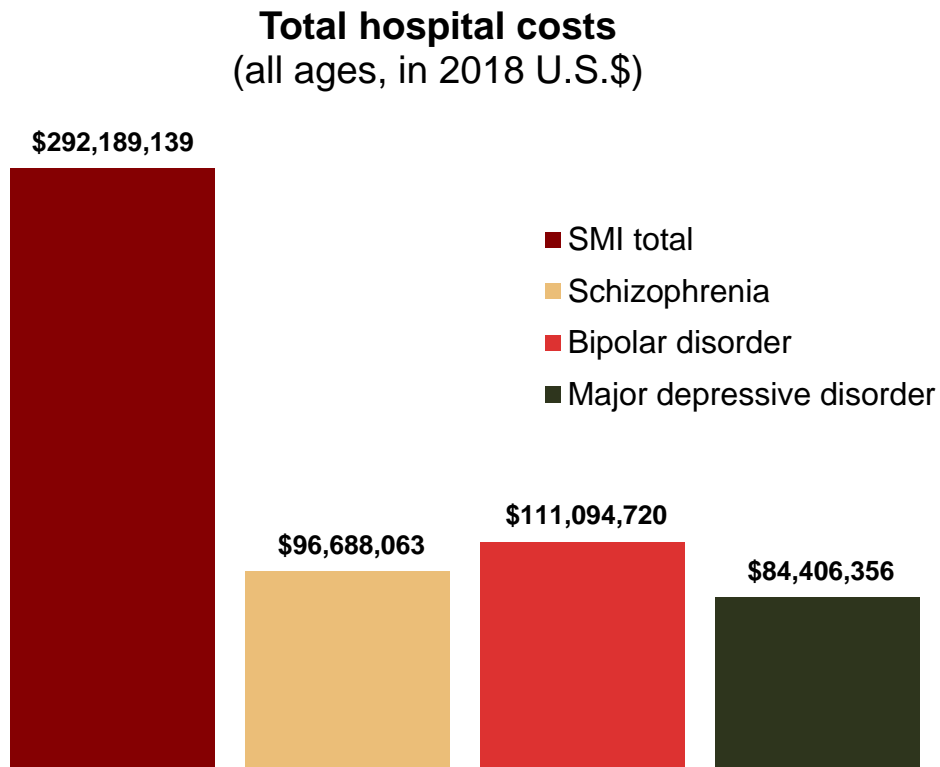
MASSACHUSETTS AND UNITED STATES 2014



*Hospital costs in the U.S. and Massachusetts ranged from \$5,500 to \$16,500 per stay for patients with serious mental illness. This is despite **a general absence of procedures or surgeries** during a hospitalization for symptoms of serious mental illness.*

Total hospital costs for mental illness hospitalizations

MASSACHUSETTS 2014



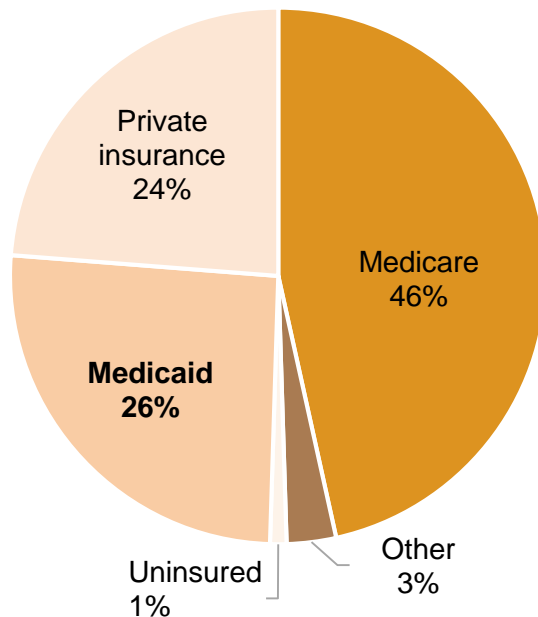
The total hospital costs in Massachusetts for hospitalizations for serious mental illness exceeded \$290 million in 2014.

Total hospital costs for serious mental illness hospitalizations by insurance type

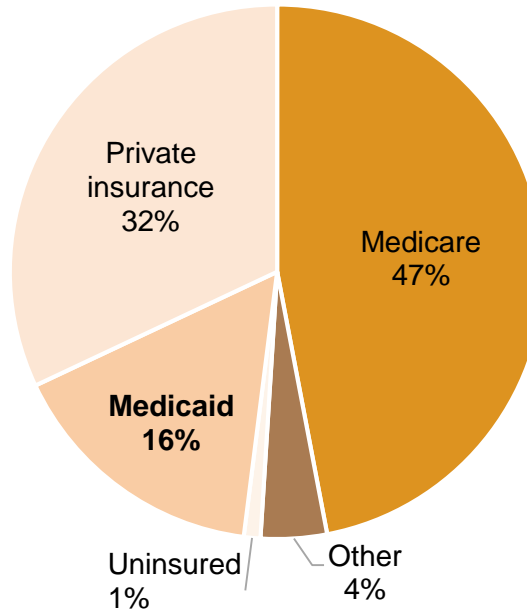
MASSACHUSETTS 2014

Total hospital costs
(all ages, in 2018 U.S.\$)

Serious mental illness
\$292 million



All hospitalizations
\$10 billion



Compared to all hospitalizations, the expected payer for hospitalizations involving serious mental illness is much more likely to be Medicaid and less likely to be a private insurer.

Only a small fraction of the \$292 million in total hospitalization costs is covered by other programs (including VA/military health insurance), or paid by patients without health insurance.

Source: Healthcare Cost and Utilization Project (HCUPnet) 2014.

'Other' includes Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs. 'Uninsured' includes 'self-pay' and 'no charge'.

Hospitalizations for which the primary payer is 'missing' (less than 0.2%) are excluded.

MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

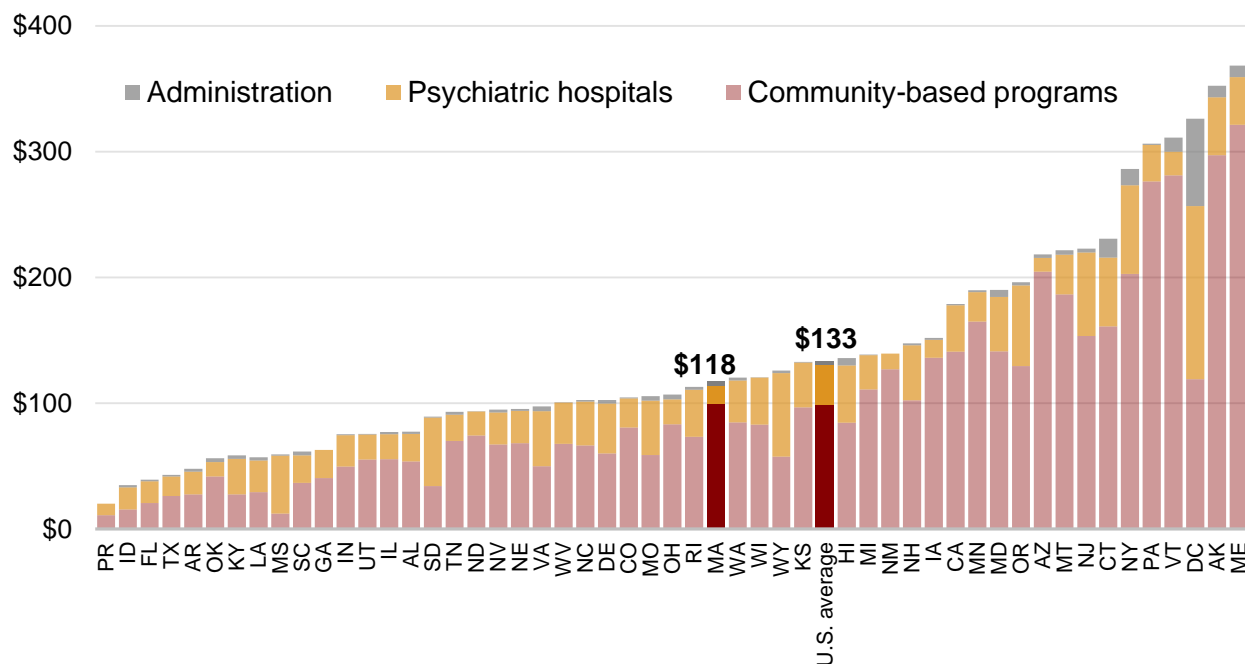
Investment in community-based programs

For several decades, a shift from hospital inpatient care towards community-based clinic outpatient treatment has taken place, as is exemplified by the budget trends of state mental health agencies. On average, approximately 72% of their budgets is now spent on community-based programs, compared to 33% in the early 1980s. Compared to the U.S. average, the Massachusetts' state mental health agency spends a lower total amount per capita, but the amount of spending on community-based programs per capita is similar to the U.S. average.

State Mental Health Agency spending

MASSACHUSETTS AND UNITED STATES 2013

**Per capita
State Mental Health Agency expenditures**
(in 2018 U.S.\$)



Massachusetts' state mental health agency spends a slightly lower per capita amount on mental health services compared to the U.S. average. However, the amount spent on community-based mental health programs is similar to the U.S. average.

Expenditures include (on average):

- 72% Community-based mental health programs funded and/or operated by state mental health agencies
- 26% Mental health services in state psychiatric hospitals
- 2% Administration/training/research/evaluation to support these services

