

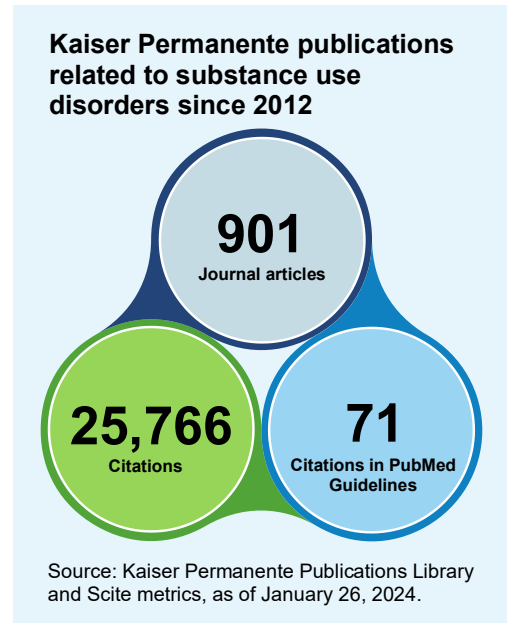
# Substance Use Disorders

This brief summarizes the contributions of Kaiser Permanente Research since 2012 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 2022 National Survey on Drug Use and Health estimated that more than 10% of Americans over age 12 have alcohol use disorders.<sup>2</sup> Nearly 7% of Americans age 12 and older have a marijuana use disorder, and almost 25% use illicit drugs.<sup>2</sup> Approximately 5% of Americans misuse prescription drugs, while 3.2% misuse opioid drugs.<sup>2</sup> This report also estimates that 41.1 million American adults are current smokers, while 6.1 million use smokeless tobacco products.<sup>2</sup> There is considerable variation in the prevalence of use and use disorders across these substances, and 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 more than 900 articles related to substance use disorders since 2012.<sup>3</sup> These articles, which have been cited almost 26,000 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.



## 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>4; 5</sup> male gender;<sup>6; 7</sup> family history;<sup>8</sup> current or prior mental health problems;<sup>5; 9-13</sup> use of smokeless tobacco;<sup>14</sup> and use of tobacco, alcohol, or drugs in ways that do not meet the criteria for use disorders.<sup>5; 9; 15-17</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>18; 19</sup> More recent research has also suggested that patients with chronic pain conditions<sup>20; 21</sup> and those recovering from surgical procedures<sup>4; 22-25</sup> may be at greater risk of unhealthy alcohol use and substance use disorders.

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

All types of substance use disorders are associated with increased risk of suicide<sup>26</sup> and premature mortality.<sup>27</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; alcohol is implicated in nearly twice as many deaths as opioids, and three times as many people die of alcohol-related causes as die by suicide.<sup>28</sup> Risks associated with alcohol use disorder that have been studied by Kaiser Permanente researchers include liver disease,<sup>29</sup> gastrointestinal conditions,<sup>30</sup> surgical complications,<sup>31</sup> hospitalizations,<sup>32</sup> inadequate adherence to prescribed medications,<sup>33</sup> and accidents and injuries.<sup>34; 35</sup> Among Kaiser Permanente members who drink alcohol, higher rates of unhealthy drinking are associated with common chronic health problems such as diabetes, hypertension, or chronic obstructive pulmonary disease.<sup>36</sup> Higher levels of drinking among people living with HIV may be associated with poorer control of HIV.<sup>37-39</sup>

According to a 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>40</sup> Studies conducted by Kaiser Permanente researchers have linked tobacco use with risks including death,<sup>41</sup> heart disease,<sup>42; 43</sup> stroke,<sup>43</sup> other vascular disease,<sup>42-44</sup> respiratory disease,<sup>42; 45; 46</sup> immune-mediated illnesses,<sup>47</sup> and numerous forms of cancer.<sup>42; 48-52</sup> Findings from a recent Kaiser Permanente study suggested that the potential benefits of lung cancer screening are limited by low rates of screening among smokers.<sup>53</sup> Other studies have suggested that smokers may be at increased risk of opioid use disorders<sup>54</sup> and impaired cognition in middle age.<sup>55</sup>




Risks associated with cannabis use studied by Kaiser Permanente researchers include mental health symptoms<sup>56-62</sup> and respiratory illness.<sup>63; 64</sup> Other Kaiser Permanente studies have found that cannabis use disorder is associated with the risk of co-occurring health problems<sup>65; 66</sup> and the use of emergency,<sup>66-69</sup> inpatient,<sup>66; 67</sup> and psychiatric care.<sup>57</sup> Recent work conducted by our scientists has explored the risks associated with use of cannabis for pain,<sup>70</sup> the harms associated use by pregnant women,<sup>71-77</sup> and the identification of and risks associated with medical cannabis.<sup>78; 79</sup> Although data on the long-term health risks of cannabis are equivocal,<sup>80-84</sup> people who use this drug may be more likely to use alcohol and other drugs,<sup>85</sup> and approximately 30% of those who use daily have symptoms consistent with a substance use disorder.<sup>86</sup> Moreover, recent legalization initiatives have contributed to concerns about the possible health consequences of increased normalization of cannabis use, including the increased risk of cannabis use disorder.<sup>87-90</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>91</sup> a trend that continued into 2021.<sup>92</sup> Kaiser Permanente studies have found links between the misuse of opioids and risks such as overdose,<sup>93-96</sup> soft-tissue infection,<sup>97; 98</sup> and HIV or hepatitis C infection arising from needle-sharing practices.<sup>99</sup> Kaiser Permanente research has also suggested that people using prescription opioids are at higher risk of illicit drug use<sup>100; 101</sup> (including use of heroin following discontinuation of opioids),<sup>102</sup> have poorer health outcomes, and have higher health care utilization.<sup>103</sup> Patients with opioid use disorder are also likely to have other medical problems,<sup>65</sup> and there are concerns about the use of opioids in conjunction with benzodiazepines among pregnant women.<sup>104</sup> Finally, there is evidence that prescribing opioids increases the risk of overdose among members of the patient’s family.<sup>105</sup>

## Improving Patient Outcomes

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

Approaches to prevention and risk reduction studied by Kaiser Permanente researchers have included screening<sup>17; 106-108</sup> and brief counseling<sup>109; 110</sup> for smoking<sup>111-113</sup> and alcohol use,<sup>114-116</sup> and addressing early substance use before it rises to the level of a use disorder.<sup>117</sup> Brief counseling prior to first use has been found to be effective in preventing substance use disorders and realizing superior health outcomes.<sup>111; 118; 119</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>120; 121</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 behavioral health clinicians on the approach.<sup>117; 122</sup> Our researchers maintain a registry of patients with alcohol misuse;<sup>123</sup> these data have been used to study differences in risk for other health problems,<sup>124</sup> use of health services,<sup>125</sup> and the potential for successful pharmacotherapy<sup>126</sup> in these patients. Kaiser Permanente also maintains a registry of patients who are using

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>116</sup>			
	 <b>Physicians</b>	 <b>Nonphysician teams</b>	 <b>Usual care</b>
Patients screened for unhealthy alcohol use	<b>9%</b>	<b>51%</b>	<b>3.5%</b>
Patients who screened positive who received brief intervention and referral to treatment	<b>44%</b>	<b>3%</b>	<b>3%</b>
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.			

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>127</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>128; 129</sup> identifying and preventing opioid overdoses,<sup>130-134</sup> and about chronic opioid use.<sup>135; 136</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>137-139</sup> Our scientists also have identified and implemented system changes for improving the safety of opioid prescribing, including minimizing variability between prescribed doses,<sup>140</sup> dose reduction programs,<sup>141-143</sup> redesigning primary care clinic processes,<sup>144</sup> suggesting changes in provider prescribing behavior,<sup>145</sup> and integrated monitoring using electronic health records.<sup>146-148</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>149</sup> Recent studies have called particular attention to stigma as a barrier to treatment engagement for patients with pain disorders who seek care for opioid misuse.<sup>150-152</sup>

**Counseling and treatment:** Behavioral therapy, including counseling and contingency management, is a mainstay in the treatment of all substance use disorders.<sup>120; 153-157</sup> Pharmacotherapy is an important component of the treatment of opioid use disorders<sup>158; 159</sup> — though patients (particularly those with co-occurring alcohol or cannabis use disorders)<sup>160</sup> often experience significant barriers to access to medications such as buprenorphine or naltrexone<sup>101; 161-163</sup> — and it is an option for treating the misuse of alcohol<sup>164-166</sup> or tobacco.<sup>120; 167; 168</sup> Research conducted by our scientists has also found that nurse-based collaborative care may improve access to medications for alcohol use disorder.<sup>169</sup> Quit lines (no-cost phone-based tobacco cessation services)<sup>170-172</sup> and similar web-based programs,<sup>173-176</sup> as well as cessation programs implemented using electronic health records,<sup>177</sup> are effective in tobacco cessation, and may also be helpful for dual users of tobacco and cannabis.<sup>172</sup> More recent work has also suggested that prescription of electronic cigarettes by clinicians may facilitate smoking cessation.<sup>178</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>179-182</sup> Research conducted in Kaiser Permanente has assessed the goals of adolescents and their parents for integrated mental health and primary care, including substance use prevention and treatment.<sup>183</sup>

