

2017 ASTHO President's Challenge: Public Health Approaches to Preventing Substance Misuse and Addiction

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Public health approaches to preventing disease, disability, and death led to remarkable advances in life expectancy and quality of life during the 19th and 20th centuries. Control of infectious diseases through improved sanitation, vector control, immunization, contact tracing, isolation and quarantine, improved diagnostic testing, judicious use of antimicrobial drugs, and improved outbreak response infrastructure has been a major contributor to these improvements in health. However, public health faces numerous long-standing and emerging challenges in the 21st century. In addition to the ongoing threat of emerging infectious diseases, psychosocial issues that have not been addressed as part of traditional public health practice create barriers to further improvements in health. Many of the successful public health approaches to control infectious diseases are based on understanding the cyclic chain of transmission of pathogens among susceptible hosts—spread of infection is interrupted by intervening at critical points in the cycle. Vexing health problems such as interpersonal violence, self-harm, and mental illness are inter-related with one another and with social determinants of health such as poverty and low educational attainment. These issues are not adequately addressed using

traditional public health approaches that are successful in control of infectious diseases. To make progress in addressing these challenging health issues in the 21st century, the public health model of prevention through interrupting the chain of transmission should be supplemented with a model of prevention through untangling the *web of cause and effect* (Figure 1). A crucial central node in the web of cause and effect is substance misuse and addiction.

The health, economic, and human burden of substance misuse and addictions is staggering. More than 20 million Americans, nearly 8% of the population, meet diagnostic criteria for substance use disorder.¹ The dramatic increase in overdose deaths from prescription opioid pain relievers and, more recently, heroin and fentanyl, has clearly placed opioid misuse on the public health agenda and in the American consciousness.² In 2015, more than 52 000 deaths were attributed to drug overdose, including 33 000 involving an opioid.³ Although the ongoing opioid epidemic grabs headlines, it must be borne in mind that still more Americans die from alcohol misuse than drug overdose. In the United States each year, alcohol alone accounts for 88 000 deaths, 2.5 million years of potential life lost, and 1 in 10 deaths among working-age adults.⁴ Excessive drinking cost the nation almost \$250 billion in 2010, and 40% of these costs are borne by government.⁵ Substance misuse and addictions have attenuated the trend of increasing life expectancy, and health gains achieved in the 20th century are being compromised. Among non-Hispanic white Americans, life expectancy *declined* 0.1 years between 2013 and 2014.⁶ Therefore, state and territorial health officials are focusing on public health approaches to preventing substance misuse and addictions as the 2017 ASTHO President's Challenge. The purpose of this article is to propose a conceptual framework that public health agencies can use to plan strategic implementation of policies and programs to reduce disease and disability caused by the direct and indirect effects of substance misuse.

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This work is supported in part by the Centers for Disease Control and Prevention (CDC) under cooperative agreement U38OT000161. The contents of this article are solely the responsibility of the author and do not necessarily represent the official views of the CDC or the Alaska Department of Health and Social Services.

The author declares no conflicts of interest.

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DOI: 10.1097/PHH.0000000000000631

