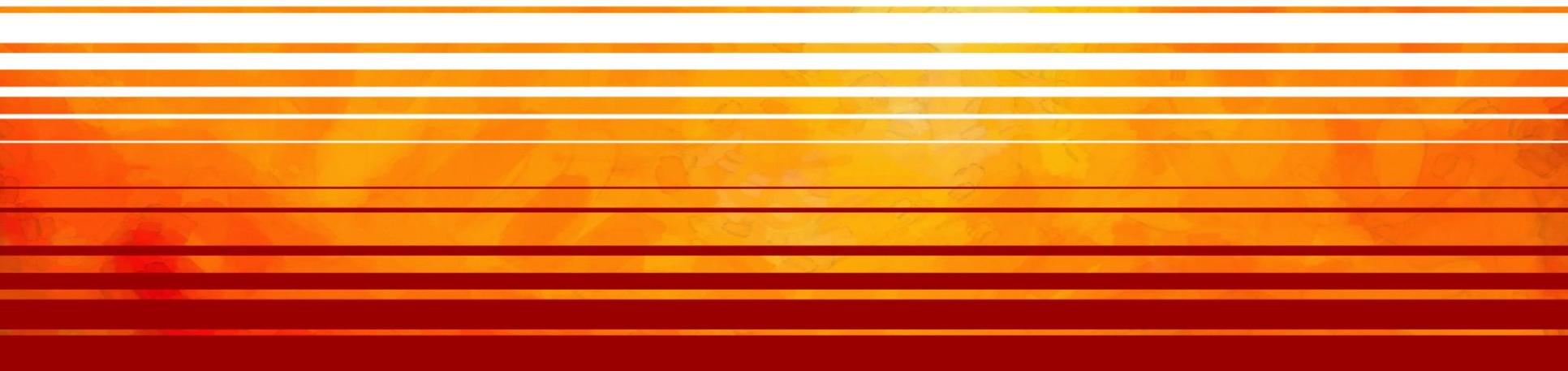


**USC** Schaeffer

Leonard D. Schaeffer Center  
for Health Policy & Economics

# **THE COST OF MENTAL ILLNESS: ALASKA FACTS AND FIGURES**

*Hanke Heun-Johnson, Michael Menchine, Dana Goldman, Seth Seabury*  
*August 2019*



# ALASKA



# INTRODUCTION

Improving access to high-quality medical and behavioral health care for patients with mental illness remains one of the most vexing problems facing the healthcare system in the United States. In Alaska, the community mental health care system has been called “fragile, fragmented and underfunded”, due in part to large shortages of psychiatric care beds and overcrowding in the emergency room.<sup>1</sup>

This chartbook attempts to quantify the magnitude of the challenges facing Alaska 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 and discuss the implications for the criminal justice system in Alaska.

<sup>1</sup><https://www.adn.com/alaska-news/2018/05/11/alaskas-only-psychiatric-emergency-room-is-overflowing-its-a-sign-of-a-system-breaking-down/>

# INTRODUCTION

## Key findings include:

- In the U.S., the hospitalization rate of patients with serious mental illness is very high compared to other hospitalizations, which imposes a large cost on the health care system because of the relatively long length of stay, despite the general absence of procedures.
- Alaska has a very low number of psychiatric hospital beds compared to the U.S. average.
- Whereas Alaska has a higher number of behavioral health care professionals compared to the (less-than-optimal) U.S. average, shortages are present throughout the state, particularly in rural areas.
- 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 Alaska exceeds \$70 million.

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](http://healthpolicy.usc.edu/Keck_Schaeffer_Initiative.aspx)

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**QUANTIFYING THE  
POPULATION LIVING WITH  
MENTAL ILLNESS IN ALASKA  
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

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### 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

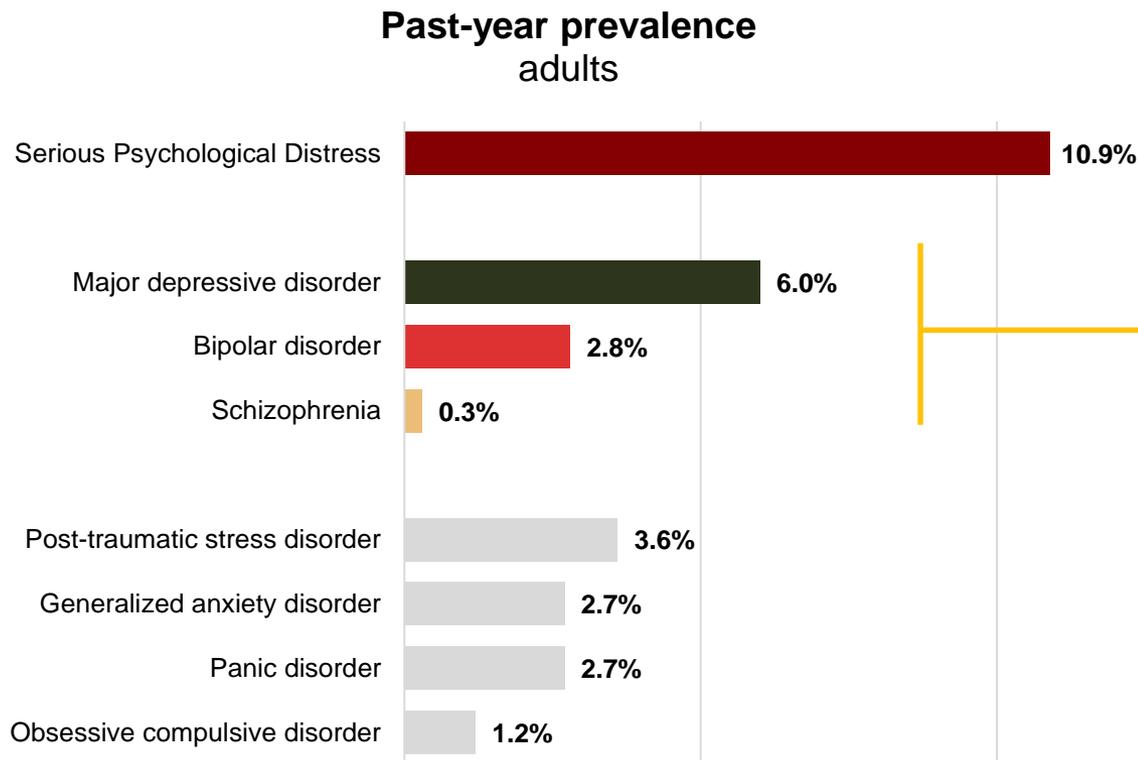
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## RISK FACTORS: GENETIC & EXTERNAL FACTORS

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 2017



*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.*

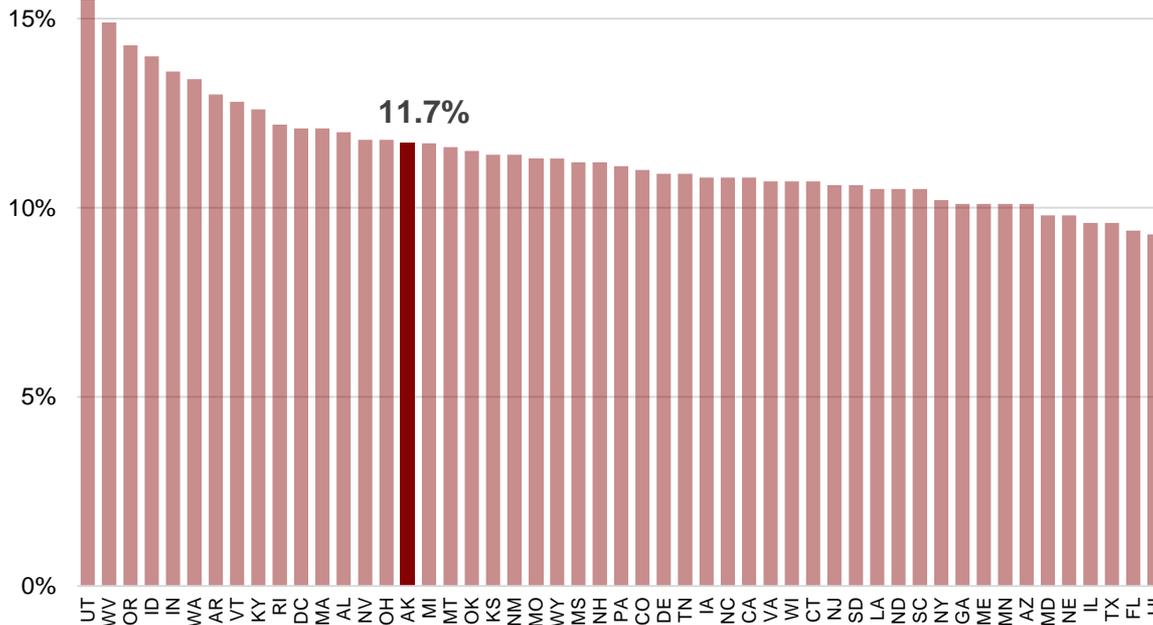
*NB: Because of symptom overlap, diagnoses of mental illnesses are not mutually exclusive.*

*Source: National Survey on Drug Use and Health (NSDUH, R-DAS) 2016-2017 (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

## ALASKA AND UNITED STATES 2017

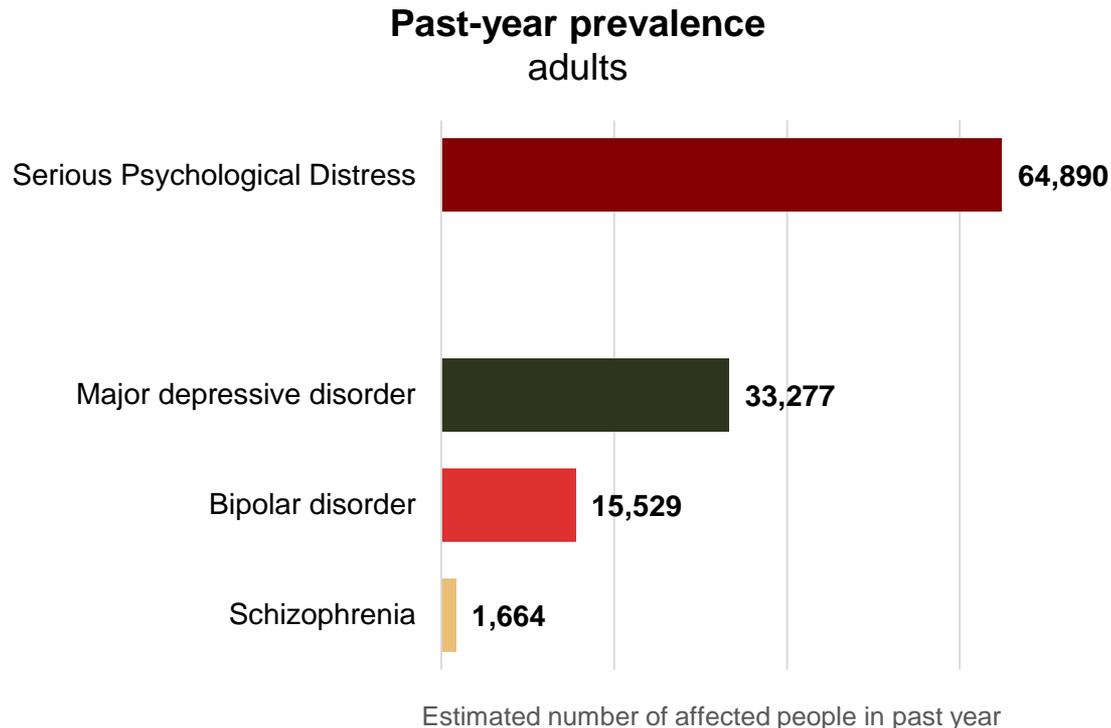
Past-year prevalence of serious psychological distress  
Adults



*The prevalence of serious psychological distress in the past year in Alaska is estimated at 11.7%, one of the higher rates in the U.S.*

# Estimated number of people living with mental illness

ALASKA 2017



*An estimated 65,000 adults in Alaska experienced serious psychological distress in the past 12 months.*

