



Central East (HHS Region 3)

PTTC

Prevention Technology Transfer Center Network
Funded by Substance Abuse and Mental Health Services Administration

Opioid and Alcohol Misuse and Risk of Suicide:

A LITERATURE REVIEW



Central East Technology Transfer Center Network

Silver Spring, MD

The Danya Institute

Silver Spring, MD

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At the time of this publication, Miriam E. Delphin-Rittmon served as Assistant Secretary for Mental Health and Substance Use in the U.S. Department of Health and Human Services and the Administrator of the Substance Abuse and Mental Health Services Administration.

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[centraleast@pttcnetwork.org]

Acknowledgements:

Oscar Morgan

Acting Executive Director of The Danya Institute and the Project Director of the Mental Health Technology Transfer Center

Renata Henry

Project Director and Principal Investigator of the Addiction Technology Transfer Center

Deborah Nixon Hughes

Project Director of the Central East Prevention Technology Transfer Center

Princess Walker

Training and Technical Assistance Manager of the Central East Prevention Technology Transfer Center

Josh Esrick

Senior Policy Analyst, Carnevale Associates, LLC

Emily Patton

Research Associate, Carnevale Associates, LLC



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The Danya Institute (The Institute) was founded as a non-profit organization to promote and improve the health, education, and well-being of individuals and communities. The Institute's mission is to provide training, leadership development, and technical assistance to health and human service systems, providers, peers, and community members, in the areas of behavioral health, health, prevention, and wellness. Using the technology transfer model, we focus on the adoption and implementation of evidence-based practices.

The Institute is staffed by a team of experienced professionals who bring dedication and understanding of the spectrum of behavioral health prevention, treatment, policy and system issues, and services. With this wealth of talent, The Institute provides tools for system change and improvement through training and technical assistance services. The Institute has a reputation for excellence in the effective implementation of activities such as training, coaching, technical assistance, needs assessments, curricula development, and dissemination of best and promising practices. The Institute currently manages the Substance Abuse and Mental Health Services Administration-funded Addiction Technology Transfer Center (ATTC), Mental Health Technology Transfer Center (MHTTC), and Prevention Technology Transfer Center (PTTC) for the U.S. Department of Health & Human Services (HHS) Region III (Central East). Central East serves Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia.

The Danya Institute

8737 Colesville Road, Suite L-203

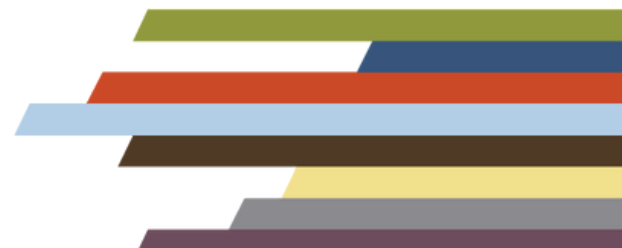
Silver Spring, MD 20910-3921

Tel. (240) 645-1145

www.danyainstitute.org

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A Note About the Organization of This Document

This document is constructed to allow readers to either read through the entire document or jump directly to the sections that most interest them

- Section I introduces why suicide prevention is important and how it relates to substance misuse prevention
- Section II provides the technical methodology behind this document's creation
- Section III summarizes the research and data showing how and to what extent opioid and alcohol misuse increase the risk of suicide
- Section IV summarizes the evidence-based best practices for simultaneously reducing the risk of opioid or alcohol misuse
- Section V provides article records, which include key information from each published article on evidence-based best practices included in this review
- Appendix A provides reference citations for the full scope of relevant literature on the links between opioid and alcohol misuse and risk of suicide
- Additional references provides other citations used in this document's creation



I. INTRODUCTION



This document is intended to support substance use prevention stakeholders in their efforts to serve their communities and states and improve outcomes. It is intended to provide information on how substance use prevention is linked with other public health initiatives, in particular suicide prevention efforts, and how stakeholders across the public health sphere can work together. In this document, readers will learn about

- How, and to what extent, substance misuse, especially opioid or alcohol misuse, increases the risk of suicide (See Section III and Appendix A)
- The evidence-based practices that substance use prevention and suicide prevention stakeholders can implement to reduce risks of opioid or alcohol misuse and suicide (See Sections IV and V)
- The impacts of these evidence-based practices (See Sections IV and V).



It would be difficult to overstate the importance of suicide prevention as a topic of public health concern. In 2018, over 48,000 people in the United States died from suicide, making it the tenth leading cause of death (CDC, 2020). Among youth and young adults, ages 10-34, suicide was the second leading cause of death.

Furthermore, the rate of suicide, already high, has been steadily increasing since 1999. And, while rates of suicide vary by demographic, it is a major concern for nearly every state, age group, and ethnicity (NIMH, 2019).

Beyond being an important public health issue overall, suicide prevention is specifically an issue closely connected to substance use prevention. According to the Center for Disease Control and Prevention (CDC), over 22 percent of suicides in the United States involve alcohol intoxication and opioids are present in 20 percent of suicides. While substance misuse and thoughts of suicide can both stem from underlying mental health conditions, research has also shown that opioid and alcohol misuse directly increases the risk of suicide (SAMHSA, 2016).



As such, substance use prevention efforts targeting opioid or alcohol misuse in general can help to reduce the risk of suicide. Furthermore, by working together to serve individuals with co-occurring needs, substance use prevention and suicide prevention stakeholders can help achieve improved outcomes. This document was created to support such collaborative efforts by providing information on how substance misuse and suicide prevention are connected and evidence-based practices to address both needs.

This review is specifically focused on the connections between suicide prevention and opioid and alcohol misuse prevention. Readers interested in learning more about opioid or alcohol misuse prevention in general are encouraged to access SAMHSA's Evidence-Based Practices Resources Center and the Prevention Technology Transfer Center Network for additional information. While readers interested in learning about suicide prevention in general are encouraged to access SAMHSA's Suicide Prevention Resource Center.

II. METHODOLOGY



The Methodology section provides the technical information behind this document's creation. This document was created through a multipronged approach intended to capture the latest in peer-reviewed academic-published research and government and non-profit publications and databases.

This began with a search of academic journal databases, resource registries, and other key websites: The PubMed, PsychInfo, and SocIndex academic databases were searched using the combined free text search terms:

- Alcohol OR Opioid
- Suicid*

Results were restricted to peer-reviewed articles published in English, from 2014 to 2019, that were not book reviews or dissertations. The following websites were also searched to identify grey literature:

- SAMHSA (samhsa.gov)
- Centers for Disease Control and Prevention (cdc.gov)
- National Institutes of Health (nih.gov)
- National Council on Behavioral health (thenationalcouncil.org)
- Google Scholar (scholar.google.com)

These sites were searched using the same free text terms. However, due to the less refined nature of their search engines, only the first 10 pages of search results from each site were reviewed. Additionally, obviously unrelated results were immediately excluded from the review process.