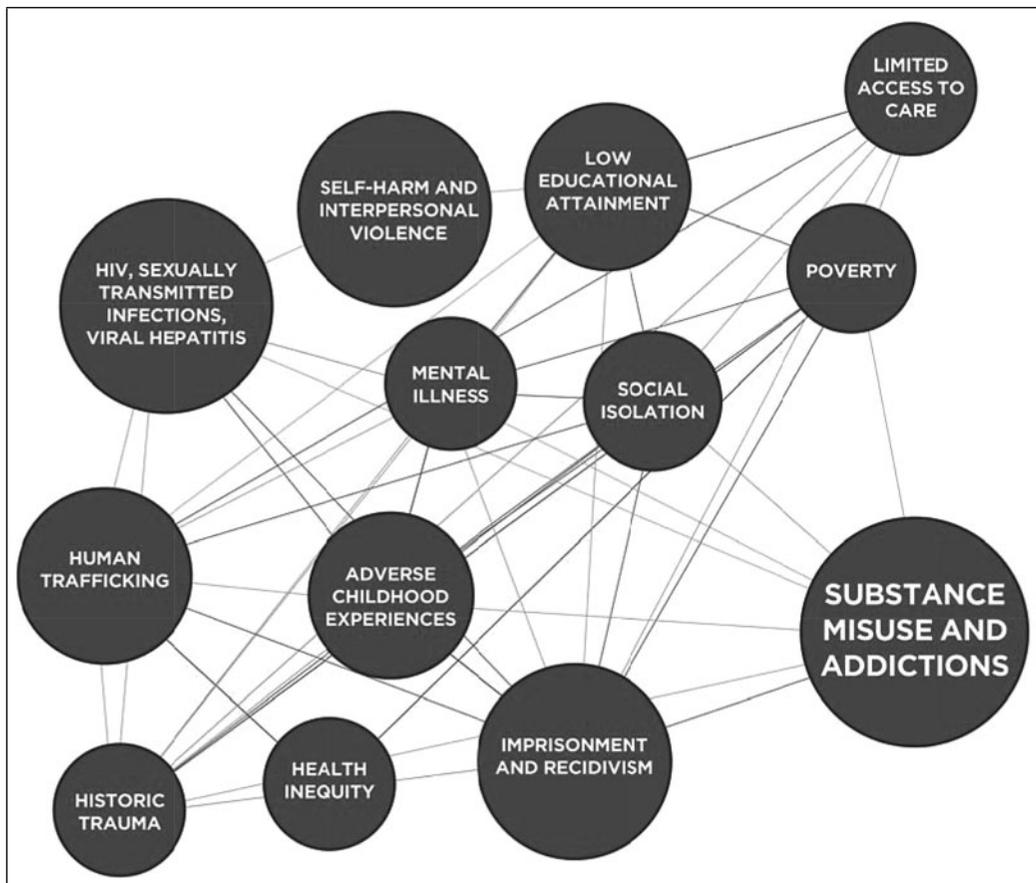


FIGURE 1 *Web of Causation* Representing a Number of the Most Challenging US Health Threats in the 21st Century, Including Substance Misuse and Addictions, and Their Interrelatedness
Abbreviation: HIV, human immunodeficiency virus.

The public health approach to substance misuse and addiction requires recognition that the scope of the problem includes much more than opioids and alcohol and must be comprehensive, rather than molecule-specific. Substances with potential for misuse, physical dependency, and addiction include not only those that are legal in most parts of the country, such as alcohol, but also quasi-legal products such as the broad array of cannabis products that are now legal for retail sale under state law in 8 states (Alaska, California, Colorado, Nevada, Massachusetts, Maine, Oregon, and Washington). More than 20% of the American population resides in these 8 states.⁷ Concurrent use of marijuana and alcohol may cause synergistic increase in the risk of fatal motor vehicle accidents beyond the risk caused by use of either substance alone.⁸ In addition to opioids, other classes of prescription drugs such as amphetamines and benzodiazepines may be misused, leading to drug diversion, dependency, and addiction.^{9,10} Finally, non-opioid illicit substances such as methamphetamine, cocaine, designer psychoactive drugs, synthetic cannabinoids, and cathinones continue to impact

health and health care systems.¹¹⁻¹³ Limiting adverse health effects of these substances is further challenged by emerging technologies such as powdered alcohol, Internet sales of drugs, and availability of electronic cigarettes and vaping devices that can be used for delivery of substances other than nicotine.^{12,14}

Public health approaches to preventing and mitigating the health effects of substance misuse and addictions can be viewed through the conceptual framework of 3 levels of prevention (Figure 2). Each level of prevention (tertiary, secondary, and primary) correlates to current public health practice paradigms, has specific goals, and provides examples in public health practice as well as additional opportunities for prevention. All 3 levels of prevention are built on the foundation of 5 broad strategic priorities to achieve progress:

- Reduce stigma surrounding substance misuse and addiction and change social norms.
- Increase the protective factors and reduce risk factors for substance misuse in communities.
- Strengthen multisectoral collaboration.