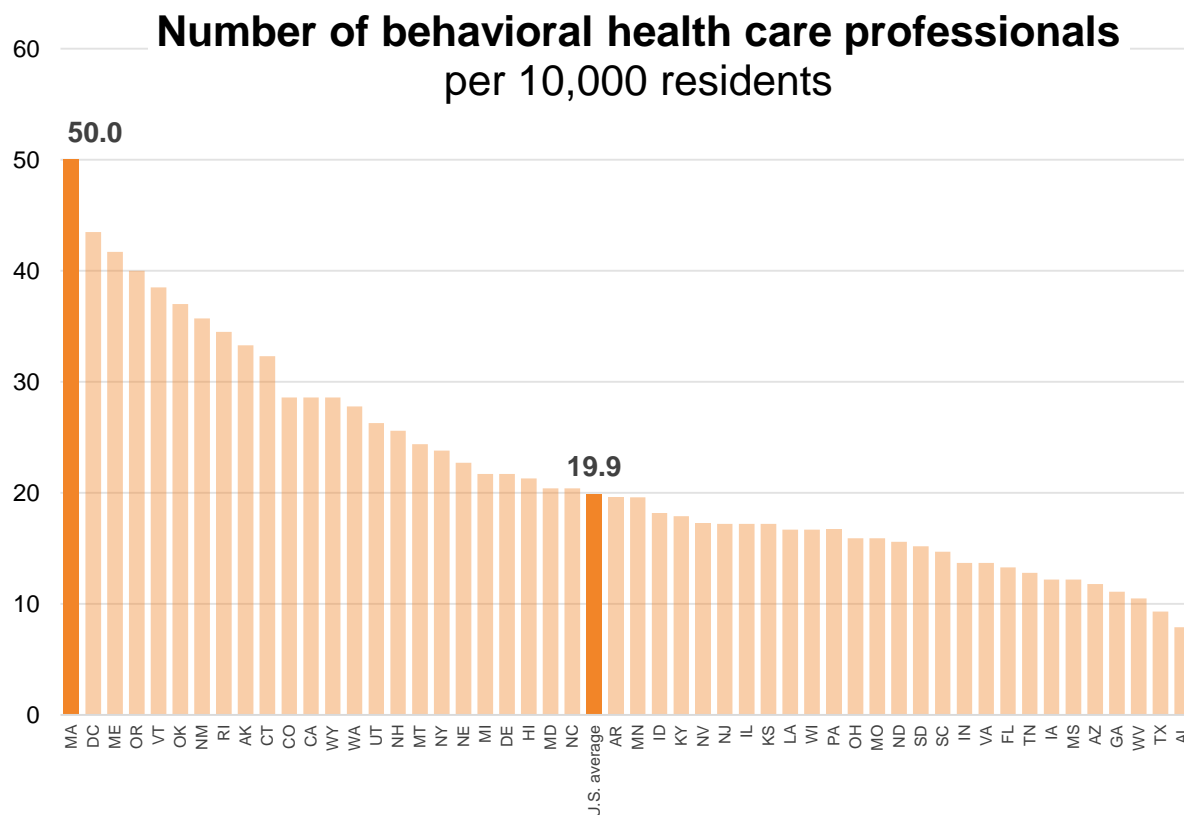
AVAILABILITY OF BEHAVIORAL HEALTH CARE PROFESSIONALS

Massachusetts has the largest number of behavioral health care professionals and hospital beds per capita in the U.S. However, there are still areas and facilities in Massachusetts that have a shortage of behavioral health care professionals; to fully serve the population with mental health needs, 20 full-time professionals are needed in addition to the current workforce in these designated “shortage areas” to reach an acceptable provider-to-patient ratio.

This shortage is particularly acute in the criminal justice system, where many people are in need of behavioral health treatment.

Availability of behavioral health care professionals

MASSACHUSETTS AND UNITED STATES 2017



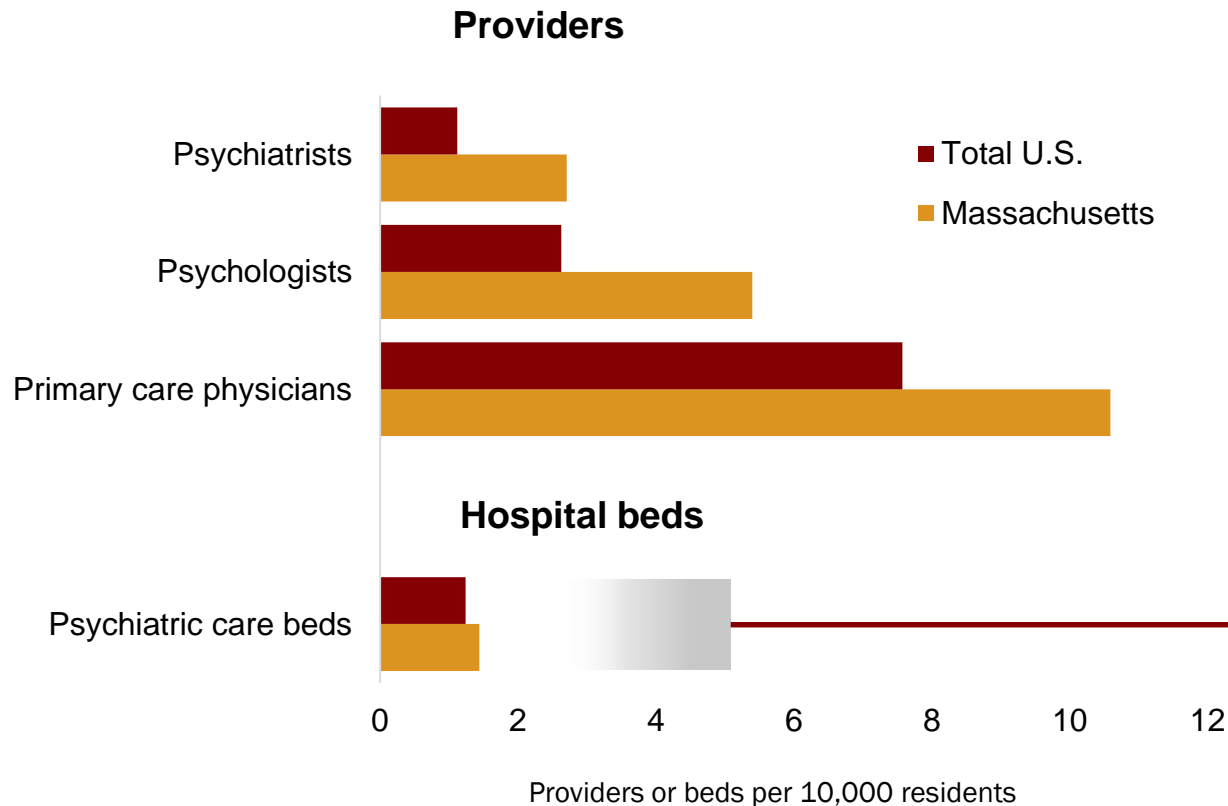
There are approximately 50 behavioral health care professionals for every 10,000 residents in Massachusetts. This is the highest number in the U.S.

Note that the U.S. average does not represent the optimal number of behavioral health care professionals.

Behavioral health care professionals include: psychiatrists, psychologists, licensed clinical social workers, counselors, marriage and family therapists, and advanced practice nurses specializing in behavioral health care

Availability of behavioral health care professionals and hospital beds

MASSACHUSETTS AND UNITED STATES 2013



Per resident, Massachusetts has more psychiatrists, psychologists, and primary care physicians compared to the U.S. average, as well as a higher number of hospital beds dedicated to psychiatric care.

Note that the U.S. average does not represent the optimal number of behavioral health care professionals or hospital beds.

Although the optimal number of beds is unknown in our current health care infrastructure, there are estimates that 5 beds per 10,000 residents are minimally required assuming sufficient availability of outpatient programs for long-term treatment.

Source: Area Health Resource Files 2013 (psychiatrists, physicians and psychiatric care beds), and 2005-2013 Demographics of the U.S. Psychology Workforce, American Psychological Association (psychologists)

Treatment Advocacy Center, "The Shortage of Public Hospital Beds for Mentally Ill Persons"

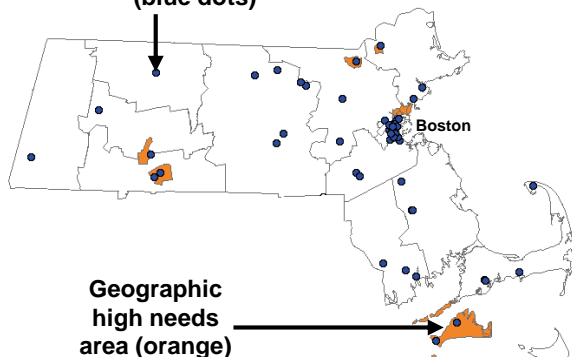
Shortage of behavioral health care professionals

MASSACHUSETTS 2019



Currently, Massachusetts has 9 full-time equivalent behavioral health care professionals in designated shortage areas and facilities with behavioral health care professional shortages. In order to address the shortage issue, 15 more full-time professionals are needed in these areas, 2 of whom are needed in correctional facilities.

Specific facility with shortage of behavioral health care professionals (blue dots)



Behavioral health care professionals:

Psychiatrists, clinical psychologists, clinical social workers, psychiatric nurse specialists, and marriage & family therapists

Facilities:

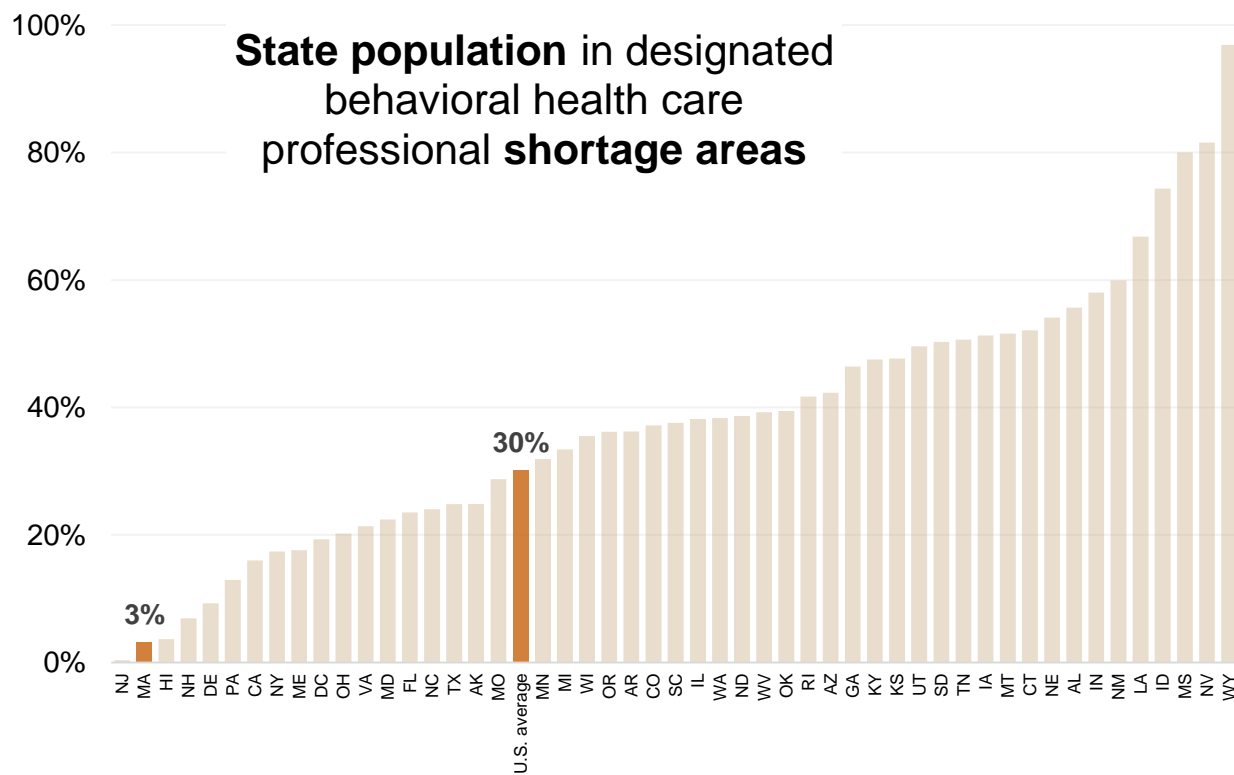
Federal & state correctional institutions, state & county mental hospitals, community mental health centers, and other public or nonprofit private facilities

Geographic high needs area based on population-to-provider ratio, poverty levels, elderly and youth ratio, alcohol and substance abuse prevalence, and travel time to nearest source of care outside area

Source: Health Professional Shortage Areas (HPSA), HRSA Data Warehouse data as of 1/13/2019

State population in behavioral health care professional shortage areas

MASSACHUSETTS AND UNITED STATES 2018



224,121 people in Massachusetts (3% of the state population) reside in designated shortage areas and/or are served by a facility with shortages of behavioral health care professionals. This is one of the lowest shortages of the U.S.