## Translating Research Findings 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. Most patients with substance use disorders never receive treatment, and extensive research by our scientists has focused on developing, evaluating, and refining performance measures that assess the quality of care for these conditions.<sup>184-189</sup> Work on engaging patients<sup>6; 190</sup> and integrating interventions for substance use into primary care workflows<sup>149; 158; 191-197</sup> has been adopted nationally into practice recommendations from the National Council for Behavioral Health.<sup>198; 199</sup> A team in Northern California has studied alcohol screening in the context of assessing alcohol use as a vital sign.<sup>116</sup> The study supported the design and implementation of broader screening and reporting, with millions of members being screened by nonphysician clinicians for

alcohol use disorders, and many receiving counseling or referral to specialty care by their physician in the 10 years since the program's inception.. This screening and brief intervention program is associated with lower rates of alcohol use and reductions in blood pressure among patients with hypertension.<sup>114; 118</sup> In Washington state, Kaiser Permanente has implemented screening for alcohol, cannabis, and other drugs as part of routine mental health care for primary care patients, a program that has increased both alcohol counseling and initiation of treatment for alcohol use disorders.<sup>152; 192; 200</sup> Our researchers have led the development of symptom checklists for alcohol and other substance use, to enable providers and patients to assess whether treatment may be helpful.<sup>7; 86; 201; 202</sup> Kaiser Permanente is expanding broader screening and assessment to identify unhealthy use of alcohol and other drugs.<sup>86</sup> Additionally, the ongoing Primary Care Opioid Use Disorders Treatment and More Individualized Care: Assessment and Recovery through Engagement trials 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>101; 203-207</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>208; 209</sup> Our scientists have also discussed challenges and strategies for managing the care of substance use disorders during the COVID-19 pandemic.<sup>125; 210-213</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>214</sup> Kaiser Permanente researchers also work as investigators and collaborators in numerous national research initiatives, including a recent effort to develop standard outcome measures for use in evaluating treatments for opioid use disorder.<sup>215</sup> Kaiser Permanente researchers have led or collaborated in several notable studies related to the risks, prevention, and treatment of substance use disorders. Our scientists have also participated in developing quality measures for the treatment of opioid use disorders in emergency departments; this work was organized by the National Institute on Drug Abuse.<sup>216</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>217</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. Numerous studies of patients seeking addiction treatment have identified perceived stigma as one of many barriers to receiving care, particularly among patients seeking care for misuse of opioids.<sup>150; 218-220</sup> Other Kaiser Permanente researchers have studied clinician-reported barriers to the adoption of evidence-based opioid treatment,<sup>191; 221; 222</sup> and one team has studied patient preferences for pharmacotherapy for opioid use disorder.<sup>218</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

Collectively, research from Kaiser Permanente authors has been cited more than 70 times within recent consensus statements and clinical practice guidelines published by a wide range of entities, including the CDC,<sup>223</sup> the Department of Defense, the Department of Veterans Affairs,<sup>224</sup> the Society for Perioperative Assessment and Quality Improvement,<sup>225</sup> and Washington state's Department of Labor and Industries.<sup>226</sup> In addition, Kaiser Permanente researchers and clinician scientists have directly contributed as authors of a 2013 American Heart Association guideline,<sup>227</sup> several systematic reviews undertaken for the U.S. Preventive Services Task Force,<sup>111; 120; 168; 228; 229</sup> and a guideline on cannabis-related vomiting written in collaboration with the county of San Diego.<sup>230</sup>

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## References

1. U.S. Department of Health and Human Services. *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*. Washington, DC: HHS;2016.
2. Substance Abuse and Mental Health Services Administration Center for Behavioral Health Statistics and Quality. *Key substance use and mental health indicators in the United States: Results from the 2022 National Survey on Drug Use and Health*. Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration;2023.
3. KPPL Search, conducted on January 26, 2024: (dc.title:alcoholism OR dc.title:addiction OR title:"chemical dependency" OR dc.title:smok\* OR dc.title:"substance abuse" OR dc.title:drink\* OR dc.title:"drug abuse" OR title:"substance use" OR dc.title:"drug misuse" OR dc.title:"opiate addiction" OR dc.title:"opioid addiction" OR dc.title:marijuana OR dc.title:cannabis OR dc.title:nicotine OR(title:"opioid overdose"~10) OR (title:"tobacco cessation"~10) OR (title:"alcohol and drug treatment"~10) OR abstract:"problem drinking" OR abstract:"12-step" OR dc.subject.mesh:"Substance-Related Disorders" OR dc.subject.mesh:"Marijuana Abuse" OR dc.subject.mesh:Alcoholism OR dc.subject.mesh:"Amphetamine-Related Disorders" OR dc.subject.mesh:"Opioid-Related Disorders" OR dc.subject.mesh:"street drugs" OR dc.subject.mesh:"tobacco use" OR dc.subject.mesh:"Tobacco Use Cessation" OR dc.subject.mesh:"Smoking Cessation" OR dc.subject.mesh:nicotine OR dc.subject.mesh:"Substance Abuse Treatment Centers" OR citation:Addiction OR citation:"J Addict Med" OR citation:"Drug Alcohol Depend" OR citation:"J Subst Abuse Treat") AND dc.type:"Journal Article". Date range 2012 to 2024.
4. Namba RS, Singh A, Paxton EW, Inacio MCS. Patient Factors Associated With Prolonged Postoperative Opioid Use After Total Knee Arthroplasty. *The Journal of arthroplasty*. 2018;33(8):2449-2454.
5. Silverberg MJ, Leyden WA, Leibowitz A, et al. Factors associated with hazardous alcohol use and motivation to reduce drinking among HIV primary care patients: Baseline findings from the Health & Motivation study. *Addict Behav*. 2018;84:110-117.
6. Bradley KA, Ludman EJ, Chavez LJ, et al. Patient-centered primary care for adults at high risk for AUDs: the Choosing Healthier Drinking Options In primary Care (CHOICE) trial. *Addict Sci Clin Pract*. 2017;12(1):15.
7. Ryan ED, Chang YM, Oliver M, Bradley KA, Hallgren KA. An Alcohol Symptom Checklist identifies high rates of alcohol use disorder in primary care patients who screen positive for depression and high-risk drinking. *BMC health services research*. 2022;22(1):1123.

