

Harm Reduction

Not Dirty Words Any More

Avinash Ramprashad, MD^a,

Gregory Malik Burnett, MD, MBA, MPH^{b,*}, Christopher Welsh, MD^c

KEYWORDS

• Harm reduction • Harm minimization • Risk reduction

KEY POINTS

- Harm reduction refers to a collection of principles, practices, and policies that aim to minimize the negative health, social, and legal impacts associated with drug use.
- Harm reduction practices have been shown to significantly reduce negative consequences of substance use such as infectious diseases and overdoses.
- Harm reduction principles and practices should be integrated with all traditional medical, psychiatric, and addiction treatment programs.

DEFINITIONS/PRINCIPLES

Harm reduction is a conceptual framework that has increased reach and application at the individual, public health, and public policy settings in the twenty-first century. With a history rooted in reducing harms associated with substance use and contemporary applications around reducing pandemic contagion,¹ the framework is principally centered around reducing risk to the health of individuals without eliminating the risk entirely. The globally recognized leading civil society organization in the field, Harm Reduction International, defines harm reduction as “policies, programs, and practices that aim to minimize the negative health, social, and legal impacts associated with drug use, drug policies, and drug laws.”² In North America, harm reduction has historically been viewed with significant controversy, with opponents stating that these strategies enable drug use despite overwhelming evidence to the contrary. The US-based Harm Reduction Coalition similarly defines harm reduction as a set of principles that reduce the negative consequences associated with drug use but broaden

^a Division of Addiction Research and Treatment, Department of Psychiatry, University of Maryland School of Medicine, 701 W Pratt St, 2nd Floor Suite 289, Baltimore, MD 21201, USA;

^b Center for Addiction Medicine, University of Maryland Midtown Campus, 827 Linden Avenue 4th Floor Suite 405, Baltimore, MD 21201, USA; ^c Division of Addiction Research and Treatment, Department of Psychiatry, University of Maryland School of Medicine, 22 S. Greene Street S-1-D-04, Baltimore, MD 21201, USA

* Corresponding author.

E-mail address: gregory.burnett@umm.edu

the concept to include the movement for social justice and respect for the rights of individuals who use drugs.³ Despite the lack of a universal definition, there is agreement around a universal set of principles which support the conceptual framework and allow for its broad application across settings. Scholars have attempted to contextualize these principles for general application across health care settings to include humanism, pragmatism, autonomy, incrementalism, individualism, and accountability without termination⁴ (**Box 1**).

Overall, the conceptual framework of harm reduction allows individuals, providers, and policy makers to develop strategies to objectively address issues in the real world as they exist today. The framework removes the dichotomy of good and bad as it pertains to people and their decisions, allowing a more nuanced approach to the behaviors that accompany substance use disorders. What follows is a review of the history of harm reduction and the practical applications of the concept across the spectrum of substance use and public health management.

Infectious Disease Prevention

There is evidence of efforts to reduce harms related to substance use for thousands of years. Various cultures have used rituals and taboos to protect community and individual health from known harms from opium (Asia) and hallucinogens and coca (Central & South America). The conceptual framework of more “modern” harm reduction efforts is inextricably linked to the goal of infectious disease prevention, largely due to the inherent risks associated with injection drug use from communicable diseases such as hepatitis and human immunodeficiency virus (HIV) to the seeding of various parts of the body with bacteria which lead to skin, soft tissue, vascular, and valvular infections. Epidemiological estimates of the disease burden associated with injection drug use are notoriously difficult to capture, however, the burden is significant.⁵ There are high levels of regional variation in skin and soft tissue infections (SSTIs) burden, largely attributable to the variation in the type of illicit substances available in the drug supply, with greater burdens in areas where black tar heroin is more prevalent.