*Note that a patient can receive multiple diagnoses of a serious mental illness because of a high degree of overlap between the mental health conditions.*

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 554,598 (18 years and over), Census Bureau data (2016)

# MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

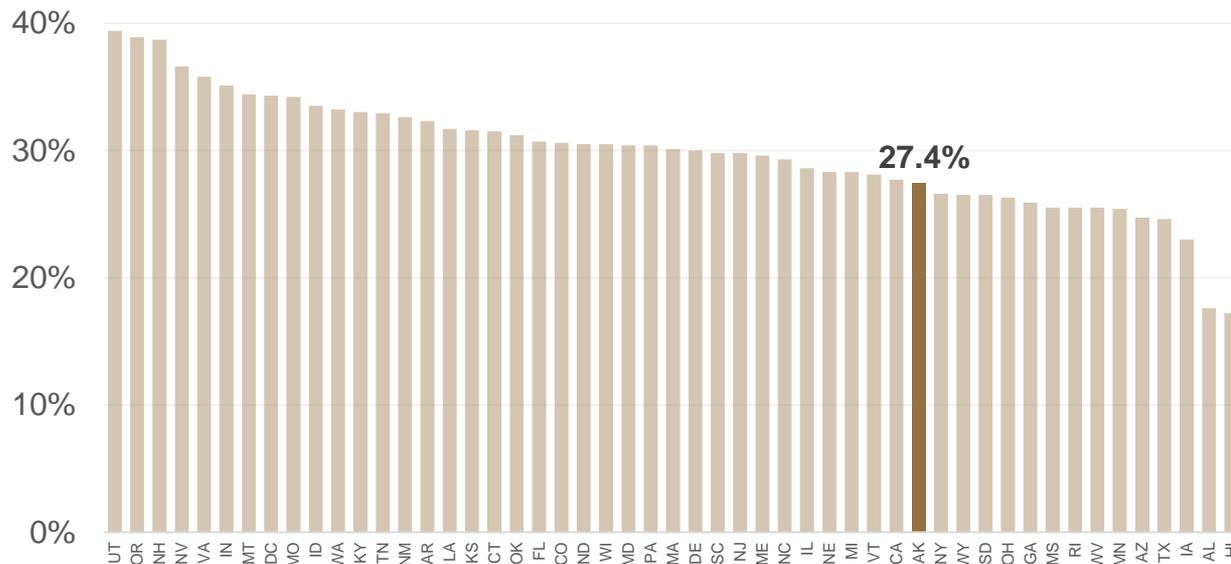
## Unmet mental health care needs

*More than 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

## ALASKA AND UNITED STATES 2017

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



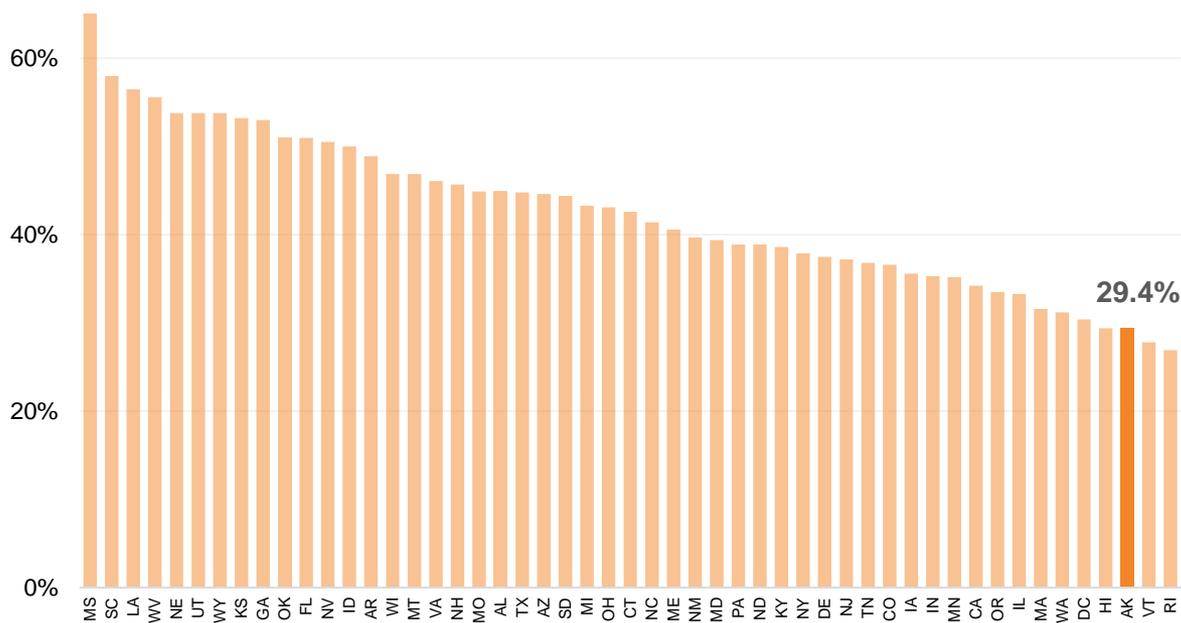
*In Alaska, more than a quarter of people with serious psychological distress have an unmet need of mental health treatment.*

*In Alaska's general adult population, 5% of people have a unmet need of mental health treatment.*

# Unmet need of mental health treatment due to costs

## ALASKA AND UNITED STATES 2017

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

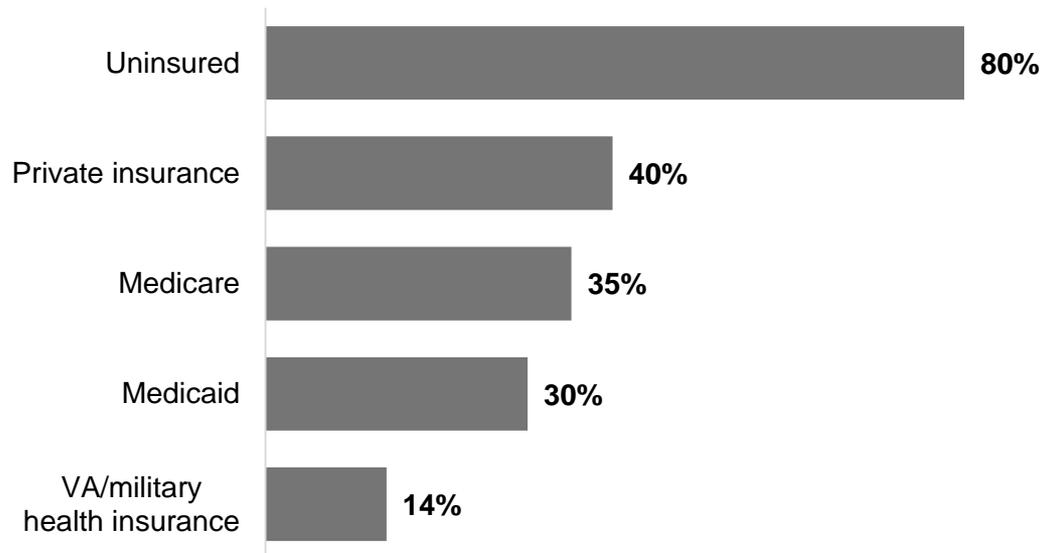


*In Alaska, almost a third of people with serious psychological distress and an unmet need of mental health treatment, did not receive this treatment because of high costs.*

# Unmet need of mental health treatment because of costs differs by insurance coverage

UNITED STATES 2017

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

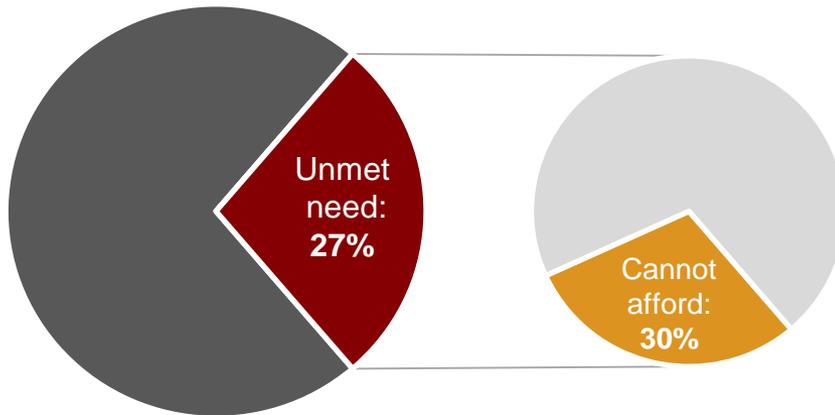


*On a national level, the extent to which cost was a factor in driving unmet need for mental health care among those with serious psychological distress, varied by insurance status. People without health insurance were most affected by the inability to afford mental health treatment (80%), while those with VA/military health insurance coverage were least affected (14%).*

# There is significant unmet need for mental health care in Alaska

ALASKA 2017

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



27% indicates an **unmet need of mental health treatment**

And 30% 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 Alaska, a quarter reported an unmet need for mental health care.*

*Almost a third of the people with a perceived unmet need reported that they did not receive treatment because they could not afford it.*

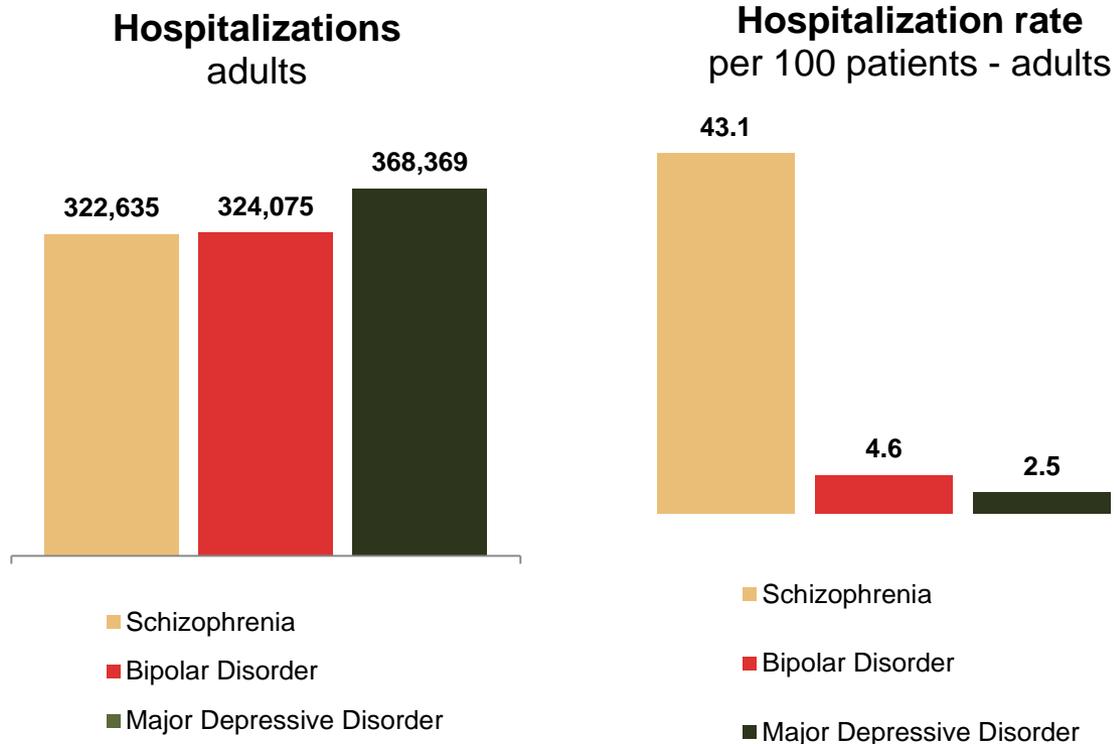
# MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

## Hospital utilization & costs

*For every 100 patients with a serious mental illness, there were approximately 51 hospitalizations in the U.S. in 2016. The average length of stay for these hospitalizations is long compared to other hospital stays, and 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

UNITED STATES 2016



*In the U.S. the total number of hospitalizations is highest for adult patients with a principal diagnosis of major depressive disorder, whereas patients with a schizophrenia diagnosis have a much higher rate of hospitalizations.*

