

# 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.

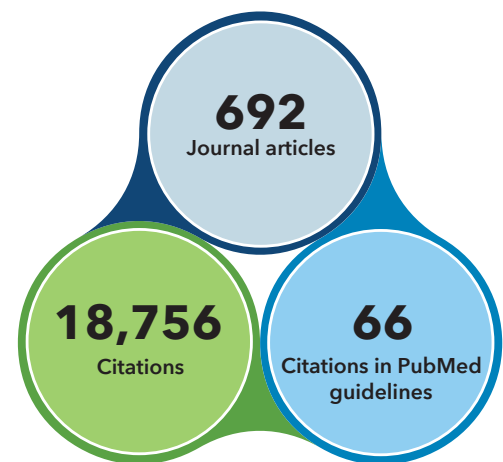
The office of the U.S. surgeon general defines substance use disorders as “medical illness[es] caused by repeated misuse of a substance or substances, characterized by clinically significant impairments in health [and] social function, and impaired control over substance use, and diagnosed through assessing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

The 2020 National Survey on Drug Use and Health estimated that 10% of Americans over age 11 have alcohol use disorders.<sup>2</sup> More than 20% of Americans age 12 and older use marijuana or illicit drugs.<sup>2</sup> Approximately 5.8% of Americans misuse prescription drugs, while 3.4% misuse opioid drugs.<sup>2</sup>

The Centers for Disease Control and Prevention estimates that 12.5% of American adults are current smokers,<sup>3</sup> while 2.3% use smokeless tobacco products.<sup>4</sup> Misuse of all these substances varies 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 nearly 700 articles related to substance use disorders since 2007.<sup>5</sup> These articles, which have been cited almost 19,000 times, are the product of observational studies, randomized controlled trials, meta-analyses, and other studies led by Kaiser Permanente scientists. Our unique environment – a fully integrated care and coverage model in which our research scientists, clinicians, medical groups, and health plan leaders collaborate – lets us contribute generalizable knowledge on substance use disorders and many other research topics.

## Kaiser Permanente publications related to substance use disorders since 2007



Source: Kaiser Permanente Publications Library and Scite metrics, as of January 5, 2022.

## 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>6;7</sup> male gender;<sup>6;7</sup> family history;<sup>8-10</sup> current or prior mental health problems;<sup>7;11-16</sup> use of smokeless tobacco;<sup>17</sup> and use of tobacco, alcohol, or drugs at levels not meeting the criteria for use disorders.<sup>6;11;13;18;19</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.<sup>20</sup> More recent research also suggests that patients with chronic pain conditions<sup>21;22</sup> and those recovering from surgical procedures<sup>23-26</sup> may be at greater risk of opioid and other substance use disorders.

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

A second line of research looks at the health risks faced by people with substance use disorders. All types of substance use disorders are associated with increased risk of suicide<sup>27</sup> and premature mortality.<sup>28</sup> The CDC estimates that 141,000 Americans die each year from alcohol-related causes, making alcohol the third-leading preventable cause of death in the United States.<sup>29</sup> Risks associated with alcohol use disorder that have been studied by Kaiser Permanente researchers include liver disease,<sup>30;31</sup> surgical complications,<sup>32-34</sup> inadequate adherence to prescribed medications,<sup>35</sup> accidents and injuries,<sup>36-38</sup> and fetal alcohol syndrome.<sup>39</sup> Higher levels of drinking among people living with HIV may also be associated with poorer control of HIV.<sup>40</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 deaths due to COPD, or chronic obstructive pulmonary disease.<sup>41</sup> Studies conducted by Kaiser Permanente researchers have linked tobacco use with risks including death,<sup>42</sup> heart disease,<sup>43;44</sup>

stroke,<sup>44</sup> other vascular disease,<sup>43;45</sup> respiratory disease,<sup>43;46-50</sup> immune-mediated illnesses,<sup>51</sup> and numerous forms of cancer.<sup>43;52-58</sup> Findings from a recent Kaiser Permanente study suggest that cancer risk may be compounded by low rates of lung cancer screening among smokers.<sup>59</sup> Other studies suggest that smokers may be at increased risk of opioid use disorders<sup>60</sup> and impaired cognition in middle age.<sup>61</sup>