Box 1

Harm reduction principles⁴

Humanism	Providers treat patients with care and respect and take time to understand why patients make the decisions they make, taking into account that patients may derive benefit from otherwise harmful behaviors
Pragmatism	Providers understand that perfect health decisions are not achievable and the capacity for patients to make change is highly influenced by social determinants
Autonomy	Providers allow for patient-centered decision-making
Incrementalism	Providers understand that change happens over time and any positive change should be acknowledged
Individualism	Providers recognize that every person has their own needs, strengths, receptivity, to change along the continuum of harmful behaviors and requires unique strategies to facilitate change
Accountability without termination	Providers let patients know they are responsible for their own health choices and providers should not withhold care from patients for not achieving health goals but should instead help patients understand and take ownership of the consequences of their decisions

International efforts to reduce the incidence of drug-related infectious disease originally centered around reducing syringe sharing. Needle exchange began in the Netherlands in the early 1980s⁶ and has evolved over time to meet the growing needs of the population, becoming the prevailing harm reduction practice.

In North America, given the stigma associated with injection drug use and the criminalization of drug paraphernalia, access to clean needles was, historically, significantly constrained. During the mid-1980s and early 1990s, in the context of the emerging HIV/acquired immunodeficiency syndrome (AIDS) epidemic, harm reduction efforts centered around cleaning available needles with bleach and other crude antimicrobial agents. However, given the unrelenting spread of HIV, harm reduction activists realized that this effort was insufficient and began to distribute needles in violation of the law. Activists like Johnny Parker and civil society organizations such as ACT UP and ADAPT significantly advanced the cause of needle exchange programs, ultimately winning a court ruling overturning New York state's ban on syringe sharing⁶ which paved the way for organizations like the North American Syringe Exchange Network to finance the development of syringe service programs (SSPs) across the country.⁷ As more SSPs emerged, these programs quickly adapted to include a wide range of health services beyond access to clean needles, including condom and drug paraphernalia distribution, referrals to substance abuse treatment, infectious disease counseling and testing, and naloxone distribution for the prevention of overdose.

The efficacy of SSPs in reducing infectious disease burden was demonstrated in dramatic fashion in 2014 in Scott County, Indiana, where the establishment of an SSP program facilitated the end of an outbreak of HIV in the community.⁸ The success of this effort had a significant impact on Congress's decision in 2016 to partially repeal the ban on the use of federal funding to support SSPs.⁹ Currently, SSPs continue to proliferate around the country and are also beginning to incorporate strategies like co-locating wound care and substance use disorder service programs to connect the traditionally difficult to reach populations serviced by these programs to advanced medical care.¹⁰

As syringe service programs became a more established part of public health strategy, people who inject drugs (PWID) and their supporters began to advocate for the establishment of safe spaces to inject drugs. Through the work of advocates like Ann Livingston and the Vancouver Area Drug User Network, leveraging evidence from countries in Europe (where the first such program opened in Switzerland in 1986) the first North American supervised consumption site (SCS) (also referred to as supervised injection facilities or overdose prevention sites) was established in 2003.¹¹ Although the primary goal of SCSs is to reduce overdose mortality, SCSs play a significant role in reducing infectious disease burden by providing a hygienic space for injection, clean injection equipment, a prohibition on equipment sharing, and education on safe injection practices. Data from around the world support the efficacy of SCSs in reducing infectious disease burden, with 75% of SCS users adopting safer injection practices outside of SCSs and 80% of SCS users reporting a decrease in rushed injections, where users fail to use safe injection practices due to fear of prosecution and needle sharing. The overall incidence of SSTI was found to be lower in PWID who use SCSs (6%–10%) than in the broader PWID population (10%–30%).¹² Despite this positive evidence, SCSs are not without significant controversy and have been effectively banned in the United States until November 2021 when New York City opened the first two sanctioned SCSs in the country.¹³

Outside of the aforementioned traditional harm reduction interventions, additional efforts at reducing infectious disease burden among PWID have been attempted which would appropriately be categorized as harm reduction albeit at a smaller scale. For PWID requiring long-term intravenous antibiotics, the use of peripherally inserted

central catheters (PICC) is controversial with some physicians viewing the strategy as increasing the risk of intravenous use through the PICC itself, whereas other physicians view the use of PICC lines as a potential harm reduction strategy for individuals who otherwise cannot obtain vascular access themselves and resort to intramuscular use and subdermal injection or “skin popping.”¹⁴ Additional novel antibiotics, like the lipoglycopeptide dalbavancin, have promise as an effective antimicrobial for PWID who require long-term intravenous antibiotics and are at risk for leaving the hospital against medical advice.¹⁵

