

American College of Preventive Medicine: Addressing the Opioid Epidemic Through a Prevention Framework



Catherine J. Livingston, MD, MPH,^{1,2} Manijeh Berenji, MD, MPH,^{3,4,5} Tisha M. Titus, MD, MPH,⁶
Lee S. Caplan, MD, MPH, PhD,⁷ Randall J. Freeman, MD, MPH, MBA, MTM&H,⁸
Kevin M. Sherin, MD, MPH,^{9,10} Amir Mohammad, MD, MPH,^{11,12}
Elizabeth M. Salisbury-Afshar, MD, MPH¹³

The opioid epidemic has resulted in significant morbidity and mortality in the U.S. Health systems, policymakers, payers, and public health have enacted numerous strategies to reduce the harms of opioids, including opioid use disorder (OUD). Much of this implementation has occurred before the development of OUD-related comparative effectiveness evidence, which would enable an understanding of the benefits and harms of different approaches. This article from the American College of Preventive Medicine (ACPM) uses a prevention framework to identify the current approaches and make recommendations for addressing the opioid epidemic, encompassing strategies across a primordial, primary, secondary, and tertiary prevention approach.

Key primordial prevention strategies include addressing social determinants of health and reducing adverse childhood events. Key primary prevention strategies include supporting the implementation of evidence-based prescribing guidelines, expanding school-based prevention programs, and improving access to behavioral health supports. Key secondary prevention strategies include expanding access to evidence-based medications for opioid use disorder, especially for high-risk populations, including pregnant women, hospitalized patients, and people transitioning out of carceral settings. Key tertiary prevention strategies include the expansion of harm reduction services, including expanding naloxone availability and syringe exchange programs.

The ACPM Opioid Workgroup also identifies opportunities for de-implementation, in which historical and current practices may be ineffective or causing harm. De-implementation strategies include reducing inappropriate opioid prescribing; avoiding mandatory one-size-fits-all policies; eliminating barriers to medications for OUD, debunking the myth of detoxification as a primary solo treatment for opioid use disorder; and destigmatizing care practices and policies to better treat people with OUD.

Am J Prev Med 2022;63(3):454–465. © 2022 American Journal of Preventive Medicine. Published by Elsevier Inc. All rights reserved.

From the ¹Department of Family Medicine, School of Medicine, Oregon Health & Science University, Portland, Oregon; ²Department of Health Management and Policy, School of Public Health, OHSU-Portland State University, Portland, Oregon; ³Department of Occupational Health, VA Long Beach Healthcare System, Long Beach, California; ⁴Department of Occupational Medicine, UC Irvine School of Medicine, Irvine, California; ⁵Department of Environmental and Occupational Health, School of Public Health, University of California, Irvine, Irvine, California; ⁶Department of Family and Preventive Medicine, Emory University School of Medicine, Atlanta, Georgia; ⁷Department of Community Health & Preventive Medicine, Morehouse School of Medicine, Atlanta, Georgia; ⁸Department of Occupational Medicine, Tripler Army Medical Center, Schofield Barracks, Hawaii; ⁹Department of Family Medicine and Rural Health Florida State University College of Medicine, Orlando, Florida;

¹⁰Department of Medicine University of Central Florida College of Medicine, Orlando, Florida; ¹¹Department of Medicine, Veterans Affairs Connecticut Healthcare System, West Haven, Connecticut; ¹²Department of Medicine, Yale University School of Medicine, New Haven, Connecticut; and ¹³Department of Family Medicine and Community Health, School of Medicine and Public Health, University of Wisconsin, Madison, Wisconsin

Address correspondence to: Catherine J. Livingston, MD, MPH, Department of Family Medicine, Oregon Health & Science University, 3930 Southeast Division Street, Portland OR 97202. E-mail: livingsc@ohsu.edu.

0749-3797/\$36.00

<https://doi.org/10.1016/j.amepre.2022.04.021>

INTRODUCTION

Opioid use disorder (OUD) is a treatable, chronic medical condition involving complex interactions among brain circuits, genetics, the environment, and an individual's life experiences. OUD rates dramatically increased in the U.S. and across the globe over the past several decades, resulting in substantial morbidity and mortality.^{1–4}

In the U.S., the first wave of opioid overdose deaths was largely attributable to prescription opioids; subsequent waves included heroin (starting in 2010) and synthetic opioids (starting in 2013).⁵ The dramatic rise in opioid prescribing over the past few decades occurred despite no evidence showing the benefit of opioids in treating chronic noncancer pain.⁶ The first long-term RCT examining opioids compared with nonopioid therapies found no difference in pain-related function and worse outcomes in pain intensity and adverse reactions.⁷ Even though there was no evidence of benefit and the harms of opioids were well known, the U.S. has far surpassed the rest of the world in opioid prescribing per capita.⁸

Numerous factors have contributed to the opioid epidemic, including overabundant opioid prescribing, aggressive pharmaceutical marketing practices, changing heroin and illicit drug markets, and worsening socioeconomic conditions.^{9–11} The coronavirus disease 2019 (COVID-19) pandemic further contributed to an increase in drug overdose deaths in the U.S., primarily driven by illicit synthetic opioids.¹²

In response to the opioid epidemic, clinicians, health systems, public health practitioners, state legislatures, and payers have all implemented a variety of initiatives. However, many of these were implemented with insufficient evidence to guide quality decision making.^{13,14}

The American College of Preventive Medicine (ACPM) Science and Translation Committee established an Opioid Working Group to develop an ACPM practice statement addressing the opioid epidemic. Key areas of foci included applying the prevention framework to evaluate the current key interventions across the 4 levels of prevention, highlighting best practice opportunities that may be underutilized across the prevention continuum, and identifying potential opportunities for de-implementation of harmful or ineffective policies and practices. A nonsystematic review of the literature was conducted to identify summary resources and highlight key examples with these goals. Recommendations are focused on areas within the scope of preventive

medicine. Although there are interrelationships between criminal legal policies to reduce illicit opioid supply and incarceration practices, addressing those strategies is outside this article's scope.

PREVENTION FRAMEWORK

A prevention framework is often used when developing population health approaches to chronic diseases. This article applies a prevention framework that considers the predisposing factors that increase the risk of OUD and provides the structural framework for appropriate action through prevention, treatment, and harm reduction approaches. With the ever-evolving nature of opioid consumption and morbidity and mortality trends globally, applying this prevention framework will enrich how community and public health practices respond to such changes.

This article identifies evidence-based strategies and promising practices across the prevention continuum. The evidence on the longer-term impact on OUD incidence and mortality of these strategies is insufficient in many areas and is actively emerging. [Table 1](#) provides an overview of the key recommended strategies for addressing the opioid epidemic by the 4 levels of prevention.

PRIMORDIAL PREVENTION

Primordial prevention is the earliest prevention modality, targeting the underlying social and environmental conditions that promote the onset of disease.¹⁵ Primordial prevention strategies for preventing OUD address potential socioeconomic contributors (also known as the social determinants of health [SDOH]), such as poverty, limited socioeconomic opportunity, structural racism, and adverse childhood events (ACEs).