*In the U.S. there are approximately 51 serious mental illness-related hospitalizations for every 100 adult patients.*

3.4% of all hospitalizations are due to SMI

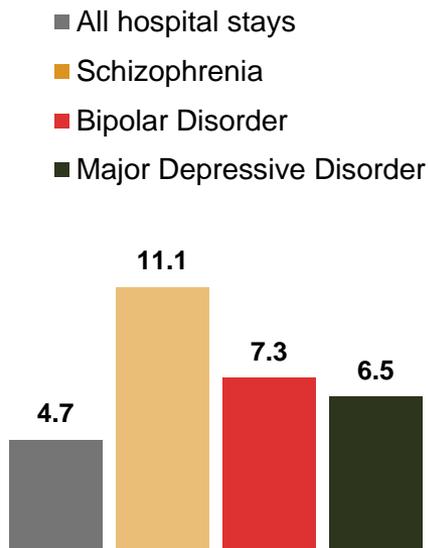
Source: Healthcare Cost and Utilization Project (HCUPnet) 2016

Estimate of hospitalization rate: based on total population (Census bureau data, 2016) and prevalence estimates reported previously

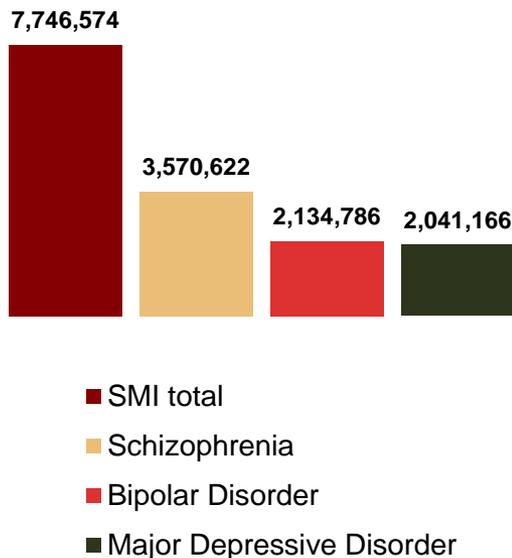
# Length of stay for mental illness hospitalizations

## UNITED STATES 2016

**Average length of hospital stays (days) adults**



**Total number of hospital days in 2016 adults**

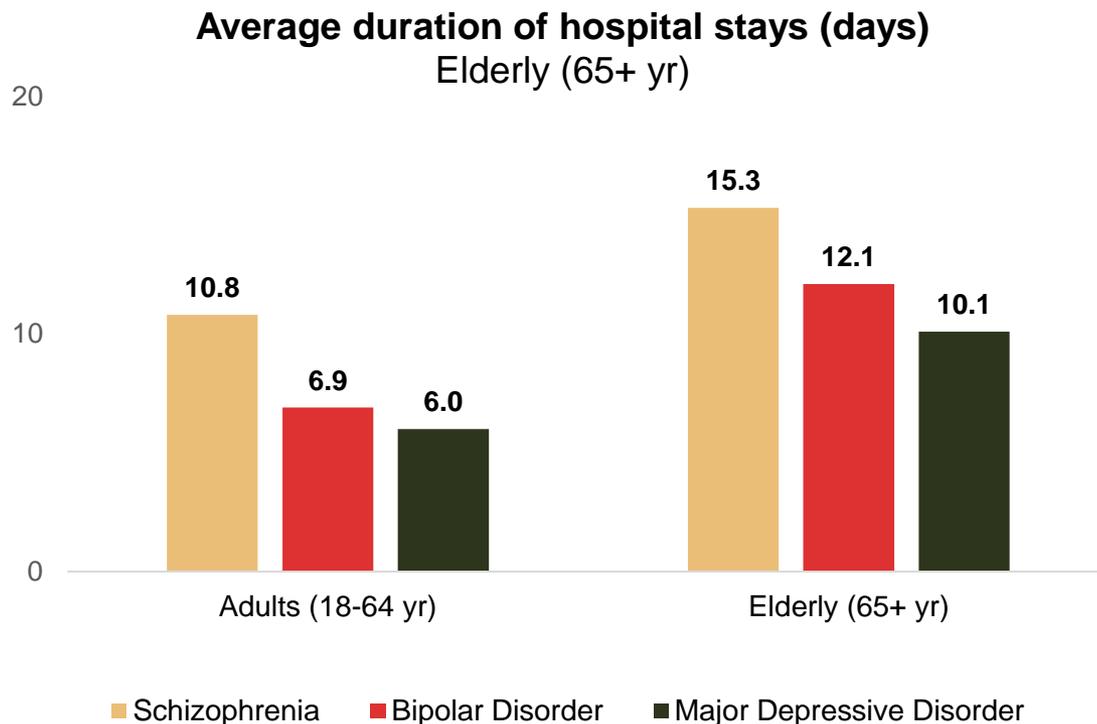


*In the U.S., the average hospital stay duration for adult patients with serious mental illness is high compared to all hospital stays, especially for patients diagnosed with schizophrenia.*

*The total time spent in the hospital by adults with a primary diagnosis of schizophrenia, bipolar disorder or major depressive disorder almost reaches eight million days each year in the U.S.*

# Hospitalizations of elderly patients with serious mental illness

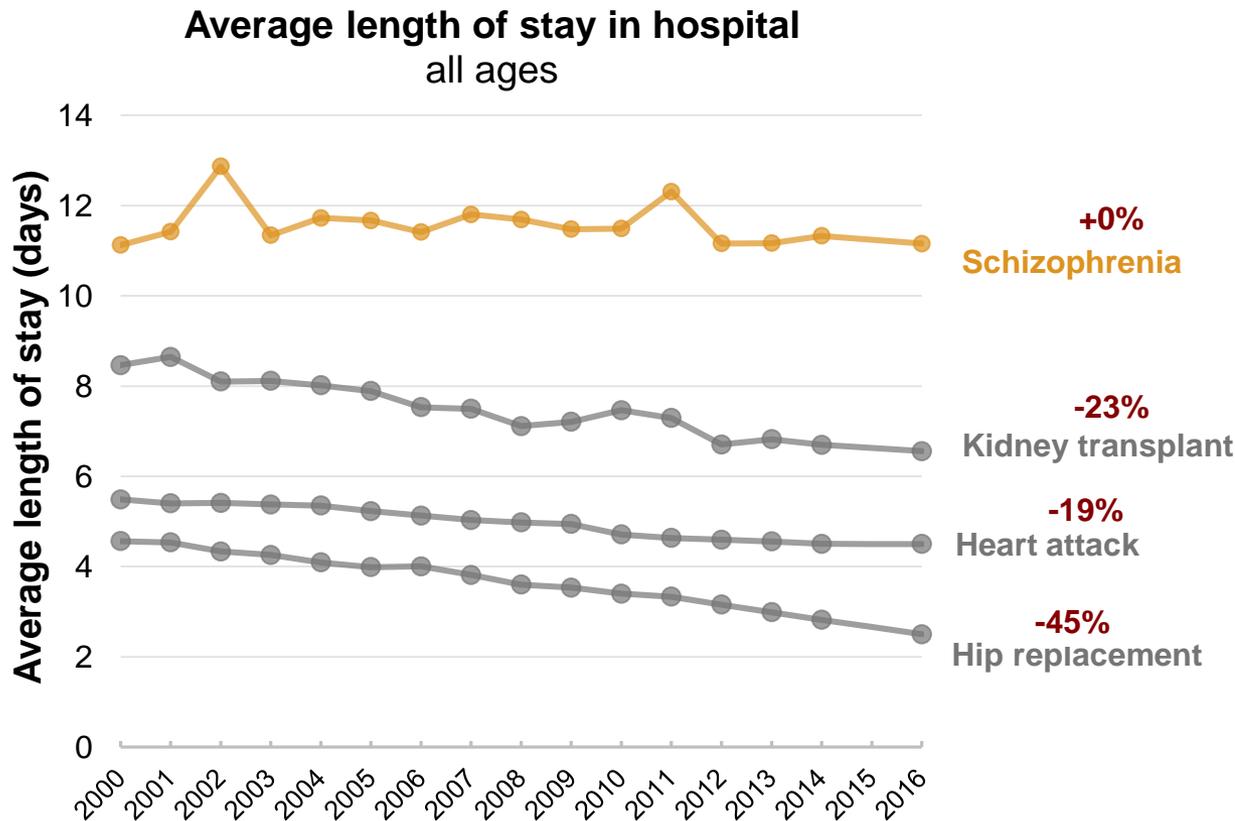
UNITED STATES 2016



*The length of stay in the hospital for serious mental illness in elderly patients is at least 40% higher on average than for younger adults with a similar diagnosis. Treatment of medical comorbidities as a result of 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

UNITED STATES 2000-2016



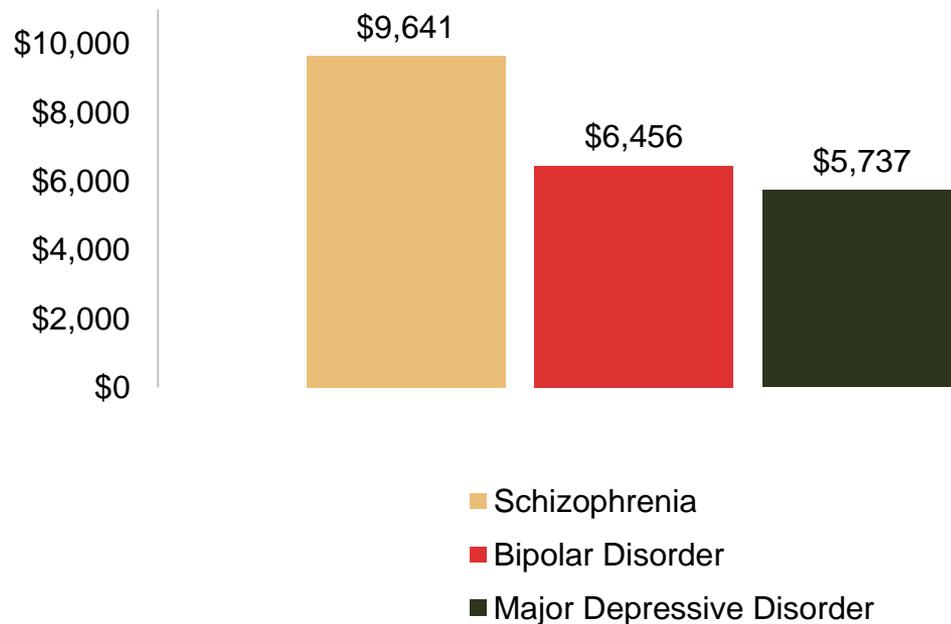
*The average length of stay for a schizophrenia hospitalization was longer than those for kidney transplants, heart attacks or hip replacement surgeries. Moreover, the average duration for these other conditions all declined by at least 19% from 2000 to 2016 while for schizophrenia there was no net change in duration.*

Source: Healthcare Cost and Utilization Project (HCUPnet) 2016.  
Data for 2015 are missing because of the switch from ICD-9 to ICD-10