Risks associated with cannabis use studied by Kaiser Permanente researchers include mental health symptoms<sup>62-67</sup> and respiratory illness.<sup>68;69</sup> Other Kaiser Permanente studies found that marijuana use disorder was associated with the risk of co-occurring health problems<sup>70</sup> and the use of emergency,<sup>71;72</sup> inpatient,<sup>71</sup> and psychiatric care.<sup>64</sup> Recent work conducted by our scientists has explored the harms associated with cannabis use by pregnant women.<sup>73-77</sup> Although data on the long-term health risks of cannabis are equivocal,<sup>68;78-81</sup> people who use the drug may be more likely to use alcohol and other drugs, and approximately 30% of daily users have symptoms consistent with a substance use disorder.<sup>82</sup> Moreover, recent legalization initiatives have contributed to concerns about the possible health consequences of increased normalization of marijuana use.<sup>83-85</sup>

Data compiled by the CDC found that the use of opioid medications (particularly fentanyl and fentanyl analogs) drove the sharp increase of overdose deaths between 1999 and 2016,<sup>86</sup> a trend that has continued into 2021.<sup>87</sup> Kaiser Permanente studies found a link between the misuse of opioids and risks such as overdose,<sup>88-91</sup> soft-tissue infection,<sup>92-94</sup> and HIV or hepatitis C infection arising from needle-sharing practices.<sup>95</sup> Kaiser Permanente research also suggests that people using prescription opioids are at higher risk of illicit drug use<sup>96</sup> (including use of heroin following discontinuation of opioids),<sup>97</sup> have poorer health outcomes, and have higher health care utilization.<sup>98</sup> Patients with opioid use disorder are also likely to have other medical problems,<sup>70</sup> and there are concerns about the use of opioids in conjunction with benzodiazepines among pregnant women.<sup>99</sup> Finally, there is evidence that prescribing opioids increases the risk of overdose among members of the patient's family.<sup>100</sup>

## Improving Patient Outcomes

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

Approaches to prevention and risk reduction studied by Kaiser Permanente researchers include screening<sup>101</sup> and brief counseling<sup>102</sup> for smoking<sup>103-105</sup> and alcohol use,<sup>106-108</sup> and addressing early substance use before it rises to the level of a use disorder.<sup>109;110</sup> Brief counseling prior to<sup>111</sup> first use has been found to be effective in preventing substance use disorders and realizing superior health outcomes.<sup>104;112</sup> Evidence regarding prevention in people who use substances at risky levels is mixed, but some interventions have yielded positive results, such as smoking-cessation programs combining counseling with nicotine replacement.<sup>113;114</sup> Kaiser Permanente has studied early interventions for adolescent substance use disorders, including 2 randomized trials demonstrating that screening and brief intervention for adolescents can be improved by training pediatricians or embedded behavioral health clinicians on the approach.<sup>110;115</sup> Kaiser Permanente maintains a registry of patients who are using prescription opioids in Northern California to monitor the care of these patients and allow for further study of the public health issues surrounding opioid use;<sup>116</sup> similar registries are being set up across Kaiser Permanente. Moreover, ongoing studies are using electronic health record data to learn more about identifying opioid use and other substance use disorders in young patients,<sup>117;118</sup> identifying and preventing opioid overdoses,<sup>119-121</sup> and about chronic opioid use.<sup>122;123</sup> Kaiser Permanente researchers were among the earliest to raise concerns about the national opioid epidemic and have urged greater caution in long-term opioid prescribing.<sup>124;125</sup> Our scientists also have identified and implemented system changes for improving the safety of opioid prescribing, including minimizing variability between prescribed doses,<sup>126</sup> dose reduction programs,<sup>127;128</sup> redesigning primary care clinic processes,<sup>129</sup> suggesting changes in provider prescribing behavior,<sup>130</sup> and integrated monitoring using electronic health records.<sup>131;132</sup>

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

**Addressing stigma:** Substance use disorders are chronic illnesses in which long-term engagement 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>133</sup> Recent studies called particular attention to stigma as a barrier to treatment engagement for patients with pain disorders who seek care for opioid misuse.<sup>134;135</sup>