On a broad scale, the opioid epidemic disproportionately impacts economically strained communities.^{16,17} Although life expectancy was generally improving across the world in wealthy countries, the U.S. saw a decline in life expectancy, with “deaths of despair” from drug and alcohol poisonings being a significant contributor to the worsening rates.⁹ Evidence is emerging that a variety of social stressors increase vulnerability for drug use.¹⁸ Macroeconomic shocks, which disrupt employment and housing, have been shown to correlate with increased opioid death rates, and labor force participation has been inversely correlated with increased opioid prescribing in some geographic areas.^{16,17} Food insecurity is a predictor of chronic pain and prescription opioid use as

Table 1. Key Strategies to Address the Opioid Epidemic Using the Prevention Framework

| Prevention level | Definition | Key strategy | Examples |
|------------------|--|--|---|
| Primordial | Targeting the underlying social and environmental conditions that promote the onset of disease | Reduce predisposing risk factors <ul style="list-style-type: none"> • Decrease negative SDOH that increase the risk of OUD • Increase protective factors | <ul style="list-style-type: none"> • ACE prevention and mitigation • Address housing insecurity • Address structural racism |
| Primary | Preventing the development of disease | Reduce the risk of developing OUD or experiencing an overdose <ul style="list-style-type: none"> • Decrease access to opioids • Increase protective factors • Reduce risk factors | <ul style="list-style-type: none"> • Improve adherence to opioid prescribing guidelines • Support evidence-based education and training on opioid prescribing • Implement electronic health record clinical decision support systems • Increase Prescription Drug Monitoring Program best practices • Expand access to nonpharmacological pain therapies • Expand school-based prevention programs • Offer life skills-based education • Improve access to behavioral health care |
| Secondary | Early identification of disease and linkage to evidence-based treatment services | Improve the screening and diagnosis of OUD with linkage to effective treatment <ul style="list-style-type: none"> • Increase access to MOUD • Increase behavioral health and social supports | <ul style="list-style-type: none"> • Improve the screening and diagnosis of OUD with linkage to effective treatment • Increase access to MOUD • Increase behavioral health and social supports • Screen for OUD with connection to MOUD • Payer strategies to improve access to MOUD • Initiation and continuation of MOUD in carceral settings • Support primary care in providing MOUD • Wraparound supports for pregnant women with OUD |
| Tertiary | Managing a condition to slow progression and/or reduce negative consequences | Harm reduction <ul style="list-style-type: none"> • Decrease negative effects of ongoing drug use • Facilitate linkages to treatment | <ul style="list-style-type: none"> • Syringe services programs • Expand naloxone availability • Housing first models |

ACE, adverse childhood event; MOUD, medications for opioid use disorder; OUD, opioid use disorder; SDOH, social determinants of health.

well.¹⁹ Modifying the structures that contribute to homelessness, systemic racism, food insecurity, and other SDOH will require large-scale change, although the health system's role in impacting SDOH is still emerging.^{20,21}

ACEs (such as abuse, neglect, parental divorce, parental death, or parental incarceration) are associated with a 4 to 10-fold increase in substance use in adults,²² and decreasing ACEs will hypothetically decrease OUD incidence. The Center for Disease Control and Prevention (CDC) has identified 6 core evidence-based strategies to decrease ACEs.²³ An example program to reduce ACEs is Project Nurture, an innovative Oregon Medicaid care

delivery model for pregnant women with OUD, which integrates prenatal care, OUD treatment, and social-service coordination and was found to reduce child maltreatment and placement of children in foster care.²⁴ This approach uses a life course model of prevention: secondary prevention for the mother and primordial prevention for the infant.

PRIMARY PREVENTION

Primary prevention focuses on preventing the development of OUD or opioid overdose deaths. This can be achieved by preventing exposure to opioids, increasing

protective factors known to reduce the risk of OUD, and reducing risk factors with direct and demonstrable links to OUD development and opioid overdose deaths.

Adolescent exposure to opioids is a significant concern for both acute opioid overdose and the future risk of OUD development. The predictors of adolescent pharmaceutical opioid overdose include an opioid prescription written for youth (sixfold increased risk) and concurrent exposure of youth and family members to opioid prescriptions (13-fold increased risk).²⁵ The key strategies for reducing risk among adolescents include reducing unnecessary opioid prescriptions and building protective factors that help to prevent or delay substance use. School-based prevention programs (such as Life Skills Training, Project Towards No Drug Abuse, PROSPER, and The Good Behavior Game) and selected family-based interventions (such as Strengthening Families 10–14) have shown effectiveness.²⁶ Evidence-based middle school programs have been found to reduce opioid misuse risk by up to 41%,²⁷ which is promising for reducing long-term OUD incidence.

Among individuals exposed to prescription opioids, a history of substance use disorder (SUD), mental health diagnosis, and concurrent prescription of certain psychiatric medications are associated with a higher risk of developing OUD.²⁸ Therefore, potential prevention strategies should include interventions to reduce any substance use, prevention and treatment of mental health conditions, and efforts to minimize unnecessary opioid exposure. Because more than 50% of people who report misusing prescription opioids report getting them from friends or relatives rather than from a prescriber,²⁹ efforts aimed at reducing community access, such as reducing overall prescribing and drug take-back programs, may confer additional benefits.

Opioid Prescribing Guidelines

The CDC Guideline for Prescribing Opioids for Chronic Pain has been widely adopted as a best practice standard across the country.³⁰ Per the 2016 guideline, reducing initial opioid prescription amounts will presumably decrease the number of people who transition to long-term opioid therapy, whereas reducing morphine milligram equivalents will contribute to fewer complications associated with chronic opioid prescribing, including prescription-related overdose and death.

A variety of interventions have been adopted to encourage the uptake of and adherence to CDC guidelines, including the adoption of public health strategies, legislative limitations, clinical decision support systems, required training, and payer interventions.^{31–34} These interventions exist along a spectrum, from passive (e.g., Prescription Drug Monitoring Programs [PDMPs] and

guidelines are available) to active (e.g., previous authorizations, legal requirements to check PDMPs). Reinforcement measures range from more supportive (e.g., academic detailing, prescriber report cards) to more punitive (e.g., legal ramifications for outlier prescribing). Adoption and enforcement of guidelines and laws have been criticized for a 1-size-fits-all approach, and misapplications of CDC guideline have occurred.³⁵ As of this writing, CDC guideline is being updated to reflect new evidence and incorporates guiding principles to address misapplications of the 2016 guideline.

There is significant variation in prescribing practices across the continuum of healthcare training and medical specialties. Among surgeons, substantial variation exists in postsurgical opioid prescribing.³⁶ Nurse practitioners and physician assistants are more likely to prescribe high-frequency, high-dose opioids than physicians.^{37,38} U.S. dentists' proportion of opioid prescriptions is 37 times higher than those of dentists in England.³⁹

Several studies have shown improved clinician adherence to opioid prescribing guidelines through enhanced electronic health record access to PDMPs and safer opioid prescribing practices utilizing clinical decision support systems.^{40–42} PDMPs, which enable providers to see patients' controlled substance prescribing history, are largely effective at reducing opioid prescriptions through evidence showing that their impact on reducing opioid overdoses is less clear.^{43,44} The quality and characteristics of PDMPs appear to be associated with whether or not they are associated with improved outcomes.^{45,46}

For reducing postoperative opioid prescribing, evidence supports clinician-mediated and organizational-level interventions.⁴⁷ An electronic health record intervention that changed the default number of opioid pills in a postoperative order set plus trainee education decreased opioid prescribing by 15%.⁴⁸ In Arizona, report cards decreased the percentage of outlier prescribers from 19.2% to 14.2%.⁴⁹ Given the U.S. prescribing in comparison with those of other countries and marked variability in clinical practice compared with that in evidence-based standards, it is clear that broader implementation of evidence-based guidelines and supports is necessary.