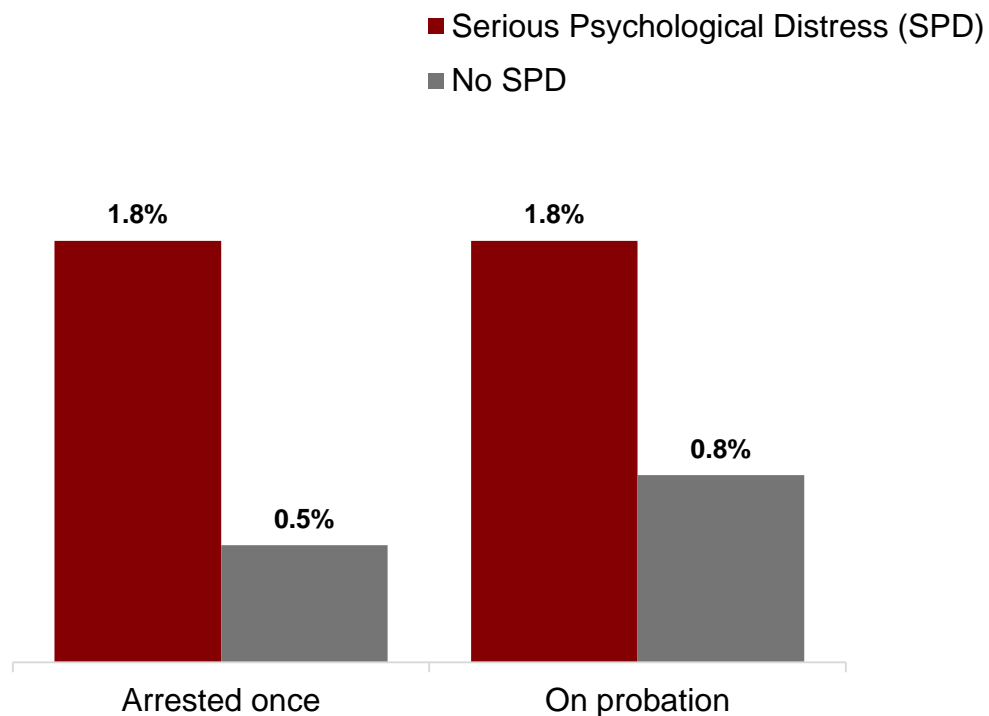
MENTAL HEALTH CONDITIONS & THE CRIMINAL JUSTICE SYSTEM

People living with mental illness are more likely to encounter the criminal justice system and to be arrested, suggesting that mental illness is a factor in incarceration risk. Whereas state and federal prisons have resources to provide mental health care to prisoners who were not receiving this before incarceration, local jails appear particularly unable to meet the health care needs of people with mental illness.

The overall cost of incarceration of the 2,000+ prisoners with serious mental illness in the state of Massachusetts exceeds \$250 million per year.

Contact with Criminal Justice System

MASSACHUSETTS 2016

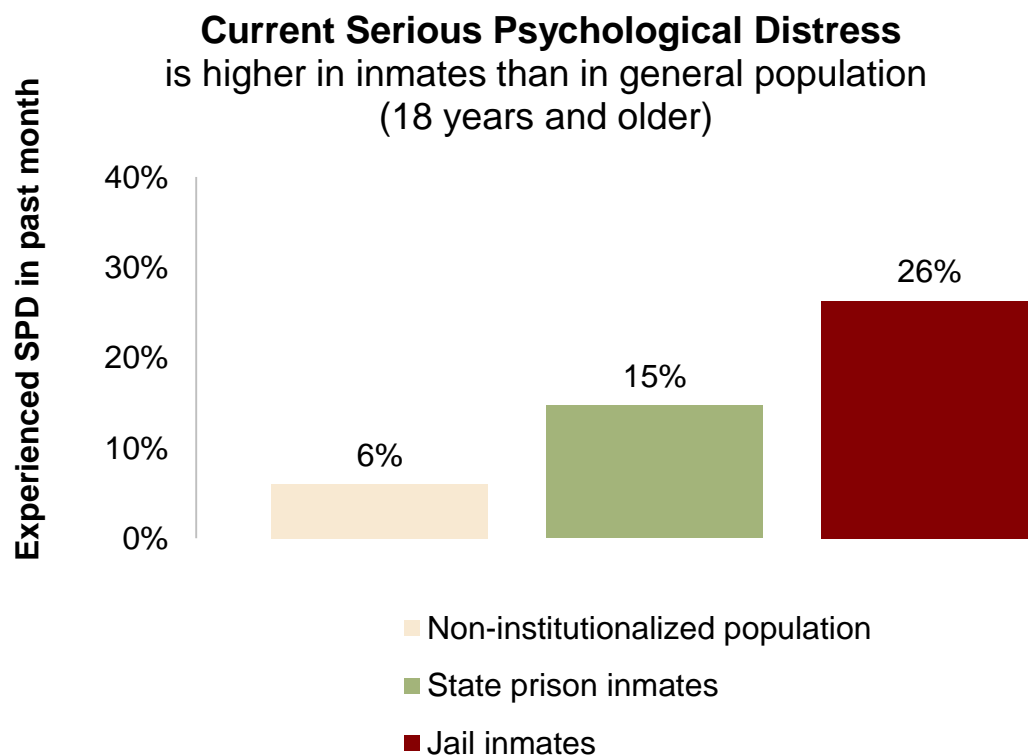


People who experienced Serious Psychological Distress (SPD) are more likely to have been arrested or be on probation in the past year.

In Massachusetts these statistics are approximately two times lower than in the rest of the U.S.

Mental health issues in prison and jail populations

UNITED STATES



A large percentage of the U.S. adult prison and jail inmate population currently experiences Serious Psychological Distress compared to the non-institutionalized population.

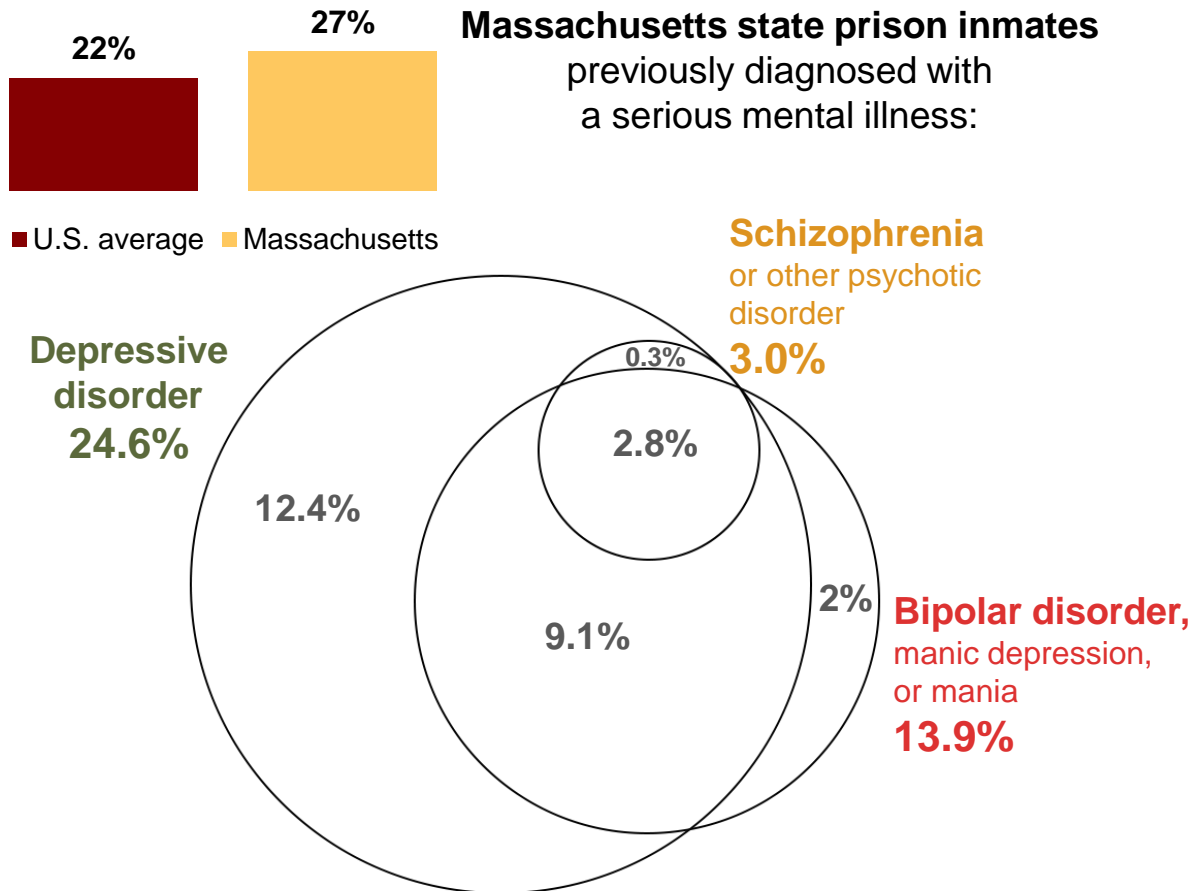
Additionally, these mental health issues are observed at higher rates in local jails than in prisons.

Source: National Survey of Drug Use and Health (NSDUH) 2016

Bureau of Justice report: Sexual Victimization in Prisons and Jails Reported by Inmates, 2011-12, based on data from the National Inmate Survey

State prison population with Serious Mental Illness

MASSACHUSETTS



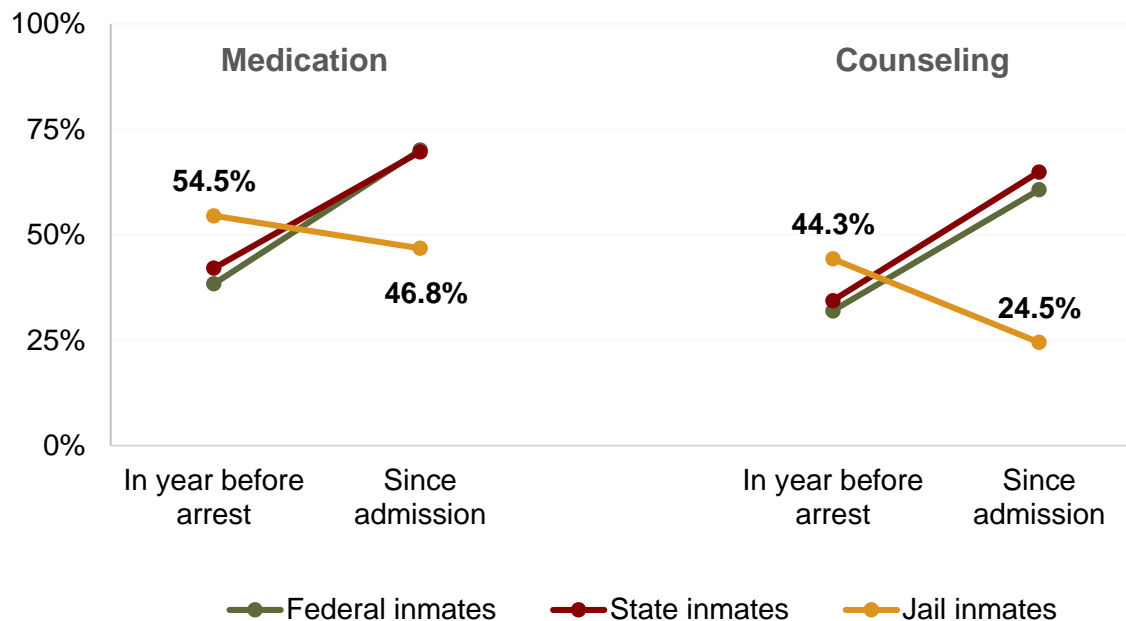
In Massachusetts state prisons, approximately 27% of prison inmates have previously been diagnosed with a serious mental illness, which is high compared to the overall U.S. prison population. Many patients have been diagnosed with two or three mental illnesses, confirming the presence of overlap in symptoms in this population.

