

## Kaiser Permanente Research Brief

# Substance-Use Disorders

This brief summarizes the contributions of Kaiser Permanente Research since 2007 on the topic of substance-use disorders, including misuse of tobacco products, alcohol, prescription medications, and illicit drugs.

The Office of the U.S. Surgeon General defines substance-use disorders as “medical illness[es] caused by repeated misuse of a substance or substances, characterized by clinically significant impairments in health, social function and impaired control over substance use, and diagnosed through assessing cognitive, behavioral, and psychological symptoms.”<sup>[1]</sup> They are neurobiological disorders that involve a complex interplay between genetics and environment, and are best treated in medical settings.

The 2016 National Survey on Drug Use and Health (NSDUH) estimated that 5.6% of Americans over age 11 have alcohol-use disorders.<sup>[2]</sup> One in 10 Americans ages 12 and older use illicit drugs, primarily marijuana.<sup>[2]</sup> Approximately 2.3% of Americans misuse prescription drugs, while 4.4% misuse opioid drugs.<sup>[2]</sup> The Centers for Disease Control and Prevention (CDC) estimates that 15.1% of American adults are current smokers,<sup>[3]</sup> while 3.4% use smokeless tobacco products.<sup>[4]</sup> Although misuse of all these substances falls within the purview of addiction medicine, they vary with respect to the prevalence of use and use disorders – each has different risk factors, associated health risks, treatment modalities, and treatment outcomes.

Substance-use disorders are an active area of study for Kaiser Permanente Research. Scientists across the organization have published approximately 400 articles related to substance-use disorders over the past decade; these articles have been

### Kaiser Permanente Publications Related to Substance-Use Disorders since 2007



Source: Kaiser Permanente Publications Library and PLUM metrics, as of 13 February 2018.

a Number of citing journal articles, according to Scopus.

b Number of references in PubMed guidelines.

c Citations in DynaMed Plus, a point-of-care clinical reference tool.

This brief summarizes a selection of the publications contained within the Kaiser Permanente Publications Library, which indexes journal articles and other publications authored by individuals affiliated with Kaiser Permanente. The work described in this brief originated from across Kaiser Permanente's eight regions and was supported by a wide range of funding sources including internal research support as well as both governmental and non-governmental extramural funding.

## STUDY SPOTLIGHT

### *Opioid prescriptions for chronic pain and overdose: a cohort study.*

Dunn KM, Saunders KW, Rutter CM, et al.,

2010; Ann Intern Med, 152(2): 85-92

PMID 20083827

544 Citations

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This 2010 article is the most cited paper related to substance-use disorders in the Kaiser Permanente Publications Library.

This study examined prescription opioid use among 9,940 members of Group Health Cooperative who were treated for non-cancer pain between 1997 and 2005. This is the first study to examine the relationship between daily opioid dose and the risk of overdose.

Over the study period, 51 opioid-related overdoses occurred. Relative to patients receiving low daily opioid doses (1-20 mg/day), patients with higher daily doses were at significantly greater risk. Patients receiving 100 mg/day or more were almost 9 times more likely to experience overdose. The study has led to closer clinician monitoring of patients receiving higher doses of opioids.

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cited more than 9,000 times. These articles are the product of observational studies, randomized controlled trials, meta-analyses, and other studies led by Kaiser Permanente scientists. Our research scientists, clinicians, and leaders collaborate in a unique environment that enables us to make real contributions to understanding risk, improving patient outcomes, and translating knowledge into policy and practice.

## Understanding Risk

### Who is at risk for developing substance-use disorders?

Kaiser Permanente researchers have contributed to understanding the risk of substance-use disorders. Factors found to be associated with higher risks include younger age,<sup>[5, 6]</sup> male gender,<sup>[5, 6]</sup> family history,<sup>[7-9]</sup> current or prior mental health problems,<sup>[6, 10]</sup> and use of tobacco, alcohol, or drugs at levels not meeting the criteria for use disorders.<sup>[5, 10-12]</sup> These factors contribute, to varying degrees, to the risk of use disorders in all addictive substances. Familial risk factors may include genetic influences or modeling substance-use behaviors by family members.