Opioid Tapering

Given the lack of long-term benefits and known harms of opioids for chronic noncancer pain, numerous studies have explored the impact of tapering patients off opioids.⁵⁰ A systematic review of 67 studies, including 11 RCTs, found that dose reduction of opioids results in improvements in pain severity (8 of 8 fair-quality studies), functioning (5 of 5 fair-quality studies), and quality

of life (3 of 3 fair-quality studies).⁵¹ Recently, published guidance now exists on the best practice approaches to opioid tapering.⁵²

Utilization of Opioid Alternatives

Effective pain management that reduces the reliance on opioids is a key strategy to decrease the potential harms of unnecessary opioid prescriptions. Opportunities exist to promote nonpharmacological and nonopioid alternatives for pain relief and simultaneously minimize exposure to opioids.^{53,54} A variety of nonpharmacologic strategies are effective for different types of chronic pain, including exercise (e.g., physical therapy), acupuncture, cognitive behavioral therapy, and mindfulness practices.⁵⁵ To deliver more effective nonopioid-based pain care through nonpharmacological therapies, policy changes are needed to promote awareness, availability, accessibility, and affordability.

To date, most focus in the primary prevention space has been on reducing the volume of opioids prescribed for chronic, noncancer pain, with the goal of reducing opioid exposure. Interventions aimed at increasing the protective factors and reducing other risk factors for OUD have been less studied and emphasized. In addition, approaches focused solely on reducing access to prescription opioids are unlikely to impact populations of individuals who initiate with heroin and illicit synthetic opioids such as fentanyl. Therefore, it is critical that future primary prevention research efforts include not only prescription opioid supply reduction but also include efforts to reduce the risk factors for initiating illicit opioids and enhancing protective factors.

SECONDARY PREVENTION

Secondary prevention focuses on the early identification of OUD and linkage to evidence-based treatment services. The U.S. Preventive Services Task Force recommends that all adults be screened for unhealthy drug use when accurate diagnosis, effective treatment, and appropriate care can be offered or referred.⁵⁶

Medications for OUD (MOUD), previously referred to as medication-assisted treatment, is the standard evidence-based treatment of OUD and involves 1 of 3 Federal Drug Administration–approved medications: methadone, buprenorphine, or extended-release naltrexone. Treatment with agonist therapy (methadone or buprenorphine) reduces all-cause mortality by 50% and is also associated with substantial reductions in suicide, cancer, and cardiovascular mortality.⁵⁷ Expanded access to methadone and buprenorphine is directly related to reduced opioid-overdose deaths.⁵⁸ Comparative effectiveness evidence suggests that methadone and

buprenorphine are more effective than antagonist therapy (extended-release naltrexone), intensive behavioral therapy, and inpatient treatment.⁵⁹ Among individuals who are engaged in the criminal justice system, providing extended-release naltrexone before release decreases the rates of relapse and reincarceration, although with higher rates of adverse events.⁶⁰ Although *medically managed withdrawal* (often referred to as detoxification) is a widely available, highly promoted method for discontinuation of opioids, it is ineffective and potentially harmful when used alone, and the Substance Abuse and Mental Health Services Administration considers detoxification as one step in a comprehensive addiction treatment plan.⁶¹ Detoxification should be accompanied by offering evidence-based treatment options, including MOUD.

Significant barriers exist for people with OUD to access evidence-based treatment. Historically, in the U.S., methadone has been the primary treatment of OUD, available through designated Opioid Treatment Programs in a high-intensity model, largely limited to urban areas. The Drug Addiction Treatment Act of 2000 substantially increased access to office-based opioid treatment with buprenorphine as a more accessible alternative to methadone. However, 96% of states have insufficient buprenorphine capacity to match the rates of opioid dependence.⁶² Multiple barriers to expanded prescribing of buprenorphine remain, including limited numbers of trained clinicians, varying standards, regulatory hurdles, and stigma.⁶³ Rural inaccessibility to clinicians who prescribe MOUD is especially acute.⁶⁴

Traditional treatment of OUD has been disrupted by COVID-19, and the regulatory flexibilities introduced provide a significant opportunity to understand the impact of these changes on the care of individuals with OUD, including expanded use of telemedicine and increased leniency with traditional program requirements.^{65,66}

A series of policy options exist to expand access to MOUD, such as decreasing burdensome state requirements for Opioid Treatment Programs and, more controversially, revising federal law to allow methadone to be prescribed for OUD in primary care, mirroring Canada, Great Britain, and Australia.^{67,68} Less controversial and increasingly available across the country is expanding low-barrier access to buprenorphine. In France, eliminating prescribing limitations resulted in 20% of physicians prescribing buprenorphine and was associated with substantial declines in opioid overdose deaths.⁶⁹ The California Bridge Program, which involves Emergency Department (ED) initiation of buprenorphine, resulted in 60% of OUD ED encounters with buprenorphine administration and 40% attending

follow-up visits.⁷⁰ In Missouri, a Medication First approach doubled MOUD, improved timeliness of receipt of MOUD, improved retention in care, and resulted in 21% lower costs.⁷¹ Lowering barriers to MOUD is a critical underutilized strategy.

Stigma remains a major barrier to accessing MOUD.⁵⁸ Persistent beliefs exist among patients, clinicians, and policymakers that MOUD is simply substituting one drug for another, with physical dependency being perceived as primarily a failure of self-discipline. Such beliefs decrease some patients' and clinicians' willingness to adopt MOUD as an evidence-based treatment. Only a minority of SUD treatment facilities offer evidence-based MOUD, and many continue to promote abstinence-based models.^{72,73} Given that residential treatment programs are among the most intensive and expensive treatment options available, promoting evidence-based treatments is a key strategy for improving cost-effective care.

A critical strategy to improve access to MOUD involves payer coverage policies. Coverage of MOUD is not universal among insurers. Medicaid expansion has been associated with an approximately 10% decrease in opioid-related inpatient hospitalizations, attributed to improved access to effective OUD treatment.⁷⁴ However, not all Medicaid programs cover methadone for OUD treatment.⁷⁵ A variety of toolkits are available to payers for comprehensive approaches.⁷⁶ Alberta, Canada makes MOUD readily available at no cost for those without coverage.⁷⁷ The key payer strategies to improve MOUD access include minimizing coinsurance and copays for MOUD, decreasing previous authorization requirements, eliminating lifetime prescription limits, and offering care coordination.^{75,78}

Special Populations

Pregnant women with OUD face multiple barriers to effective treatment, including maternity clinicians often unable or unwilling to prescribe MOUD and experiencing stigma when seeking care. Expanding the number of maternity clinicians who can prescribe MOUD is an essential strategy, as are working partnerships between addiction and maternity care clinicians.