# Average hospital costs for mental illness hospitalizations

UNITED STATES 2016

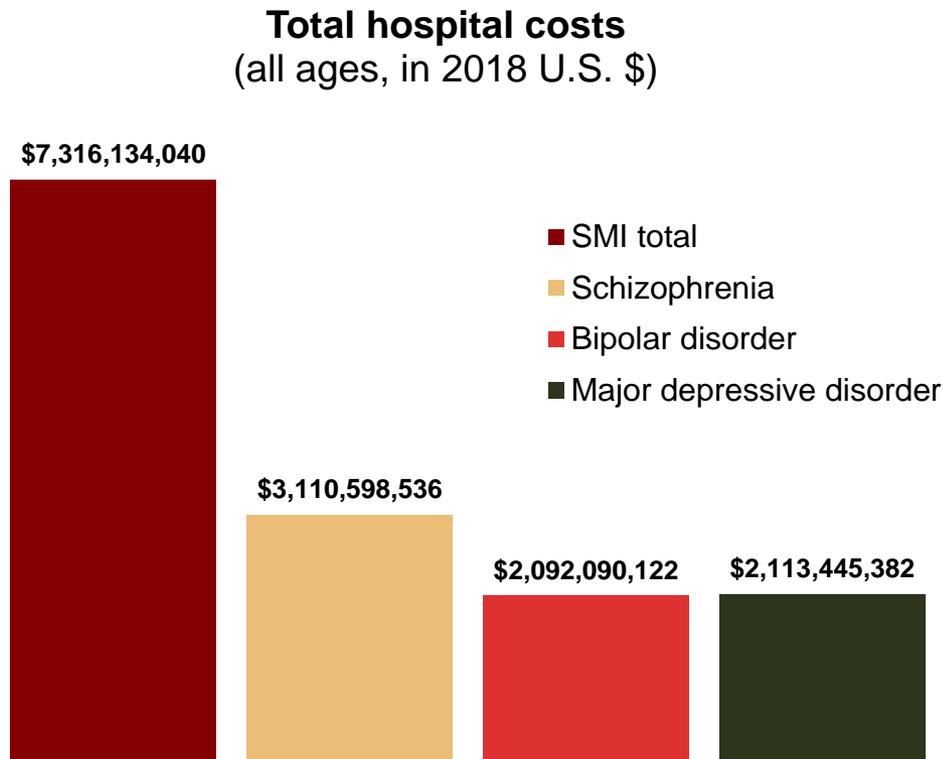
**Average hospital costs per stay**  
(all ages, in 2018 U.S. \$)



*The average costs for a hospitalization in the U.S. ranged from \$5,700 to \$9,600 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

UNITED STATES 2016

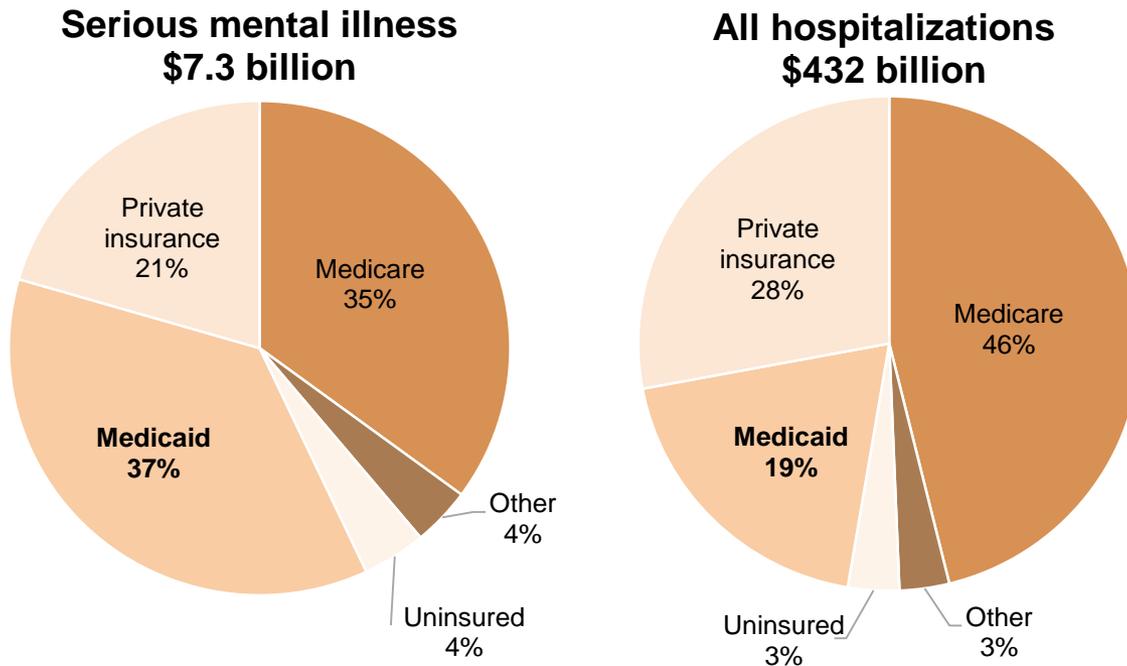


*The total costs for serious mental illness hospitalizations exceeded \$7 billion in the U.S. in 2016.*

# Total hospital costs for serious mental illness hospitalizations by insurance type

UNITED STATES 2016

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



*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 Medicare or a private insurer. Only a small fraction of the \$432 billion in total hospitalization costs is covered by other programs (including VA/military health insurance), or paid by patients without health insurance.*

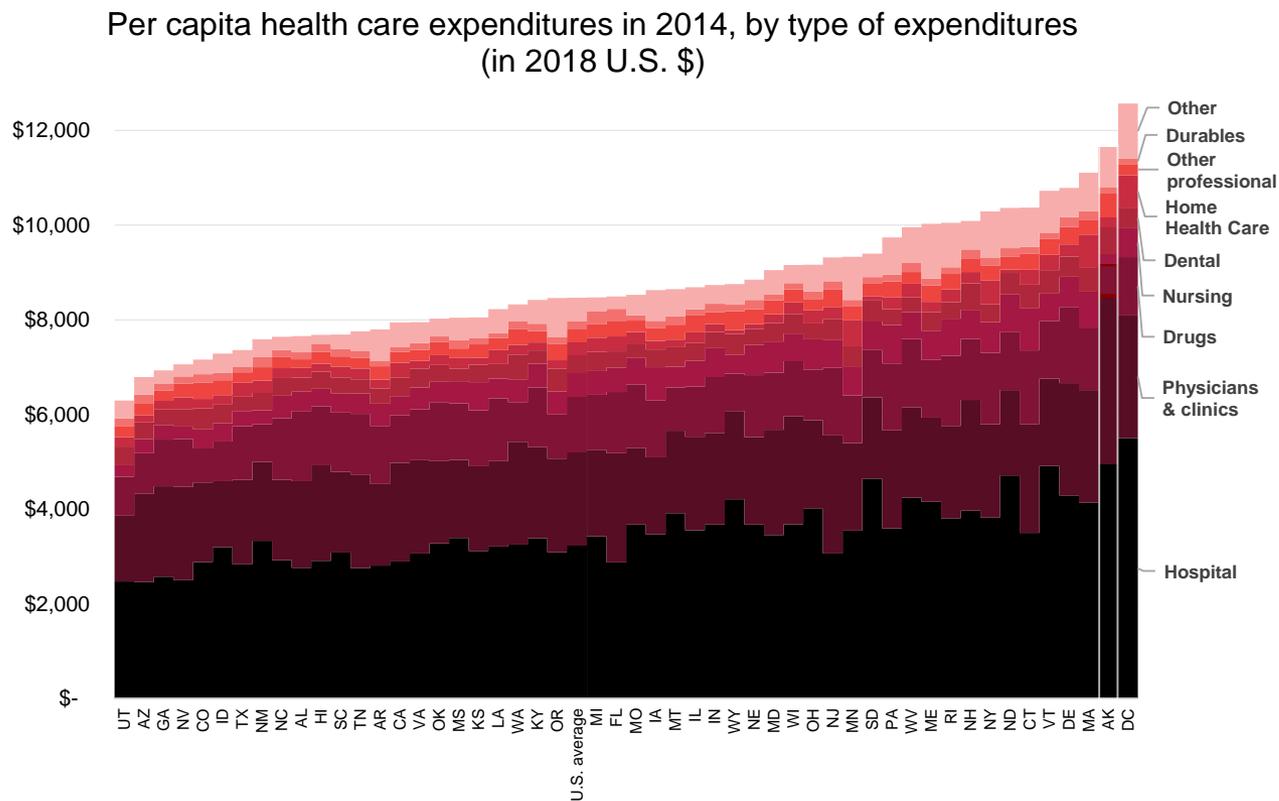
Source: Healthcare Cost and Utilization Project (HCUPnet) 2016.

'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 0.3%) are excluded.

# Per capita health care expenditures

## ALASKA AND UNITED STATES 2014



*Alaska's average per capita health expenditures are 38% higher than the U.S. average, which is mostly due to higher costs related to hospitalizations and visits to physicians and other health professionals.*

*Per capita expenditures for people enrolled in Medicaid are especially high, at \$12,627, which is 76% higher than the U.S. average of \$7,171.*

# MENTAL HEALTH CARE COVERAGE, UTILIZATION & COSTS

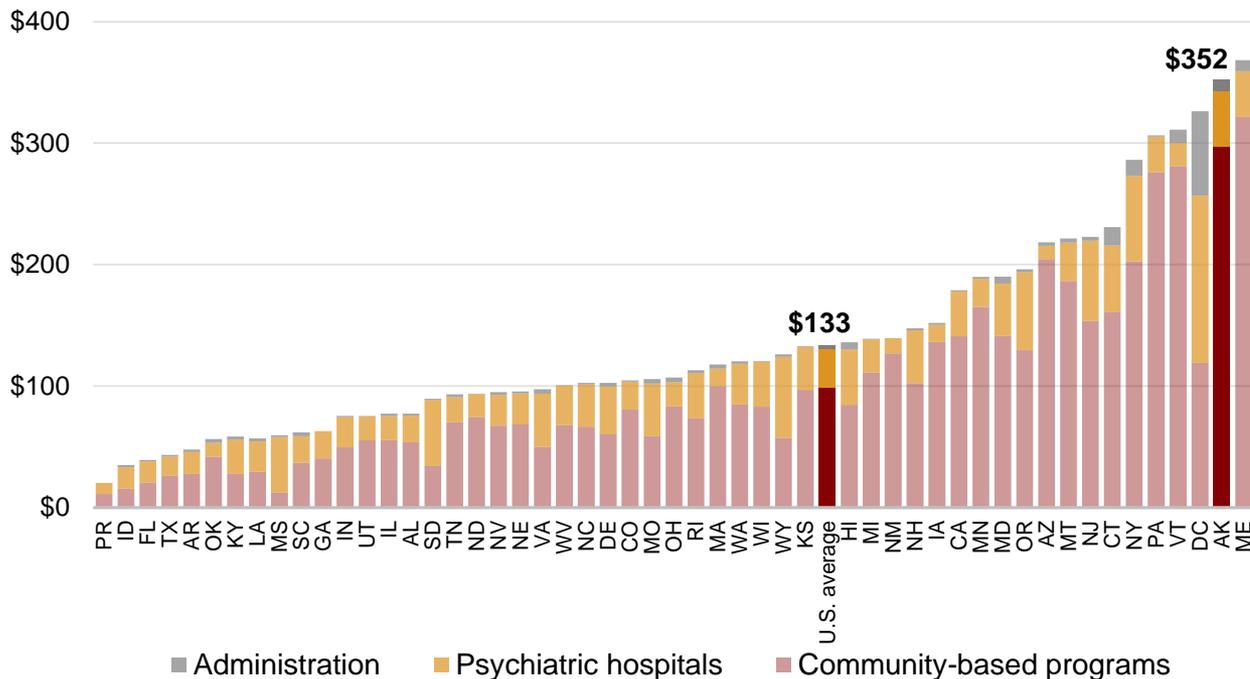
## Investment in community-based programs

*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 Alaska state mental health agency spends a higher amount per capita, and a larger percentage on community-based programs.*

# State Mental Health Agency spending

## ALASKA AND UNITED STATES 2013

**Per capita  
State mental health agency expenditures**  
(in 2018 U.S. \$)



*Alaska's state mental health agency spending on mental health services per capita is one of the highest in the U.S. In addition, a larger part of the per capita budget (84%) is spent on community-based programs.*