### What other health risks do people with substance-use disorders face?

A second line of research has studied health risks faced by people with substance-use disorders. The CDC has estimated that 88,000 Americans die each year from alcohol-related causes, making alcohol the third-leading preventable cause of death in the United States.<sup>[13]</sup> Risks associated with alcohol-use disorder that have been studied by our researchers include liver disease,<sup>[14, 15]</sup> surgical complications,<sup>[16-18]</sup> inadequate adherence to prescribed medications,<sup>[19]</sup> accidents and injuries,<sup>[20-22]</sup> and fetal alcohol syndrome.<sup>[23]</sup>

According to a recent report from the Office of the U.S. Surgeon General, smoking causes more than 480,000 deaths nationally each year, including 90% of lung cancer deaths and 80% of Chronic Obstructive Pulmonary Disease (COPD) deaths.<sup>[24]</sup> Studies conducted by our researchers have linked tobacco addiction with risks including heart disease,<sup>[25, 26]</sup> stroke,<sup>[26]</sup> other vascular disease,<sup>[25, 27]</sup> respiratory disease,<sup>[25, 28-31]</sup> and numerous forms of cancer.<sup>[25, 32-36]</sup> A recent Kaiser Permanente study also suggests that smokers may be at increased risk of opioid-use disorders.<sup>[37]</sup>

Our researchers have studied risks associated with cannabis use, including mental health symptoms<sup>[38-40]</sup> and respiratory illness.<sup>[41, 42]</sup> Other studies conducted in Kaiser Permanente found that patients with marijuana-use disorder had more co-occurring

health problems<sup>[43]</sup> and higher emergency,<sup>[44]</sup> inpatient,<sup>[44]</sup> and psychiatric utilization.<sup>[40]</sup> Although data on the long-term health risks of cannabis are equivocal,<sup>[41, 45]</sup> persons who use this drug may be more likely to use alcohol and other drugs, and recent legalization initiatives have contributed to concern about the possible health consequences of increased normalization of marijuana use.

Data compiled by the CDC has found that use of opioid medications (particularly fentanyl and fentanyl analogs) has driven the sharply increasing rate of overdose deaths between 1999 and 2016.<sup>[46]</sup> Misuse of opioids has been linked in our studies with risks such as overdose,<sup>[47-49]</sup> soft-tissue infection,<sup>[50, 51]</sup> and HIV or Hepatitis C infection arising from needle-sharing practices.<sup>[52]</sup> Kaiser Permanente research has also suggested that persons using prescription opioids are at higher risk of illicit drug use,<sup>[53]</sup> and that patients with opioid-use disorder are more likely to have other medical problems.<sup>[43]</sup>

## Improving Patient Outcomes

### What strategies are effective in preventing substance-use disorders?

Approaches to prevention or risk reduction studied by Kaiser Permanente researchers include screening and brief counseling for smoking<sup>[54-56]</sup> and alcohol use,<sup>[57-59]</sup> and addressing early substance use before it rises to the level of a use disorder.<sup>[60, 61]</sup> Brief counseling prior to first use has been found to be effective in preventing use disorders and realizing superior health outcomes.<sup>[55, 62]</sup> Evidence regarding prevention in persons who use at risky levels is mixed, but some interventions have yielded positive results, such as smoking cessation programs combining counseling with nicotine replacement.<sup>[63, 64]</sup> We have studied early interventions for adolescent substance-use disorders, including two randomized trials demonstrating that screening and brief intervention for adolescents can be improved by training pediatricians or embedded behavioral

health clinicians to provide Screening, Brief Intervention, and Referral to Treatment (SBIRT).<sup>[61, 65]</sup> Kaiser Permanente has established a registry of patients using prescription opioids in Northern California, to monitor the care of these patients and allow further study of the public health issues surrounding opioid use,<sup>[66]</sup> and an ongoing study is using electronic health record data to learn more about identifying and preventing opioid overdoses. Our researchers were among the earliest to raise concerns about the national opioid epidemic, and have urged greater caution in long-term opioid prescribing.<sup>[67]</sup>