Carceral settings (prisons and jails) are a critical area of need to improve access to evidence-based treatment. Despite a high prevalence of OUD in prisons and dramatically increased risk of opioid overdose mortality upon release, <1% of jails and prisons provide MOUD.⁷⁹ A systematic review of studies involving incarcerated populations found that MOUD in prison and after release was associated with significant benefits both within the carceral setting and upon release into the community.⁸⁰ A national study in 39 English prisons

found that MOUD was associated with a 75% reduction in all-cause mortality and an 85% reduction in fatal drug-related poisoning in the first month after release.⁸¹ In Rhode Island, a comprehensive MOUD program implemented in a carceral setting resulted in a 60% reduction in postincarceration overdose fatalities.⁸² The American Society of Addiction Medicine recommends access to evidence-based OUD treatment, including all Federal Drug Administration–approved medications, as the standard of care within carceral facilities as well as for individuals under community supervision,^{83,84} and implementation toolkits are available.⁸⁵

Acute care settings are a critical place to ensure that those with OUD are getting effective treatment. Inadequately treated OUD during a hospital stay can complicate the management of the co-occurring conditions, increasing treatment nonadherence and the rates of discharge against medical advice. In Chicago, consultation with a Multidisciplinary Substance Use Intervention Team was associated with a shorter average length of stay (5.91 vs 6.73 days) and a lower 30-day readmission rate (13.6% vs 15.7%).⁸⁶

TERTIARY PREVENTION

Tertiary prevention focuses on managing a condition to slow progression and/or reduce negative consequences. For OUD, the tertiary prevention goals are to (1) prevent complications of OUD, including opioid-induced overdose deaths; (2) reduce opioid-associated diseases (including injection-related infectious diseases); and (3) reduce medical and psychosocial complications. Through a harm reduction approach, there is recognition that not all people with OUD are ready to discontinue nonmedical opioid use, but there are still substantial opportunities to reduce opioid-associated morbidity and mortality.

Housing First Models

Houselessness and SUD commonly co-occur and can exacerbate one another, so addressing houselessness can be both a tertiary prevention and primordial prevention strategy. Housing First models address the houselessness first, assuming that core stability with housing is critical to being able to effectively engage in substance use and other treatment. These models have been associated with decreased medical utilization (fewer ED visits, fewer hospitalizations, and less time spent hospitalized) and are considered a best practice for developing comprehensive models to support people with SUDs,⁸⁷ although evidence on outcomes related to OUD is not yet clear.

Syringe Services Programs

Syringe services programs (SSPs) can provide a range of support for patients with OUD who inject drugs, including public health services such as vaccinations, testing and infectious disease treatment, and connection to OUD treatment. SSPs are effective at reducing HIV transmission and hepatitis C acquisition, and individuals who utilize SSPs are 5 times more likely to enter drug treatment than individuals who do not.⁸⁸ As a safe, effective, and cost-saving intervention, SSPs are underutilized, and increased access is an important component of comprehensive approaches to OUD.

Intensive Harm Reduction Strategies

A novel approach to harm reduction is supervised consumption sites (SCSs), which have been associated with reductions in overdose deaths.⁸⁹ SCSs are sites where people who inject drugs (most often heroin) can consume drugs, with access to clean needles and medical supervision. Whereas other countries have adopted SCS (including Australia, Canada, and several countries in Europe), the U.S. has only considered adoption recently. In 2021, New York City permitted the opening of 2 SCS (termed Overdose Prevention Centers). Evidence from this model of harm reduction in the U.S. context is still emerging. Additional more intensive harm reduction strategies (e.g., heroin maintenance, injectable hydromorphone) for refractory OUD are offered outside of the U.S. but are beyond the scope of this article.

Naloxone

Naloxone is an opioid antagonist used to rapidly reverse opioid-induced respiratory depression. Expanding access to naloxone is a critical strategy to decrease fatal overdoses. A variety of distribution models exist, including community-based organization distribution, traditional prescriptions (including for family members and friends of high-risk individuals), standing medication orders, and pharmacist prescribing.⁹⁰ Coprescribing of naloxone to patients using chronic opioids is associated with lower ED utilization.⁹¹ Increasing the number of law enforcement officers trained and carrying naloxone is associated with reducing opioid overdose deaths.⁹² Observational studies and economic models suggest that providing naloxone to laypeople is safe, is cost effective, and reduces death.⁹³ Multiple opportunities to enhance naloxone distribution exist, including utilizing public health data to identify where overdoses are most likely to occur and ensuring that efforts are reaching those most at-risk.

DE-IMPLEMENTATION OF INEFFECTIVE OR HARMFUL STRATEGIES

The rapid adoption of various systems-level strategies in the face of the OUD epidemic has been remarkable. Along with the emerging research on the effectiveness of these various strategies is an opportunity to identify interventions that may have little benefit or may be causing harm. The ACPM Opioid Workgroup has identified a series of potential opportunities for de-implementation or avoidance due to lack of efficacy or concern for harm (Table 2). Decreasing unnecessary opioid prescribing as defined by CDC is a key area of de-implementation that has been robustly discussed in the literature. However, a concurrent critical area of de-implementation includes reducing or eliminating barriers to evidence-based MOUD, enabling more access to this core secondary prevention strategy.

EFFECTIVE DATA SURVEILLANCE

Data surveillance, such as through CDC's Annual Surveillance Report of Drug-Related Risks and Outcomes, is a critical strategy to both identify emerging trends in opioid-related morbidity and mortality (e.g., rising overdose deaths with fentanyl), inform ecologic-level comparative effectiveness of different large-scale solutions, and tailor effective community preventive strategies.² The Data-Driven Prevention Initiative is one example of CDC-funded initiatives for states to utilize robust surveillance data and develop comprehensive and community-responsive solutions to decreased opioid overdose rates.

Toolkits have been developed, implementing effective data surveillance programs,⁹⁴ and numerous public-facing state data dashboards exist in addition to a national overdose detection mapping application program.⁹⁵ Although evidence continues to emerge on the comparative effectiveness of various policy strategies, data surveillance enables more real-time assessment of emerging threats and trends. Data surveillance can also help to inform the effectiveness of de-implementation interventions.

CONCLUSIONS

A preventive medicine framework enables the examination of current gaps and opportunities in response to the opioid epidemic across the prevention continuum. ACPM has previously identified the key priorities for research in this space, including addressing SDOH on opioid misuse, improving prevention policy implementation, and risk mitigation/harm

Table 2. Key Harmful and Unproven Policies and Practices to De-emphasize or Eliminate

| Category | ACPM recommendations |
|-----------------------------------|---|
| Opioid prescribing approaches | <ul style="list-style-type: none"> • Avoid prescribing quantities that are higher dose and longer duration than is necessary • Avoid opioids as a first-line treatment when nonopioid pharmacotherapy and nonpharmacological therapies are more likely to offer a greater benefit/risk profile (key improvement opportunities include dental prescribing and managing pain in adolescents) • Avoid abrupt opioid tapering in well-functioning patients who appear to be benefiting and safely using chronic opioid therapy • Avoid inflexible mandates (e.g., legislation) on opioid prescribing limits that do not allow for some individuation (e.g., cancer, palliative care) • Avoid failing to anticipate and put plans in place to prevent overdoses during pill mill shutdowns • Restrict and hold accountable pharmaceutical marketing to patients and clinicians |
| OUD treatment approaches | <ul style="list-style-type: none"> • Do not use detoxification alone as a primary treatment approach for OUD • Do not require universal participation in behavioral treatment as a condition of receiving ongoing MOUD in primary care • Minimize financial barriers to MOUD, including coinsurance, copayments, and repeated previous authorizations that create barriers to access • Avoid stigmatizing patients with OUD, including using terms such as addict and dirty/clean • Clinicians and payers should avoid lifetime limits or required tapering off medication treatment in patients who are benefiting from effective management of OUD in alignment with evidence-based guidelines • Addiction treatment programs and payers should dispense with the concept of abstinence-based treatment (i.e., prohibits MOUD) being the primary therapeutic strategy for most patients with OUD • Treating clinicians should not withhold MOUD when someone continues to use other substances (e.g., marijuana) as long as that individual is taking the prescribed medication, and the benefits outweigh the risks |
| Approaches to special populations | <ul style="list-style-type: none"> • Avoid forced discontinuation of MOUD among individuals who are incarcerated or under community supervision (i.e., probation or parole) • Avoid failing to develop a transition and support plan, including MOUD, for individuals with OUD being released from carceral settings • Do not withhold MOUD for pregnant women with OUD • Avoid withholding appropriate opioids in specific conditions (e.g., sickle cell disease) |

ACPM, American College of Preventive Medicine; MOUD, medications for opioid use disorder; OUD, opioid use disorder

reduction approaches.⁹⁶ Although further research is clearly necessary, there are substantial opportunities to increase the adoption of evidence-based interventions across the prevention framework. This article provides a preventive medicine framework to shape future prevention efforts.