These searches resulted in 1,628 articles after excluding duplicates. Article abstracts and executive summaries underwent an initial review to determine relevance. Articles were excluded if they if they were not related to suicide or risk of suicide, with a connection to opioid or alcohol misuse. Articles were organized into two categories: articles on identifying the risk and protective factors that impact the risk of suicide, and articles on interventions to reduce the risk of suicide.

Intervention articles were excluded if they were not studying populations at risk for opioid or alcohol misuse or disorders, or did not provide outcomes. Risk and protective factor articles were excluded if opioid or alcohol misuse or disorders were not among the risk factors being examined, or were not examining U.S. based populations. Literature reviews were examined to identify any additional articles that should be included in this review.

The 63 intervention articles then underwent a full-text review using the same exclusion criteria. In addition, articles were examined to determine their relevance to substance use prevention; articles focused on suicide prevention among people receiving substance use treatment services were excluded. This additional review resulted in a final list of 10 relevant intervention articles, all of which were academic, peer-reviewed articles.

The majority of excluded intervention articles either focused on treatment services rather than prevention, or did not have a connection to opioid or alcohol misuse.

Key information from the included articles was extracted into article records which are presented in Section V of this document. Additionally, Section IV of this document presents a summary of their overall findings.

Due to the varied interests readers may have in learning more about opioid- and alcohol-related risk factors for suicide and suicide attempts, the full list of 236 articles on risk and protective factors is presented in Appendix A. Additionally, Section III of this document presents a summary of the overall body of evidence on the connections between opioid and alcohol misuse and suicide. This summary was created from a full-text review of a selection of the articles.



III. HOW ALCOHOL AND OPIOID MISUSE INCREASE THE RISK OF SUICIDE





Background on Suicide

In the United States, the per 100,000 individuals rate of suicide increased by 40.9 percent from 1999 to 2018 (from 10.5 to 14.8). In nominal terms, the number of people dying from suicide each year increased from 29,199 to 48,344 (CDC, 2020).

Suicide is the tenth leading cause of death in the United States, and every year since 1975 has been in the top 12 leading causes of death (Stone et al, 2017; SAMSHA, 2016).

Overall, 745,356 Americans died from suicide from 1999-2018. These suicides have impacts not just on the individuals themselves, but on their friends, family members, and the larger community around them. Many people know someone who has died from a suicide. The effect of this on individuals can significantly impact long-term behavioral and physical health outcomes. This includes feelings of guilt, anxiety, PTSD, and even an increased risk of suicidal ideation and suicide (Stone et al, 2017).

Suicide can be defined as “a death caused by self-directed injurious behavior with any intent to die as a result of the behavior” (Stone et al, 2017). Suicide is an example of a larger issue referred to as “self-directed violence,” which data shows is also occurring at an increasing rate year-over-year.

Self-directed violence are behaviors and actions that are directed at the self in order to deliberately cause injury or at least the potential for injury (Stone et al, 2017; Berman, 2017). The lifetime prevalence rates for adults for self-directed violence are around six percent (Berman, 2017).

Suicide attempts are a related example of self-directed violence. A suicide attempt is a "non-fatal self-directed and potentially injurious behavior with any intent to die as a result of the behavior"(Stone et al, 2017). the vast majority of individuals experiencing depression

attempting suicide, or who have suicidal risk factors do not actually die from suicide (Stone et al, 2017). It is estimated that there are approximately 25 suicide attempts for every one suicide death (Canner et al, 2018).

In 2014, among individuals aged 18 or older, there were 9 adults treated in hospital emergency departments for self-harm related injuries for every one suicide death (Stone et al, 2017), and there are many failed suicide attempts that do not result in hospital services. Each year, approximately 650,000 people are treated in an emergency room after an attempted suicide (SAMSHA, 2016).

Although suicide and other forms of self-directed violence are an issue for all demographics, research has identified certain populations as experiencing a higher risk for suicide and suicidal behaviors. The U.S. Department of Health and Human Services (HHS) has identified the following groups as having a higher risk of suicide and suicidal behaviors (SAMSHA, 2016; Walter, 2016; Stone et al, 2017; Miller et al, 2016):

- Individuals who have attempted suicide previously
- American Indians/ Alaska Native (AI/IN)
- Individuals who experience chronic pain
- Individuals who have lost someone else to suicide
- Individuals in justice and child welfare settings
- Individuals who participate in non-suicidal self injury(i.e. self-harming behaviors)
- Members of the armed forces as well as veterans
- Members of the LGTBTQ+ community
- Men in midlife and older men
- Individuals who have a mental health and/or substance use disorder(s)

ACROSS RACIAL AND ETHNIC DEMOGRAPHICS, THE HIGHEST RATES OF SUICIDE ACROSS THE LIFESPAN OCCUR AMONG AMERICAN INDIANS/ALASKA NATIVES AND WHITE POPULATIONS (SAMSHA, 2016; TFAH, 2019; CAETANO ET AL, 2015; STONE ET AL, 2017).

From 2003-2011, data from the National Violent Death Reporting System found that ethnic minorities accounted for 15 percent of suicide deaths (N=52,276) (Caetano et al, 2015).

Within that group, AIs/ANs experienced the highest suicide rate. This is concentrated among youth and young adults, with over 50 percent of suicides occurring among people age 30 or younger (Caetano et al, 2015).

According to the American Foundation for Suicide Prevention, middle-aged white men experience the highest rates of suicide among all racial/ethnic groups (AFSP, 2020; SAMSHA, 2016).

While suicide can occur at any age, its prevalence has significantly increased among younger populations and is getting more prevalent over time. Suicide is currently the second leading cause of death for Americans aged 10-14 and 15-34, the fourth leading cause of death for those aged 35-55, and the eighth leading cause for those aged 55-64. (Stone et al, 2017; SPRC, 2020). From 1999 to 2018, the population-adjusted rate of death by suicide increased by 150 percent among children 5-14, 43.6 percent among youth 15-24, 38.6 percent among young adults 25-34, 27.3 percent among adults 35-44, and so on.



The only age group that saw a decline in the rate of suicide deaths was older adults age 85+, who had a decline of one percent. The only age group that broke the trend of smaller increases in the rate of suicide deaths among older groups was adults 45-54, who experienced an increase of 43.4 percent (CDC, 2020).

In addition to changes in trends, it is also important to review the prevalences themselves. The data reveal that the rate of suicide increases over time, from 14.5 deaths/100,000 individuals among those aged 15-24, to 20.2 deaths/100,000 among those aged 55-64.

Among adults over age 65, the rate slightly decreases before increasing again. The key takeaway across these data is that suicide is a large and growing problem for all ages; one which public health stakeholders must be prepared to address.

It is also important to note that suicide death rates are almost four times higher among men compared to women (SAMSHA, 2016; Monnat, 2017).