### What are the key factors in effective treatment of people with substance-use disorders?

**Addressing Stigma.** Substance-use disorders are chronic illnesses characterized by frequent relapse. Thus, engaging the patient to initiate and persist in care is critical to successful treatment. To foster patient engagement, clinicians should be careful to avoid language that stigmatizes the patient's substance use, both in communication with the patient and with one another.<sup>[68]</sup>

**Medical Management.** Behavioral therapy, including counseling and contingency management, is a mainstay in the treatment of all substance-use disorders.<sup>[63]</sup> Pharmacotherapy is an important component of treatment of opioid-use disorders,<sup>[69, 70]</sup> and is an option for treating misuse of alcohol<sup>[71]</sup> or tobacco.<sup>[63, 72]</sup> Quitlines (no-cost phone-based tobacco cessation services) are also effective in tobacco cessation.<sup>[73-75]</sup> Harm-reduction interventions to mitigate the negative consequences of substance use are another component of effective treatment. Community-based 12-step-style programs or other peer supports may also be helpful resources for persons with substance-use disorders.<sup>[76-79]</sup> Our research in adolescent patients has also found that continued care is associated with greater long-term abstinence in these patients.<sup>[80]</sup>

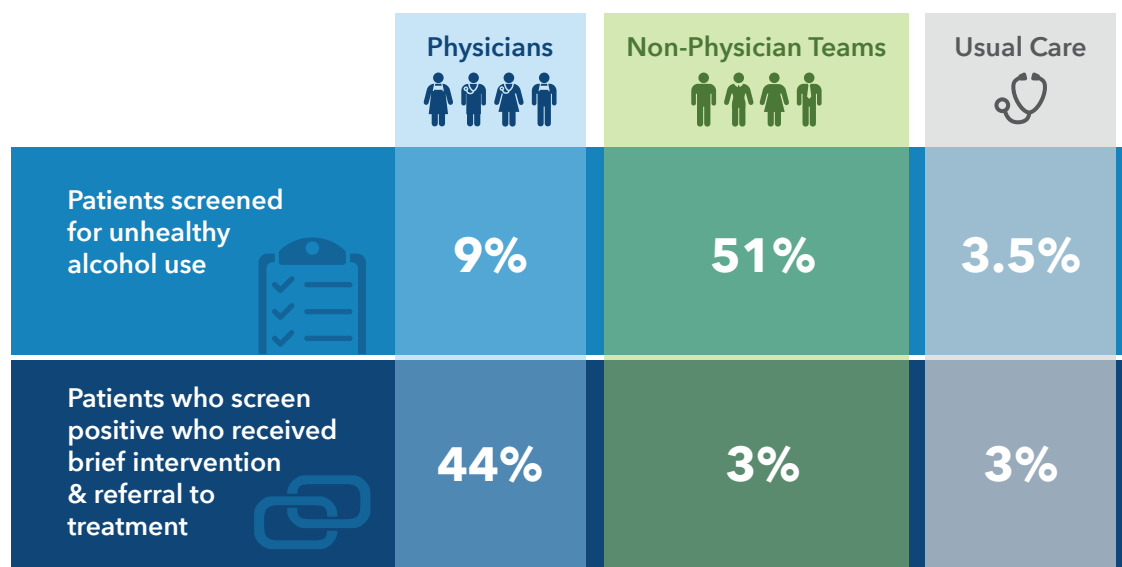
## Translating Research into Policy & Practice