This review highlights the critical areas of prevention-based intervention that can be used to reduce the risk of harm from opioids. Low-cost, high-benefit, evidence-based strategies such as expanding access to naloxone and implementation supports for opioid prescribing should be adopted more widely. Changing policies to expand coverage and access to MOUD by decreasing payer and regulatory barriers is also a high priority and likely cost effective but requires greater political effort, coordination, and time. Interventions focused on supporting the implementation of evidence-based care for specific populations, including pregnant women, hospitalized patients, and those transitioning from carceral settings to the community, should be prioritized.

Other efforts that require longer-term planning, require significant legislative policy changes, require multiagency coordination, or are costly should not be

forgotten because these have great potential for long-term impact. Targeted activities to reduce ACEs and build resiliency (protective factors) in children and adolescents are critical primordial prevention areas. High-yield secondary and tertiary prevention activities, including incarceration transition programs and housing first models of care, should be supported.

For short-term and long-term interventions to be sustained, they must be practiced not only in the healthcare settings but interwoven within the criminal legal, education, and social services systems. Adherence to CDC's Evidence-Based Strategies for Preventing Opioid Overdose 4 Guiding Principles is fundamental for successful interventions.⁹¹ Moreover, the budgetary framework guiding opioid prevention efforts needs to be fundamentally restructured on the basis of analytics, with the ability to redirect funds as needed on the basis of surveillance data. There is ample opportunity for public health professionals with litigation settlements, including The Global Prescription Opioid Litigation Settlement Agreement (signed by all the 50 states and territories in July 2021) and a recently finalized \$26 billion opioid settlement agreement, to guide the funding

allocation process.⁹⁷ This funding needs to be applied equitably across all geographic regions using an evidence-informed decision tree embedded in the prevention framework.

Using a prevention framework will enable vital stakeholders (clinicians, public health officials, government officials, payers, the criminal legal system, community-based organizations, and the public) to reduce future OUD and overdose deaths.

ACKNOWLEDGMENTS

CJL serves as the Medical Director of Health Share of Oregon. One of the programs cited in this article (Project Nurture) involves funding from and involvement of members of Health Share. This potential conflict of interest has been reviewed and managed by Oregon Health & Science University. No financial disclosures were reported.

REFERENCES

1. United Nations Office On Drugs & Crime. World drug report 2021. CrimRxiv. Published online June 24, 2021. <https://doi.org/10.21428/cb6ab371.e39c4e60>.
2. Centers for Disease Control and Prevention. 2019 Annual surveillance report of drug-related risks and outcomes - United States surveillance special report. Atlanta, GA: Centers for Disease Control and Prevention. <https://www.cdc.gov/drugoverdose/pdf/pubs/2019-cdc-drug-surveillance-report.pdf>. Published November 1, 2019. Accessed May 28, 2022.
3. Singh JA, Cleveland JD. National U.S. time-trends in opioid use disorder hospitalizations and associated healthcare utilization and mortality. *PLoS One*. 2020;15(2):e0229174. <https://doi.org/10.1371/journal.pone.0229174>.
4. Alho H, Dematteis M, Lembo D, Maremmanni I, Roncero C, Somaini L. Opioid-related deaths in Europe: strategies for a comprehensive approach to address a major public health concern. *Int J Drug Policy*. 2020;76:102616. <https://doi.org/10.1016/j.drugpo.2019.102616>.
5. Understanding the epidemic: CDC's response to the opioid overdose epidemic. Centers for Disease Control and Prevention; 2021. <https://www.cdc.gov/drugoverdose/epidemic/index.html>. Updated March 17. Accessed May 28, 2022.
6. Chou R, Hartung D, Turner J, et al. *Opioid treatments for chronic pain*. Rockville, MD: Agency for Healthcare Research and Quality, 2020. Published Mar 17. <https://doi.org/10.23970/AHRQEPCCER229>.
7. Krebs EE, Gravely A, Nugent S, et al. Effect of opioid vs nonopioid medications on pain-related function in patients with chronic back pain or hip or knee osteoarthritis pain: the SPACE randomized clinical trial. *JAMA*. 2018;319(9):872–882. <https://doi.org/10.1001/jama.2018.0899>.
8. Congressional Research Service. Consumption of prescription opioids for pain: a comparison of opioid use in the United States and other countries. Washington, DC: Congressional Research Service; 2021. <https://crsreports.congress.gov/product/pdf/R/R46805>. Published June 2. Accessed May 28, 2022.
9. Case A, Deaton A. Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. *Proc Natl Acad Sci U S A*. 2015;112(49):15078–15083. <https://doi.org/10.1073/pnas.1518393112>.
10. Haffajee RL, Mello MM. Drug companies' liability for the opioid epidemic. *N Engl J Med*. 2017;377(24):2301–2305. <https://doi.org/10.1056/NEJMp1710756>.
11. Kolodny A. How FDA failures contributed to the opioid crisis. *AMA J Ethics*. 2020;22(1):E743–E750. <https://doi.org/10.1001/ama-jethics.2020.743>.
12. Centers for Disease Control and Prevention. Increase in fatal drug overdoses across the United States driven by synthetic opioids before and during the COVID-19 pandemic. Atlanta, GA: Centers for Disease Control and Prevention; 2020. <https://emergency.cdc.gov/han/2020/han00438.asp>. Published December 17. Accessed May 28, 2022.
13. Beaudoin FL, Banerjee GN, Mello MJ. State-level and system-level opioid prescribing policies: the impact on provider practices and overdose deaths, a systematic review. *J Opioid Manag*. 2016;12(2):109–118. <https://doi.org/10.5055/jom.2016.0322>.
14. Haegerich TM, Jones CM, Cote PO, Robinson A, Ross L. Evidence for state, community and systems-level prevention strategies to address the opioid crisis. *Drug Alcohol Depend*. 2019;204:107563. <https://doi.org/10.1016/j.drugalcdep.2019.107563>.
15. Kislung LA, Das JM. *Prevention strategies*. StatPearls. Treasure Island, FL: Pearls Publishing; 2022. <https://www.ncbi.nlm.nih.gov/books/NBK537222/>. Accessed May 28, 2022.
16. Ghertner R, Groves L. *The opioid crisis and economic opportunity: geographic and economic trends*. Washington, DC: ASPE Research Brief, HHS; September 11, 2018. https://aspe.hhs.gov/sites/default/files/migrated_legacy_files/183261/ASPEconomicOpportunityOpioidCrisis.pdf. Published September 11, 2018. Accessed May 28, 2022.
17. Altekruse SF, Cosgrove CM, Altekruse WC, Jenkins RA, Blanco C. Socioeconomic risk factors for fatal opioid overdoses in the United States: findings from the Mortality Disparities in American Communities Study (MDAC). *PLoS One*. 2020;15(1):e0227966. <https://doi.org/10.1371/journal.pone.0227966>.
18. Amaro H, Sanchez M, Bautista T, Cox R. Social vulnerabilities for substance use: stressors, socially toxic environments, and discrimination and racism. *Neuropharmacology*. 2021;188:108518. <https://doi.org/10.1016/j.neuropharm.2021.108518>.
19. Men F, Fischer B, Urquia ML, Tarasuk V. Food insecurity, chronic pain, and use of prescription opioids. *SSM Popul Health*. 2021;14:100768. <https://doi.org/10.1016/j.ssmph.2021.100768>.
20. Maani N, Galea S. The role of physicians in addressing social determinants of health. *JAMA*. 2020;323(16):1551–1552. <https://doi.org/10.1001/jama.2020.1637>.
21. Weil A. *The social determinants of death*. Bethesda, MD: HealthAffairs; 2020. <https://www.healthaffairs.org/doi/10.1377/forefront.20200603.831955/>. Published June 3. Accessed May 28, 2022.
22. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998;14(4):245–258. [https://doi.org/10.1016/s0749-3797\(98\)00017-8](https://doi.org/10.1016/s0749-3797(98)00017-8).
23. Centers for Disease Control and Prevention. Preventing adverse childhood experiences (ACEs): leveraging the best available evidence. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; 2019. <https://www.cdc.gov/violenceprevention/pdf/preventingACES.pdf>. Accessed May 28, 2022.
24. John McConnell K, Kaufman MR, Grundtitz JL, et al. Project nurture integrates care and services to improve outcomes for opioid-dependent mothers and their children. *Health Aff (Millwood)*. 2020;39(4):595–602. <https://doi.org/10.1377/hlthaff.2019.01574>.
25. 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. <https://doi.org/10.1001/jamanetworkopen.2020.1018>.
26. Ramos C, Clemans-Cope L, Samuel-Jakubos H, Basurto L. *Evidence-based interventions for adolescent opioid use disorder what might work for high-risk Ohio counties?* Washington, DC: Urban Institute; 2018. <https://urban.org/sites/default/files/publication/>