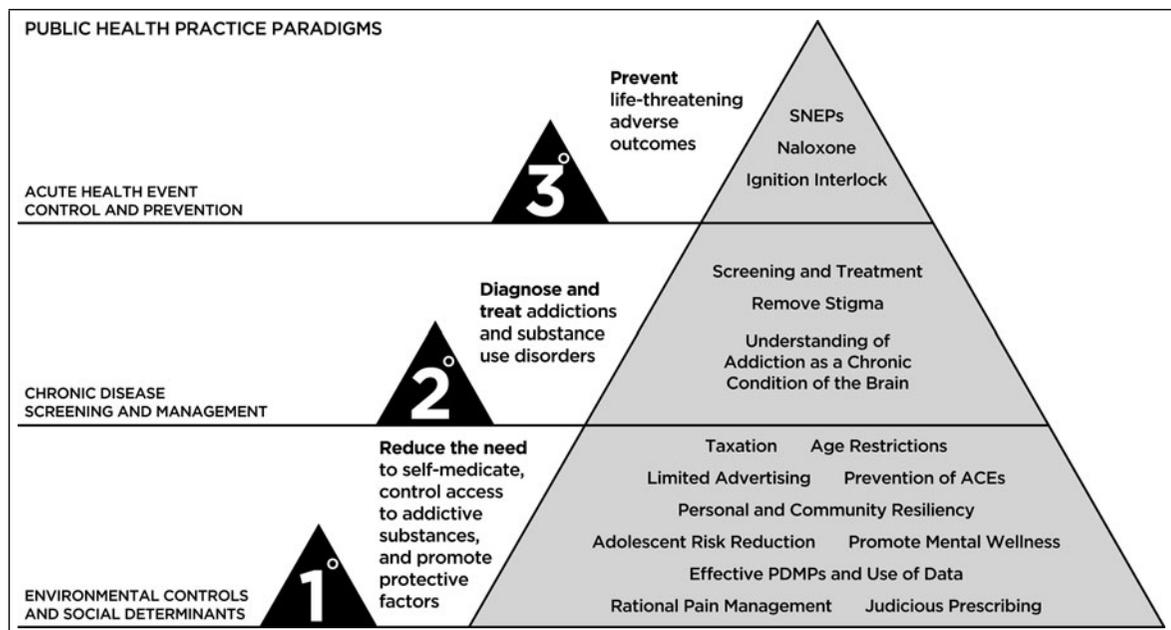


FIGURE 2 A Conceptual Framework of Public Health Approaches to Preventing Substance Misuse and Addictions (See Text for Details)
Abbreviations: ACEs, adverse childhood experiences; PDMPs, prescription drug-monitoring programs; SNEPs, syringe and needle exchange programs.

- Improve prevention infrastructure.
- Optimize the use of cross-sector data sharing for decision making.

Tertiary prevention generally fits within the public health paradigm of acute health event control and prevention with the goal of preventing life-threatening adverse outcomes. The recent outbreak of human immunodeficiency virus and hepatitis C virus infections in southern Indiana among self-injecting drug users, the continuing increase in opioid overdose deaths, and the ongoing tragedy of injury and death from alcohol-related motor vehicle accidents highlight the need for lifesaving interventions.^{2,15,16} Syringe and needle exchange programs have been shown to decrease the spread of blood-borne pathogens, improve survival among self-injecting drug users, and increase access to health services and addiction treatment, without leading to increases in drug misuse.¹⁷ Several American cities, including Seattle and Boston, are exploring taking the concept of safer self-injection drug use a step further by establishing facilities where users can inject with clean supplies under medical supervision in hope of saving lives, decreasing overdoses, and increasing access to treatment and recovery services.¹⁸ Naloxone is an opioid antagonist that reverses the respiratory depression that causes death in opioid overdose.¹⁹ Authorization of statewide standing orders, third-party prescribing, pharmacist-independent dispensing authority, and eliminating liability and financial barriers are public health policy steps that can increase access to this lifesaving drug, providing

a critical first step to persons with opioid addiction on the path of recovery.²⁰ Ignition interlock devices and sobriety checkpoints provide an evidence-based intervention to reduce alcohol-related motor vehicle accidents and to support the recovery of people living with alcoholism.^{21,22}

Secondary prevention measures align with current public health practices of chronic disease screening and management through diagnosis and treatment before progression to the life-threatening events addressed by tertiary prevention measures. Addiction is now understood as a chronic health condition involving the brain and should be approached like other chronic diseases, such as diabetes, hypertension, or asthma.^{23,24} SBIRT (Screening, Brief Intervention, and Referral to Treatment) is a useful tool for identifying persons at risk of substance misuse adverse health events and for providing treatment.²⁵ However, 2 major obstacles to receiving treatment must be overcome. First, the number of providers who are skilled in addiction treatment is limited, and in many areas, qualified providers may not be available. Most medical providers have little or no specific training in the neurobiological basis of addiction or in clinical management of substance misuse and addiction. Continuing professional education based on a science-based view of addictions and evidence-based methods for withdrawal management and maintenance of recovery could improve care of persons with addictions. Encouraging third-party payer coverage of treatment services may be cost-saving in the long term. Second, persisting stigma creates disincentives for providers

to seek additional training and for patients to seek care. The perception of addiction as a moral failing or simply lack of judgment fails to acknowledge what is known about alterations in brain function that drive destructive behavior among persons with addictions. Removing stigma will require reframing our understanding of addictions through health professional and public education. When discussing addictions, we can remove stigma by using language appropriate to how we discuss other health conditions, which is based on science and respects patients.²⁶