8. Gueorguieva R, Wu R, O'Connor PG, et al. Predictors of abstinence from heavy drinking during treatment in COMBINE and external validation in PREDICT. *Alcohol Clin Exp Res*. 2014;38(10):2647-2656.
9. Grattan A, Sullivan MD, Saunders KW, Campbell CI, Von Korff MR. Depression and prescription opioid misuse among chronic opioid therapy recipients with no history of substance abuse. *Ann Fam Med*. 2012;10(4):304-311.
10. Prochaska JJ, Das S, Young-Wolff KC. Smoking, Mental Illness, and Public Health. *Annual review of public health*. 2017;38:165-185.
11. Loree AM, Yeh HH, Satre DD, et al. Psychiatric comorbidity and Healthcare Effectiveness Data and Information Set (HEDIS) measures of alcohol and other drug treatment initiation and engagement across 7 health care systems. *Subst Abus*. 2019;40(3):311-317.
12. Satre DD, Bahorik A, Zaman T, Ramo D. Psychiatric Disorders and Comorbid Cannabis Use: How Common Is It and What Is the Clinical Impact? *The Journal of clinical psychiatry*. 2018;79(5):06.
13. Cruden G, Karmali R. Opioid misuse as a coping behavior for unmet mental health needs among U.S. adults. *Drug Alcohol Depend*. 2021;225:108805.
14. Jain V, Rifai MA, Naderi S, et al. Association of Smokeless Tobacco use with the use of other Illicit Drugs in the United States. *The American journal of medicine*. 2021;134(1):e15-e19.
15. Kline-Simon AH, Falk DE, Litten RZ, et al. Posttreatment low-risk drinking as a predictor of future drinking and problem outcomes among individuals with alcohol use disorders. *Alcohol Clin Exp Res*. 2013;37(Suppl 1):E373-E380.
16. Mertens JR, Kline-Simon AH, Delucchi KL, Moore C, Weisner CM. Ten-year stability of remission in private alcohol and drug outpatient treatment: Non-problem users versus abstainers. *Drug Alcohol Depend*. 2012;125(1-2):67-74.
17. Matson TE, Lapham GT, Bobb JF, et al. Validity of the Single-Item Screen-Cannabis (SIS-C) for Cannabis Use Disorder Screening in Routine Care. *JAMA Netw Open*. 2022;5(11):e2239772.
18. Jorgenson E, Thai KK, Hoffmann TJ, et al. Genetic contributors to variation in alcohol consumption vary by race/ethnicity in a large multi-ethnic genome-wide association study. *Molecular psychiatry*. 2017;22(9):1359-1367.
19. Saunders GRB, Wang X, Chen F, et al. Genetic diversity fuels gene discovery for tobacco and alcohol use. *Nature*. 2022;612(7941):720-724.
20. Fritz JM, King JB, McAdams-Marx C. Associations between Early Care Decisions and the Risk for Long-Term Opioid Use for Patients with Low Back Pain with a New Physician Consultation and Initiation of Opioid Therapy. *Clin J Pain*. 2018;34(6):552-558.
21. Nugent SM, Yarborough BJ, Smith NX, et al. Patterns and correlates of medical cannabis use for pain among patients prescribed long-term opioid therapy. *General hospital psychiatry*. 2018;50:104-110.
22. Namba RS, Inacio MCS, Pratt NL, Graves SE, Roughead EE, Paxton EW. Persistent Opioid Use Following Total Knee Arthroplasty: A Signal for Close Surveillance. *The Journal of arthroplasty*. 2018;33(2):331-336.
23. Namba RS, Paxton EW, Inacio MC. Opioid Prescribers to Total Joint Arthroplasty Patients Before and After Surgery: The Majority Are Not Orthopedists. *The Journal of arthroplasty*. 2018;33(10):3118-3124.
24. Bauer FL, Donahoo WT, Hollis HW, et al. Marijuana's Influence on Pain Scores, Initial Weight Loss, and Other Bariatric Surgical Outcomes. *Perm J*. 2018;22:18-002.
25. Maciejewski ML, Smith VA, Berkowitz TSZ, et al. Association of Bariatric Surgical Procedures With Changes in Unhealthy Alcohol Use Among US Veterans. *JAMA Netw Open*. 2020;3(12):e2028117.
26. Lynch FL, Peterson EL, Lu CY, et al. Substance use disorders and risk of suicide in a general US population: a case control study. *Addict Sci Clin Pract*. 2020;15(1):14.
27. Iturralde E, Slama N, Kline-Simon AH, Young-Wolff KC, Mordecai D, Sterling SA. Premature mortality associated with severe mental illness or substance use disorder in an integrated health care system. *General hospital psychiatry*. 2020;68:1-6.
28. Centers for Disease Control and Prevention. *Alcohol and Public Health: Alcohol-Related Disease Impact (ARDI). Average for United States 2015-2019 Alcohol-Attributable Deaths Due to Excessive Alcohol Use*. Atlanta, GA: Author;2022.

29. Gordon SC, Lamerato LE, Rupp LB, et al. Prevalence of Cirrhosis in Hepatitis C Patients in the Chronic Hepatitis Cohort Study (CHeCS): A Retrospective and Prospective Observational Study. *Am J Gastroenterol.* 2015;110(8):1169-1177.
30. Bradley KA, Rubinsky AD, Lapham GT, et al. Predictive validity of clinical AUDIT-C alcohol screening scores and changes in scores for three objective alcohol-related outcomes in a Veterans Affairs population. *Addiction.* 2016;111(11):1975-1984.
31. Rubinsky AD, Sun H, Blough DK, et al. AUDIT-C alcohol screening results and postoperative inpatient health care utilization. *J Am Coll Surg.* 2012;214(3):296-305.
32. Jack HE, Oliver MM, Berger DB, Bobb JF, Bradley KA, Hallgren KA. Association between clinical measures of unhealthy alcohol use and subsequent year hospital admissions in a primary care population. *Drug Alcohol Depend.* 2023;245:109821.
33. Williams EC, McGinnis KA, Rubinsky AD, et al. Alcohol Use and Antiretroviral Adherence Among Patients Living with HIV: Is Change in Alcohol Use Associated with Change in Adherence? *AIDS and behavior.* 2021;25(1):203-214.
34. Hansen RN, Walker RL, Shortreed SM, et al. Impact of an opioid risk reduction initiative on motor vehicle crash risk among chronic opioid therapy patients. *Pharmacoepidemiol Drug Saf.* 2017;26(1):47-55.
35. Williams EC, Bryson CL, Sun H, et al. Association between alcohol screening results and hospitalizations for trauma in Veterans Affairs outpatients. *Am J Drug Alcohol Abuse.* 2012;38(1):73-80.
36. Sterling SA, Palzes VA, Lu Y, et al. Associations Between Medical Conditions and Alcohol Consumption Levels in an Adult Primary Care Population. *JAMA Netw Open.* 2020;3(5):e204687.
37. Williams EC, McGinnis KA, Bobb JF, et al. Changes in alcohol use associated with changes in HIV disease severity over time: A national longitudinal study in the Veterans Aging Cohort. *Drug Alcohol Depend.* 2018;189:21-29.
38. Williams EC, McGinnis KA, Edelman EJ, et al. Level of Alcohol Use Associated with HIV Care Continuum Targets in a National U.S. Sample of Persons Living with HIV Receiving Healthcare. *AIDS and behavior.* 2019;23(1):140-151.
39. Williams EC, McGinnis KA, Tate JP, et al. HIV Disease Severity is Sensitive to Temporal Changes in Alcohol Use: A National Study of VA Patients with HIV. *Journal of acquired immune deficiency syndromes (1999).* 2019;81(4):448-455.
40. U.S. Department of Health and Human Services. *The Health Consequences of Smoking--50 Years of Progress: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health;2014.
41. Nelson HD, Lui L, Ensrud K, Cummings SR, Cauley JA, Hillier TA. Associations of Smoking, Moderate Alcohol Use, and Function: A 20-Year Cohort Study of Older Women. *Gerontology & geriatric medicine.* 2018;4:2333721418766127.
42. Binswanger IA, Carson EA, Krueger PM, Mueller SR, Steiner JF, Sabol WJ. Prison tobacco control policies and deaths from smoking in United States prisons: population based retrospective analysis. *BMJ.* 2014;349:g4542.
43. Vazquez-Benitez G, Desai JR, Xu S, et al. Preventable major cardiovascular events associated with uncontrolled glucose, blood pressure, and lipids and active smoking in adults with diabetes with and without cardiovascular disease: A contemporary analysis. *Diabetes Care.* 2015;38(5):905-912.
44. Gottdiener JS, Buzkova P, Kahn PA, et al. Relation of Cigarette Smoking and Heart Failure in Adults ≥65 Years of Age (From the Cardiovascular Health Study). *The American journal of cardiology.* 2022;168:90-98. Epub 2022-01-16.:90-98.
45. Burney P, Jithoo A, Kato B, et al. Chronic obstructive pulmonary disease mortality and prevalence: the associations with smoking and poverty--a BOLD analysis. *Thorax.* 2014;69(5):465-473.
46. Neophytou AM, Oh SS, White MJ, et al. Secondhand smoke exposure and asthma outcomes among African-American and Latino children with asthma. *Thorax.* 2018;73(11):1041-1048.
47. Schiffenbauer A, Faghihi-Kashani S, O'Hanlon TP, et al. The effect of cigarette smoking on the clinical and serological phenotypes of polymyositis and dermatomyositis. *Seminars in arthritis and rheumatism.* 2018;48(3):504-512.