- 98990/evidence-based_interventions_for_adolescent_opioid_use_-disorder.pdf. Published September. Accessed May 28, 2022.
27. Spoth R, Redmond C, Shin C, Greenberg MT, Feinberg ME, Trudeau L. PROSPER delivery of universal preventive interventions with young adolescents: long-term effects on emerging adult substance misuse and associated risk behaviors. *Psychol Med*. 2017;47(13):2246–2259. <https://doi.org/10.1017/S0033291717000691>.
 28. Klimas J, Gorfinkel L, Fairbairn N, et al. Strategies to identify patient risks of prescription opioid addiction when initiating opioids for pain: a systematic review. *JAMA Netw Open*. 2019;2(5):e193365. <https://doi.org/10.1001/jamanetworkopen.2019.3365>.
 29. Lipari RN, Hughes A. *How people obtain the prescription pain relievers they misuse*. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2017. https://www.samhsa.gov/data/sites/default/files/report_2686/ShortReport-2686.html. Published January 12. Accessed May 28, 2022.
 30. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain - United States, 2016 [published correction appears in *MMWR Recomm Rep*. 2016;65(11):295]. *MMWR Recomm Rep*. 2016;65(1):1–49. <https://doi.org/10.15585/mmwr.rr6501e1>.
 31. Davis CS, Lieberman AJ, Hernandez-Delgado H, Suba C. Laws limiting the prescribing or dispensing of opioids for acute pain in the United States: a national systematic legal review. *Drug Alcohol Depend*. 2019;194:166–172. <https://doi.org/10.1016/j.drugalcdep.2018.09.022>.
 32. Buitendijk H, Caplea G, Janet Desroche A, et al. *Safe practice recommendations for safer opioid prescribing: measures and clinical decision support*. Rockville, MD: Partnerships for Health IT patient Safety, Agency for Healthcare Research and Quality; 2019. <https://assets.ecri.org/PDF/HIT-Partnership/EHRA-ECRI-Safe-Opioid-White-Paper-Final.pdf>. Accessed May 28, 2022.
 33. A comprehensive public health framework to address the opioid crisis. ASTHO. <https://my.astho.org/opioids/home>. Accessed May 28, 2022.
 34. Centers for Medicare & Medicaid Services. Healthcare payer strategies to reduce the harms of opioids. Baltimore, MD: Centers for Medicare & Medicaid Services; 2017. <https://downloads.cms.gov/files/hfpp/hfpp-opioid-white-paper.pdf>. Published January. Accessed May 28, 2022.
 35. Dowell D, Haegerich T, Chou R. No shortcuts to safer opioid prescribing. *N Engl J Med*. 2019;380(24):2285–2287. <https://doi.org/10.1056/NEJMp1904190>.
 36. Mikosz CA, Zhang K, Haegerich T, et al. Indication-specific opioid prescribing for U.S. patients with Medicaid or private insurance, 2017. *JAMA Netw Open*. 2020;3(5):e204514. <https://doi.org/10.1001/jamanetworkopen.2020.4514>.
 37. Lozada MJ, Raji MA, Goodwin JS, Kuo YF. Opioid prescribing by primary care providers: a cross-sectional analysis of nurse practitioner, physician assistant, and physician prescribing patterns. *J Gen Intern Med*. 2020;35(9):2584–2592. <https://doi.org/10.1007/s11606-020-05823-0>.
 38. Ellenbogen MI, Segal JB. Differences in opioid prescribing among generalist physicians, nurse practitioners, and physician assistants. *Pain Med*. 2020;21(1):76–83. <https://doi.org/10.1093/pm/pnz005>.
 39. Suda KJ, Durkin MJ, Calip GS, et al. Comparison of opioid prescribing by dentists in the United States and England. *JAMA Netw Open*. 2019;2(5):e194303. <https://doi.org/10.1001/jamanetworkopen.2019.4303>.
 40. Hahn KL. Strategies to prevent opioid misuse, abuse, and diversion that may also reduce the associated costs. *Am Health Drug Benefits*. 2011;4(2):107–114.
 41. Liebschutz JM, Xuan Z, Shanahan CW, et al. Improving adherence to long-term opioid therapy guidelines to reduce opioid misuse in primary care: a cluster-randomized clinical trial. *JAMA Intern Med*. 2017;177(9):1265–1272. <https://doi.org/10.1001/jamainternmed.2017.2468>.
 42. Sim I, Gorman P, Greenes RA, et al. Clinical decision support systems for the practice of evidence-based medicine. *J Am Med Inform Assoc*. 2001;8(6):527–534. <https://doi.org/10.1136/jamia.2001.0080527>.
 43. Rhodes E, Wilson M, Robinson A, Hayden JA, Asbridge M. The effectiveness of prescription drug monitoring programs at reducing opioid-related harms and consequences: a systematic review. *BMC Health Serv Res*. 2019;19(1):784. <https://doi.org/10.1186/s12913-019-4642-8>.
 44. Ponnappalli A, Grando A, Murcko A, Wertheim P. Systematic literature review of prescription drug monitoring programs. *AMIA Annu Symp Proc*. 2018;2018:1478–1487. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6371270/> Accessed May 28, 2022.
 45. Pardo B. Do more robust prescription drug monitoring programs reduce prescription opioid overdose? *Addiction*. 2017;112(10):1773–1783. <https://doi.org/10.1111/add.13741>.
 46. Patrick SW, Fry CE, Jones TF, Buntin MB. Implementation of prescription drug monitoring programs associated with reductions in opioid-related death rates. *Health Aff (Millwood)*. 2016;35(7):1324–1332. <https://doi.org/10.1377/hlthaff.2015.1496>.
 47. Wetzel M, Hockenberry J, Raval MV. Interventions for postsurgical opioid prescribing: a systematic review. *JAMA Surg*. 2018;153(10):948–954. <https://doi.org/10.1001/jamasurg.2018.2730>.
 48. Chiu AS, Freedman-Weiss MR, Jean RA, Cohen E, Yoo PS. No refills: the durable impact of a multifaceted effort by surgical trainees to minimize the prescription of postoperative opioids. *Surgery*. 2019;166(5):758–763. <https://doi.org/10.1016/j.surg.2019.05.021>.
 49. Bonnie RJ, Ford MA, Phillips JK. *Pain Management and the Opioid Epidemic*. National Academies Press, 2017. <https://doi.org/10.17226/24781>.
 50. Berna C, Kulich RJ, Rathmell JP. Tapering long-term opioid therapy in chronic noncancer pain: evidence and recommendations for everyday practice. *Mayo Clin Proc*. 2015;90(6):828–842. <https://doi.org/10.1016/j.mayocp.2015.04.003>.
 51. Frank JW, Lovejoy TI, Becker WC, et al. Patient outcomes in dose reduction or discontinuation of long-term opioid therapy: a systematic review. *Ann Intern Med*. 2017;167(3):181–191. <https://doi.org/10.7326/M17-0598>.
 52. Rich RC, Chou R, Mariano ER, et al. Best practices, research gaps, and future priorities to support tapering patients on long-term opioid therapy for chronic non-cancer pain in outpatient settings. *NAM Perspect*. 2020 2020:10.31478/202008c. <https://doi.org/10.31478/202008c>.
 53. National Academies of Sciences, Engineering, and Medicine. *The Role of Nonpharmacological Approaches to Pain Management: Proceedings of a Workshop*. Washington, DC: The National Academies Press, 2019. <https://doi.org/10.17226/25406>.
 54. Duncan RW, Smith KL, Maguire M, Stader DE 3rd. Alternatives to opioids for pain management in the emergency department decreases opioid usage and maintains patient satisfaction. *Am J Emerg Med*. 2019;37(1):38–44. <https://doi.org/10.1016/j.ajem.2018.04.043>.
 55. Skelly AC, Chou R, Dettori JR, et al. *Noninvasive nonpharmacological treatment for chronic pain: a systematic review update*. Rockville, MD: Agency for Healthcare Research and Quality; 2020. <https://www.ncbi.nlm.nih.gov/books/NBK556229>. Published April. Accessed May 28, 2022.
 56. USPSTF. Screening for unhealthy drug use: U.S. Preventive Services Task Force recommendation statement. *JAMA*. 2020;323(22):2301–2309. <https://doi.org/10.1001/jama.2020.8020>.
 57. Santo T Jr, Clark B, Hickman M, et al. Association of opioid agonist treatment with all-cause mortality and specific causes of death among people with opioid dependence: a systematic review and meta-analysis [published correction appears in *JAMA Psychiatry*. 2021;78(9):1044] [published correction appears in *JAMA Psychiatry*. 2022;79(5):516]. *JAMA Psychiatry*. 2021;78(9):979–993. <https://doi.org/10.1001/jamapsychiatry.2021.0976>.