### How has Kaiser Permanente research on substance-use disorders contributed to changes in policy and practice?

As part of a learning health care organization that uses research to inform and improve practice, Kaiser Permanente’s research, clinical, and operational partners have tested many interventions to reduce the risk of substance-use disorders and improve outcomes for patients with these disorders. Work on engaging patients<sup>[81-83]</sup> and integrating interventions for substance use into primary care workflows<sup>[58, 68, 69, 84-88]</sup> has been adopted nationally into practice recommendations from the National Council for Behavioral Health.<sup>[89]</sup> In the Alcohol Drinking as a Vital Sign (ADVISE) trial, a team in Kaiser Permanente’s Northern California region studied alcohol screening in the context of assessing alcohol use as a vital sign.<sup>[90]</sup> This study has supported the design and implementation of region-wide screening and reporting, leading to millions of members being screened by non-physician clinicians for alcohol-use disorders (with physicians directing treatment referral). Work is underway to implement this program in other Kaiser Permanente regions. Additionally, the ongoing Primary Care Opioid Use Disorders Treatment (PROUD) trial will explore the impact of a nurse care manager on access and adherence to medication therapy for patients being treated for opioid-use disorders.<sup>[91]</sup> Our researchers have also studied the documentation of e-cigarette use in the organization’s electronic health records, and have provided recommendations to improve routine screening.<sup>[92]</sup>

#### Screening, Brief Intervention, and Referral to Treatment (SBIRT) for Alcohol-Use Disorder

Improving implementation of recommended screening and brief intervention for unhealthy alcohol use in primary care: A comparison of alternative staffing models<sup>[90]</sup>



Non-physician providers screened a larger proportion of their patients, but physicians were more likely to deliver the brief intervention and referral to patients who screened positive.

Kaiser Permanente’s regional research groups all participate in the Addiction Research Network, a National Institute on Drug Abuse (NIDA)-sponsored initiative aimed at expanding access and improving the quality of addiction treatment by enhancing its integration with general medical care. Our researchers also work as investigators and collaborators in numerous national research initiatives. We have led or collaborated on several notable studies related to the risks, prevention and treatment of substance-use disorders (see table below).

### Notable Studies Related to Substance-Use Disorders

STUDY	FUNDER
Medication Use, Safety and Evidence (MUSE)	Food and Drug Administration
Alcohol Drinking as a Vital Sign (ADVISE)	National Institute of Alcohol Abuse and Alcoholism
Coronary Artery Risk Development in Young Adults (CARDIA)	National Heart, Lung, and Blood Institute
CONsortium to Study Opioid Risk and Trends (CONSORT)	National Institute on Drug Abuse

A great deal of work has focused on addressing stigma in the care of patients with substance-use disorders, and changing the broader culture in caring for this population. One Kaiser Permanente study assessed the experiences of patients entering addiction treatment facilities and found substantial opportunities for process improvements to lower barriers to treatment entry.<sup>[93]</sup> Other Kaiser Permanente researchers have studied clinician-reported barriers to the adoption of evidence-based opioid treatment,<sup>[85, 94]</sup> and one team has studied patient preferences for pharmacotherapy for opioid-use disorder.<sup>[95]</sup>

Collectively, research from Kaiser Permanente authors has been cited more than 20 times within recent consensus statements and clinical practice guidelines published by a wide range of entities, including the CDC,<sup>[96]</sup> the Departments of Defense and Veterans Affairs,<sup>[97]</sup> and the Washington State Department of Labor and Industries.<sup>[98]</sup> In addition, our researchers and clinician scientists have directly contributed as authors of a 2013 American Heart Association guideline,<sup>[99]</sup> and of two systematic reviews undertaken for the U.S. Preventive Services Task Force.<sup>[55, 63]</sup>

Kaiser Permanente’s nearly 170 research scientists and more than 1,600 support staff are based at 8 regional research centers and 1 national center. There are currently more than 2,500 studies underway, including clinical trials. Since 2007, our research scientists have published more than 12,000 articles in peer reviewed journals. Kaiser Permanente currently serves more than 12 million members in 8 states and the District of Columbia.

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