Background on Causes of Suicide

However, women attempt suicide at a higher rate than men. In 2017, women reported a suicide attempt 1.4 times as often as men (AFSP, 2020). Suicide fatalities may be higher for men due to their tendency to use more lethal methods.

Suicide has no single cause, it is instead based on a confluence of factors. Suicide is a “response to biological, psychological, interpersonal, and societal influences that interact with one another, often over time” (Stone et al, 2017).

The three-step theory of suicide suggests that the progression from suicidal ideation to direct action is the result of a combination of reasons such as pain, hopelessness, lack of connectedness (to others and the larger community), the capacity to attempt suicide due to certain individual dispositional factors (such as a genetic predisposition to pain sensitivity), learned experiences (around pain, injury, death), and practical factors such as the knowledge of and access to lethal means (Choi et al, 2018).

The socio-ecological model of suicide helps to provide a framework to understand both the risk and protective factors associated with suicide. At the individual level, known risk factors include substance use, a previous suicide attempt, depression or other mental illness, and being a victim or a perpetrator of violence. At the relationship level, risk factors include a sense of isolation, a lack of social support, financial or work stress, and a family member or loved one's history of suicide. At the community level, factors include barriers to accessing health care and poor community connectedness.

Finally, at the societal level, factors can include the availability and access to a lethal means of suicide as well as the stigmatization of mental illness and seeking mental health care (Stone et al, 2017). Protective factors against the risk of suicide include skills such as effective coping and problem-solving abilities, having strong relationships, a supportive environment, an individuals' moral objection to suicide, access to quality mental and physical health care, and reduced access to lethal means (Stone et al, 2017).

There are numerous strategies and approaches to help reduce risk factors and increase the protective factors for suicide, such as strengthening economic support through housing stabilization polices, increasing access and delivery of suicide care by reducing provider shortages and ensuring mental healthcare is covered by insurance, using peer norms programs to expand connectedness, increasing crisis intervention training and sources, and creating safe reporting and messaging resources around suicide/attempts (Stone et al, 2017). More information on these broad-based suicide prevention activities is available through SAMHSA's Suicide Prevention Resource Center.

Background on Rates of Opioid and Alcohol Use

In the United States, approximately 1 in 5 people age 12 or older used an illicit drug in the past year, while almost 1 in 12 experienced a substance use disorder (SUD). In 2018, the most recent year for which there is data, prescription pain reliever misuse was the second most common form of illicit drug use (after marijuana use), with 3.6 percent of people age 12+ reporting past-year misuse.

Overall, approximately 10.3 million people misused opioids, with prescription pain relievers used on their own or in conjunction with heroin being the most commonly misused type. Also in 2018, 139.8 million Americans age 12+ were regular (past-month) alcohol users, with an estimated 67.1 million Americans being regular binge drinkers. Among youth, rates of underage alcohol use continued a long-standing decline; however, an estimated 7.1 million youth age 12-20 were regular alcohol users. Overall, 5.4 percent of Americans experienced an alcohol use disorder.

The consequences from this use and misuse have risen as well. From 1999 to 2018, the fatal drug-involved overdose rate increased 243 percent, from 6.0 per 100,000 people to 20.6 per 100,000 people. In nominal terms, there were 16,849 fatal overdoses in 1999 and 67,367 in 2018 (CDC, 2020). While fatal overdoses of all kinds have increased, opioids are responsible for largest number of additional deaths.

The annual number of opioid-involved fatal overdoses increased from 8,050 in 1999 to 46,802 in 2018. Due to inconsistencies in data reporting, the true number of how many of these overdoses are intentional (i.e. suicides) versus unintentional is unknown.

However, there is significant overlap between the populations identified as most at risk for fatal overdoses and most at risk for suicide and suicide attempts.

It is difficult to assess the total number of alcohol-induced or related deaths that occur annually, due to the many potential negative consequences from excessive alcohol use. However, there are estimates ranging from 35,800 (TFAH, 2019) to 88,000 deaths annually (NIAAA, 2020). These include deaths from alcohol poisoning, traffic accidents, liver cirrhosis, homicide, and others.

Intersections Between Alcohol and Opioid Misuse and Risk of Suicide

Suicide does not occur in a vacuum and is connected to and impacted by adverse life experiences, such as substance use (Stone et al, 2017; SAMSHA, 2016). In fact, many of the same risk factors for suicide are shared by substance use and other forms of violence. People with an SUD are at particularly high risk for suicide and suicide attempts. In fact, suicide is the leading cause of death among those who misuse substances (SAMSHA, 2016; Miller et al, 2016). More than half of acute psychiatric admissions that involve suicide or suicide risk, also involve alcohol or drug use.

For individuals with an SUD, their lifetime risk of a completed suicide is 7 percent (Miller et al, 2016). This is due to multiple interactions and levels of influence.

For instance, SUDs are linked to higher rates of co-occurring disorders, including mental health conditions with their own elevated risk of suicide. Additionally, acute intoxication from alcohol or drugs can influence impulsive behavior, which also increases risk of suicide (Miller et al, 2016; SAMSHA, 2016).

Additionally, acute intoxication from alcohol or drugs can influence impulsive behavior, which also increases risk of suicide (Miller et al, 2016; SAMSHA, 2016).

These inter-relational and interconnected factors all contribute and come together to lead to higher suicide risks for individuals who misuse substances.

Alcohol intoxication is present in 22% of suicide deaths and opioids are present in 20% of suicide deaths (SAMSHA, 2016).





ALCOHOL

Alcohol is closely associated with suicide and is commonly consumed prior to a suicide event (Caetano et al, 2015; Beradelli et al, 2018; Choi et al, 2018).

In attempted suicides, acute alcohol intoxication is present 30-40 percent of the time (SAMSHA, 2016). In a national sample of suicides from 2013, 37 percent of men and 29 percent of women tested positive for blood alcohol levels (Caetano et al, 2015).

Alcohol use disorders as well as acute alcohol intoxication increase the risk of suicide and suicide attempts, with heavy alcohol drinkers having a 5-10 times higher risk of suicide compared to social drinkers (Nadorff et al, 2014; Pompili, 2010; SAMSHA, 2016; Berman et al, 2017; Cherpitel, 2004). Individuals who abuse alcohol have a lifetime risk of suicide ranging from 10-15 percent (Pompili, 2010), this is 4.8-6.5 times greater compared to someone without a substance use disorder (Miller et al, 2016).

Around 40 percent of individuals who seek treatment for alcohol misuse report they had at least one suicide attempt in their lifetime, with impulsive suicide attempts common in those with an alcohol use disorder (Pompili, 2010). Alcohol can impair the brain and body in several ways, leading to an elevated risk of suicide. It can increase psychological distress and aggressiveness, provide the motivation to turn suicidal ideation into action, promote risky behavior, create feelings of dysphoria, exacerbate mental health issues, and it can hamper cognitive abilities, such as the capability to use coping strategies or reason (SAMSHA, 2016; Choi et al, 2018).