58. National Academies of Sciences, Engineering, and Medicine. Medications for Opioid Use Disorder Save Lives. Washington, DC: The National Academies Press, 2019. <https://doi.org/10.17226/25310>.
59. Wakeman SE, Larochelle MR, Ameli O, et al. Comparative effectiveness of different treatment pathways for opioid use disorder. *JAMA Netw Open*. 2020;3(2):e1920622. <https://doi.org/10.1001/jamanetworkopen.2019.20622>.
60. Bahji A, Carlone D, Altomare J. Acceptability and efficacy of naltrexone for criminal justice-involved individuals with opioid use disorder: a systematic review and meta-analysis. *Addiction*. 2020;115(8):1413–1425. <https://doi.org/10.1111/add.14946>.
61. Center for Substance Abuse Treatment (CSAT). Detoxification and substance abuse treatment. treatment improvement protocol (TIP) series, no. 45. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2015. <https://store.samhsa.gov/product/TIP-45-Detoxification-and-Substance-Abuse-Treatment/SMA15-4131>. Published October. Accessed May 28, 2022.
62. Jones CM, Campopiano M, Baldwin G, McCance-Katz E. National and state treatment need and capacity for opioid agonist medication-assisted treatment. *Am J Public Health*. 2015;105(8):e55–e63. <https://doi.org/10.2105/AJPH.2015.302664>.
63. Madras BK, Ahmad NJ, Wen J, Sharfstein JS. Improving access to evidence-based medical treatment for opioid use disorder: strategies to address key barriers within the treatment system. *NAM Perspect*. 2020;2020:10.31478/202004b. <https://doi.org/10.31478/202004b>.
64. Haffajee RL, Lin LA, Bohnert ASB, Goldstick JE. Characteristics of U. S. counties with high opioid overdose mortality and low capacity to deliver medications for opioid use disorder. *JAMA Netw Open*. 2019;2(6):e196373. <https://doi.org/10.1001/jamanetworkopen.2019.6373>.
65. Lin LA, Casteel D, Shigekawa E, Weyrich MS, Roby DH, McMenamin SB. Telemedicine-delivered treatment interventions for substance use disorders: a systematic review. *J Subst Abuse Treat*. 2019;101:38–49. <https://doi.org/10.1016/j.jsat.2019.03.007>.
66. Centers for Medicare & Medicaid Services. Changes in access to medication treatment during COVID-19 telehealth expansion and disparities in telehealth use for Medicare beneficiaries with opioid use disorder. Baltimore, MD: Centers for Medicare & Medicaid Services; January 2022. <https://www.cms.gov/files/document/data-highlight-jan-2022.pdf>. Published January. Accessed May 28, 2022.
67. Samet JH, Botticelli M, Bharel M. Methadone in primary care - one small step for Congress, one giant leap for addiction treatment. *N Engl J Med*. 2018;379(1):7–8. <https://doi.org/10.1056/NEJMp1803982>.
68. Korownyk C, Perry D, Ton J, et al. Managing opioid use disorder in primary care: PEER simplified guideline [published correction appears in *Can Fam Physician*. 2019;65(10):687] [published correction appears in *Can Fam Physician*. 2019;65(10):687]. *Can Fam Physician*. 2019;65(5):321–330. <https://www.cfp.ca/content/65/5/321> Accessed May 28, 2022.
69. Fatseas M, Auriacombe M. Why buprenorphine is so successful in treating opiate addiction in France. *Curr Psychiatry Rep*. 2007;9(5):358–364. <https://doi.org/10.1007/s11920-007-0046-2>.
70. Snyder H, Kalmin MM, Moulin A, et al. Rapid adoption of low-threshold buprenorphine treatment at California emergency departments participating in the CA Bridge Program. *Ann Emerg Med*. 2021;78(6):759–772. <https://doi.org/10.1016/j.annemergmed.2021.05.024>.
71. Winograd RP, Wood CA, Stringfellow EJ, et al. Implementation and evaluation of Missouri's Medication First treatment approach for opioid use disorder in publicly- funded substance use treatment programs. *J Subst Abuse Treat*. 2020;108:55–64. <https://doi.org/10.1016/j.jsat.2019.06.015>.
72. Huhn AS, Hobelmann JG, Strickland JC, et al. Differences in availability and use of medications for opioid use disorder in residential treatment settings in the United States. *JAMA Netw Open*. 2020;3(2):e1920843. <https://doi.org/10.1001/jamanetworkopen.2019.20843>.
73. Mojtabai R, Mauro C, Wall MM, Barry CL, Olfson M. Medication treatment for opioid use disorders in substance use treatment facilities. *Health Aff (Millwood)*. 2019;38(1):14–23. <https://doi.org/10.1377/hlthaff.2018.05162>.
74. Wen H, Soni A, Hollingsworth A, et al. Association between Medicaid expansion and rates of opioid-related hospital use. *JAMA Intern Med*. 2020;180(5):753–759. <https://doi.org/10.1001/jamainternmed.2020.0473>.
75. Huskamp HA, Riedel LE, Barry CL, Busch AB. Coverage of medications that treat opioid use disorder and opioids for pain management in marketplace plans, 2017. *Med Care*. 2018;56(6):505–509. <https://doi.org/10.1097/MLR.0000000000000918>.
76. Foundation. Opioid safety toolkit. California Health Care. <https://www.chcf.org/resource/opioid-safety-toolkit/>. Accessed May 28, 2022.
77. Opioid agonist therapy gap coverage program. Government of Alberta Canada. <https://www.alberta.ca/opioid-agonist-therapy-gap-coverage-program.aspx#jumplinks-4>. Updated December 1, 2021. Accessed May 28, 2022.
78. Hartung DM, Johnston K, Geddes J, Leichtling G, Priest KC, Korhuit PT. Buprenorphine coverage in the Medicare Part D program for 2007 to 2018. *JAMA*. 2019;321(6):607–609. <https://doi.org/10.1001/jama.2018.20391>.
79. National Council for Behavioral Health, Vital Strategies. Medication-assisted treatment for opioid use disorder in jails and prisons: a planning & implementation toolkit. https://www.thenationalcouncil.org/wp-content/uploads/2022/02/MAT_in_Jails_Prisons_Toolkit_Final_12_Feb_20.pdf. Accessed May 28, 2022.
80. Sugarman OK, Bachhuber MA, Wennerstrom A, Bruno T, Springgate BF. Interventions for incarcerated adults with opioid use disorder in the United States: a systematic review with a focus on social determinants of health. *PLoS One*. 2020;15(1):e0227968. <https://doi.org/10.1371/journal.pone.0227968>.
81. Marsden J, Stillwell G, Jones H, et al. Does exposure to opioid substitution treatment at prison release reduce the risk of death? A prospective, observational study in England. *Lancet*. 2016;388(suppl1):11. [https://doi.org/10.1016/S0140-6736\(16\)32247-4](https://doi.org/10.1016/S0140-6736(16)32247-4).
82. Green TC, Clarke J, Brinkley-Rubinstein L, et al. Postincarceration fatal overdoses after implementing medications for addiction treatment in a statewide correctional system. *JAMA Psychiatry*. 2018;75(4):405–407. <https://doi.org/10.1001/jamapsychiatry.2017.4614>.
83. American Society of Addiction Medicine. Public policy statement on treatment of opioid use disorder in correctional settings. Chevy Chase, MD: American Society of Addiction Medicine; 2020. <https://www.asam.org/docs/default-source/public-policy-statements/2020-statement-on-treatment-of-oud-in-correctional-settings.pdf>. Published July 15. Accessed May 28, 2022.
84. American Society of Addiction Medicine. Public policy statement on access to medications for addiction treatment for persons under community correctional control. Chevy Chase, MD: American Society of Addiction Medicine; 2021. <https://www.asam.org/advocacy/public-policy-statements/details/public-policy-statements/2021/08/09/access-to-medications-for-addiction-treatment-for-persons-under-community-correctional-control>. Published January 20. Accessed May 28, 2022.
85. Mace S, Siegler A, Wu K, Latimore A, Flynn H. *Medication-assisted treatment for opioid use disorder in jails and prisons: a planning and implementation toolkit*. Washington, DC: National Council for Behavioral Health and Vital Strategies; 2020. https://www.thenationalcouncil.org/wp-content/uploads/2022/02/MAT_in_Jails_Prisons_Toolkit_Final_12_Feb_20.pdf. Published January. Accessed May 28, 2022.
86. Thompson HM, Hill K, Jadhav R, Webb TA, Pollack M, Karnik N. The Substance Use Intervention Team: a preliminary analysis of a population-level strategy to address the opioid crisis at an academic health center. *J Addict Med*. 2019;13(6):460–463. <https://doi.org/10.1097/ADM.0000000000000520>.
87. Baxter AJ, Tweed EJ, Katikireddi SV, Thomson H. Effects of Housing First approaches on health and well-being of adults who are homeless