Change in treatment before and during incarceration in prison and jails

UNITED STATES

Lack of access to mental health treatment in local jails

Among inmates with a previously diagnosed serious mental illness and who have ever received respective treatment before incarceration



The increase in mental health care treatment in federal and state prisons after admission to prison suggests that these institutions are making up for the gaps in mental health treatment in the general health care system.

At the same time, local jail inmates do not have the same access to medication and counseling while incarcerated as federal and state prisoners.

Mental health conditions include prior diagnosis of depressive disorder, bipolar disorder, and/or schizophrenia. Medication and counseling data includes treatment for any mental illness.

Estimated number of
Massachusetts state prison inmates in 2017,
previously diagnosed with serious mental illness:

2,404

Estimate of overall annual costs in 2017:

\$ 259,434,862

(in 2018 U.S.\$)

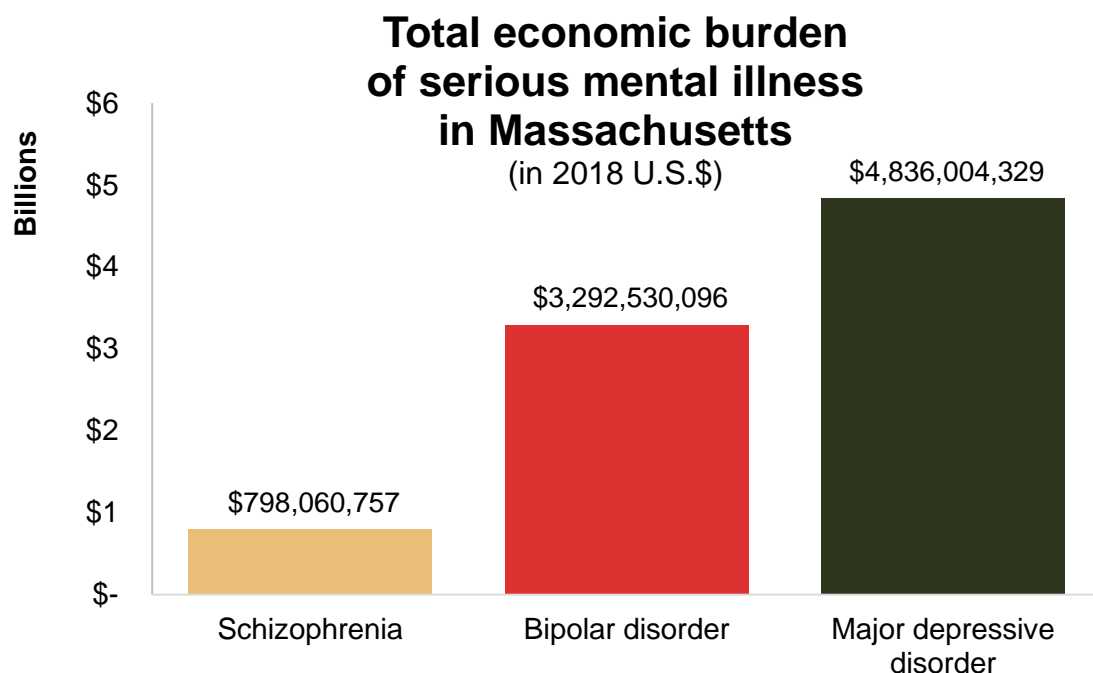
*Overall annual costs based on 2017 average of all state prison inmates in Massachusetts
Source: Annual Survey of State Government Finances 2017
Survey of Inmates in State/Federal Correctional facilities, BJS, 2004
Massachusetts Department of Correction - Prison Population Trends 2017*

TOTAL ECONOMIC BURDEN OF SERIOUS MENTAL ILLNESS

The economic burden of each serious mental illness in adults is estimated to be at least \$36 billion for the U.S. and \$800 million for Massachusetts per year.

Economic burden of serious mental illness

MASSACHUSETTS 2018



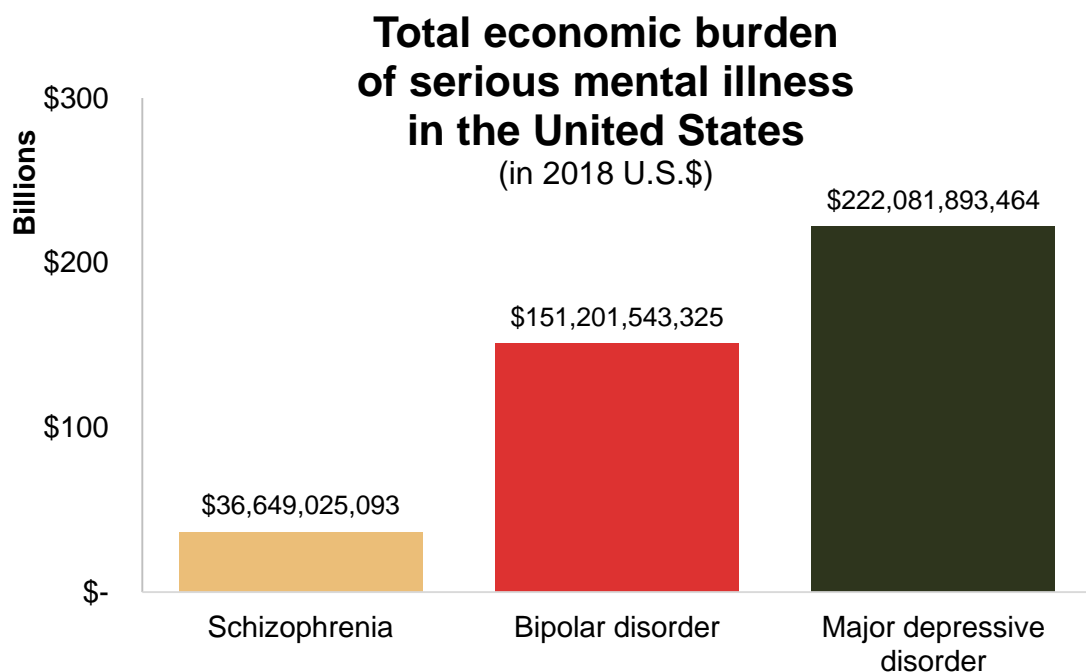
*The economic burden of schizophrenia, bipolar disorder, and major depressive disorder in adults in Massachusetts is estimated to be at least **\$800 million for each serious mental illness.***

Due to symptom overlap, diagnoses of mental illnesses are not mutually exclusive, therefore, patients with two or more diagnoses may be represented in multiple categories.

Source: MacEwan JP, Seabury S, et al. Pharmaceutical innovation in the treatment of schizophrenia and mental disorders compared with other diseases. *Innov Clin Neurosci.* 2016 Aug 1;13(7-8):17-25. See appendix for original sources

Economic burden of serious mental illness

UNITED STATES 2018



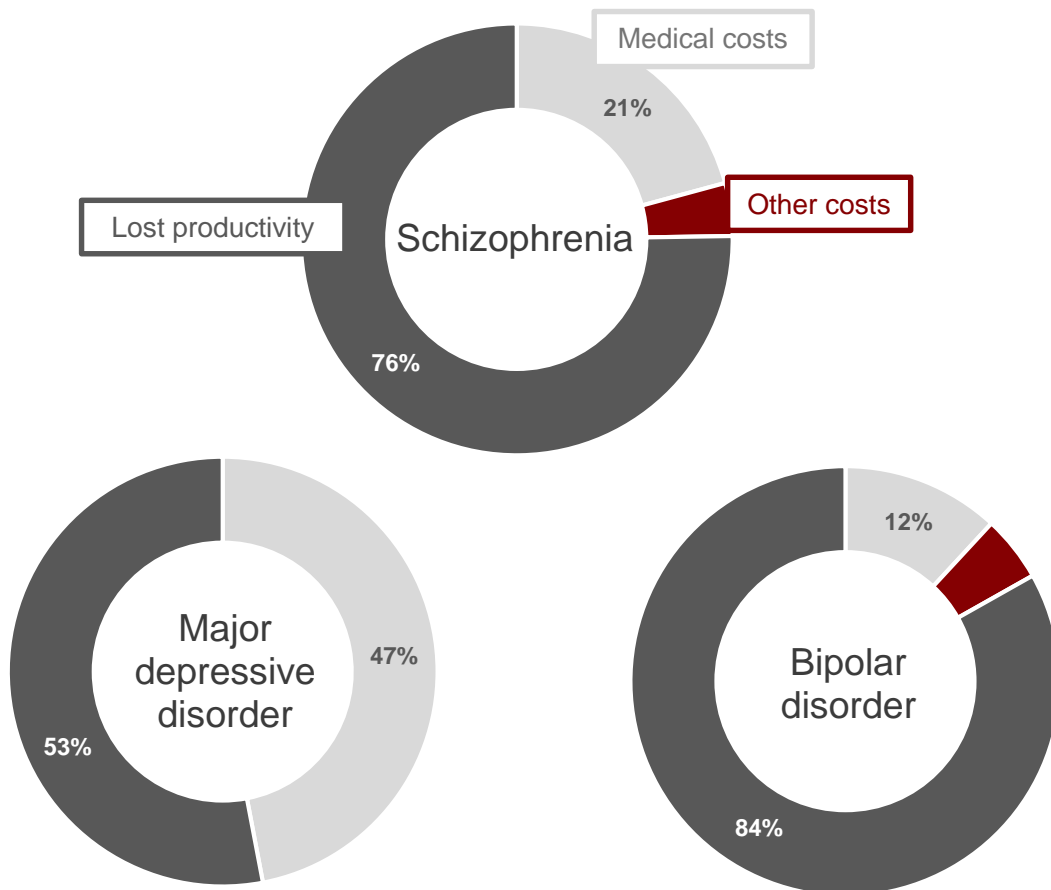
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Source: MacEwan JP, Seabury S, et al. Pharmaceutical innovation in the treatment of schizophrenia and mental disorders compared with other diseases. *Innov Clin Neurosci.* 2016 Aug 1;13(7-8):17-25. See appendix for original sources

Lost productivity is the largest contributor to economic burden of serious mental illness

UNITED STATES



*Most of the total economic burden of serious mental illness is due to **lost productivity** (unemployment, lost compensation (incl. caregivers), or early mortality). Only 12 to 47% of the total burden is resulting from direct **medical costs** (including substance abuse treatment), and an even smaller percentage from law enforcement, incarceration, shelters, or research & training (**other costs**).*

This highlights the large potential economic and societal benefits from improving treatment for serious mental illness even if it means spending more on care.