**Counseling and treatment:** Behavioral therapy, including counseling and contingency management, is a mainstay in the treatment of all substance use disorders.<sup>113;136-139</sup> Pharmacotherapy is an important component of the treatment of opioid use disorders<sup>140-142</sup> – though patients often experience significant barriers to access to medications such as buprenorphine or naltrexone<sup>143;144</sup> – and it is an option for treating the misuse of alcohol<sup>145;146</sup> or tobacco.<sup>113;147</sup> Quit lines (no-cost phone-based tobacco cessation services)<sup>148-150</sup> and similar web-based programs<sup>151-153</sup> are effective in tobacco cessation, and may also be helpful for dual users of tobacco and cannabis.<sup>154</sup> More recent work has also suggested that prescription of electronic cigarettes by clinicians may facilitate smoking cessation.<sup>155</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 people with substance use disorders.<sup>156-159</sup> Research in adolescent patients also found that continued care is associated with greater long-term abstinence in these patients.<sup>160</sup>

## Translating Research into 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>161-163</sup> and integrating interventions for substance use into primary care workflows<sup>107;133;140;164-170</sup> has been adopted nationally into practice recommendations from the National Council for Behavioral Health.<sup>171</sup> A team in Northern California studied alcohol screening in the context of assessing alcohol use as a vital sign.<sup>172</sup> The study supported the design and implementation of broader screening and reporting, leading to millions of members being screened by nonphysician clinicians for alcohol-use disorders (with physicians directing treatment referral). Work is underway to expand this program across Kaiser Permanente. Kaiser Permanente also is expanding broader screening and assessment to identify unhealthy use of alcohol and other drugs.<sup>82</sup> Additionally, the ongoing Primary Care Opioid Use Disorders Treatment 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>173</sup> Kaiser Permanente researchers also have studied the documentation of e-cigarette use in the organization's electronic health record system and have provided recommendations to improve routine screening.<sup>174;175</sup> Our scientists have also discussed challenges and strategies for managing the care of anxiety and substance use disorders during the COVID-19 pandemic.<sup>176</sup>

Kaiser Permanente's regional research groups all participate in the Addiction Research Network, a National Institute on Drug Abuse-sponsored initiative aimed at expanding access and improving the quality of addiction treatment by enhancing its integration with general medical care.<sup>177</sup> Kaiser Permanente researchers also work as investigators and collaborators in numerous national research initiatives. Kaiser Permanente researchers have led or collaborated in several notable studies related to the risks, prevention, and treatment of substance use disorders (see table). Our scientists also participated in developing quality measures for the treatment of opioid use disorders in emergency

### Screening, brief intervention, and referral to treatment 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>172</sup>

	Physicians 	Nonphysician teams 	Usual care 
Patients screened for unhealthy alcohol use	9%	51%	3.5%
Patients who screened positive who received brief intervention and referral to treatment	44%	3%	3%

Nonphysician 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.

departments; this work was organized by the National Institute on Drug Abuse.<sup>178</sup> Finally, Kaiser Permanente is involved in the Alliances to Disseminate Addiction Prevention and Treatment initiative, a program designed to improve substance use disorder treatment for youth involved with the criminal justice system.<sup>179</sup>

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>180</sup> Other Kaiser Permanente researchers studied clinician-reported barriers to the adoption of evidence-based opioid treatment,<sup>165;181;182</sup> and one team studied patient preferences for pharmacotherapy for opioid use disorder.<sup>183</sup>

Collectively, research from Kaiser Permanente authors has been cited nearly 70 times within recent consensus statements and clinical practice guidelines published by a wide range of entities, including the CDC,<sup>184</sup> the Department of Defense, the Department of Veterans Affairs,<sup>185</sup> the Society for Perioperative Assessment and Quality Improvement,<sup>186</sup> and Washington state’s Department of Labor and Industries.<sup>187</sup> In addition, Kaiser Permanente researchers and clinician scientists have directly contributed as authors of a 2013 American Heart Association guideline,<sup>188</sup> several systematic reviews undertaken for the U.S. Preventive Services Task Force,<sup>104;113;189-191</sup> and a guideline on cannabis-related vomiting written in collaboration with the county of San Diego.<sup>192</sup>

### Notable studies related to substance use disorders

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

Kaiser Permanente’s 185 research scientists and 1,530 support staff members are based at 9 research centers. There are currently 2,355 studies underway, including clinical trials. Since 2007, our research scientists and clinicians have published more than 19,000 articles. Kaiser Permanente currently serves 12.5 million members in 8 states and the District of Columbia.

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