48. Lubin JH, Cook MB, Pandeya N, et al. The importance of exposure rate on odds ratios by cigarette smoking and alcohol consumption for esophageal adenocarcinoma and squamous cell carcinoma in the Barrett's Esophagus and Esophageal Adenocarcinoma Consortium. *Cancer Epidemiol*. 2012;36(3):306-316.
49. Gong J, Hutter C, Baron JA, et al. A pooled analysis of smoking and colorectal cancer: timing of exposure and interactions with environmental factors. *Cancer Epidemiol Biomarkers Prev*. 2012;21(11):1974-1985.
50. Nyante SJ, Gierach GL, Dallal CM, et al. Cigarette smoking and postmenopausal breast cancer risk in a prospective cohort. *Br J Cancer*. 2014;110(9):2339-2347.
51. Altekruse SF, Shiels MS, Modur SP, et al. Cancer burden attributable to cigarette smoking among HIV-infected people in North America. *AIDS*. 2018;32(4):513-521.
52. Wang X, Chan AT, Slattery ML, et al. Influence of smoking, body mass index and other factors on the preventive effect of nonsteroidal anti-inflammatory drugs on colorectal cancer risk. *Cancer research*. 2018;78(16):4790-4799.
53. Raz DJ, Wu G, Nelson RA, et al. Perceptions and Utilization of Lung Cancer Screening Among Smokers Enrolled in a Tobacco Cessation Program. *Clinical lung cancer*. 2019;20(1):e115-e122.
54. Young-Wolff KC, Klebaner D, Weisner C, Von Korff M, Campbell CI. Smoking Status and Opioid-related Problems and Concerns Among Men and Women on Chronic Opioid Therapy. *Clin J Pain*. 2017;33(8):730-737.
55. Bahorik AL, Sidney S, Kramer-Feldman J, et al. Early to Midlife Smoking Trajectories and Cognitive Function in Middle-Aged US Adults: the CARDIA Study. *J Gen Intern Med*. 2022;37(5):1023-1030.
56. Ramo DE, Bahorik AL, Delucchi KL, Campbell CI, Satre DD. Alcohol and Drug Use, Pain and Psychiatric Symptoms among Adults Seeking Outpatient Psychiatric Treatment: Latent Class Patterns and Relationship to Health Status. *J Psychoactive Drugs*. 2018;50(1):43-53.
57. Campbell CI, Sterling S, Chi FW, Kline-Simon AH. Marijuana use and service utilization among adolescents 7 years post substance use treatment. *Drug Alcohol Depend*. 2016;168:1-7.
58. Bahorik AL, Campbell CI, Sterling SA, et al. Adverse impact of marijuana use on clinical outcomes among psychiatry patients with depression and alcohol use disorder. *Psychiatry research*. 2018;259:316-322.
59. Bahorik AL, Leibowitz A, Sterling SA, Travis A, Weisner C, Satre DD. Patterns of marijuana use among psychiatry patients with depression and its impact on recovery. *Journal of affective disorders*. 2017;213:168-171.
60. Bahorik AL, Sterling SA, Campbell CI, Weisner C, Ramo D, Satre DD. Medical and non-medical marijuana use in depression: Longitudinal associations with suicidal ideation, everyday functioning, and psychiatry service utilization. *Journal of affective disorders*. 2018;241:8-14.
61. Lapham GT, Lee AK, Caldeiro RM, et al. Prevalence of Behavioral Health Conditions Across Frequency of Cannabis Use Among Adult Primary Care Patients in Washington State. *J Gen Intern Med*. 2018;33(11):1833-1835.
62. Lapham GT, Lee AK, Caldeiro RM, et al. Frequency of Cannabis Use Among Primary Care Patients in Washington State. *Journal of the American Board of Family Medicine : JABFM*. 2017;30(6):795-805.
63. Pletcher MJ, Vittinghoff E, Kalhan R, et al. Association between marijuana exposure and pulmonary function over 20 years. *JAMA*. 2012;307(2):173-181.
64. Zeiger JS, Silvers WS, Winders TA, Hart MK, Zeiger RS. Cannabis attitudes and patterns of use among followers of the Allergy & Asthma Network. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2021.
65. Bahorik AL, Satre DD, Kline-Simon AH, Weisner CM, Campbell CI. Alcohol, Cannabis, and Opioid Use Disorders, and Disease Burden in an Integrated Health Care System. *J Addict Med*. 2017;11(1):3-9.
66. Phillips KT, Pedula KL, Choi NG, et al. Chronic health conditions, acute health events, and healthcare utilization among adults over age 50 in Hawai'i who use cannabis: A matched cohort study. *Drug Alcohol Depend*. 2022;234:109387. Epub 2022-03-03.:109387. Epub 102022-109303.
67. Campbell CI, Bahorik AL, Kline-Simon AH, Satre DD. The role of marijuana use disorder in predicting emergency department and inpatient encounters: A retrospective cohort study. *Drug Alcohol Depend*. 2017;178:170-175.

68. Bahorik AL, Satre DD, Kline-Simon AH, Weisner CM, Young-Wolff KC, Campbell CI. Alcohol, Marijuana, and Opioid Use Disorders: 5-Year Patterns and Characteristics of Emergency Department Encounters. *Subst Abus*. 2018;39(1):59-68.
69. Matson TE, Lapham GT, Bobb JF, et al. Cannabis use, other drug use, and risk of subsequent acute care in primary care patients. *Drug Alcohol Depend*. 2020;216:108227.
70. Ford MA, Lapham GT, Matson TE, Luce C, Oliver MM, Binswanger IA. Comparing Cannabis Use for Pain to Use for Other Reasons in Primary Care Patients. *Journal of the American Board of Family Medicine : JABFM*. 2024;36(6):996-1007.
71. Young-Wolff KC, Tucker LY, Alexeeff S, et al. Trends in Self-reported and Biochemically Tested Marijuana Use Among Pregnant Females in California From 2009-2016. *Jama*. 2017;318(24):2490-2491.
72. Young-Wolff KC, Sarovar V, Tucker LY, et al. Association of Nausea and Vomiting in Pregnancy With Prenatal Marijuana Use. *JAMA internal medicine*. 2018;178(10):1423-1424.
73. Goler N, Conway A, Young-Wolff KC. Data Are Needed on the Potential Adverse Effects of Marijuana Use in Pregnancy. *Ann Intern Med*. 2018;169(7):492-493.
74. Young-Wolff KC, Sarovar V, Tucker LY, et al. Trends in marijuana use among pregnant women with and without nausea and vomiting in pregnancy, 2009-2016. *Drug Alcohol Depend*. 2019;196:66-70.
75. Young-Wolff KC, Gali K, Sarovar V, Rutledge GW, Prochaska JJ. Women's Questions About Perinatal Cannabis Use and Health Care Providers' Responses. *Journal of women's health (2002)*. 2020;29(7):919-926.
76. Young-Wolff KC, Ray GT, Alexeeff SE, et al. Rates of Prenatal Cannabis Use Among Pregnant Women Before and During the COVID-19 Pandemic. *JAMA*. 2021;326(17):1745-1747.
77. Kiel L, Hsu C, Wartko PD, Albertson-Junkans L, Ewing J, Lapham GT. Perspectives from women who engaged in prenatal and postpartum cannabis use in a U.S. State with legal non-medical use. *Preventive medicine reports*. 2023;31:102075.
78. Lapham GT, Matson TE, Carrell DS, et al. Comparison of Medical Cannabis Use Reported on a Confidential Survey vs Documented in the Electronic Health Record Among Primary Care Patients. *JAMA Netw Open*. 2022;5(5):e2211677.
79. Matson TE, Carrell DS, Bobb JF, et al. Prevalence of Medical Cannabis Use and Associated Health Conditions Documented in Electronic Health Records Among Primary Care Patients in Washington State. *JAMA Netw Open*. 2021;4(5):e219375.
80. Banks MP, Auer R, Carr JJ, et al. Self-Reported Marijuana Use Over 25 Years and Abdominal Adiposity: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Addiction*. 2018;113(4):689-698.
81. Banks MP, Pletcher MJ, Kertesz SG, Sidney S, Rana JS, Schreiner PJ. Marijuana use and risk of prediabetes and diabetes by middle adulthood: the Coronary Artery Risk Development in Young Adults (CARDIA) study. *Diabetologia*. 2015;58(12):2736-2744.
82. Reis JP, Auer R, Bancks MP, et al. Cumulative Lifetime Marijuana Use and Incident Cardiovascular Disease in Middle Age: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. *American journal of public health*. 2017;107(4):601-606.
83. Auer R, Sidney S, Goff D, et al. Lifetime Marijuana Use and Subclinical Atherosclerosis: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Addiction*. 2018;113(5):845-856.
84. Rein JL, Zeng H, Faulkner GB, et al. A Retrospective Cohort Study That Examined the Impact of Cannabis Consumption on Long-Term Kidney Outcomes. *Cannabis and cannabinoid research*. 2023.
85. McClure EA, Hamilton L, Schauer GL, Matson TE, Lapham GT. Cannabis and nicotine co-use among primary care patients in a state with legal cannabis access. *Addict Behav*. 2023;140:107621.
86. Sayre M, Lapham GT, Lee AK, et al. Routine Assessment of Symptoms of Substance Use Disorders in Primary Care: Prevalence and Severity of Reported Symptoms. *J Gen Intern Med*. 2020;35(4):1111-1119.
87. Metz TD, Silver RM, McMillin GA, et al. Prenatal Marijuana Use by Self-Report and Umbilical Cord Sampling in a State With Marijuana Legalization. *Obstetrics and gynecology*. 2019;133(1):98-104.