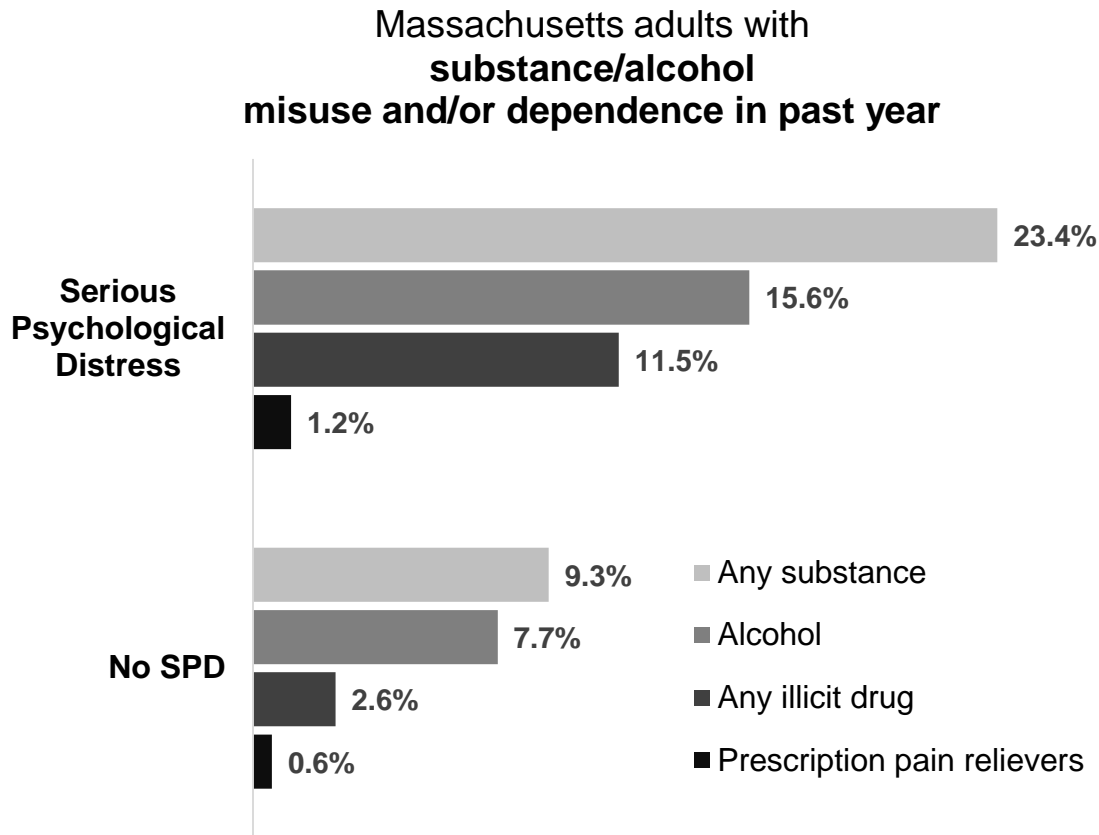
OPIOID MISUSE AND FATAL OVERDOSES

People who experience serious psychological distress are more likely to misuse or be dependent on alcohol, prescription opioids, and illicit drugs. During the past decades, the rates of opioid-related hospitalizations and emergency department visits have increased steadily in the U.S. and Massachusetts, despite a recent reduction in prescription opioid sales.

The increase in misuse and dependency, as well as the presence of substances like fentanyl, has resulted in a large increase in fatal overdoses by opioids in the last several years.

Substance misuse in people with Serious Psychological Distress

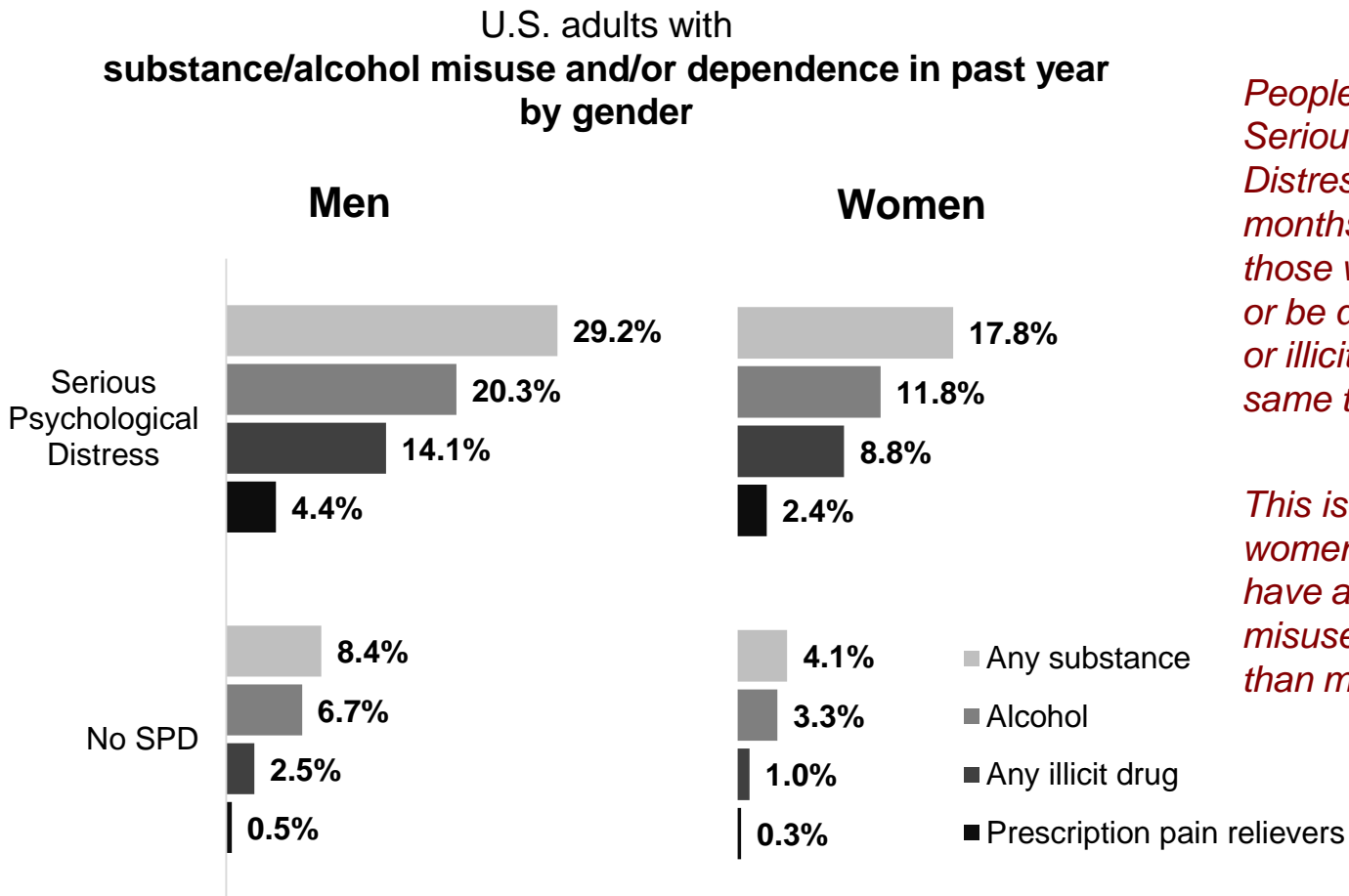
MASSACHUSETTS 2016



People who experienced Serious Psychological Distress (SPD) in the past 12 months are more likely than those without SPD to misuse or be dependent on alcohol or illicit drugs during that same time period.

Substance misuse in men and women with Serious Psychological Distress

UNITED STATES 2016



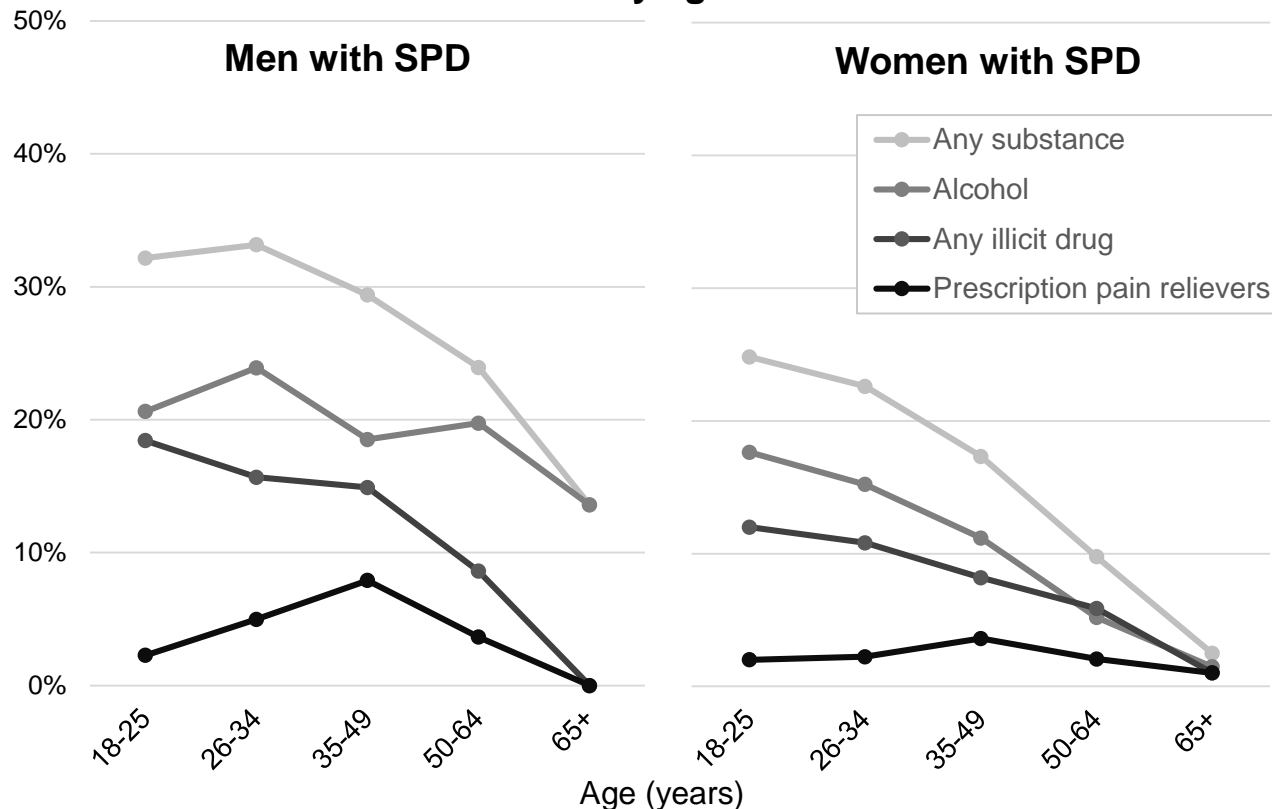
People who experienced Serious Psychological Distress (SPD) in the past 12 months are more likely than those without SPD to misuse or be dependent on alcohol or illicit drugs during that same time period.