Opioids

The opioid epidemic and its resultant increase in nonfatal and fatal overdoses are an excellent example of an issue where a wide range of interventions at the individual, public health, and public policy levels have been implemented to reduce harm. As with many public health issues, prevention of opioid overdose can be thought of in terms of (1) primary prevention, focused on the reduction of use or misuse of opioids; (2) secondary prevention, focused on the reduction of overdose; and (3) tertiary prevention, focused on the reduction of deaths from overdose (**Box 2**).

Despite these various efforts, it is difficult to attribute any observed benefits to a given intervention as, in many cases, multiple interventions were in effect simultaneously.^{18,25,26} It is also important to point out that the success of many primary prevention initiatives in reducing the availability and misuse of prescription opioids may have played a role in the unintended result of increased use of heroin and related overdose seen in the United States beginning around 2010,^{27–29} though this is far from a universally held belief.²⁹ Similarly, it is not clear how many patients with pain are negatively impacted by these same efforts as they have increased difficulty accessing opioids for appropriate use.³⁰

Primary prevention

Largely as a response to the increase in prescription opioid misuse and overdose starting in the late 1990s, a number of efforts have focused on reducing the prescribing, obtaining, and use and misuse of these medications. Although some efforts have been in existence for decades, there has been a significant increase in local, state, and federal efforts since the early to mid-2000s. Across these categories, there are efforts focused both on the individual patient and entire populations. Some of these interventions (increased provider education, prescription guidelines, quantity limits, Risk Evaluation and Mitigation Strategy, and so forth) are an attempt to increase the use of evidence-based medicine in the management of pain and would not generally be seen as typical “harm reduction” interventions. However, a primary goal is the reduction of the incidence of opioid use disorder and overdose.

Secondary prevention

Over the past 15 to 20 years, a growing amount of effort has been put into reducing/preventing opioid overdose and increasing help for those already meeting criteria for opioid use disorder. Many of these interventions can be thought of as being both secondary and tertiary prevention, focused on reducing overdose and reducing related fatalities. Most studies or evaluation efforts are unable to distinguish the relative effects of the two. As an example, various studies of SCSs have been shown to reduce fatal opioid overdoses.^{31–33} However, a few studies found no significant reduction in overall overdoses.³⁴ Similarly, some studies of heroin-assisted treatment (HAT) have shown modest reductions in fatal and nonfatal overdoses but it is unclear if this can truly be attributed to the HAT.^{20,22}

Box 2**Harm reduction measures for opioid overdose prevention**

Primary Prevention (preventing opioid use/misuse)

- Prescriber education voluntary; mandated by the state licensure boards or other organizations (eg, food and drug administration (FDA) Risk Evaluation and Mitigation Strategy (REMS) for extended-release/long-acting opioid medications)
- Prescription guidelines (local and national, by specialty or procedure)
- Insurance company prescription monitoring (drug utilization review programs)
- Insurance company medication quantity limits/prior authorization requirements (may also create other harms like delays)
- Prescription drug identification laws (requiring photographic identification for controlled substances)
- Prescription drug monitoring programs^{16,17}
- Electronic Prescriptions for Controlled Substances
- drug enforcement administration (DEA) changes in scheduling (eg, hydrocodone from Schedule III to Schedule II in 2014)
- FDA post-marketing surveillance of opioid safety and risk
- State "Pill Mill" and "Doctor Shopping" Laws¹⁸
- Increased law enforcement interdiction (eg, DEA "Operation Pill Nation" and "Operation Oxy Alley")
- Screening of patients with pain for risk of substance misuse (eg, Opioid Risk Tool)
- Prescription medication disposal and "take-back" (eg, The Secure and Responsible Drug Disposal Act; DEA-sponsored National Prescription Drug Take-Back Days; Patch-4-Patch Return Program in Canada)
- Public awareness/education about safe storage of medications and non-opioid pain management (eg, *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*; Partnership For A Drug-Free America's "Mind Your Meds" campaign)
- Abuse-deterrent formulations (eg, Embeda, Hysingla, Xtampza, Zohydro)