OPIOIDS

Opioid misuse is also associated with a higher risk of suicide and suicidal behaviors (Samples, 2019; Choi et al, 2018). Research has shown that around 20 percent of suicide deaths include the presence of opioids such as heroin and prescription pain relievers (SAMSHA, 2016).

Suicidal ideation has been linked to former or persistent misuse of opioids, as well as prescription opioid use disorders (Sample, 2019). More frequent opioid misuse can also increase suicidal ideation, planning, and number of attempts (Sample, 2019; Schepis, 2019). One study of adults aged 50 and older found that past year prescription opioid misuse was associated with an 84% increase in suicidal ideation (Schepis, 2019).

Rates of suicide may be even higher than currently reported due to under-reporting of suicide as a cause-of-death when opioids or other drugs are present (Rockett, 2019). A recent study looking at data from the U.S. National Violent Death Reporting System showed that the criteria many coroners and medical examiners use to designate suicide from drug intoxication as the cause-of-death is significantly higher than for other common causes of mortality.

While suicides by firearm or hanging have higher rates and numbers of fatalities, the most common form of attempted suicide continues to be drug ingestion (Rockett, 2019). One study of older adults (ages 45-64), found that suicide attempts presenting at hospital emergency departments were more likely to involve prescription or over-the-counter medications (Curtin, 2017).

These included anti-anxiety and insomnia medications (48% of older adults), pain relievers (29%), and antidepressants (22%). An additional 11 percent of attempts involve illicit drugs (SAMSHA, 2014). Older adults also tend to experience chronic pain, which is another elevated risk factor for suicide (Choi et al, 2017). However, it is important to note that chronic pain can occur in all age groups and increases suicide risk across ages.

One study of cause-of-death among individuals who died from suicide found that those who reported chronic pain were significantly more likely to test positive for opioids than those who did not report such pain (51.9% vs. 18.8%; Ilgen, 2018). Among suicide deaths of individuals experiencing chronic pain, death by an opioid overdose was the second most common cause of death (16.2%) (Ilgen, 2018). These intersections reveal the importance of substance use and suicide prevention stakeholder collaboration to improve outcomes for individuals.



IV. SUMMARY OF FINDINGS FROM RESEARCH



The Summary of Findings From Academic Research section provides a descriptive summary of findings from the academic journal articles identified through this document's literature review process. Additional information from each article, organized by article, is found in Section V of this document. The published articles described here shed light on key considerations for organizations seeking to improve their approach to combatting suicide and substance use (focusing specifically on opioid or alcohol misuse) in a combined effort.

There is substantial research and evidence-based practices that focus on either suicide OR substance use prevention and treatment. And more information on suicide prevention activities in general is available through SAMHSA's Suicide Prevention Resource Center. However, less is known about what prevention activities are available for practitioners and communities seeking to target individuals at risk of suicide AND substance use (including risk of opioid or alcohol misuse), as providers tend to treat those issues separately (O'Brien et al, 2018). As a result, a review of existing literature identified few evidence-based substance use and suicide prevention programs. What was found primarily focuses on screening tools, programs designed for subgroups of at-risk communities, and reviews of environmental strategies and polices.

Existing research on suicide tends to use cross-sectional design and secondary data analysis. This can result in the loss of real time information about how individuals experience suicidal ideation and behaviors as well as how risk factors can interact with each other (Bishop et al, 2016). As such, a critical resource for both suicide and substance use treatment are thorough screening tools. These tools are used to assess and manage risk, which is paramount when creating a treatment and care plan for substance using individuals with directly related risks, such as suicide (Bogdanowicz et al, 2016). One example of these tools comes from a study that used an addiction-specific screening tool that was effective in identifying high mortality risk groups.

Researchers sought to determine if any follow-up clinical action based on the screening results would have an impact on mortality rates. Bogdanowicz and colleagues (2016) used healthcare system data from almost 4,500 patients receiving treatment for an opioid use disorder in a major city in the United Kingdom between 2008-2014.

They found that use of an addiction-specific screening tool could be useful when identifying subgroups who are at greater risk of mortality. Specifically, suicide accounted for a twofold increase in mortality risk among those who were not admitted for mental services.

Screening tools have also been developed and used for specific groups who are at a higher risk of suicide and substance use, such as veterans. In the United States, veterans make up about 8 percent of the adult population, but account for 18 percent of suicides (Berg et al, 2018).

Additionally, they are at 21 percent higher risk for suicide compared to the general public. In 2014, veterans with a substance use disorder experienced the second-highest suicide rate among the mental health categories (89 per 100,000) and veterans who had been diagnosed with an opioid use specific disorder experienced an even higher rate of suicide (140 per 100,000) (Berg et al, 2018). The Veterans Health Administration (VHA) treats veterans' comprehensive health needs, which includes serving individuals with higher rates of mental health issues, chronic pain, and substance use (Oliva et al, 2017).

Several tools have been identified to work with veteran specific populations, including screening protocols, clinical practice guidelines, and specialized surveys. One such tool is the Stratification Tool for Opioid Risk Mitigation (STORM). This particular resource was developed in the VHA and prioritized patients for review and intervention according to their modeled risk for overdose/suicide-related events (Oliva et al, 2017). Study authors created a risk model and gathered mortality data from over 1.1 million VHA patients that had been prescribed opioid analgesics. Findings suggested that, by using electronic medical record data, patients at risk for overdose- or suicide-related events could be more easily identified. Authors also used the data to develop flags for prior adverse life events that were found to be highly predictive of future risk of overdose- or suicide-related events.

Another resource developed for veterans experiencing alcohol abuse and suicidal ideation are interactive voice recordings (IVRs) surveys. This type of intervention has been used in other populations, such as those with chronic pain, tobacco use disorders, and co-occurring alcohol use disorders and posttraumatic stress disorder (Bishop et al, 2016).

IVR surveys were studied among four veterans receiving care through the VHA for problem alcohol use and suicidal ideation. This qualitative study asked participants to complete daily phone-based IVR surveys to assess changes in suicidal ideation over time. While this study used an extremely small sample size, participants generally reported that completing the calls was not a burden. Half of the participants reported that the self-monitoring through IVR helped reduce their suicidal ideation (Bishop et al, 2016).

Additional efforts to combat suicide and substance use in veterans include the creation of clinical practice guidelines for the VHA in the management of opioid misuse. Two recent studies evaluated changes in how opioid based prescriptions in the VHA are distributed and monitored. Malte et al (2018) reviewed how a medical alert, designed to reduce co-prescription rates of opioids and benzodiazepines among veterans with high-risk conditions was implemented. They used VHA data from the Puget Sound Health Care System, which consisted of 2 medical centers and 7 outpatient clinics.