88. Young-Wolff KC, Sarovar V, Tucker LY, et al. Self-reported Daily, Weekly, and Monthly Cannabis Use Among Women Before and During Pregnancy. *JAMA Netw Open*. 2019;2(7):e196471.
89. Thomas AA, Von Derau K, Bradford MC, Moser E, Garrard A, Mazor S. Unintentional Pediatric Marijuana Exposures Prior to and After Legalization and Commercial Availability of Recreational Marijuana in Washington State. *The Journal of emergency medicine*. 2019.
90. Lapham GT, Matson TE, Bobb JF, et al. Prevalence of Cannabis Use Disorder and Reasons for Use Among Adults in a US State Where Recreational Cannabis Use Is Legal. *JAMA Netw Open*. 2023;6(8):e2328934.
91. CDC WONDER. Author; 2017. <https://wonder.cdc.gov/>. Accessed September 30, 2017.
92. Centers for Disease Control and Prevention. U.S. Overdose Deaths In 2021 Increased Half as Much as in 2020 – But Are Still Up 15%. 2022; [https://www.cdc.gov/nchs/pressroom/nchs\\_press\\_releases/2022/202205.htm#:~:text=The%20new%20data%20show%20overdose,in%202021%20compared%20to%202020](https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2022/202205.htm#:~:text=The%20new%20data%20show%20overdose,in%202021%20compared%20to%202020). Accessed October 6, 2022.
93. Calcaterra S, Glanz J, Binswanger IA. National trends in pharmaceutical opioid related overdose deaths compared to other substance related overdose deaths: 1999-2009. *Drug Alcohol Depend*. 2013;131(3):263-270.
94. Yarborough BJ, Stumbo SP, Janoff SL, et al. Understanding opioid overdose characteristics involving prescription and illicit opioids: A mixed methods analysis. *Drug Alcohol Depend*. 2016;167:49-56.
95. Karmali RN, Ray GT, Rubinstein AL, Sterling SA, Weisner CM, Campbell CI. The role of substance use disorders in experiencing a repeat opioid overdose, and substance use treatment patterns among patients with a non-fatal opioid overdose. *Drug Alcohol Depend*. 2020;209:107923.
96. Glanz JM, Xu S, Narwaney KJ, et al. Association Between Opioid Dose Reduction Rates and Overdose Among Patients Prescribed Long-Term Opioid Therapy. *Subst Abus*. 2023;44(3):209-219.
97. Monteiro J, Phillips KT, Herman DS, et al. Self-treatment of skin infections by people who inject drugs. *Drug Alcohol Depend*. 2019;206:107695.
98. Kimmel SD, Phillips KT, Anderson BJ, Stein MD. Characteristics associated with motivation to stop substance use and improve skin and needle hygiene among hospitalized patients who inject drugs. *Subst Abus*. 2022;43(1):878-883.
99. Biondi BE, Anderson BJ, Phillips KT, Stein M. Sex Differences in Injection Drug Risk Behaviors Among Hospitalized Persons. *J Addict Med*. 2022;16(3):e165-e170.
100. Campbell CI, Kline-Simon AH, Von Korff M, Saunders KW, Weisner C. Alcohol and Drug Use and Aberrant Drug-Related Behavior Among Patients on Chronic Opioid Therapy. *Subst Use Misuse*. 2017;52(10):1283-1291.
101. Lapham G, Boudreau DM, Johnson EA, et al. Prevalence and treatment of opioid use disorders among primary care patients in six health systems. *Drug Alcohol Depend*. 2019;207:107732.
102. Binswanger IA, Glanz JM, Faul M, et al. The Association between Opioid Discontinuation and Heroin Use: A Nested Case-Control Study. *Drug Alcohol Depend*. 2020;217:108248.
103. Morasco BJ, Yarborough BJ, Smith NX, et al. Higher Prescription Opioid Dose is Associated With Worse Patient-Reported Pain Outcomes and More Health Care Utilization. *The journal of pain : official journal of the American Pain Society*. 2017;18(4):437-445.
104. Shyken JM, Babbar S, Babbar S, Forinash A. Benzodiazepines in Pregnancy. *Clinical obstetrics and gynecology*. 2019;478(1):66-67.
105. Nguyen AP, Glanz JM, Narwaney KJ, Binswanger IA. Association of Opioids Prescribed to Family Members With Opioid Overdose Among Adolescents and Young Adults. *JAMA Netw Open*. 2020;3(3):e201018.
106. Chavez LJ, Bradley KA, Lapham GT, Wickizer TM, Chisolm DJ. Identifying Problematic Substance Use in a National Sample of Adolescents Using Frequency Questions. *Journal of the American Board of Family Medicine : JABFM*. 2019;32(4):550-558.
107. McNeely J, Hamilton L. Screening for Unhealthy Alcohol and Drug Use in General Medicine Settings. *The Medical clinics of North America*. 2022;106(1):13-28.
108. Matson TE, Hallgren KA, Lapham GT, et al. Psychometric Performance of a Substance Use Symptom Checklist to Help Clinicians Assess Substance Use Disorder in Primary Care. *JAMA Netw Open*. 2023;6(5):e2316283.

109. Yonek JC, Velez S, Satre DD, et al. Addressing adolescent substance use in an urban pediatric federally qualified health center. *J Subst Abuse Treat.* 2022;135:108653.
110. Sterling S, Parthasarathy S, Jones A, et al. Young Adult Substance Use and Healthcare Use Associated With Screening, Brief Intervention and Referral to Treatment in Pediatric Primary Care. *J Adolesc Health.* 2022;71(4S):S15-S23.
111. Patnode CD, O'Connor E, Whitlock EP, Perdue LA, Soh C, Hollis J. Primary care-relevant interventions for tobacco use prevention and cessation in children and adolescents: A systematic evidence review for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2013;158(4):253-260.
112. Tan ASL, Young-Wolff KC, Carter-Harris L, Salloum RG, Banerjee SC. Disparities in the Receipt of Tobacco Treatment Counseling within the US Context of the Affordable Care Act and Meaningful Use Implementation. *Nicotine Tob Res.* 2018;20(12):1474-1480.
113. LeLaurin JH, Theis RP, Thompson LA, et al. Tobacco-related counseling and documentation in adolescent primary care practice: Challenges and opportunities. *Nicotine Tob Res.* 2020;22(6):1023-1029.
114. Chi FW, Parthasarathy S, Palzes VA, et al. Alcohol brief intervention, specialty treatment and drinking outcomes at 12 months: Results from a systematic alcohol screening and brief intervention initiative in adult primary care. *Drug Alcohol Depend.* 2022;235:109458.
115. Metz VE, Palzes VA, Kline-Simon AH, et al. Substance use disorders among primary care patients screening positive for unhealthy alcohol use. *Family practice.* 2022;39(2):226-233.
116. Mertens JR, Chi FW, Weisner CM, et al. Physician versus non-physician delivery of alcohol screening, brief intervention and referral to treatment in adult primary care: the ADVISE cluster randomized controlled implementation trial. *Addict Sci Clin Pract.* 2015;10:26.
117. Sterling S, Kline-Simon AH, Satre DD, et al. Implementation of Screening, Brief Intervention, and Referral to Treatment for Adolescents in Pediatric Primary Care: A Cluster Randomized Trial. *JAMA Pediatr.* 2015;169(11):e153145.
118. Chi FW, Weisner CM, Mertens JR, Ross TB, Sterling SA. Alcohol brief intervention in primary care: Blood pressure outcomes in hypertensive patients. *J Subst Abuse Treat.* 2017;77:45-51.
119. Weinstein ZM, Gryczynski G, Cheng DM, et al. Tapering off and returning to buprenorphine maintenance in a primary care Office Based Addiction Treatment (OBAT) program. *Drug Alcohol Depend.* 2018;189:166-171.
120. Patnode CD, Henderson JT, Thompson JH, Senger CA, Fortmann SP, Whitlock EP. Behavioral counseling and pharmacotherapy interventions for tobacco cessation in adults, including pregnant women: A review of reviews for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2015;163(8):608-621.
121. Heffner JL, McClure JB, Mull KE, Anthenelli RM, Bricker JB. Acceptance and Commitment Therapy and nicotine patch for smokers with bipolar disorder: preliminary evaluation of in-person and telephone-delivered treatment. *Bipolar Disord.* 2015;17(5):560-566.
122. Sterling S, Kline-Simon AH, Jones A, Satre DD, Parthasarathy S, Weisner C. Specialty addiction and psychiatry treatment initiation and engagement: Results from an SBIRT randomized trial in pediatrics. *J Subst Abuse Treat.* 2017;82:48-54.
123. Palzes VA, Weisner C, Chi FW, et al. The Kaiser Permanente Northern California Adult Alcohol Registry, an Electronic Health Records-Based Registry of Patients With Alcohol Problems: Development and Implementation. *JMIR medical informatics.* 2020;8(7):e19081.
124. Palzes VA, Chi FW, Weisner C, Kline-Simon AH, Satre DD, Sterling S. Risk profiles of adults with heavy alcohol use: Drinking patterns, behavioral and metabolic factors, health problems, and racial and ethnic disparities. *Alcohol, clinical & experimental research.* 2023;47(12):2301-2312.
125. Palzes VA, Chi FW, Metz VE, Campbell C, Corriveau C, Sterling S. COVID-19 pandemic-related changes in utilization of telehealth and treatment overall for alcohol use problems. *Alcohol Clin Exp Res.* 2022;46(12):2280-2291.
126. Palzes VA, Farokhnia M, Kline-Simon AH, et al. Effectiveness of spironolactone dispensation in reducing weekly alcohol use: a retrospective high-dimensional propensity score-matched cohort study. *Neuropsychopharmacology : official publication of the American College of Neuropsychopharmacology.* 2021;46(12):2140-2147.