This is true for men and women, however, women have an overall lower rate of misuse and/or dependence than men.

Age trends in substance misuse in men and women with Serious Psychological Distress

UNITED STATES 2016

U.S. adults with Serious Psychological Distress (SPD) & substance/alcohol misuse and/or dependence in past year by age

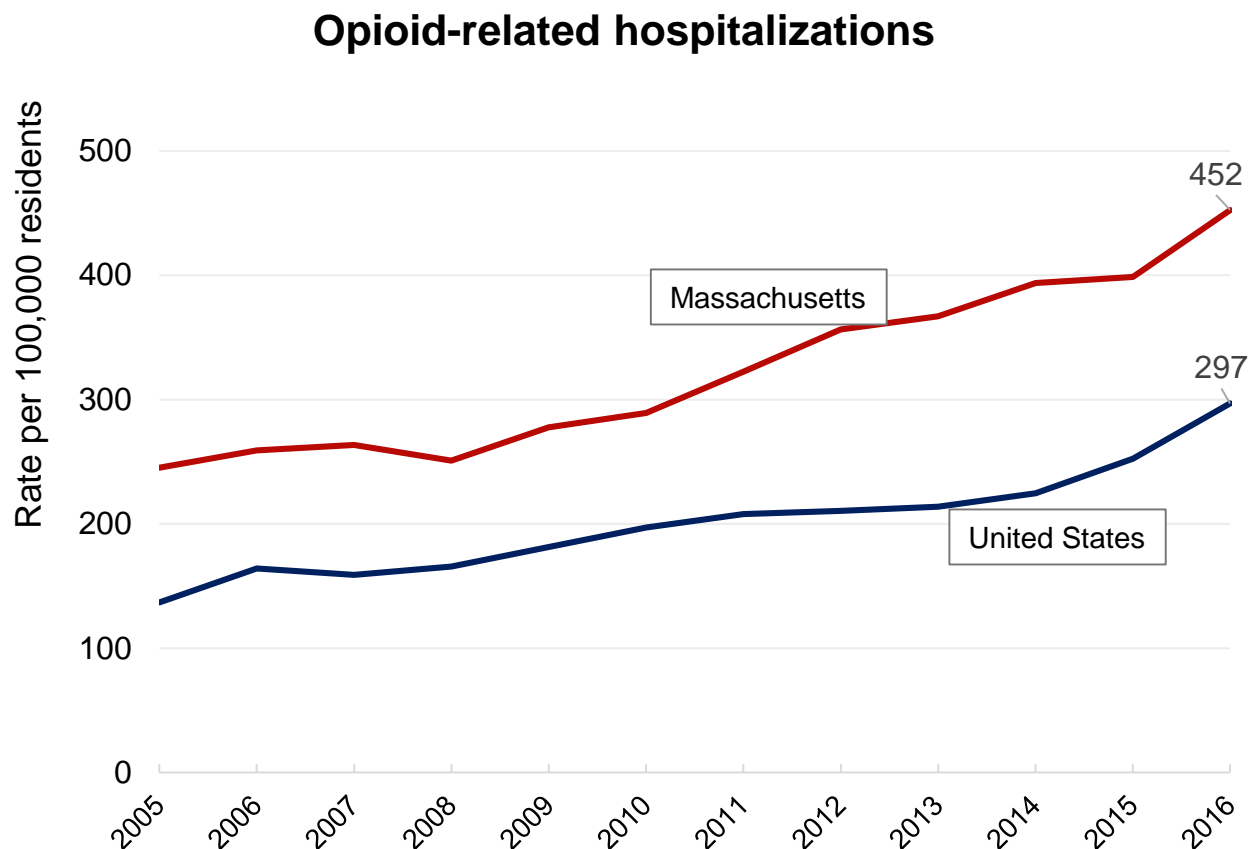


Women with Serious Psychological Distress (SPD) have an overall lower rate of substance/alcohol misuse and/or dependence than men.

Similar age trends exist for men and women with SPD, but some differences are observed. For example, alcohol abuse and/or dependence is much more prevalent in older men with SPD than in older women with SPD.

Opioid-related hospitalizations are on the rise

MASSACHUSETTS AND UNITED STATES 2005-2016



The rate of opioid-related hospitalizations has been rising steadily over the last decade. In Massachusetts, the hospitalization rate in 2016 was 52% higher than the U.S. average.*

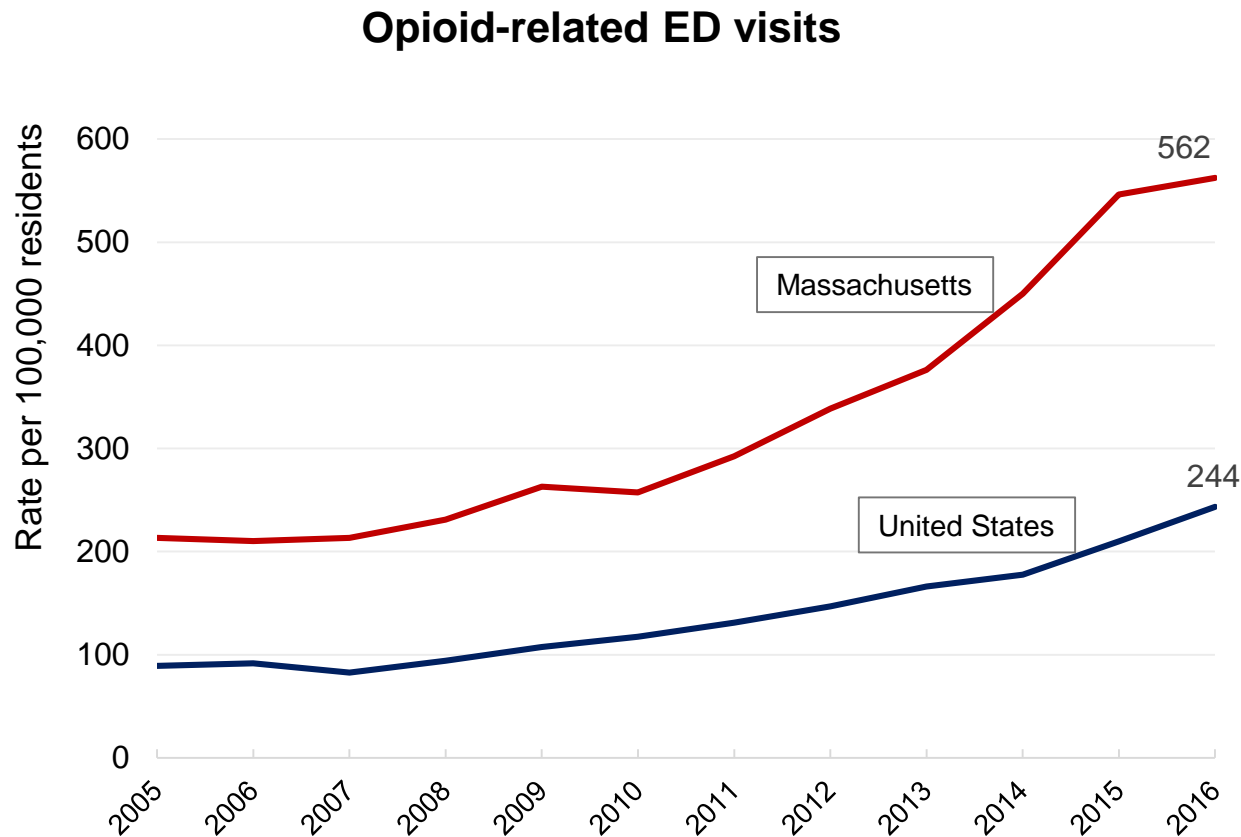
Source: Healthcare Cost and Utilization Project (HCUP Fast Stats - Opioid-Related Hospital Use)

* Opioid refers to both opioids and opiates in this chartbook

Transition between ICD-9 and ICD-10 diagnostic coding systems in Q4 2015 may have caused discontinuity in results

Opioid-related emergency department visits are on the rise

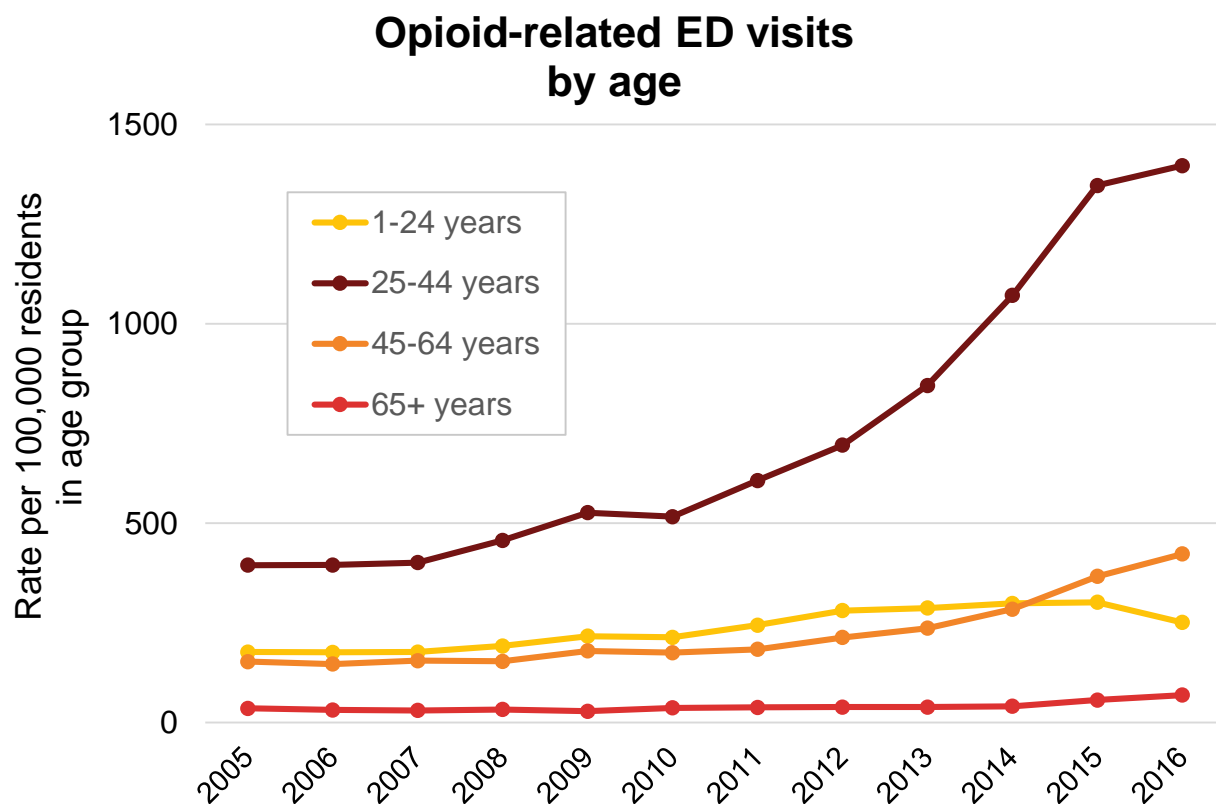
MASSACHUSETTS AND UNITED STATES 2005-2016



The rate of opioid-related emergency department (ED) visits more than doubled between 2005 and 2016 in Massachusetts, and is 2.3 times greater than the average rate in the U.S.