*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

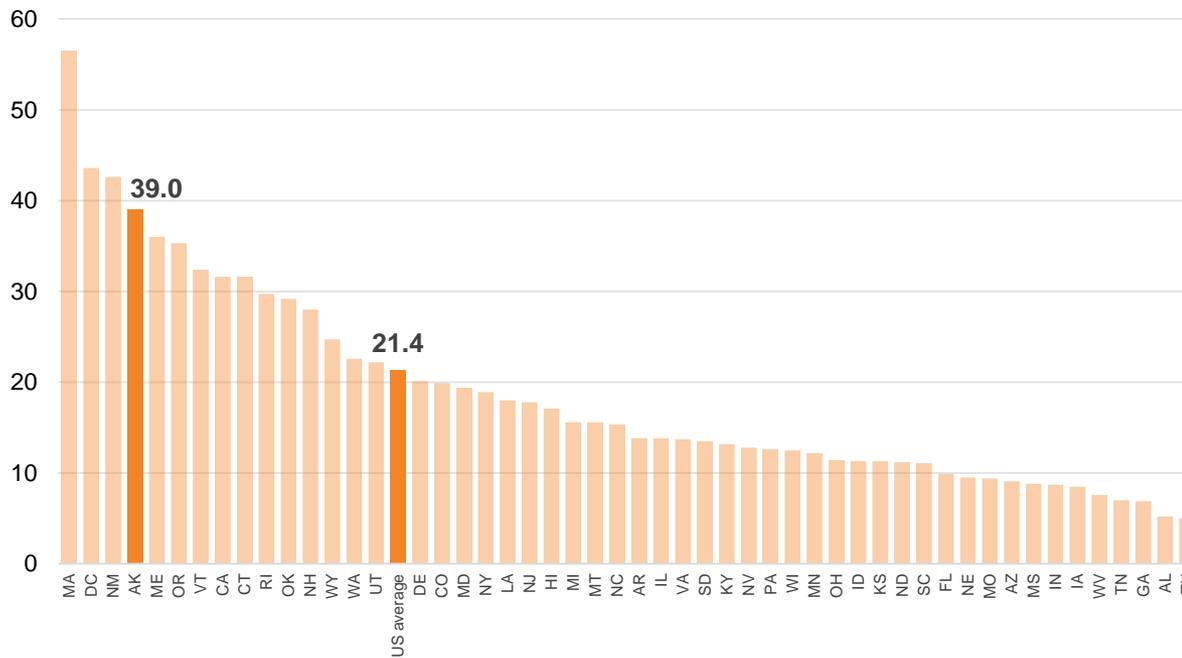
*Per capita, Alaska has more behavioral health care professionals, but fewer hospital beds dedicated to psychiatric care in comparison to the U.S. average. Overall, this is not sufficient to fully serve the population with behavioral health care needs. There are many areas and facilities in Alaska that have a shortage of behavioral health care professionals; 11 full-time professionals are needed in addition to the current workforce in designated “shortage areas” to reach an acceptable provider-to-patient ratio.*

*This shortage is also present in the criminal justice system, where many people are in need of behavioral health treatment.*

# Availability of behavioral health care professionals

## ALASKA AND UNITED STATES 2018

**Number of behavioral health care professionals per 10,000 residents**



*There are 39 behavioral health care professionals for every 10,000 residents in Alaska, which is high compared to the average in the U.S.*

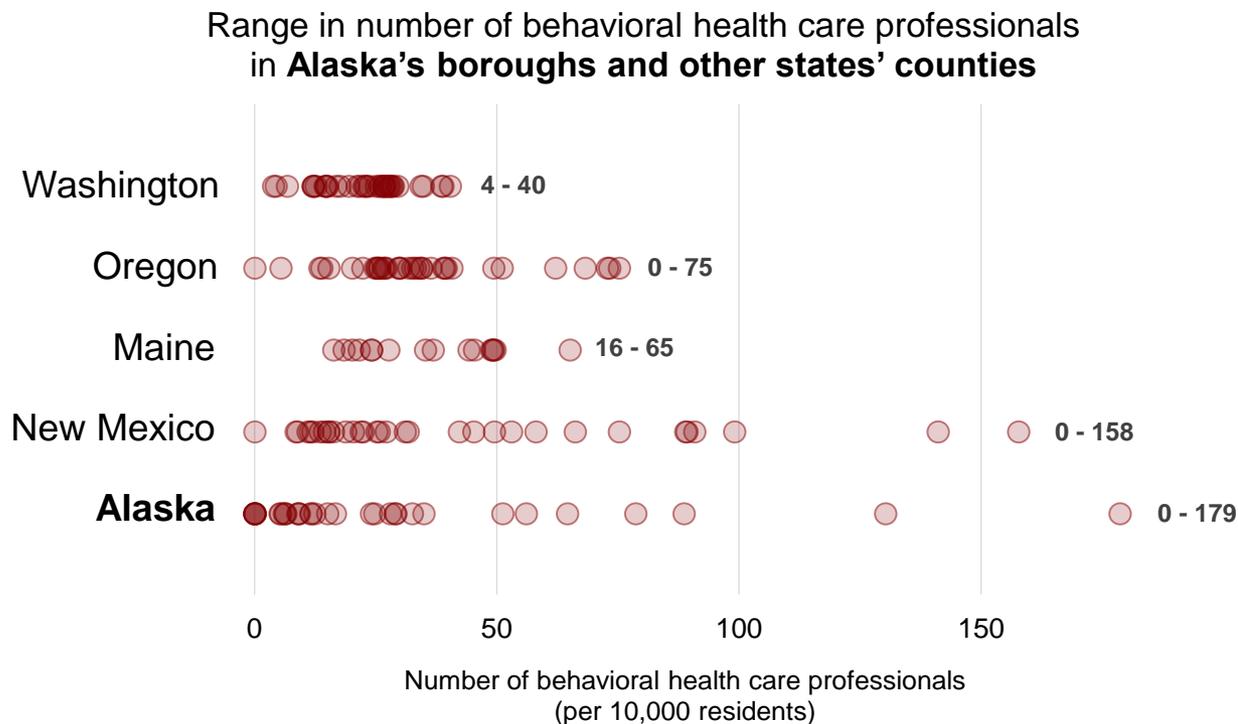
*Note that the U.S. average does not represent the optimal number of behavioral health care professionals.*

**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

Source: County Health Rankings & Roadmaps, by the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute.

# Distribution of behavioral health care professionals

## ALASKA AND OTHER STATES 2018



*Whereas Alaska has a relatively high average number of behavioral health professionals per capita, this in part reflects a few outlier counties with a large number of providers. Looking at the range of number of professionals per capita across county-level equivalent areas, a majority of Alaska counties have a small number of professionals per capita compared with counties in states with similar average numbers.*

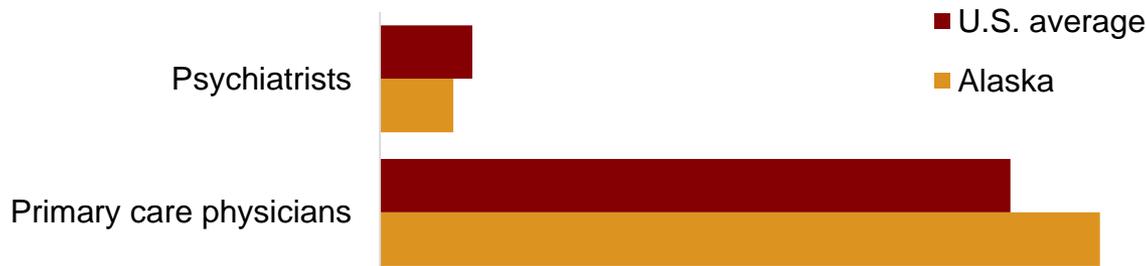
**Behavioral health care professionals include:** psychiatrists, psychologists, licensed clinical social workers, counselors, marriage and family therapists, and advanced practice nurses specializing in behavioral health care.

Source: County Health Rankings & Roadmaps, by the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute.

# Availability of behavioral health care professionals and hospital beds

## ALASKA AND UNITED STATES 2014

### Behavioral health care professionals



*Per resident, Alaska has slightly more primary care physicians, but fewer psychiatrists, and hospital beds dedicated to psychiatric care in comparison to the U.S. average.*

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

### 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

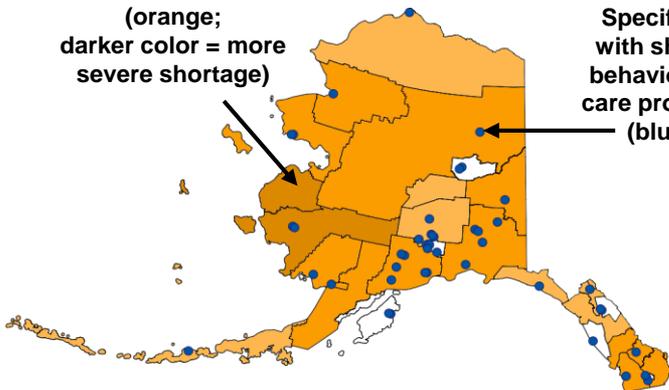
ALASKA 2019



Currently, Alaska has four full-time equivalent behavioral health care professional in designated shortage areas and facilities with behavioral health care professional shortages. In order to address the shortage issue, 13 more full-time professionals are needed in these areas, one of whom is needed in correctional facilities.

Geographic high needs area (orange; darker color = more severe shortage)

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

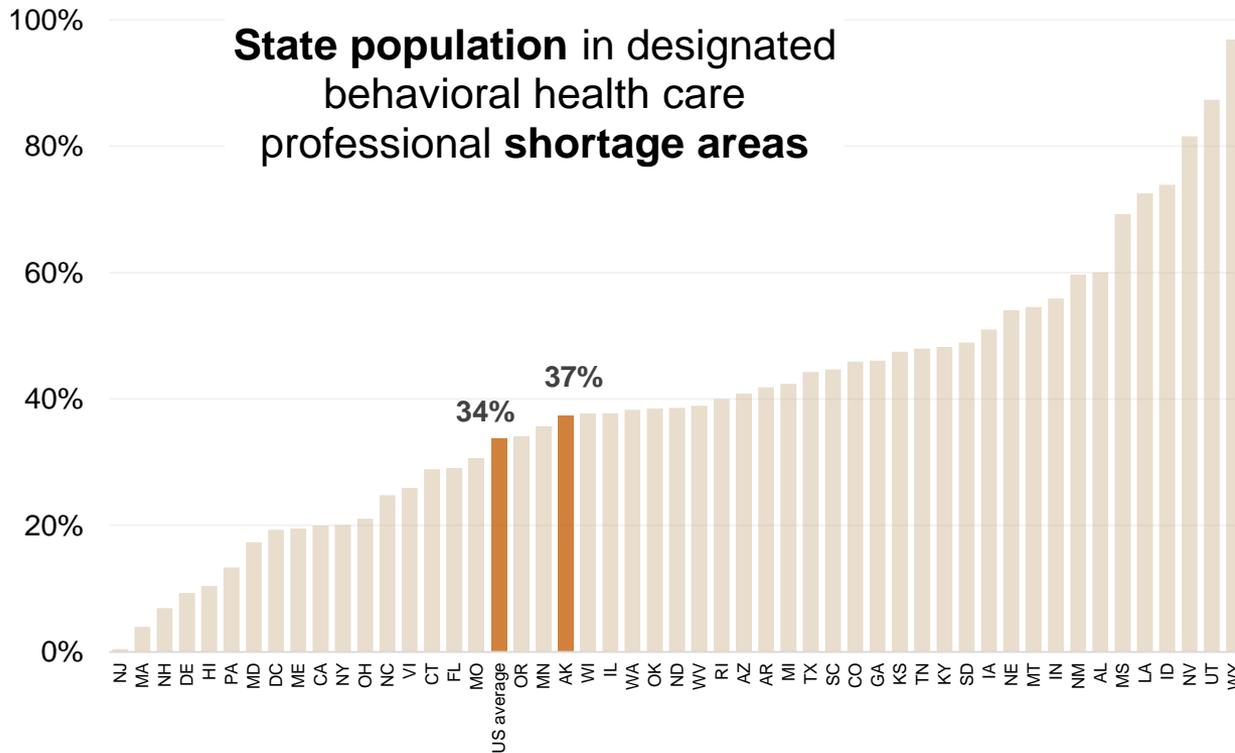
**Facilities:** Federal & state correctional institutions, state & county mental hospitals, community mental health centers, and other public or nonprofit private facilities

**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, 08/01/2019

# State population in behavioral health care professional shortage areas

## ALASKA AND UNITED STATES 2019



*276,673 people in Alaska (37% 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 slightly higher than the U.S. average of 34%.*

Source: Health Professional Shortage Areas (HPSA), HRSA Data Warehouse, 08/01/19, and Census Bureau data (2017)