Secondary Prevention (preventing overdose)

- Prescriber education specifically focused on reducing overdose risk (eg, REMS; FDA Black box warning of combination of opioids and benzodiazepines)
- Public awareness/education specifically focused on reducing overdose risk; safe storage
- Overdose fatality review team members of various agencies meeting
- Increased treatment of opioid use disorder (OUD) w/medications (methadone, buprenorphine, long-acting naltrexone; slow-release morphine & hydrocodone used in some other countries)¹⁹⁻²¹
- Use of "diverted" buprenorphine/methadone (shown to decrease overdose and fatal overdose in individuals not in treatment as well as increase acceptability and engagement in treatment)
- Safe injection facilities (aka supervised consumption centers/rooms/facilities/services; overdose prevention centers; drug consumption rooms) (Switzerland, the Netherlands, Germany, Spain, Denmark, Norway, Luxembourg, France, Canada, Australia, United States)
- Heroin-assisted treatment (aka polymorphine- or diacetylmorphine-assisted treatment or supervised injectable heroin (Canada, the United Kingdom, Switzerland, Germany, the Netherlands, Denmark)^{20,22}
- Drug testing-fentanyl test strips (eg, Energy Control International)

Tertiary Prevention (preventing fatal overdose)

- Public education/awareness specifically focused on the recognition of overdose and the use of naloxone; International Overdose Awareness Day (August 31)
- Naloxone prescription/distribution (to illicit opioid users, patients taking opioids for pain, patients in treatment for opioid use disorder, "third parties")^{23,24}
- Naloxone carried by law enforcement and other first responders
- Good Samaritan Laws/Overdose Immunity (from related charges for individual who has overdosed and individual providing aid)
- Overdose survivor outreach programs
- Mobile/wearable technology (eg, "Remote Egg Timer," Trek Medics, OD Help)

- Environmental manipulations (eg, reverse motion detectors in bathrooms that detect when someone has stopped moving and alert staff that an overdose may have occurred)
- Hydromorphone vending machines (eg, MySafe Project in Vancouver)

Tertiary prevention

As mentioned above, many initiatives focus on both prevention of overdose and prevention of fatal overdose. The use of naloxone is one example where the intervention is clearly geared at tertiary prevention, intervening once the individual has experienced an overdose. The provision of naloxone to individuals who use heroin was first discussed in the mid-1990s with small programs beginning distribution around 1996. Multiple U.S. professional societies and government agencies have also made naloxone distribution a key component to their recommendations for battling the opioid overdose epidemic. Programs now exist in more than 15 other countries in Europe, Asia, Africa, and Australia with more being added as the World Health Organization has added naloxone to its Model List of Essential Medicines.

Cannabis

Cannabis has proven itself to have a wide therapeutic index and to be relatively physiologically safe over the millennia of human use. The history of harm reduction as a public health policy, internationally, was first applied in the context of cannabis, when the Netherlands Public Prosecutor's guideline allowed for the establishment of "coffee shops," in an effort to separate cannabis from "harder" drugs. In North America today, broadening legalization in the United States and federal legalization in Canada has increased access to medical and recreational cannabis products, subject to rigorous testing to ensure a safe and uncontaminated supply. This policy decision represents a significant reduction in harm when compared with the previous policy of blanket prohibition and criminalization. Given the lengthy detection period of THC on typically conducted drug screenings, with subsequent legal or vocational ramifications, individuals may be compelled to seek cannabis-adjacent products to avoid detection. This contributed to the popularity of synthetic cannabinoids (aka Spice or K2) which have been associated with increased psychotic episodes, agitation, and violence.³⁵