Public health interventions that will have longest-lasting benefit form the primary prevention foundation of the framework (Figure 2). Primary prevention measures include environmental controls and improvements in social determinants of health with the goal of reducing the need to self-medicate, controlling access to addictive substances, and promoting protective factors in communities and families. Taxation is an effective method for reducing excessive and underage alcohol consumption as well as alcohol-related harms.^{27,28} Age restrictions to limit access for youth and limiting advertising of addictive substances are additional tools. Adverse childhood experiences (ACEs), including childhood maltreatment or neglect, household exposure to interpersonal violence, mental illness, alcohol or drug abuse, or parental separation or incarceration, have been linked with a number of adverse adult health outcomes. Epidemiologic studies indicate that persons with a greater number of ACEs have markedly higher risk of substance misuse and addiction and that more than half of illicit drug use and addiction are attributable to ACEs.^{29,30} Therefore, preventing ACEs through maternal and early childhood programs, such as home nurse visitation, and by utilizing tools in the Centers for Disease Control and Prevention's technical package for preventing child abuse and neglect, as well as mitigating the effects of ACEs through building personal and community resiliency, may be crucial to primary prevention.^{31,32} Adolescence is a time of rapid brain development when the risk of misuse and addiction is greatest; thus, risk reduction during this period can have lifelong benefits. Mental illnesses and certain neurologic conditions, such as traumatic brain injury, are common among people with substance use disorders and addictions, and recognition and treatment of these conditions play an important role in primary prevention.

In recent years, prescription drugs have been increasingly recognized as a pathway to substance misuse and addiction, and prescribed drugs can be diverted into the illicit drug market. Prescription drug-monitoring programs are centralized databases of controlled substance dispensing information

accessible to prescribers and pharmacists and are designed to curb overprescribing. Evidence to date suggests that robust prescription drug-monitoring programs can reduce the number of prescriptions for controlled substances, reduce overdose and Medicaid pharmacy costs, prevent "doctor shopping," and reduce overdose.³³⁻³⁶ Opioid prescribing can also be reduced through more rational and evidence-based pain management.³⁷⁻³⁹ Even legitimate medication use can sometimes lead to misuse and dependency. Taking opioids as prescribed before high school graduation is independently associated with a 33% greater risk of opioid misuse after high school.⁴⁰ A review of Medicare beneficiaries receiving care in emergency departments found a greater than 3-fold variability among providers in the likelihood to prescribe an opioid and that patients who received care from the providers most likely to prescribe opioids were at greater risk of long-term opioid use.⁴¹ Just as more judicious prescribing of antibiotics can limit the emergence and spread of drug-resistant bacteria, more careful use of controlled substances and psychoactive prescription medications will be a critical component of improving patient safety. Limiting the number of pills dispensed can reduce the amount of prescription opioids in the community. Although persistent pain is an uncommon cause of readmission after surgery, the amount of pills dispensing at the time of discharge can be excessive.⁴² A follow-up survey of patients discharged after surgery with a prescription for opioids from one hospital found that 72% of the pills dispensed were never used.⁴³ Prescription drug diversion and misuse may also be prevented by promotion of safe medication storage practices and support of drug return and disposal programs.

Public health cannot address the huge challenge of substance misuse and addiction alone. Parochial and siloed approaches are doomed to failure. In states and territories where public health agencies are structurally separate from behavioral health and alcohol and drug abuse agencies, bridging artificial bureaucratic divides is foundational to progress. Within state and territorial government, cross-sector collaboration with attorneys general, state law enforcement and public safety, health boards, justice and corrections, education, Medicaid programs, and social service agencies will foster a coordinated approach. In Alaska, Incident Command Structure is being utilized subsequent to Governor Bill Walker's declaration of the opioid epidemic as a public health disaster in February 2017 to facilitate coordination and communication among state departments. State agencies will need to work with state health professional organizations, state hospital associations, third-party payers, business organizations, and the pharmaceutical

industry, among others. Success in addressing substance misuse and addictions will not occur without leadership at the local level and states and territories will need to work closely with and provide support to city, county, and tribal agencies. Community coalitions provide the focal point for work at the local level and should include not only the local public health agencies but also representation of local health care providers and administrators, mental health professionals, emergency medical services, the faith community, businesses, school boards, law enforcement, and most importantly, community members living in recovery.

What will success look like? Reducing the health effects of substance misuse and addictions will not be achieved easily or quickly. However, with focused, cross-sectoral work, some health metrics could see improvement by 2020, including reduced numbers of deaths caused by overdose, declines in motor vehicle crashes from impaired driving, fewer new human immunodeficiency virus and hepatitis C infections from drug self-injection, and less unintentional and self-harm injuries occurring under the influence of drugs or alcohol. Before 2030, we can anticipate that robust implementation of public health approaches to preventing substance misuse and addictions could result in lower rates of drug misuse, particularly among youth, reduced drug- and alcohol-related incarceration and reincarceration, lower rates of crime, increased workforce productivity and less reliance on public assistance, fewer referrals to child protective services, less interpersonal violence, and improved patient safety. Ultimately, minimizing the health and social effects of substance misuse and addictions will help unravel the web of cause and effect to the end that we may realize health as defined in the constitution of the World Health Organization as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”⁴⁴

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