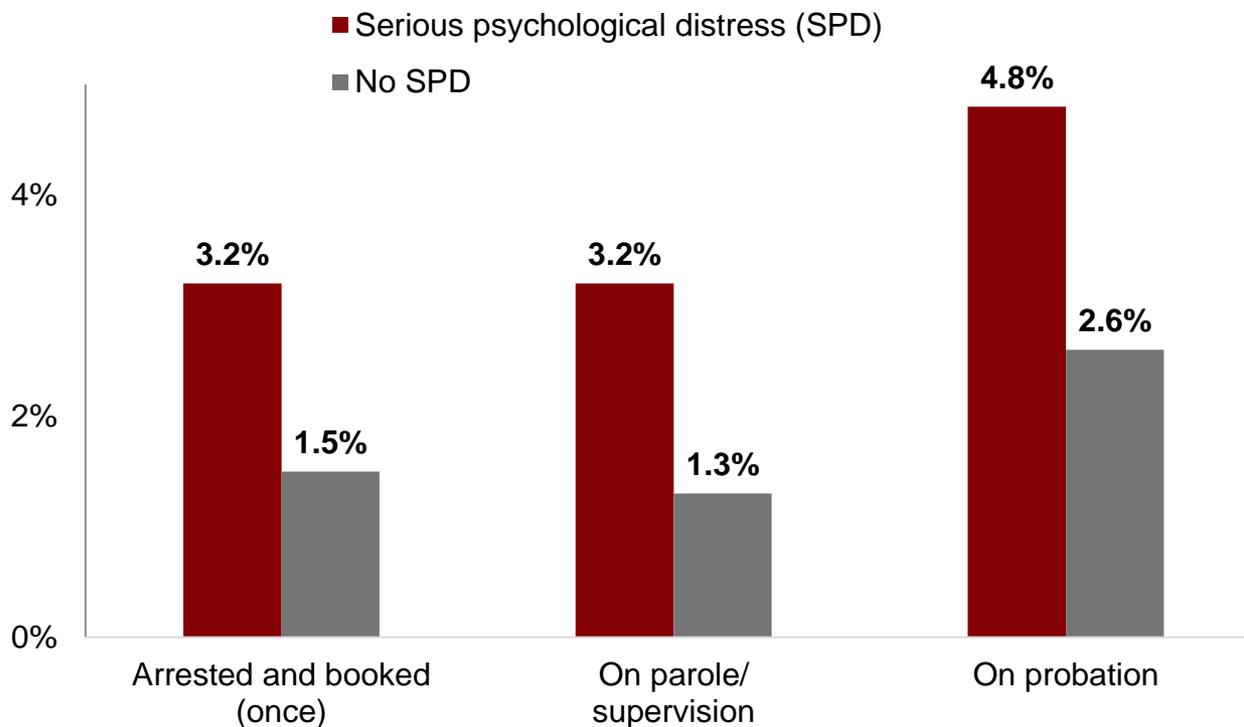
# MENTAL HEALTH CONDITIONS & THE CRIMINAL JUSTICE SYSTEM

*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.*

*In Alaska, the prevalence of serious mental illness is similar to the U.S. average. The overall cost of incarceration of the approximately 1000 prisoners with serious mental illness in the state of Alaska exceeds \$70 million per year.*

# Contact with criminal justice system

ALASKA 2017

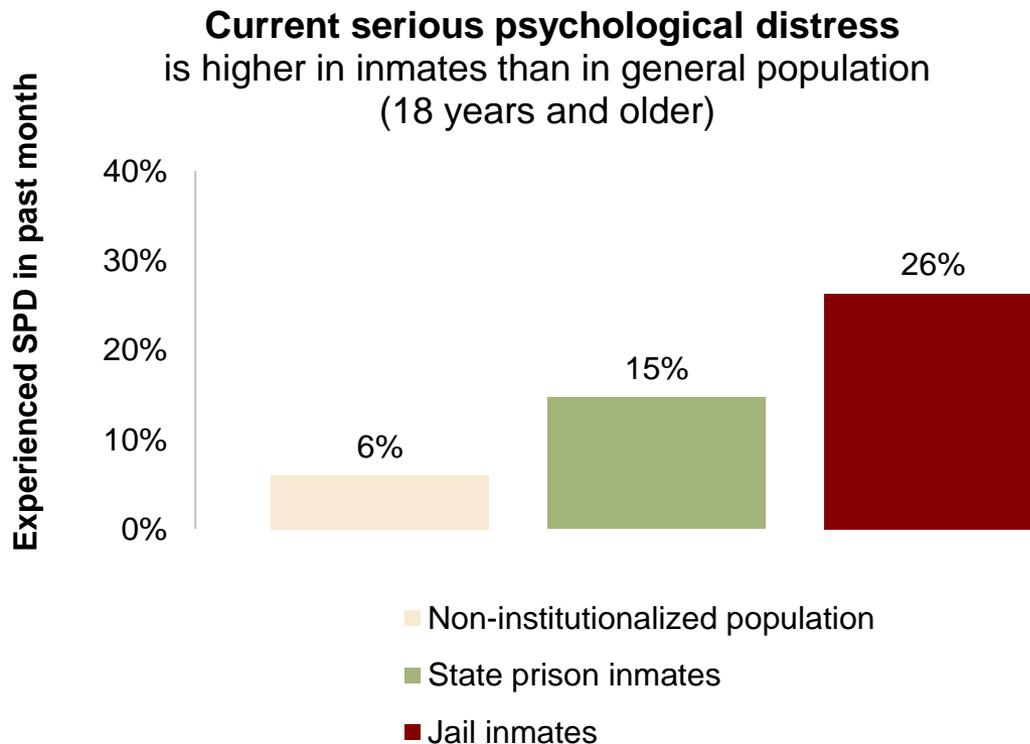


*People who experienced serious psychological distress (SPD) are more likely to have been arrested or be on parole or probation in the past year.*

Source: National Survey on Drug Use and Health (NSDUH, R-DAS) 2016-2017  
Survey does not include current institutionalized population

# 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.*

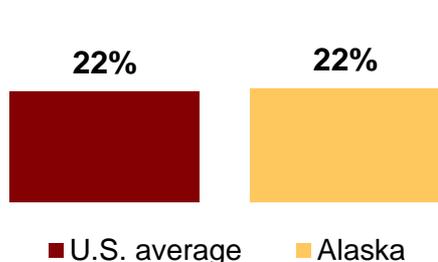
*Additionally, these mental health issues are observed at higher rates in local jails than in prisons.*

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

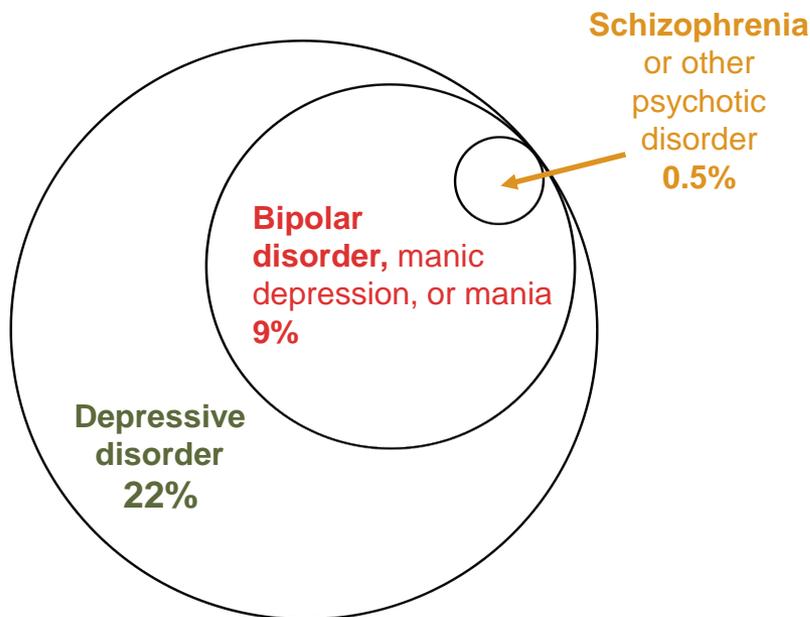
Bureau of Justice report: Sexual Victimization in Prisons and Jails Reported by Inmates, 2011-12, based on data from the National Inmate Survey

# State prison population with serious mental illness

## ALASKA - 2004



**Alaska state prison inmates** previously diagnosed with a serious mental illness:



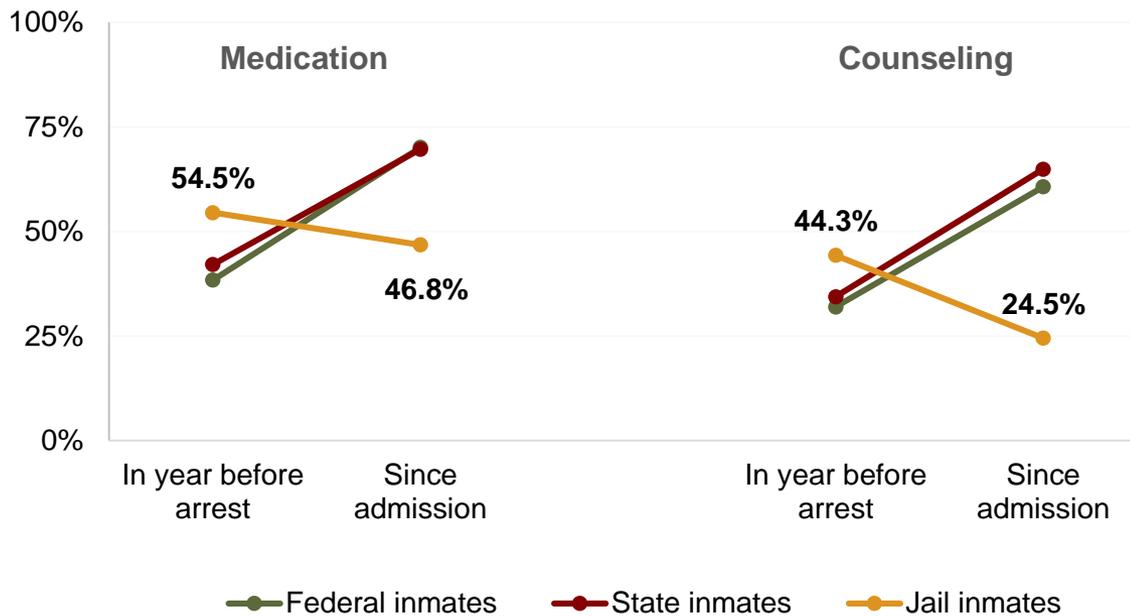
*In 2004, in Alaska state prisons, approximately 22% of prison inmates previously have been diagnosed with a serious mental illness, which is equal to the overall U.S. state prison population. Many patients have been diagnosed with two or three mental illnesses, confirming the presence of overlap in 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.