The 2018 Farm Bill effectively legalized the sale of hemp-derived cannabinoids, aimed at increasing the availability of cannabidiol (CBD), but provided limited oversight, leading to an increasingly popular market for analogous molecules to delta-9 tetrahydrocannabinol (THC), such as delta-8-THC among others, which may provide favorable alternative cannabis high with the decreased risk of legal consequence.³⁶ There is a dearth of information about these compounds and their safety for medical or recreational use, warranting more research as these markets expand.³⁶

Synthetic Stimulants and Hallucinogens

There are hundreds of illicitly available synthetic stimulant and hallucinogenic compounds that are used recreationally in nightlife or concert settings, the most widely known among them being lysergic acid diethylamide (LSD), methylenedioxymethamphetamine (MDMA), and methamphetamine. These substances are associated with serious physical health problems, in addition to the risks of harm related to risky or disinhibited behavior previously described with other intoxicants.³⁷ Some harm reduction strategies include regulating the quantity of drugs used, spacing out doses, and not combining stimulants with depressants.³⁸ Harm reduction outreach services focused

on recreational drug use in the nightlife setting include *Energy Control* (1997) in Spain and the public health organization *DanceSafe* (1998), both of which disseminate objective information around recreational and responsible use of drugs.

Drug checking is a harm reduction intervention that allows for identification of drug composition and the chance to minimize exposure to unexpected adulterants, which have been found at high rates in illicit drugs.³⁷ The point-of-care testing technologies have been used for years in Europe but are only now starting to be used in this context in North America³⁷ (Testing kits may not only significantly reduce accidental overdoses and fatalities, but data gleaned from them may signal trends in the circulation of novel and potentially lethal substances³⁷).

Alcohol

The consumption of alcohol is widely associated with socialization, ceremony, and pleasure across cultures. Binge drinking (>5 drinks in a sitting for men, >4 for women), and chronic drinking patterns are more likely to lead to harm and should be categorically discouraged (**Box 3**).

Approaches to addressing problematic alcohol use range from complete abstinence from alcohol (ie, 12-step models or Alcoholics Anonymous (AA)) to managed or controlled drinking which aims to reduce negative consequences from drinking if abstinence is not attainable. Managed alcohol programs can decrease the number of alcohol beverages consumed per day, increase safety and quality of life, lower the incidence of alcohol-related harm, that is, reduced Extended Release (ER) visits or hospital admissions, fewer police or legal interactions, and provide potential cost savings to the health care and legal services.³⁹ However, a Cochrane review was unable to make conclusions about the efficacy of managed alcohol programs given lack of control or comparison interventions in the 22 studies reviewed.⁴⁰

Alcohol, driving, and educational programs

A recent study from the National Center for Statistics and Analytics found that approximately one-third of fatal motor vehicle crashes involve a driver who had consumed any alcohol, including a total of 10,142 (28%) deaths in 2019. Drinkers tend to underestimate the rate of alcohol absorption and overestimate the rate of elimination.⁴¹ Without training, drinkers are very poor estimators of blood alcohol concentration (BAC), which is especially pertinent to decisions about legal driving ability.⁴²

Designated drivers have been shown to reduce alcohol-related fatalities when executed well, that is, designating the person before drinking begins, and typically connoting abstinence from alcohol during the night.⁴³ However, loose interpretation of this concept (ie, driver simply being the least intoxicated person in the group) can limit effectiveness.⁴³ One study, finding that the mean BAC for 66 designated drivers leaving campus bars was 0.06 g/dL, summarized that the “differences between the ideal of abstinence and the actual behavior of designated drivers may result in smaller public health benefits from designated driver use than would be expected under the assumption of abstinence⁴⁴” (**Box 4: Rideshare Services as Harm Reduction**).