127. Ray GT, Bahorik AL, VanVeldhuisen PC, Weisner CM, Rubinstein AL, Campbell CI. Prescription opioid registry protocol in an integrated health system. *Am J Manag Care*. 2017;23(5):e146-e155.
128. Wagner NM, Binswanger IA, Shetterly SM, et al. Development and validation of a prediction model for opioid use disorder among youth. *Drug Alcohol Depend*. 2021;227:108980.
129. Chi FW, Alexeeff S, Ahmedani B, et al. Predicting adolescent alcohol and other drug problems using electronic health records data. *J Subst Abuse Treat*. 2021;132:108487.
130. Green CA, Perrin NA, Janoff SL, Campbell CI, Chilcoat HD, Coplan PM. Assessing the accuracy of opioid overdose and poisoning codes in diagnostic information from electronic health records, claims data, and death records. *Pharmacoepidemiology and drug safety*. 2017;26(5):509-517.
131. Glanz JM, Narwaney KJ, Mueller SR, et al. Prediction Model for Two-Year Risk of Opioid Overdose Among Patients Prescribed Chronic Opioid Therapy. *J Gen Intern Med*. 2018;33(10):1646-1653.
132. Green CA, Perrin NA, Hazlehurst B, et al. Identifying and classifying opioid-related overdoses: A validation study. *Pharmacoepidemiology and drug safety*. 2019;28(8):1127-1137.
133. Jones JD, Campbell AN, Brandt L, et al. A randomized clinical trial of the effects of brief versus extended opioid overdose education on naloxone utilization outcomes by individuals with opioid use disorder. *Drug Alcohol Depend*. 2022;237:109505.
134. Nguyen AP, Glanz JM, Narwaney KJ, et al. Update of a Multivariable Opioid Overdose Risk Prediction Model to Enhance Clinical Care for Long-term Opioid Therapy Patients. *J Gen Intern Med*. 2023;38(12):2678-2685.
135. Calcaterra SL, Scarbro S, Hull ML, Forber AD, Binswanger IA, Colborn KL. Prediction of Future Chronic Opioid Use Among Hospitalized Patients. *J Gen Intern Med*. 2018;33(6):898-905.
136. Sherman KJ, Walker RL, Saunders K, et al. Doctor-Patient Trust Among Chronic Pain Patients on Chronic Opioid Therapy after Opioid Risk Reduction Initiatives: A Survey. *Journal of the American Board of Family Medicine : JABFM*. 2018;31(4):578-587.
137. Psaty BM, Merrill JO. Addressing the Opioid Epidemic - Opportunities in the Postmarketing Setting. *The New England journal of medicine*. 2017;376(16):1502-1504.
138. Lyden J, Binswanger IA. The United States opioid epidemic. *Seminars in perinatology*. 2019;43(3):123-131.
139. Yoo M, Perret D, Dusto N, Lin K, Whyte J. Pain and Addiction: The Distribution of Supply and Demand During the Opioid Epidemic. *American journal of physical medicine & rehabilitation*. 2022;101(7):702-707.
140. Glanz JM, Binswanger IA, Shetterly S, Narwaney KJ, Xu S. Association Between Opioid Dose Variability and Opioid Overdose Among Adults Prescribed Long-term Opioid Therapy. *JAMA Network Open*. 2019;2(4):e192613.
141. Thakral M, Walker RL, Saunders K, et al. Impact of Opioid Dose Reduction and Risk Mitigation Initiatives on Chronic Opioid Therapy Patients at Higher Risk for Opioid-Related Adverse Outcomes. *Pain medicine (Malden, Mass)*. 2018;19(12):2450-2458.
142. Von Korff M, Saunders K, Dublin S, et al. Impact of Chronic Opioid Therapy Risk Reduction Initiatives on Opioid Overdose. *The journal of pain : official journal of the American Pain Society*. 2019;20(1):108-117.
143. Hechter RC, Pak KJ, Chang CK, et al. Chronic and Sustained High-Dose Opioid Use in an Integrated Health System. *American journal of preventive*. 2023;64(2):167-174.
144. Parchman ML, Von Korff M, Baldwin LM, et al. Primary Care Clinic Re-Design for Prescription Opioid Management. *Journal of the American Board of Family Medicine : JABFM*. 2017;30(1):44-51.
145. Rothenberg KA, Huyser MR, Edquiang JK, et al. Experience with a Nonopioid Protocol in Ambulatory Breast Surgery: Opioids are Rarely Necessary and Use is Surgeon-Dependent. *Perm J*. 2019;23:18-127.
146. Losby JL, Hyatt JD, Kanter MH, Baldwin G, Matsuoka D. Safer and more appropriate opioid prescribing: a large healthcare system's comprehensive approach. *Journal of evaluation in clinical practice*. 2017;23(6):1173-1179.
147. Campbell CI, Bahorik AL, VanVeldhuisen P, Weisner C, Rubinstein AL, Ray GT. Use of a prescription opioid registry to examine opioid misuse and overdose in an integrated health system. *Prev Med*. 2018;110:31-37.

148. Duan L, Lee MS, Adams JL, Sharp AL, Doctor JN. Opioid and Naloxone Prescribing Following Insertion of Prompts in the Electronic Health Record to Encourage Compliance With California State Opioid Law. *JAMA Netw Open*. 2022;5(5):e229723.
149. Pating DR, Miller MM, Goplerud E, Martin J, Ziedonis DM. New systems of care for substance use disorders: treatment, finance, and technology under health care reform. *Psychiatr Clin North Am*. 2012;35(2):327-356.
150. Stumbo SP, Yarborough BJ, McCarty D, Weisner C, Green CA. Patient-reported pathways to opioid use disorders and pain-related barriers to treatment engagement. *J Subst Abuse Treat*. 2017;73:47-54.
151. Mueller SR, Glanz JM, Nguyen AP, et al. Restrictive opioid prescribing policies and evolving risk environments: A qualitative study of the perspectives of patients who experienced an accidental opioid overdose. *The International journal on drug policy*. 2021;92:103077.
152. Glass JE, Bobb JF, Lee AK, et al. Study protocol: a cluster-randomized trial implementing Sustained Patient-centered Alcohol-related Care (SPARC trial). *Implementation science : IS*. 2018;13(1):108.
153. Bailey SR, Stevens VJ, Fortmann SP, et al. Long-Term Outcomes From Repeated Smoking Cessation Assistance in Routine Primary Care. *American journal of health promotion : AJHP*. 2018;32(7):1582-1590.
154. McClure JB, Bricker J, Mull K, Heffner JL. Comparative-Effectiveness of Group-Delivered Acceptance and Commitment Therapy vs. Cognitive Behavioral Therapy for Smoking Cessation: A Randomized Controlled Trial. *Nicotine Tob Res*. 2020;22(3):354-362.
155. O'Connor E, Thomas R, Senger CA, Perdue L, Robalino S, Patnode C. Interventions to Prevent Illicit and Nonmedical Drug Use in Children, Adolescents, and Young Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA*. 2020;323(20):2067-2079.
156. Palzes VA, Kline-Simon AH, Satre DD, Sterling S, Weisner C, Chi FW. Predictors of Early and Sustained Cessation of Heavy Drinking Over 5 Years Among Adult Primary Care Patients. *Addiction*. 2022;117(1):82-95.
157. DeBar L, Mayhew M, Benes L, et al. A Primary Care-Based Cognitive Behavioral Therapy Intervention for Long-Term Opioid Users With Chronic Pain : A Randomized Pragmatic Trial. *Ann Intern Med*. 2022;175(1):46-55.
158. Mueller SR, Walley AY, Calcaterra SL, Glanz JM, Binswanger IA. A review of opioid overdose prevention and naloxone prescribing: Implications for translating community programming into clinical practice. *Subst Abus*. 2015;36(2):240-253.
159. Finlay AK, Harris AHS, Timko C, et al. Disparities in Access to Medications for Opioid Use Disorder in the Veterans Health Administration. *J Addict Med*. 2021;15(2):143-149.
160. Frost MC, Hawkins EJ, Glass JE, Hallgren KA, Williams EC. Associations Between Distinct Co-occurring Substance Use Disorders and Receipt of Medications for Opioid Use Disorder in the Veterans Health Administration. *J Addict Med*. 2023;17(3):278-285.
161. Boudreau DM, Lapham G, Johnson EA, et al. Documented opioid use disorder and its treatment in primary care patients across six U.S. health systems. *J Subst Abuse Treat*. 2020;112S:41-48.
162. Calcaterra SL, Binswanger IA, Edelman EJ, McNair BK, Wakeman SE, O'Connor PG. The impact of access to addiction specialist on attitudes, beliefs and hospital-based opioid use disorder related care: A survey of hospitalist physicians. *Subst Abus*. 2022;43(1):143-151.
163. Calcaterra SL, Lockhart S, Callister C, Hoover K, Binswanger IA. Opioid Use Disorder Treatment Initiation and Continuation: a Qualitative Study of Patients Who Received Addiction Consultation and Hospital-Based Providers. *J Gen Intern Med*. 2022;37(11):2786-2794.
164. Williams EC, Achtmeyer CE, Young JP, et al. Barriers and Facilitators to Alcohol Use Disorders Pharmacotherapy in Primary Care: A Qualitative Study in 5 VA Clinics. *J Gen Intern Med*. 2018;33(3):258-267.
165. Williams EC, Gupta S, Rubinsky AD, et al. Variation in receipt of pharmacotherapy for alcohol use disorders across racial/ethnic groups: A national study in the U.S. Veterans Health Administration. *Drug Alcohol Depend*. 2017;178:527-533.
166. McPheeters M, O'Connor EA, Riley S, et al. Pharmacotherapy for Alcohol Use Disorder: A Systematic Review and Meta-Analysis. *Jama*. 2023;330(17):1653-1665.