Data suggested that there were decreased rates of co-prescribing among patients at risk for sleep apnea or suicide after the alert was implemented. Im et al (2015) evaluated VHA guidelines on opioid co-prescribing in 2010 that emphasized new recommended best practices for issuing opioid prescriptions. This included providing information on recognizing patients at higher risk for opioid-adverse events, such as risk of opioid-involved suicide.

The study used data from the VHA National Patient Care Database and VHA Decision Support System to determine the extent of provider and facility adoption of the guidelines. Specifically, researchers examined how patient outcomes compared between facilities with high or low adoption of the new guidelines. They found that VHA facilities with greater adoption rates of the guidelines experienced lower risk of veteran suicide. Additionally, the specific guidelines associated with this decreased risk included conducting higher rates of drug screening tests, scheduling follow-up appointments after new prescriptions, and discouraging co-prescriptions involving sedatives. While different approaches have been taken to treat veterans, it is important to keep in mind that no one option works best.

Providers are recommended to implement a holistic approach of addressing risk factors and implementing risk mitigation strategies (Oliva et al, 2017). Furthermore, ingraining these strategies and tools in clinical processes is essential for ensuring that are appropriately implemented and focusing on patients with the greatest need (Oliva et al, 2017).

Youth are another group at a higher risk of being adversely affected by the intersection of suicide risk and substance misuse. One third of adolescents who attempt suicide annually in the United States receive hospital emergency services (King et al, 2015).

Among such youths, many are also treated for alcohol poisoning or drug overdose (King et al, 2015). Therefore, the use of screening tools for youths that can be administered in hospital emergency departments (ED) has broad appeal. Research has identified potential benefits in using suicide risk screenings for adolescents in ED settings (King et al, 2015).

Two recent studies examined the use of youth screening tools in emergency hospital settings. King et al (2015) looked at adolescents between the ages of 14-19 who sought any health care services at an ED.

Youths who were screened for suicide risk and tested positive received intervention services either as usual or through a program called Teen Options for Change. The authors found that the screener they developed was successful at identifying high risk youths. However, no differences were found between participating or not in Teen Options for Change and the likelihood of engaging in suicidal behavior.

A second study, conducted by Newton and colleagues (2017), was comprised of a systematic review of 18 youth behavioral screening tools used by EDs. The authors identified the screening tools that had the strongest evidence-base for identifying suicide risk among youth. Another at-risk group are American Indian and Alaska Natives (AI/AN), with epidemiological data identifying suicide and alcohol use disorder as primary determinants of health disparities among them (Allen et al, 2018). Among Alaska Native youths, suicide is the fourth leading cause of death overall and the leading cause of death among those aged 15-24 (Allen et al, 2018). Recent research has yielded a promising program that targets at risk individuals in the Alaska Native population.

Called the Qungasvik intervention, this program is designed to strengthen protective factors against behavioral health issues among youth, such as alcohol misuse and suicidal ideation. The program provides a combination of 26 modules for communities to choose from based on their needs. In a series of studies, rural Yup'ik youths, along with family members and individuals from the larger community, participated in the intervention. Researchers found that the intervention had positive impacts on family and community social network variables and that a high intensity form of the intervention produced significantly greater positive impacts for suicide risk (i.e. protective factors) (Philip et al, 2016; Allen et al, 2018).

Environment-based interventions can also impact suicide and substance use rates. One review done by Xuan et al (2016) looked at environmental strategies designed to decrease alcohol access in order to reduce binge and underage drinking and associated risk of suicide. They found 17 studies from 1999-2014 that reviewed the connections between alcohol and suicide.

The studies looked at a variety of alcohol and suicide related policies such as alcohol taxation, outlet density, minimum legal drinking age (MLDA), blood alcohol content, zero tolerance, or a hybrid of different policies evaluated together. Their analysis revealed several promising findings. Generally, zero tolerance laws were found to reduce the rate of suicides among younger males aged 15-24. Lower density and availability of liquor stores was found to be associated with lower rates of suicide, with young males impacted the most by increases in density. Higher rates of alcohol taxation were generally associated with lower rates of suicide as well. One study found that increases in alcohol excise taxes were associated with a reduced number of male suicides from 1976-1999.

Another found that wine excise taxes were related to a reduction in suicide risk. The evidence also supports that an increased MLDA has contributed to a reduction in youth suicides in the United States. One study found that increasing the MLDA from age 18 to age 21 was associated with a reduced rate of suicide among youth age 19-22.

Two other studies found that, previously, when the MLDA was lowered to 18 in many states, there was a significant increase in youth hospital admissions for suicide-related injuries. Lastly, the review found that across multiple studies, suicide rates were positively associated with the per capita consumption of alcohol in multiple counties across the globe.



V. EVIDENCE-BASED PREVENTION STUDY RECORDS

This section provides key extracted information from each of the 10 articles on strategies to reduce risk of suicide among individuals at risk for opioid or alcohol misuse or disorders. The records are organized into two categories:

- Articles on screening tools to identify individuals at risk of suicide
- Articles on strategies to reduce the risk of suicide

Furthermore, articles on similar topics were grouped into a single record. Articles within each category are presented alphabetically, by a descriptive title of the record.

Each record provides the following information:

- Citation – The article citation
- Description – A summary of the key background information from the article
- Population – What population was the focus of the article
- Setting – Where the study or research described by the article occurred
- Evaluation Design – How the article authors collected information or evaluated outcomes
- Evaluation Outcomes – What the article found related to the effectiveness of cultural competency

Readers interested in learning more are encouraged to use the article citations to obtain full-text versions

SCREENING TOOLS

ADDICTION-SPECIFIC RISK SCREENING TOOLS TO IDENTIFY OPIOID USE DISORDER PATIENTS AT-RISK FOR SUICIDE

DESCRIPTION The article sought to see if the use of an addiction-specific risk assessment screening tool was effective in identifying high mortality risk groups and if any follow-up clinical action based on those results would have an impact on mortality rates. Electronic health records (EHRs) from a large health care system were reviewed to identify specific risk factors, including risk of suicide or accidental overdose, among opioid use disorder patients who died. Reviewed EHRs included initial risk assessments, all-cause and overdose mortality data, and demographic data

POPULATION Health care system patients receiving treatment for an opioid use disorder

SETTING N/A administrative data (London, United Kingdom)

EVALUATION DESIGN The study reviewed electronic health records for 4,488 patients of the South London and Maudsley NHS Foundation Trust from April 1, 2008 through March 31, 2014 with an opioid use disorder; mortality data was reviewed for patients who died within six years of baseline (n=227). The study sought to identify any significant findings between results from the Addiction Brief RiskScale Assessment (BRSA-A) that all patients completed as well as causes of death.