Based on the most recent data (from 2004),  
we estimate that the number of  
**Alaska state prison inmates** in 2017,  
previously diagnosed with serious mental illness was

**923**

**Estimate of overall annual costs in 2017:**

**\$71,080,090**

(in 2018 U.S.\$)

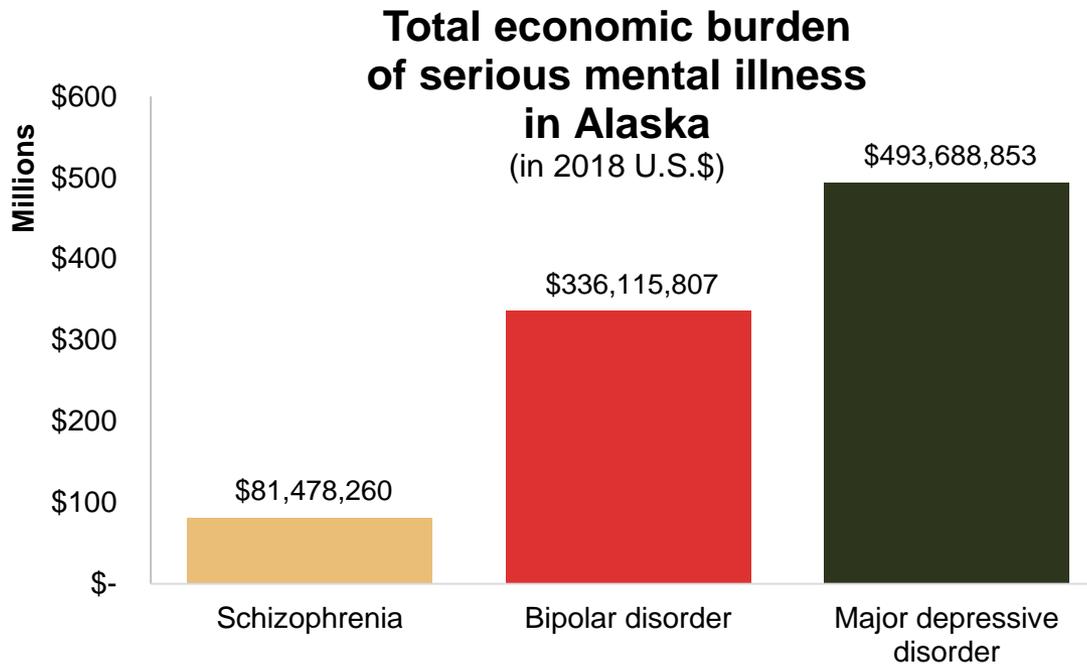
*Overall annual costs based on 2017 average of all state prison inmates in Alaska  
Source: Annual Survey of State Government Finances 2017  
Survey of Inmates in State/Federal Correctional facilities, BJS, 2004  
Alaska State, Department of Corrections Offender Profile 2017*

# TOTAL ECONOMIC BURDEN OF SERIOUS MENTAL ILLNESS

*The economic burden of each serious mental illness in adults is estimated to be at least \$37 billion for the U.S. and \$81 million for Alaska per year*

# Economic burden of serious mental illness

ALASKA 2018



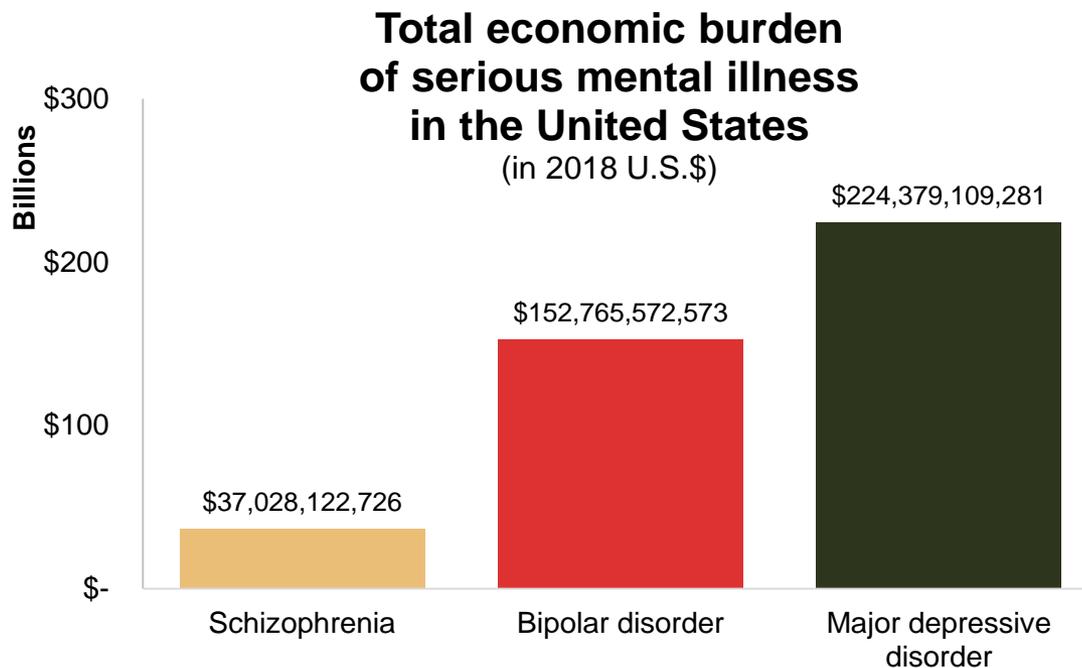
*The economic burden of schizophrenia, bipolar disorder, and major depressive disorder in adults in Alaska is estimated to be at least **\$81 million for each serious mental illness.***

Because of 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



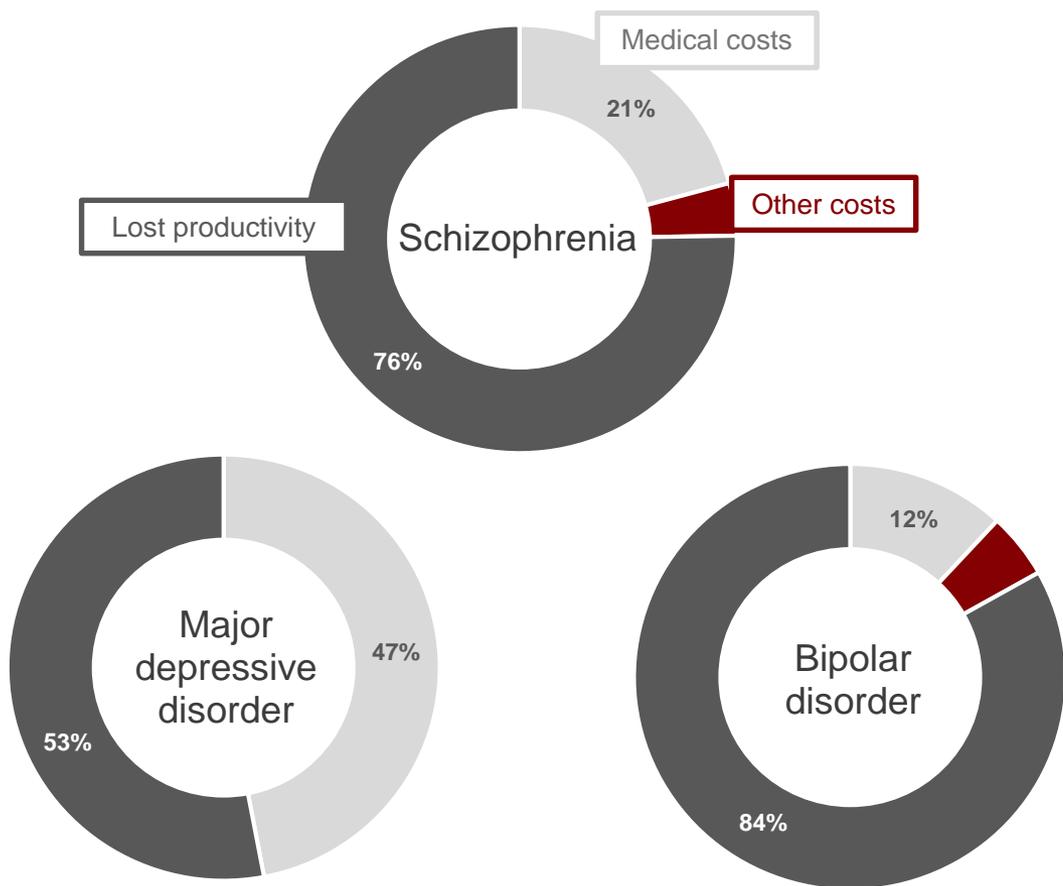
*The economic burden of schizophrenia, bipolar disorder, and major depressive disorder in adults in the U.S. is estimated to be at least **\$37 billion for each serious mental illness.***

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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.*

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

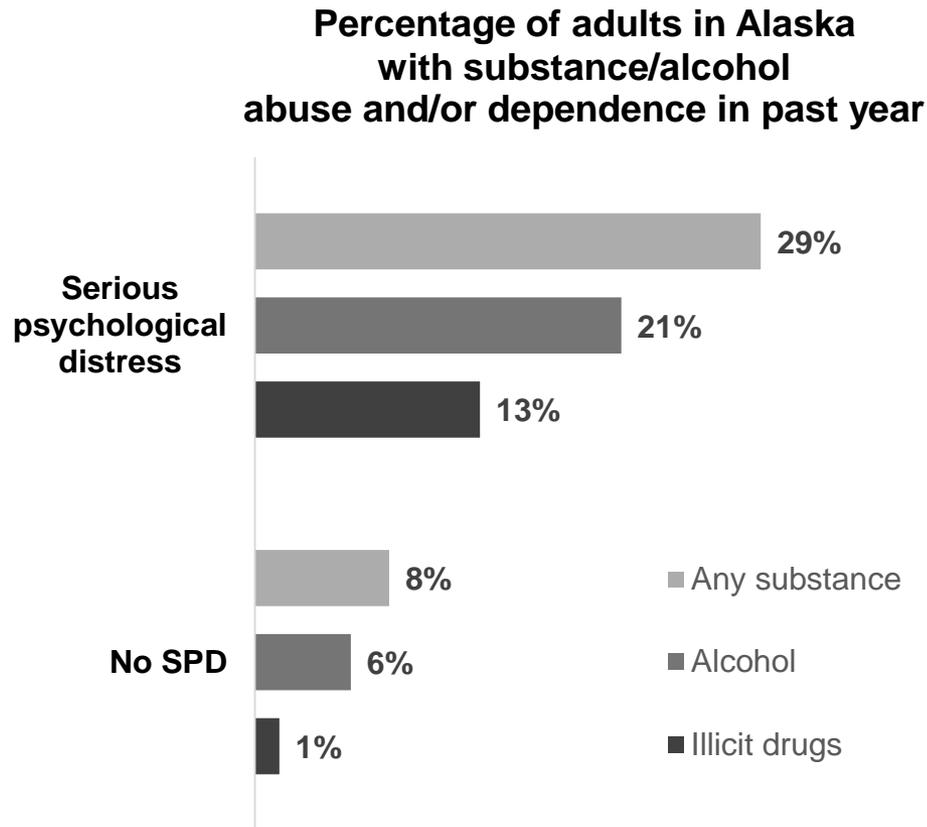
# OPIOID ABUSE AND FATAL OVERDOSES

*People who experience serious psychological distress are more likely to abuse 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., despite a recent reduction in prescription opioid sales.*

*The increase in abuse 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 abuse in people with serious psychological distress

ALASKA 2017

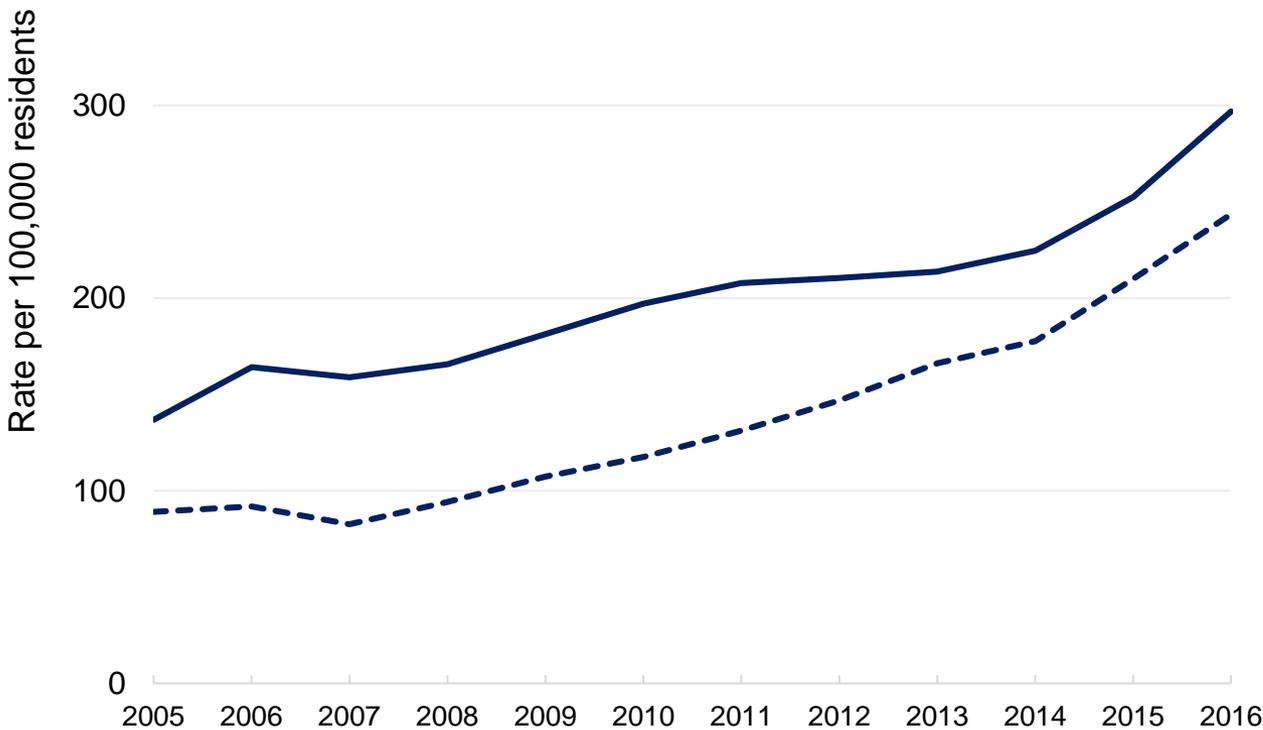


*People who experienced serious psychological distress in the past 12 months are more likely to abuse or be dependent on alcohol or illicit drugs during that same time period.*