Opioid-related emergency department visits by age

MASSACHUSETTS 2005-2016

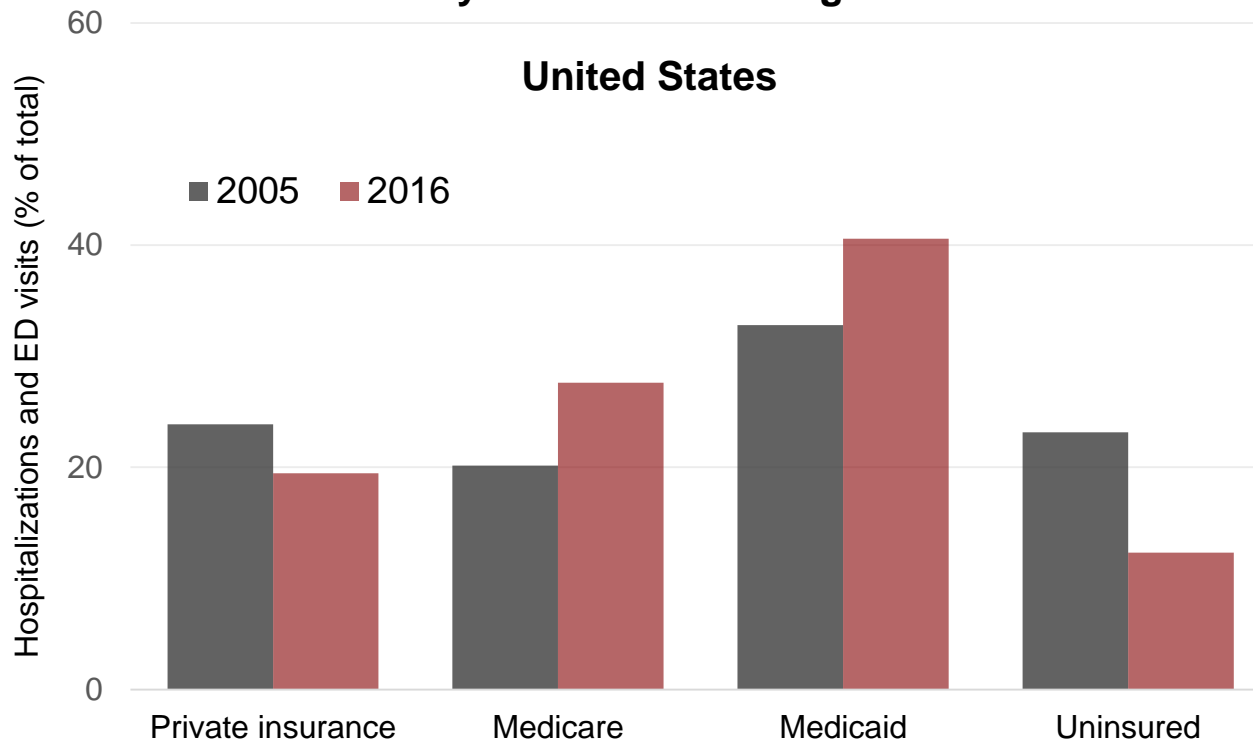


The rate of opioid-related emergency department (ED) visits in Massachusetts between 2005 and 2016 tripled for people between the ages of 25 and 64 years.

Insurance coverage for opioid-related hospitalizations and ED visits

UNITED STATES 2005-2016

**Opioid-related hospitalizations and ED visits
- by insurance coverage -**



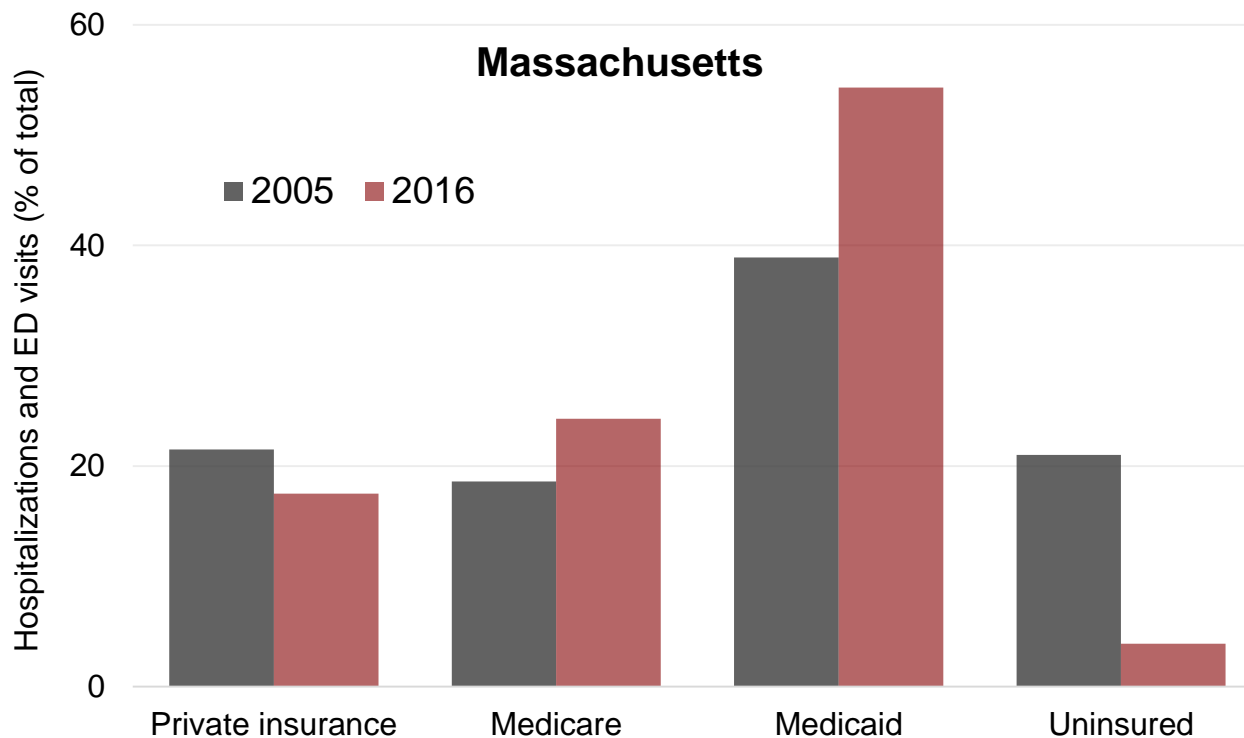
Forty percent of all opioid-related hospitalizations and ED visits in the U.S. in 2016 were by patients with Medicaid coverage, and 12% by patients without health insurance.

Compared to 2005, the fraction of opioid-related events by uninsured patients has decreased, whereas visits by patients with Medicaid coverage have increased.

Change in insurance coverage for opioid-related hospitalizations and ED visits

MASSACHUSETTS 2005-2016

Opioid-related hospitalizations and ED visits - by insurance coverage -



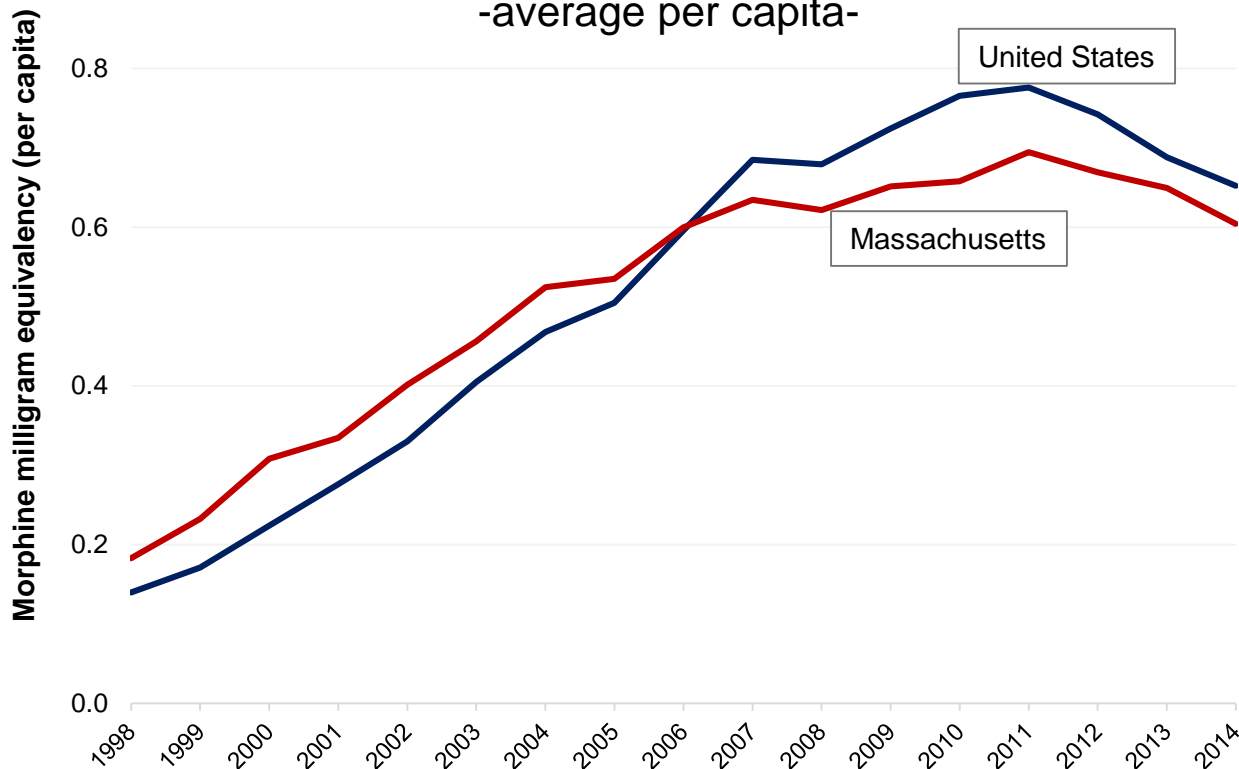
In 2005, 21% of opioid-related hospitalizations and ED visits in Massachusetts were by patients without health insurance.

Since then, the health insurance situation has changed significantly, and this is exemplified by a change in payer type; In 2016, only 4% of opioid-related hospitalizations and ED visits were by patients without health insurance.