EVALUATION OUTCOME(S) The study found that use of an addiction-specific brief risk screen assessment may be able to provide useful information to identify subgroups at elevated risk of mortality. Findings of unsafe injection practices and likelihood of accidental overdose were associated with all-cause mortality; unsafe injection practices and suicidal ideation were associated with overdose mortality. Suicidal ideation was associated with a twofold increase in mortality risk among patients not admitted to mental health services. The study concludes that screening tools asking about unsafe injection practice will better identify patients at risk.

EVALUATION STUDY CITATION Bogdanowicz, K.M. et al (2016). Identifying mortality risks in patients with opioid use disorder using brief screening assessment: Secondary mental health clinical records analysis. *Drug and Alcohol Dependence* 164, 82-88.

SCREENING TOOLS

IDENTIFYING SUICIDE/OVERDOSE RISK AND INTERVENTION STRATEGIES USING A SCREENING TOOL AMONG VETERANS

DESCRIPTION The article reviewed the Stratification Tool for Opioid Risk Mitigation (STORM), a tool developed in the Veterans Hospital Administration (VHA) that prioritized patients for review and intervention according to their modeled risk for overdose/suicide-related events.

POPULATION All Veterans patients with an active short- or long-acting opioid analgesic prescription from the VHA

SETTING Veterans Hospital Administration (United States)

EVALUATION DESIGN Researchers used FY2010 predictor variables to try and predict overdose- or suicide-related health care events or deaths in FY2011. Patients risk estimates were based on a risk model as well as mortality data from over 1.1 million VHA patients that had been prescribed opioid analgesics.

EVALUATION OUTCOME(S) Results suggested that the use of electronic medical record data can help with identifying patients at risk for overdose or suicide-related events, while also supporting providers in mitigating risk and identifying appropriate interventions. Data from STORM found that prior adverse events (such as previous overdose- or suicide-related events, accidents, and falls) and health care events indicative of risk (including previous detoxification treatments, emergency department encounters, and inpatient stays) were highly predictive of future risk of overdose- or suicide related events.

The data also indicated that the number of classes of evidence-based but sedating medications for pain management that a patient was prescribed was associated with overdose- and suicide-related event risk. Lastly, they found that patients prescribed any short-acting opioid, regardless of length of time prescribed, had similar risk for an overdose- or suicide-related event compared to patients prescribed tramadol only.

EVALUATION STUDY CITATION Oliva, E.M. et al (2017). Development and Applications of the Veterans Health Administration's Stratification Tool for Opioid Risk Mitigation (STORM) to Improve Opioid Safety and Prevent Overdose and Suicide. *Psychological Services*, 14(1), 34–49.

SCREENING TOOLS

INTERACTIVE VOICE RECORDING SURVEYS TO ASSESS CHANGES IN SUICIDAL IDEATION OVER TIME

DESCRIPTION Individuals with problem alcohol use who were assessed to have suicidal ideation and received a brief cognitive-behavioral therapy-based intervention completed daily phone-based interactive voice recording (IVR) surveys to assess changes in suicidal ideation over time. The study was of the feasibility of using IVR for this purpose.

POPULATION Veterans enrolled in Veterans Health Administration primary care who received behavioral health services and reported suicidal ideation. Half the participants received services for alcohol misuse.

SETTING Homes (New York)

EVALUATION DESIGN The study was a qualitative case study of four participants. Completion rates of the daily IVR surveys were assessed and participants were interviewed to obtain their opinions on the surveys. Survey data was also reviewed to determine if any changes in services were warranted.

EVALUATION OUTCOME(S) Across the four participants, a total of 77.7% of the surveys were completed. Participants reported that completing the calls was not burdensome and were able to successfully navigate the IVR system when completing the calls. Two participants reported that the act of self-monitoring helped reduced suicidal ideation. One participant reported that the calls were "boring." At various times, three participants denied they were experiencing suicidal ideation. All participants received a variety of health and behavioral health services throughout the study period.

EVALUATION STUDY CITATION Bishop, T. et al (2016). Considerations in the Use of Interactive Voice Recording for the Temporal Assessment of Suicidal Ideation and Alcohol Use: A Case Series. *Crisis* 2016. DOI: 10.1027/0227-5910/a000408



SCREENING TOOLS

YOUTH SUICIDE RISK SCREENING AT HOSPITAL EMERGENCY DEPARTMENTS

DESCRIPTION Study 1: Youth ages 14-19 seeking any services at a hospital emergency department were screened with a 22-item survey to assess their risk of suicide. Questions were drawn from other surveys and asked about depressive symptoms, suicidal ideation, alcohol use, and drug use.

Youth who screened positive were randomly assigned to receive services as usual or the intervention Teen Options for Change, which provided personalized feedback to survey responsible, a short motivational interview session, a handwritten follow-up note, and one telephone check-in call.

Study 2: Systematic review of 14 studies of youth behavioral health screening tools in use at hospital emergency departments. The purpose of the review was to identify the most effective screening tools currently in use. Six of the studies reviewed the suicide risk screening tools:

- Ask Suicide-Screening Questions (ASQ)
- Columbia-Suicide Severity Rating Scale (C-SSRS)
- Risk of Suicide Questionnaire (RSQ)
- A composite screening that used the Suicide Ideation Questionnaire for patients aged 13 or 14 years (SIQ-JR), Alcohol Use Disorders Identification Test-Consumption subscale (AUDIT-C), and Reynolds Adolescent Depression Scale (RADS-2)
- Single Question Screen (SQS)
- Two Question Screen (TQS)

POPULATION Study 1 & 2: Youth seeking hospital emergency department services

SETTING Study 1: Hospital emergency department (Unnamed urban area in the U.S.)
Study 2: Hospital emergency departments in the US and Canada

EVALUATION DESIGN Study 1: Youth seeking hospital emergency department services were approached and offered a suicide risk screening survey. Youth who completed the survey and screened positive for risk of suicide were contacted two months later for follow-up (n=81)

Study 2: Systematic review of 14 studies that analyzed 18 screening tools for behavioral health risks, including risk of suicide. Studies were analyzed for study quality and results of findings; this included reviewing study validity and potential screening tool biases.

EVALUATION OUTCOME(S) Study 1: At two-months follow-up, 6 youth (7.6%) reported a suicide attempt and another 15 youth (18.5%) reported engaging in some form of suicidal behavior. Youth who screened positive for suicide risk plus depression and drug or alcohol use were the most likely (38.9%) to report suicide attempts or behaviors. The study authors suggest that this means the screener successfully identified a high-risk population. No impact was found between participation in Teen Options for Change and likelihood of engaging in suicidal behavior.

Study 2: The review found that the ASQ tool had the strongest evidence-based for identifying suicide risk among youth. It recommends hospital emergency departments implement it alongside a general screening tool (HEADS-ED) for mental health conditions and a DSM two-item scale to screen for alcohol use disorders.

EVALUATION STUDY CITATION Study 1: King, C. et al. (2015). Identifying Adolescents at Highly Elevated Risk for Suicidal Behavior in the Emergency Department. *Journal of Child and Adolescent Psychopharmacology* 25(2), 100-108.