# Opioid-related hospitalization and emergency department visit rates are on the rise

UNITED STATES 2005-2016

## Opioid-related hospitalizations and ED visits



*The rates of opioid\*-related hospitalizations (solid line) and emergency department visits (dashed line) have been rising steadily over the last decade, reaching 270 hospitalizations and 240 ED visits per 100,000 residents in the U.S in 2016.*

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

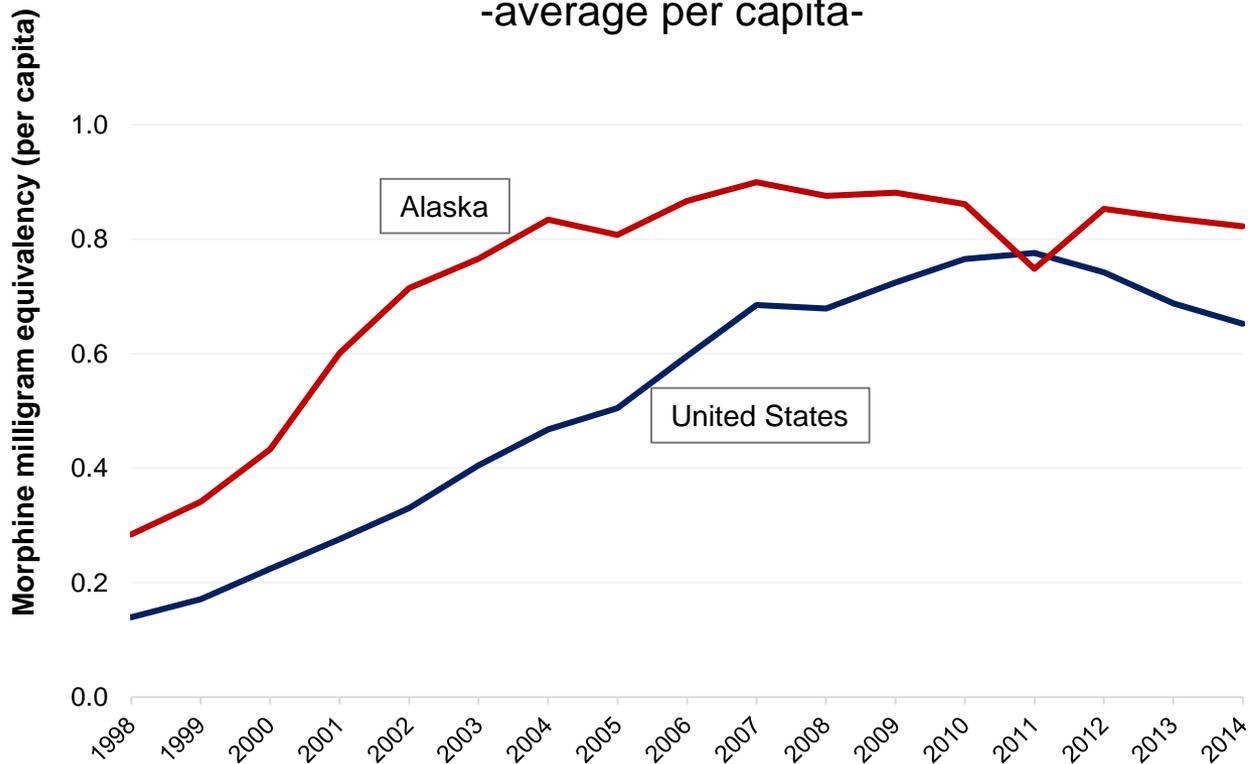
\* Opioid refers to both opioids and opiates in this chartbook

Transition from ICD-9 to ICD-10 in 2015 may lead to discontinuity in trends

# Prescribing of opioids started to decrease in 2007

## ALASKA AND UNITED STATES 1998-2014

**Prescription opioid sales**  
-average per capita-



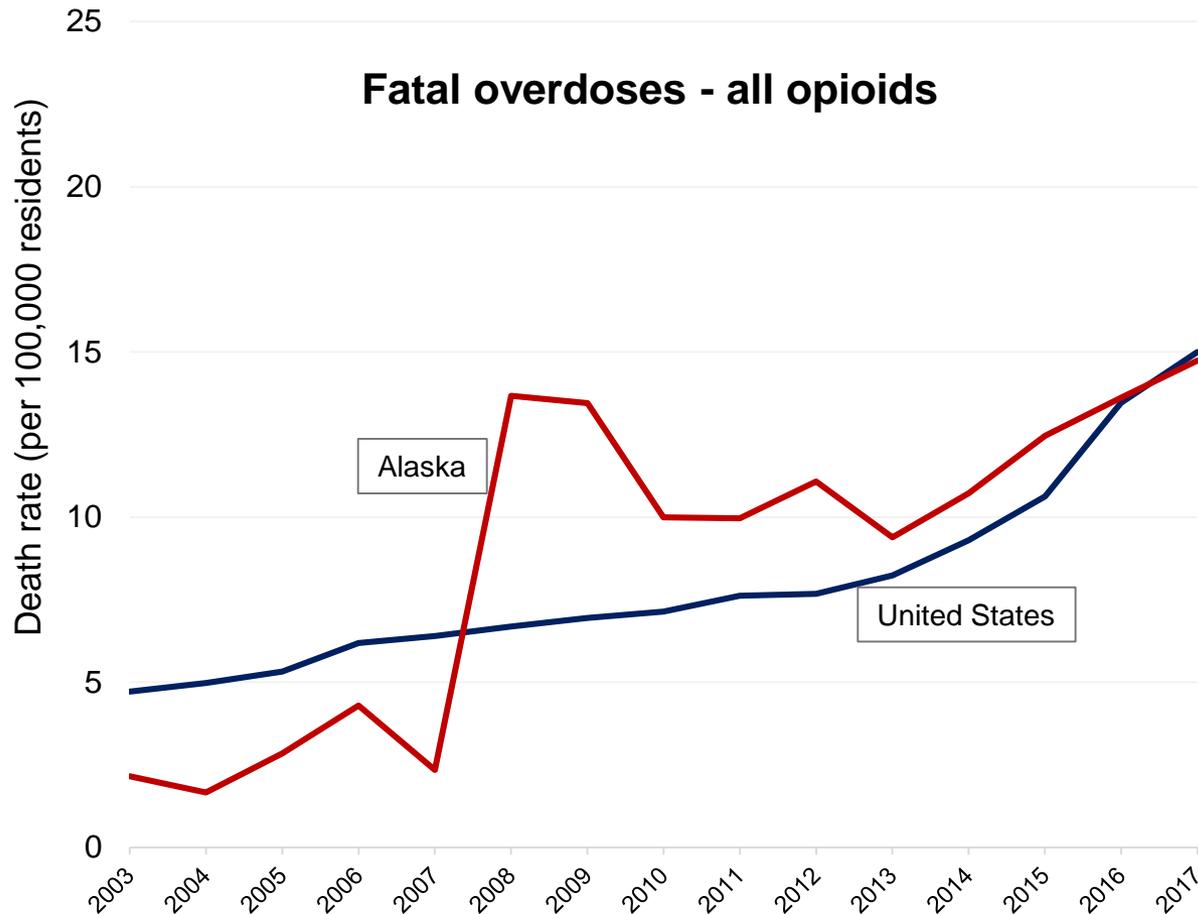
Source: Automation of Reports and Consolidated Orders System (ARCOS), Drug Enforcement Administration. United States data includes all states except DE, MO and PA

*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 Alaska were initially higher and peaked earlier, in 2007, but have been declining slowly since then.*

# Fatal overdoses by opioids are on the rise

## ALASKA AND UNITED STATES 2003-2017



Source: Centers for Disease Control and Prevention, CDC Wonder – Multiple Cause of Death Data

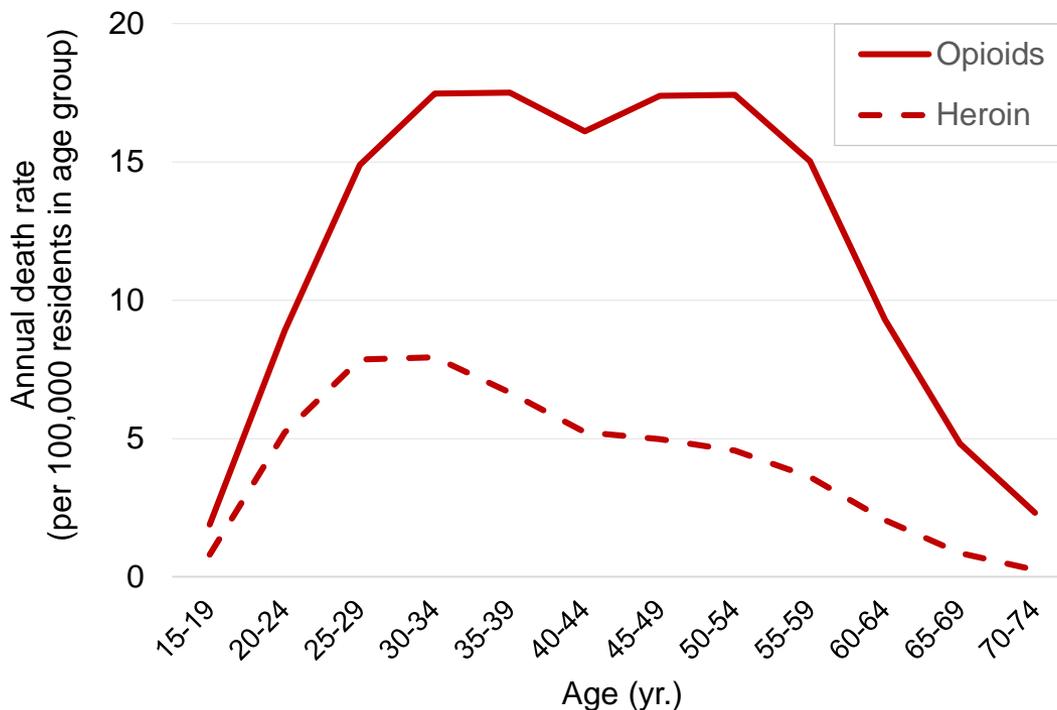
*Despite the moderate decline in opioid drug prescriptions, there has been an increase in recent years in the number of opioid overdose deaths across the United States.*

*In Alaska the fatality rate is currently similar to average U.S. levels. In 2017, 109 people died as a result of an opioid overdose in Alaska.*

# Age distribution of fatal overdoses by opioids and heroin

UNITED STATES 2011-2017

**Fatal overdoses - heroin versus opioids**  
by age - United States 2011-2017



*In the U.S., the rate of fatal overdoses due to opioids is very similar in many age groups. On the other hand, fatal overdoses due to heroin occur relatively more often in younger than in older people.*

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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](http://healthpolicy.usc.edu/Keck_Schaeffer_Initiative.aspx)

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