167. Olenik A, Mospan CM. Smoking cessation: Identifying readiness to quit and designing a plan. *JAAPA : official journal of the American Academy of Physician Assistants*. 2017;30(7):13-19.
168. Patnode CD, Henderson JT, Coppola EL, Melnikow J, Durbin S, Thomas RG. Interventions for Tobacco Cessation in Adults, Including Pregnant Persons: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA*. 2021;325(3):280-298.
169. Bradley KA, Bobb JF, Ludman EJ, et al. Alcohol-Related Nurse Care Management in Primary Care: A Randomized Clinical Trial. *JAMA internal medicine*. 2018;178(5):613-621.
170. Boccio M, Sanna RS, Adams SR, et al. Telephone-Based Coaching:A Comparison of Tobacco Cessation Programs in an Integrated Health Care System. *American Journal of Health Promotion*. 2017;31(2):136-142.
171. McClure JB, Bush T, Anderson ML, et al. Oral Health Promotion and Smoking Cessation Program Delivered via Tobacco Quitlines: The Oral Health 4 Life Trial. *American journal of public health*. 2018;108(5):689-695.
172. McClure JB, Lapham G. Tobacco quitline engagement and outcomes among primary care patients reporting use of tobacco or dual tobacco and cannabis: An observational study. *Subst Abuse*. 2021;42(3):417-422.
173. Bricker JB, Mull KE, McClure JB, Watson NL, Heffner JL. Improving quit rates of web-delivered interventions for smoking cessation: full-scale randomized trial of WebQuit.org versus Smokefree.gov. *Addiction*. 2018;113(5):914-923.
174. Bricker JB, Sridharan V, Zhu Y, et al. Trajectories of 12-Month Usage Patterns for Two Smoking Cessation Websites: Exploring How Users Engage Over Time. *Journal of medical Internet research*. 2018;20(4):e10143.
175. Heffner JL, Mull KE, Watson NL, McClure JB, Bricker JB. Smokers with bipolar disorder, other affective disorders, and no mental health conditions: Comparison of baseline characteristics and success at quitting in a large 12-month behavioral intervention randomized trial. *Drug Alcohol Depend*. 2018;193:35-41.
176. Meacham MC, Ramo DE, Prochaska JJ, et al. A Facebook intervention to address cigarette smoking and heavy episodic drinking: A pilot randomized controlled trial. *J Subst Abuse Treat*. 2021;122:108211.
177. Banerjee S, Alabaster A, Adams AS, Fogelberg R, Patel N, Young-Wolff K. Clinical impacts of an integrated electronic health record-based smoking cessation intervention during hospitalisation. *BMJ open*. 2023;13(12):e068629.
178. Wang RJ, Bhadriraju S, Glantz SA. E-Cigarette Use and Adult Cigarette Smoking Cessation: A Meta-Analysis. *American journal of public health*. 2021;111(2):230-246.
179. Mundt MP, Parthasarathy S, Chi FW, Sterling S, Campbell CI. 12-Step participation reduces medical use costs among adolescents with a history of alcohol and other drug treatment. *Drug Alcohol Depend*. 2012;126(1-2):124-130.
180. Witbrodt J, Mertens J, Kaskutas LA, Bond J, Chi F, Weisner C. Do 12-step meeting attendance trajectories over 9 years predict abstinence? *J Subst Abuse Treat*. 2012;43(1):30-43.
181. Chi FW, Campbell CI, Sterling S, Weisner C. Twelve-Step attendance trajectories over 7 years among adolescents entering substance use treatment in an integrated health plan. *Addiction*. 2012;107(5):933-942.
182. Chi FW, Sterling S, Campbell CI, Weisner C. 12-step participation and outcomes over 7 years among adolescent substance use patients with and without psychiatric comorbidity. *Subst Abuse*. 2013;34(1):33-42.
183. Hoopes AJ, Brandzel SD, Luce C, et al. What Do Adolescents and Their Parents Need From Mental Health Integration in Primary Care? A Qualitative Exploration of Design Insights. *Journal of pediatric health care : official publication of National Association of Pediatric Nurse Associates & Practitioners*. 2022;36(6):570-581.
184. Lapham GT, Achtmeyer CE, Williams EC, Hawkins EJ, Kivlahan DR, Bradley KA. Increased documented brief alcohol interventions with a performance measure and electronic decision support. *Med Care*. 2012;50(2):179-187.
185. Lapham GT, Rubinsky AD, Shortreed SM, et al. Comparison of provider-documented and patient-reported brief intervention for unhealthy alcohol use in VA outpatients. *Drug Alcohol Depend*. 2015;153:159-166.
186. Berger D, Lapham GT, Shortreed SM, et al. Increased Rates of Documented Alcohol Counseling in Primary Care: More Counseling or Just More Documentation? *J Gen Intern Med*. 2018;33(3):268-274.
187. Weisner C, Campbell CI, Altschuler A, et al. Factors associated with Healthcare Effectiveness Data and Information Set (HEDIS) alcohol and other drug measure performance in 2014-2015. *Subst Abuse*. 2019;40(3):318-327.