Study 2: Netwon, A. et al (2017). A Systematic Review of Instruments to Identify Mental Health and Substance Use Problems Among Children in the Emergency Department. *ACADEMIC EMERGENCY MEDICINE* 24(5), 552-568.



PROGRAM STUDIES

ENVIRONMENTAL STRATEGIES TO REDUCE ALCOHOL ACCESS AND RISK OF SUICIDE

DESCRIPTION Policymakers have implemented numerous environmental strategies to reduce alcohol access with the goals of reducing rates of binge drinking and underage use. Due to the connections between alcohol use and risk of suicide, many of these strategies may have had an impact on reducing rates and risk of suicide. This study was a systematic review of research on that connection.

POPULATION Universal population

SETTING U.S. and worldwide

EVALUATION DESIGN Systematic review of 17 studies conducted between 1999 and 2014 on the connections between alcohol policies and suicide (14 studies) or blood alcohol content (BAC) levels and suicide (3 studies).

EVALUATION The systematic review found that:

OUTCOME(S)

- Higher rates of alcohol taxation are generally associated with lower rates of suicide (though one study found a contra-indicated positive association instead)
- Raising the minimum legal drinking age to age 21 reduced rates of youth suicide
- Greater density and availability of liquor outlets is associated with higher rates of suicide
- Zero tolerance laws were associated with reduced rates of suicide among young males (no effect found among young females or older adults)
- Regulations to control alcohol volume and quality were associated with reduced rates of suicide among males (Russian study)
- A retrospective study found that ending an anti-alcohol campaign implemented by the Soviet Union led to increased rates of suicide (Estonian study)
- Privatization of retail alcohol sales led to increased rates of suicide (Canadian study)

EVALUATION STUDY CITATION Xuan, Z. et al (2016). Alcohol Policies and Suicide: A Review of the Literature. *Alcohol Clin Exp Res.* 2016 October; 40(10): 2043–2055.

PROGRAM STUDIES

PRESCRIBER EDUCATION TO REDUCE OPIOID MISUSE AMONG HIGH RISK VETERANS

DESCRIPTION Study 1: Health care prescribers serving veterans within the Veterans Health Administration (VHA) health care system were exposed to a point-of-prescribing medical alert designed to reduce the co-prescription of opioids and benzodiazepine among Veterans with high-risk conditions. Prescribers could ignore or override the alert or make changes to the prescriptions. The alert activated if a veteran was prescribed an opioid or benzodiazepine while having an active prescription for the other drug class and had one or more risk conditions documented in their electronic health record. Risk conditions included a diagnosed substance use disorder, alcohol misuse disorder, or a suicide risk flag.

Study 2: Health care providers serving veterans within the Veterans Health Administration (VHA) health care system were issued new guidelines about opioid prescribing in 2010. These guidelines provided new recommendations on best practices for issuing opioid prescriptions, including information on recognizing patients at higher risk for opioid-adverse events, including risk of opioid-involved suicide.

POPULATION Study 1 & 2: Health care prescribers serving high risk veterans

SETTING Study 1 & 2: VHA Health Clinics (US)

EVALUATION DESIGN Study 1: The intervention was implemented in the VHA Puget Sound Health Care System, which consists of 2 medical centers and 7 outpatient clinics. Results were compared to a control VHA system that did not implement the alerts. Administrative data were compared over a 24-month period, from 12 months before the intervention was implemented to 12 months after.

Study 2: The study reviewed administrative data from the VHA National Patient Care Database and VHA Decision Support System to determine the extent of provider and facility adoption of the guidelines. Patient outcomes were compared between providers and facilities with high and low adoption of the guidelines.

**EVALUATION
OUTCOME(S)**

Study 1: Compared to the control VHA system, the intervention VHA system reported decreased rates of co-prescribing in the sleep apnea and suicide-risk cohorts.

Study 2: Compared to facilities with lower adoption of the guidelines, facilities with greater adoption had lower risk of veteran suicide. The elements of the guidelines most associated with lower risk were:

- Increased rate of drug screening tests
- Increased rate of follow-up appointments after new prescriptions were issued
- Decreased rate of co-prescriptions with sedatives.

**EVALUATION
STUDY
CITATION**

Study 1: Malte, C. et al (2018). Electronic Medical Record Alert Associated With Reduced Opioid and Benzodiazepine Coprescribing in High-risk Veteran Patients. *Medical Care* 56(2), 171-178.

Study 2: Im, J. et al (2015). Association of Care Practices with Suicide Attempts in US Veterans Prescribed Opioid Medications for Chronic Pain Management. *J Gen Intern Med* 30(7):979-91

**RESOURCE
CITATIONS**

N/A



PROGRAM STUDIES

THE QUNGSAVIK INTERVENTION TO REDUCE ALCOHOL MISUSE AND SUICIDE AMONG RURAL YUP'IK ALASKA NATIVE YOUTH

DESCRIPTION Study 1 & 2: Rural Yup'ik Alaska Native communities implement components from the Qungasvik intervention toolbox to strengthen protective factors against behavioral health issues among youth, such as alcohol misuse and suicidal ideation. The Qungasvik intervention is strengths-based and seeks to reinforce protective factors such as family cohesion, community bonds, peer relations, and individual mastery. The intervention is not prescriptive; instead it offers 26 modules for communities to choose from based on their needs.

POPULATION Study 1 & 2: Rural Yup'ik Alaska Native Youth

SETTING Study 1 & 2: Rural communities (Alaska)

EVALUATION DESIGN Study 1: 50 youth from one Yup'ik community participated in a longitudinal study to examine the impacts of the intervention. The study sought to identify whether the intervention impacted variables known to be protective factors with suicide and alcohol use disorder; rather than measures changes in rates of misuse or suicide among participants.

Study 2: Yup'ik participants were divided into two groups which were compared to examine the impacts of the intervention at different intensities. One group received a high intensity version of the intervention with many modules, while the a second group received a low intensity version with fewer modules. Youth in both groups completed surveys at four time points across the study period on measures related to the protective factors the intervention seeks to reinforce.

EVALUATION OUTCOME(S) Study 1: The study found that the intervention had positive impacts on family and community social network variables, but only minimal impact on individual variables.

Study 2: The study found that the higher intensity intervention produced significantly greater positive impacts for suicide risk (e.g. beliefs and experiences that life is enjoyable and worthwhile) than the lower intensity intervention.

EVALUATION STUDY CITATION Study 1: Philip, J. et al (2016). Relationship of Social Network to Protective Factors in Suicide and Alcohol Use Disorder Intervention for Rural Yup'ik Alaska Native Youth. *Psychosocial Intervention* 25, 45–54

Study 2: Allen, J. et al (2018). Multi-Level Cultural Intervention for the Prevention of Suicide and Alcohol Use Risk with Alaska Native Youth: A Non-Randomized Comparison of Treatment Intensity, *Prev Sci.*, 19(2): 174–185.