- or at risk of homelessness: systematic review and meta-analysis of randomised controlled trials. *J Epidemiol Community Health*. 2019;73(5):379–387. <https://doi.org/10.1136/jech-2018-210981>.
88. Fernandes RM, Cary M, Duarte G, et al. Effectiveness of needle and syringe programmes in people who inject drugs - an overview of systematic reviews. *BMC Public Health*. 2017;17(1):309. <https://doi.org/10.1186/s12889-017-4210-2>.
 89. Armbrecht E, Guzauskas G, Hansen R, et al. *Supervised injection facilities and other supervised consumption sites: effectiveness and value final report*. Boston, MA: Institute for Clinical and Economic Review; 2021. https://icer.org/wp-content/uploads/2020/10/ICER_SIF_Final-Evidence-Report_010821.pdf. Published January 8. Accessed May 28, 2022.
 90. Weiner J, Murphy SM, Behrends C. *Expanding access to naloxone: a review of distribution strategies*. Philadelphia, PA: Penn LDI; 2019. <https://ldi.upenn.edu/our-work/research-updates/expanding-access-to-naloxone-a-review-of-distribution-strategies/>. Published May 29. Accessed May 28, 2022.
 91. Centers for Disease Control and Prevention. Evidence-based strategies for preventing opioid overdose: what's working in the United States an introduction for public health, law enforcement, local organizations, and others striving to serve their community. Atlanta, GA: Centers for Disease Control and Prevention; 2018. <https://www.cdc.gov/drugoverdose/pdf/pubs/2018-evidence-based-strategies.pdf>. Accessed May 28, 2022.
 92. Rando J, Broering D, Olson JE, Marco C, Evans SB. Intranasal naloxone administration by police first responders is associated with decreased opioid overdose deaths. *Am J Emerg Med*. 2015;33(9):1201–1204. <https://doi.org/10.1016/j.ajem.2015.05.022>.
 93. Wheeler E, Jones TS, Gilbert MK, Davidson PJ, Centers for Disease Control and Prevention (CDC). Opioid overdose prevention programs providing naloxone to laypersons - United States, 2014. *MMWR Morb Mortal Wkly Rep*. 2015;64(23):631–635.
 94. Opioid epidemic toolkit 2021. National Association of County and City Health Officials. <https://www.naccho.org/programs/community-health/injury-and-violence/opioid-epidemic/local-health-departments-and-the-opioid-epidemic-a-toolkit>. Accessed May 28, 2022.
 95. Overdose Detection Mapping Application Program. <http://www.odmap.org/#agency>. Accessed October 9, 2021.
 96. Smith HJ, Salisbury-Afshar E, Carr B, Zaza S. American College of Preventive Medicine statement on prioritizing prevention in opioid research. *AMA J Ethics*. 2020;22(8):E687–E694. <https://doi.org/10.1001/amajethics.2020.687>.
 97. Hodge JG Jr, Gostin LO. Guiding industry settlements of opioid litigation. *Am J Drug Alcohol Abuse*. 2019;45(5):432–437. <https://doi.org/10.1080/00952990.2019.1618320>.