188. Yarborough BJH, Chi FW, Green CA, et al. Patient and System Characteristics Associated with Performance on the HEDIS Measures of Alcohol and Other Drug Treatment Initiation and Engagement. *J Addict Med*. 2018;12(4):278-286.
189. Loree AM, Yeh HH, Satre DD, et al. Psychiatric comorbidity and Healthcare Effectiveness Data and Information Set (HEDIS) measures of alcohol and other drug treatment initiation and engagement across 7 health care systems. *Subst Abus*. 2019;40(3):311-317.
190. Bradley KA, Kivlahan DR. Bringing patient-centered care to patients with alcohol use disorders. *JAMA*. 2014;311(18):1861-1862.
191. Sterling S, Kline-Simon AH, Wibbelsman C, Wong A, Weisner C. Screening for adolescent alcohol and drug use in pediatric health-care settings: predictors and implications for practice and policy. *Addict Sci Clin Pract*. 2012;7:13.
192. Bobb JF, Lee AK, Lapham GT, et al. Evaluation of a Pilot Implementation to Integrate Alcohol-Related Care within Primary Care. *Int J Environ Res Public Health*. 2017;14(9):1030.
193. Bradley KA, Caldeiro RM, Hallgren KA, Kivlahan DR. Making measurement-based care for addictions a reality in primary care. *Addiction*. 2019;114(8):1355-1356.
194. Richards JE, Bobb JF, Lee AK, et al. Integration of screening, assessment, and treatment for cannabis and other drug use disorders in primary care: An evaluation in three pilot sites. *Drug Alcohol Depend*. 2019;201:134-141.
195. Iturralde E, Weisner CM, Adams SR, et al. Patterns of Health Care Use 5 Years After an Intervention Linking Patients in Addiction Treatment With a Primary Care Practitioner. *JAMA Netw Open*. 2022;5(11):e2241338.
196. Glass JE, Dorsey CN, Beatty T, et al. Study protocol for a factorial-randomized controlled trial evaluating the implementation, costs, effectiveness, and sustainment of digital therapeutics for substance use disorder in primary care (DIGITS Trial). *Implementation science : IS*. 2023;18(1):3.
197. Glass JE, Matson TE, Lim C, et al. Approaches for Implementing App-Based Digital Treatments for Drug Use Disorders Into Primary Care: A Qualitative, User-Centered Design Study of Patient Perspectives. *Journal of medical Internet research*. 2021;23(7):e25866.
198. SAMHSA-HRSA Center for Integrated Health Solutions. *Innovations in Addiction Treatment: Addiction Treatment Providers Working with Integrated Primary Care Services*. Washington, DC: Author;2013.
199. National Council for Behavioral Health. *Implementing Care for Alcohol & Other Drug Use in Medical Settings: An Extension of SBIRT*. Washington, DC: National Council for Behavioral Health;2018.
200. Lee AK, Bobb JF, Richards JE, et al. Integrating Alcohol-Related Prevention and Treatment Into Primary Care: A Cluster Randomized Implementation Trial. *JAMA internal medicine*. 2023;183(4):319-328.
201. Hallgren KA, Matson TE, Oliver M, et al. Practical Assessment of Alcohol Use Disorder in Routine Primary Care: Performance of an Alcohol Symptom Checklist. *J Gen Intern Med*. 2022;37(8):1885-1893.
202. Hallgren KA, Matson TE, Oliver M, Caldeiro RM, Kivlahan DR, Bradley KA. Practical assessment of DSM-5 alcohol use disorder criteria in routine care: High test-retest reliability of an Alcohol Symptom Checklist. *Alcohol Clin Exp Res*. 2022;46(3):458-467.
203. U.S. National Library of Medicine. PRimary Care Opioid Use Disorders Treatment (PROUD) Trial. *ClinicalTrials.gov*2018.
204. Wartko PD, Qiu H, Idu AE, et al. Baseline representativeness of patients in clinics enrolled in the PRimary care Opioid Use Disorders treatment (PROUD) trial: comparison of trial and non-trial clinics in the same health systems. *BMC health services research*. 2022;22(1):1593.
205. Campbell CI, Saxon AJ, Boudreau DM, et al. PRimary Care Opioid Use Disorders treatment (PROUD) trial protocol: a pragmatic, cluster-randomized implementation trial in primary care for opioid use disorder treatment. *Addict Sci Clin Pract*. 2021;16(1):9.
206. DeBar LL, Bushey MA, Kroenke K, et al. A patient-centered nurse-supported primary care-based collaborative care program to treat opioid use disorder and depression: Design and protocol for the MI-CARE randomized controlled trial. *Contemporary clinical trials*. 2023;127:107124.
207. Wartko PD, Bobb JF, Boudreau DM, et al. Nurse Care Management for Opioid Use Disorder Treatment: The PROUD Cluster Randomized Clinical Trial. *JAMA internal medicine*. 2023;183(12):1343-1354.



208. Young-Wolff KC, Klebaner D, Folck B, et al. Do you vape? Leveraging electronic health records to assess clinician documentation of electronic nicotine delivery system use among adolescents and adults. *Prev Med.* 2017;105:32-36.
209. Young-Wolff KC, Klebaner D, Folck B, et al. Documentation of e-cigarette use and associations with smoking from 2012 to 2015 in an integrated healthcare delivery system. *Prev Med.* 2018;109:113-118.
210. Satre DD, Iturralde E, Ghadiali M, et al. Treatment for Anxiety and Substance Use Disorders During the COVID-19 Pandemic: Challenges and Strategies. *J Addict Med.* 2020;14(6):e293-e296.
211. Satre DD, Meacham MC, Asarnow LD, Fisher WS, Fortuna LR, Iturralde E. Opportunities to Integrate Mobile App-Based Interventions Into Mental Health and Substance Use Disorder Treatment Services in the Wake of COVID-19. *American journal of health promotion : AJHP.* 2021;35(8):1178-1183.
212. Lin C, Pham H, Zhu Y, et al. Telemedicine along the cascade of care for substance use disorders during the COVID-19 pandemic in the United States. *Drug Alcohol Depend.* 2023;242:109711.
213. Foti TR, Vereen S, Vamos C, Sappenfield W, Kirby RS. "A Lot of Things Stopped with COVID": Screening Pregnant Patients for Opioid Use and Related Conditions During the COVID-19 Pandemic. *Women's health issues : official publication of the Jacobs Institute of Women's Health.* 2023;33(3):242-249.
214. Marsch LA, Campbell A, Campbell C, et al. The application of digital health to the assessment and treatment of substance use disorders: The past, current, and future role of the National Drug Abuse Treatment Clinical Trials Network. *J Subst Abuse Treat.* 2020;112S:4-11.
215. Karnik NS, Marsden J, McCluskey C, et al. The Opioid Use Disorder Core Outcomes Set (OUD-COS) for treatment research: findings from a Delphi consensus study. *Addiction.* 2022;117(9):2438-2447.
216. Samuels EA, D'Onofrio G, Huntley K, et al. A Quality Framework for Emergency Department Treatment of Opioid Use Disorder. *Annals of emergency medicine.* 2019;73(3):237-247.
217. Aalsma MC, Aarons GA, Adams ZW, et al. Alliances to disseminate addiction prevention and treatment (ADAPT): A statewide learning health system to reduce substance use among justice-involved youth in rural communities. *J Subst Abuse Treat.* 2021;128:108368.
218. Yarborough BJ, Stumbo SP, McCarty D, Mertens J, Weisner C, Green CA. Methadone, buprenorphine and preferences for opioid agonist treatment: A qualitative analysis. *Drug Alcohol Depend.* 2016;160:112-118.
219. Finlay AK, Morse E, Stimmel M, et al. Barriers to Medications for Opioid Use Disorder Among Veterans Involved in the Legal System: a Qualitative Study. *J Gen Intern Med.* 2020;35(9):2529-2536.
220. Frost MC, Matson TE, Richards JE, et al. Barriers and facilitators to changing drinking and receiving alcohol-related care: Interviews with Veterans Health Administration primary care patients who indicated interest but did not enroll in an alcohol care management intervention trial. *Subst Abus.* 2022;43(1):1197-1206.
221. Green CA, McCarty D, Mertens J, et al. A qualitative study of the adoption of buprenorphine for opioid addiction treatment. *J Subst Abuse Treat.* 2014;46(3):390-401.
222. Finlay AK, Binswanger IA, Timko C, et al. Facility-level changes in receipt of pharmacotherapy for opioid use disorder: Implications for implementation science. *J Subst Abuse Treat.* 2018;95:43-47.
223. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain -- United States, 2016. *MMWR Recomm Rep.* 2016;65(1):1-49.
224. Opioid Therapy for Chronic Pain Work Group. *VA/DoD Clinical Practice Guideline for Opioid Therapy for Chronic Pain.* Washington, DC: Department of Veterans Affairs, Department of Defense;2017.
225. Wong J, An D, Urman RD, et al. Society for Perioperative Assessment and Quality Improvement (SPAQI) Consensus Statement on Perioperative Smoking Cessation. *Anesthesia and analgesia.* 2020;131(3):955-968.
226. Washington State Department of Labor and Industries. *Guideline for Prescribing Opioids to Treat Pain in Injured Workers.* Tumwater, WA: Author;2013.
227. Pearson TA, Palaniappan LP, Artinian NT, et al. American Heart Association Guide for Improving Cardiovascular Health at the Community Level, 2013 Update: A Scientific Statement for Public Health Practitioners, Healthcare Providers, and Health Policy Makers. *Circulation.* 2013;127(16):1730-1753.

228. Selph S, Patnode C, Bailey SR, Pappas M, Stoner R, Chou R. Primary Care-Relevant Interventions for Tobacco and Nicotine Use Prevention and Cessation in Children and Adolescents: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA*. 2020;323(16):1599-1608.
229. Patnode CD, Perdue LA, Rushkin M, et al. Screening for Unhealthy Drug Use: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA*. 2020;323(22):2310-2328.
230. Lapoint J, Meyer S, Yu CK, et al. Cannabinoid Hyperemesis Syndrome: Public Health Implications and a Novel Model Treatment Guideline. *The western journal of emergency medicine*. 2018;19(2):380-386.