APPENDIX A: STUDIES ON SUICIDE PREVALENCE AND ALCOHOL AND OPIOID MISUSE RISK FACTORS



This Appendix provides a list of references for the relevant articles identified by this literature review that focused on suicide prevalence or risk and protective factor for suicide. As discussed in the Methodology Section, articles in this Appendix underwent review to ensure their relevance to the topic of this literature review. All articles focus on U.S.-based populations, and, if a review or study of risk and protective factors, include a focus on connections to alcohol or opioid misuse.

Agrawal, A. et al (2017). Reciprocal relationships between substance use and disorders and suicidal ideation and suicide attempts in the Collaborative Study of the Genetics of Alcoholism. *Journal of Affective Disorders* 213: 96-104.

Allan, N. et al (2019). Interactive effects of PTSD and substance use on suicidal ideation and behavior in military personnel: Increased risk from marijuana use. *Depression and Anxiety* 36(11): 1072-1079.

Ammerman, B. et al (2018). Risk-Taking Behavior and Suicidality: The Unique Role of Adolescent Drug Use. *Journal of Clinical Child and Adolescent Psychology* 53(47): 131-141

Anestis, M. et al (2019). The Role of Opioid Use in Distinguishing between Suicidal Ideation and Attempts. *Suicide & Life-Threatening Behavior*. Doi: 10.1111/sltb.12557

Arias, S. et al (2016). Substance use as a mediator of the association between demographics, suicide attempt history, and future suicide attempts in emergency department patients. *Crisis: The Journal of Crisis Intervention and Suicide Prevention* 37(5): 385-391.

Arias, S. et al (2016). Factors Associated With Suicide Outcomes 12 Months After Screening Positive for Suicide Risk in the Emergency Department. *Psychiatric Services* 67(2): 206-213.

Artenie, A. et al (2015). Associations of substance use patterns with attempted suicide among persons who inject drugs: can distinct use patterns play a role? *Drug and Alcohol Dependence* 147: 208-214.

Ashrafioun, L. et al (2017). Frequency of prescription opioid misuse and suicidal ideation, planning, and attempts. *Journal of Psychiatric Research* 92: doi:10.1016/j.jpsychires.2017.03.011

Ashrafioun, L. et al (2019). The relationship between past 12-month suicidality and reasons for prescription opioid misuse. *Journal of Affective Disorders* 249: 45-51.

- Ashrafioun, L. et al (2019). Opioid use disorders, psychiatric comorbidities, and risk for suicide attempts among veterans seeking pain care. *Psychological Medicine*
Doi:10.1017/S0033291719002307
- Austin, A. et al (2017). Characteristics of self-inflicted drug overdose deaths in North Carolina. *Drug and Alcohol Dependence* 181: 44-49.
- Backman, O. et al (2016). Alcohol and substance abuse, depression and suicide attempts after Roux-en-Y gastric bypass surgery. *The British Journal of Surgery* 103(10): 1336-1342.
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- Bagge, C. et al (2015). Alcohol use to facilitate a suicide attempt: an event-based examination. *Journal of Studies on Alcohol and Drugs* 76(3): 474-481.
- Baiden, P. et al (2019). Examining the association between prescription opioid misuse and suicidal behaviors among adolescent high school students in the United States. *Journal of Psychiatric Research* 112: 44-51.
- Baiden, P. et al (2019). Investigating the association between age at first alcohol use and suicidal ideation among high school students: Evidence from the youth risk behavior surveillance system. *Journal of Affective Disorders* 242: 60-67.
- Barman-A. et al 2019 Prevalence and correlates of nonmedical use of prescription drugs (NMUPD) among Young adults experiencing homelessness in seven cities across the United States. *Drug and Alcohol Dependence* 200: 153-160.
- Berardelli, I. et al (2018). Lifestyle Interventions and Prevention of Suicide *Frontiers in Psychiatry* 9: 567
- Berman, M. et al (2017). Effect of alcohol dose on deliberate self-harm in men and women. *Journal of Consulting and Clinical Psychology* 85(9): 854-861.
- Bernstein, J. et al. (2014). The association of injury with substance use disorder among women of reproductive age: An opportunity to address a major contributor to recurrent preventable emergency department visits? *Academic Emergency Medicine* 21(12): 1459-1468

- Bing-Canar, H. et al (2019). Alcohol Use Problems, Posttraumatic Stress Disorder, and Suicide Risk Among Trauma-Exposed Firefighters. *The Journal of Nervous and Mental Disease* 207(3): 192-198.
- Blakey, S. et al (2018). Chronic Pain, TBI, and PTSD in Military Veterans: A Link to Suicidal Ideation and Violent Impulses? *The Journal of Pain*. 19(7): 797-806.
- Bogdanowicz, K. et al (2015). Double trouble: Psychiatric comorbidity and opioid addiction-all-cause and cause-specific mortality. *Drug and Alcohol Dependence* 148: 85-92.
- Bohnert, A. (2019). Understanding Links among Opioid Use, Overdose, and Suicide. *The New England Journal of Medicine* 380(1): 71-79.
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Britton, P. et al (2015). Comorbid depression and alcohol use disorders and prospective risk for suicide attempt in the year following inpatient hospitalization. *Journal of Affective Disorders* 187: 151-155.

Bryan, C. et al (2016). From impulse to action among military personnel hospitalized for suicide risk: alcohol consumption and the reported transition from suicidal thought to behavior. *General Hospital Psychiatry* 41: 13-19.

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Campbell, G. et al (2015). Associations of borderline personality with pain, problems with medications and suicidality in a community sample of chronic non-cancer pain patients prescribed opioids for pain. *General Hospital Psychiatry* 37(5): 434-440.

Canner, J. et al (2018). Emergency department visits for attempted suicide and self-harm in the USA: 2006-2013. *Epidemiology and Psychiatric Sciences* 27(1): 94-102.

Cardoso, J. et al (2018). General and Ethnic-Biased Bullying Among Latino Students: Exploring Risks of Depression, Suicidal Ideation, and Substance Use. *Journal of Immigrant and Minority Health* 20(4): 816-822.

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Chan, L. et al (2014). Are predictors of future suicide attempts and the transition from suicidal ideation to suicide attempts shared or distinct: a 12-month prospective study among patients with depressive disorders. *Psychiatry Research* 220(3): 867-873.

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Coplan, P. et al (2017). Comparison of abuse, suspected suicidal intent, and fatalities related to the 7-day buprenorphine transdermal patch versus other opioid analgesics in the National Poison Data System. *Postgraduate Medicine* 129(1): 55-61.

Cornelius, J. et al (2015). Does the Transmissible Liability Index (TLI) assessed in late childhood predict suicidal symptoms at young adulthood? *The American Journal of Drug and Alcohol Abuse* 41(3): 264-268.

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