Prescribing of opioids started to decrease in 2011

MASSACHUSETTS AND UNITED STATES 1998-2014

Prescription opioid sales
-average per capita-



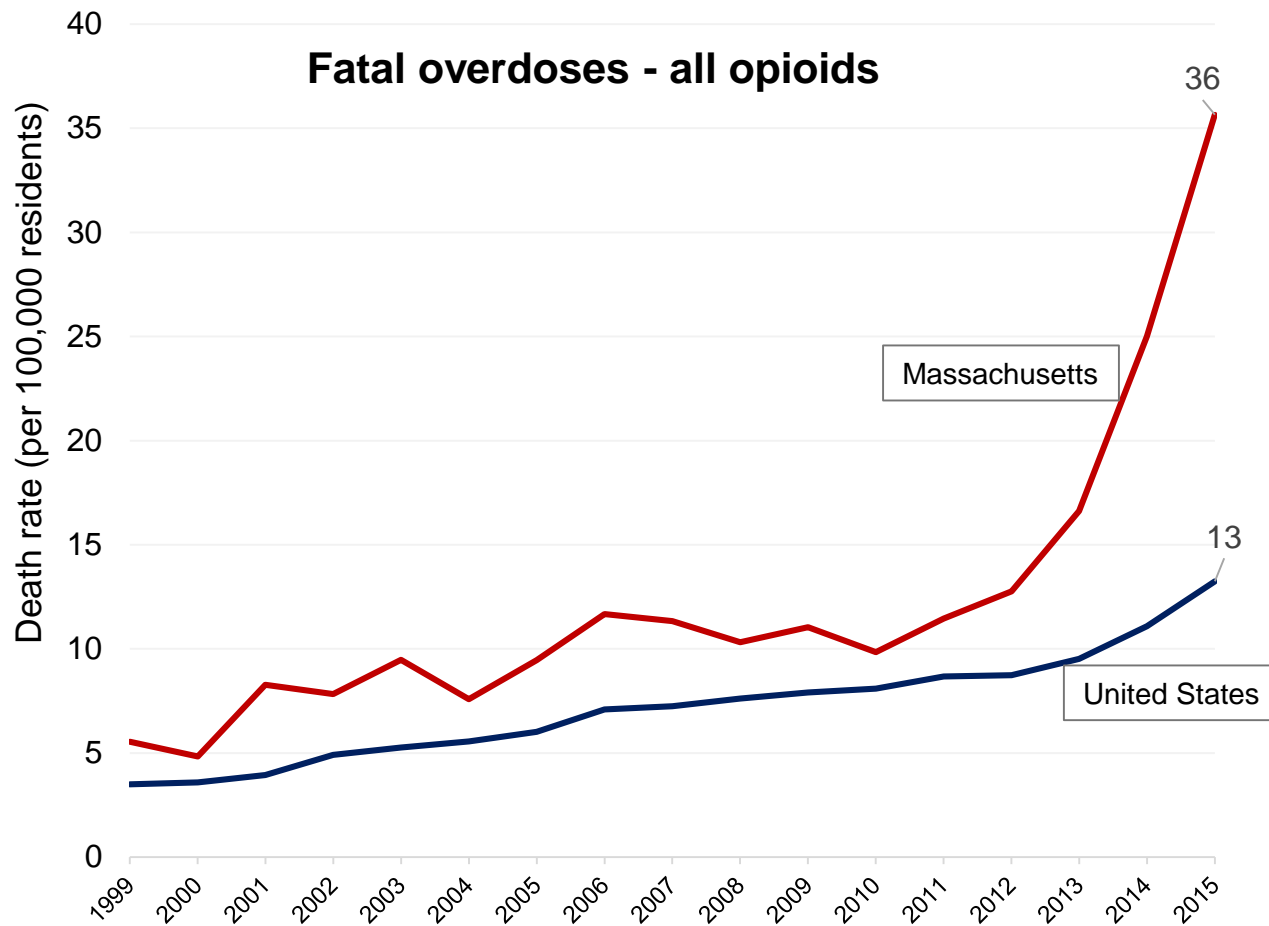
Between 1998 and 2011, average prescription opioid sales in the U.S. increased more than five-fold, followed by a decline in the last several years.

Prescription opioid sales in Massachusetts have followed the same trend, and have been slightly below the national average since 2007.

Source: Automation of Reports and Consolidated Orders System (ARCOS), Drug Enforcement Administration. United States data includes all states except DE, MO and PA

Fatal overdoses by opioids are on the rise

MASSACHUSETTS AND UNITED STATES 1999-2015

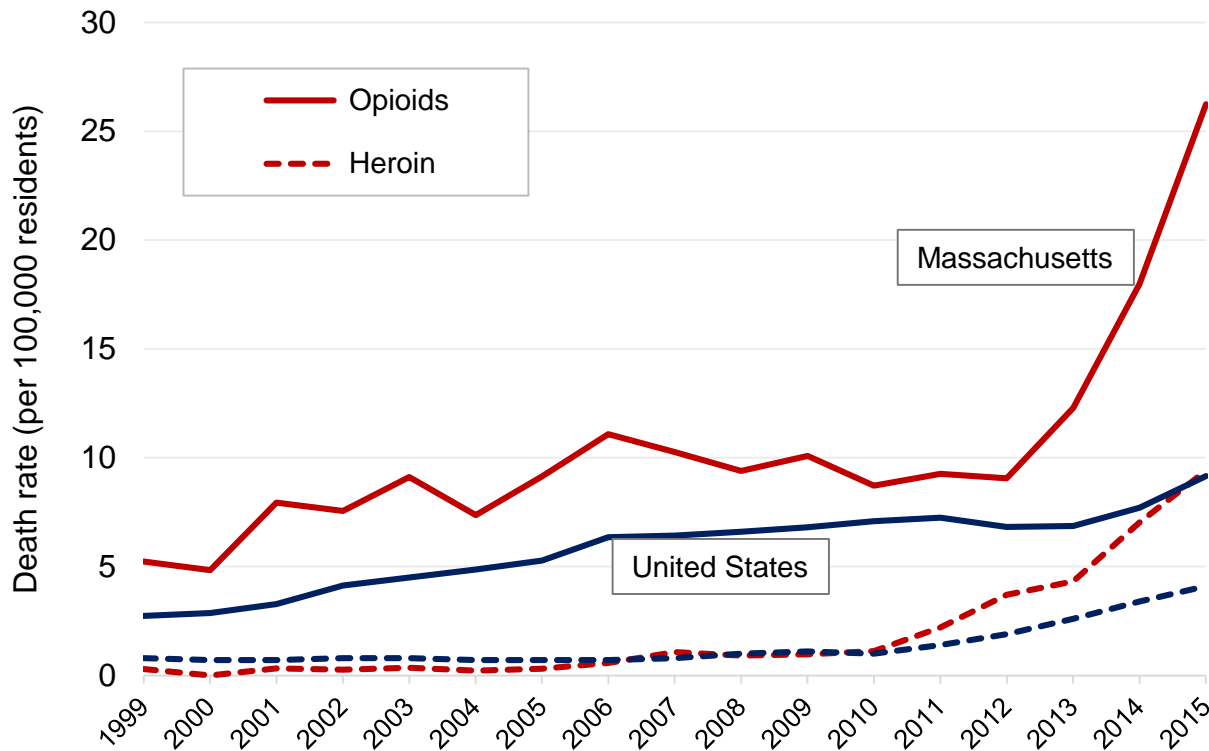


Despite the moderate decline in opioid drug prescriptions in recent years, there has been an increase in the number of opioid overdose deaths in the United States. In Massachusetts, this recent increase in overdose deaths is even more pronounced than for the U.S. as a whole.

Disproportionate increase in heroin overdose deaths

MASSACHUSETTS AND UNITED STATES 1999-2015

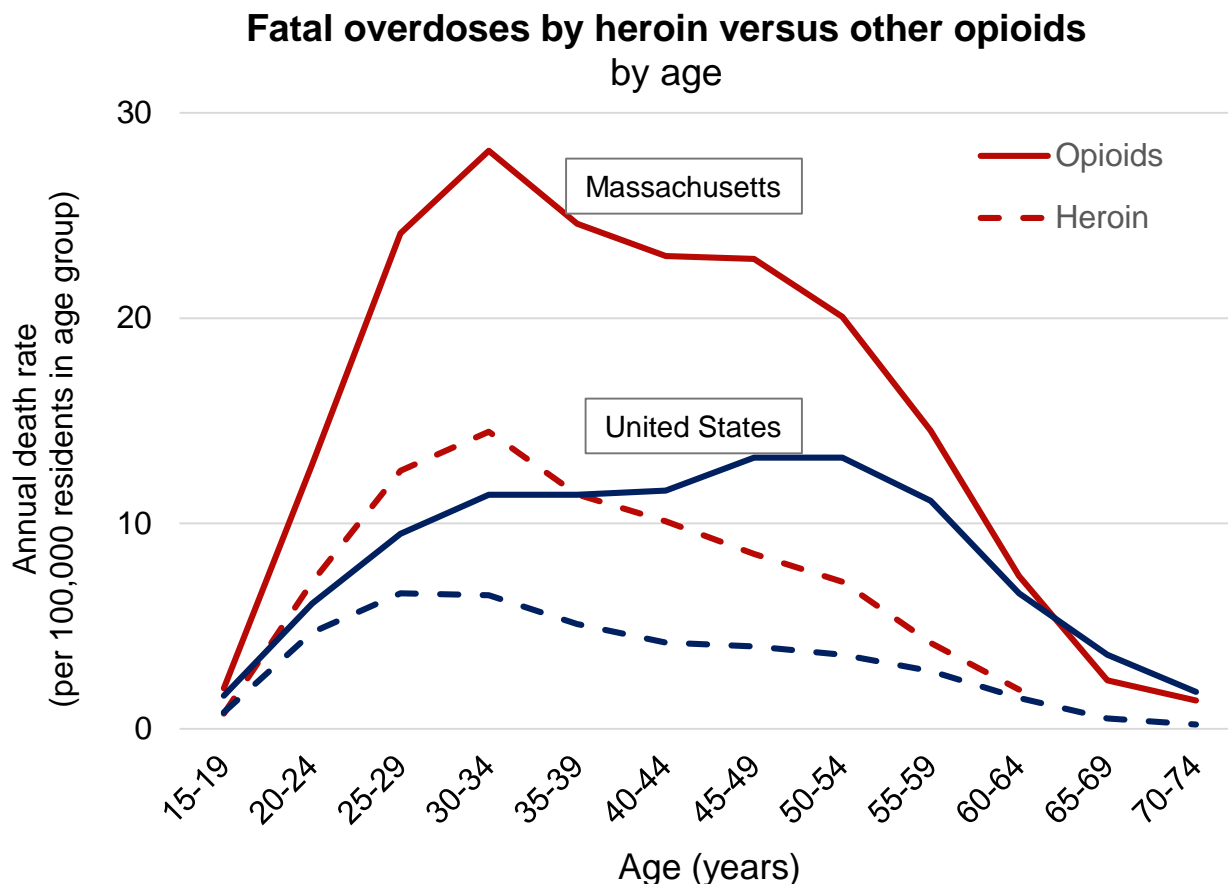
Fatal overdoses - heroin versus other opioids



Whereas the absolute number of fatal overdoses by heroin is still lower than overdoses by other opioids in Massachusetts, the relative increase in the heroin overdose death rate between 2010 and 2015 is much higher (844%) than the increase in death rate due to opioids (301%).

Age distribution of fatal overdoses by opioids and heroin

MASSACHUSETTS AND UNITED STATES 2011-2015



In Massachusetts, the highest fatal overdose rates for both heroin and other opioids between 2011 and 2015 were observed for people aged 30-34 years.

These rates are much higher in Massachusetts (red lines) than the average rates in the U.S. (blue lines).

In addition, the rate of opioid overdose fatalities in the U.S. is still highest in older age categories (45 to 54 years).

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References, data sources and methods are described in more detail in the online appendix.

This chartbook and the appendix can be downloaded at:

http://healthpolicy.usc.edu/Keck_Schaeffer_Initiative.aspx

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