Alcohol is routinely cited as the most misused substance on college campuses, with 68% of students consuming alcohol in the past month and nearly 40% admitting to heavy drinking (ie, >5 drinks in a row for men, >4 for women).⁴⁷ Education programs for consumers can help shape better informed drinking behaviors and increase awareness around the risks and harms of excessive alcohol consumption, particularly important in the college population who may just be starting to experiment with alcohol. Server education programs may lead to the increased recognition of overly intoxicated patrons, which can lead to ceasing beverage service and may also

Box 3	
Alcohol-related harms that stand to benefit from harm reduction modalities	
Domain	Examples
Health	<ul style="list-style-type: none"> • Alcohol-related injury and death due to acute accidents • Alcohol-related morbidity and mortality due to chronic disease • Worsening of psychiatric outcomes, increased rates of suicide • Impulsive sexual behaviors, increased rates of sexually transmitted disease (STD) transmission • Costs to health care system, for example, emergency department, transplantation
Crime/Public Disorder	<ul style="list-style-type: none"> • Disinhibited and risky behaviors, impulsive decision-making • Drunk driving injuries and death • Alcohol-related domestic violence • Arrests for public intoxication or disorderly conduct
Workplace	<ul style="list-style-type: none"> • Costs imposed to the criminal justice system • Working days and productivity lost due to alcohol-related illness • Working days and productivity lost due to reduced rates of employment • Costs imposed on economy due to workplace absenteeism and illness/disability/death
Family/Social Network	<ul style="list-style-type: none"> • Increased rates of divorce or separation • Children or family impacted by parental alcohol use disorder • Risk for neglect and strain on social service systems • Higher rates of domestic abuse

increase the chances that the patron can be assisted in safely getting home (see [Box 4](#): Harm reduction alcohol policy).

Tobacco

Tobacco remains one of the largest contributors to morbidity and mortality worldwide. Higher taxes generally lead to lower smoking rates⁵³ Manipulating and lowering the nicotine content in cigarettes may render them less reinforcing, leading to lower rates of initiation and more successful quit attempts. However, lower nicotine content may lead to compensatory increases in smoking or use of other combusted nicotine products which may worsen harms related to smoke inhalation, though this effect seems inconsistent.⁵⁴

Graphic warning labels (GWLs) have been recommended as a cost-effective means to increase public awareness of the physical harms induced by tobacco use by increasing both risk perceptions and quit intentions⁵⁵ GWLs are implemented in over 100 countries and are currently being challenged in U.S. courts by the tobacco industry on the grounds of their effectiveness.⁵⁵

A full discussion of nicotine replacement therapy (NRT) transcends the scope of this paper, but suffice it to say that research has shown increases in smoking cessation rates up to two times with the use of NRT compared with placebo or no additional aid as well as improvements in moderating or reducing use⁵⁶ It has also been shown that those with mental health conditions have a more difficult time with cessation, and treating comorbid mood disorders may improve cessation outcomes. This consideration may shift the use

Box 4**Individual, public health, and public policy alcohol harm reduction interventions**

Individual	Potential Harms Addressed	Interventions/Implementation/Feasibility
Medications for Alcohol Use Disorder	<ul style="list-style-type: none"> • Helping to reduce cravings for alcohol • Helping to reduce heavy drinking days even for those not abstinent 	<ul style="list-style-type: none"> • Naltrexone for reducing pleasure related to drinking, addressing, and reducing cravings, has been shown to reduce heavy drinking days (ASAM text) • Antabuse as deterrent treatment, negative conditioning due to disulfiram reaction to deter ongoing drinking • Acamprosate to regular GABA/glutamate tone in those abstinent, mechanism still unclear
Thiamine Supplementation of Alcohol ⁴⁵	<ul style="list-style-type: none"> • High rates of poor nutrition, vitamin depletion with chronic alcohol use • Risk for progression to Wernicke's encephalopathy and Korsakoff's psychosis 	<ul style="list-style-type: none"> • Thiamine has been verified to be stable when stored in alcoholic beverages with minimal to no alteration in taste • Clear cost savings when compared with costs of medical care and lost productivity related to high rates of Korsakoff's psychosis in Queensland, Australia
Glassware Bans	<ul style="list-style-type: none"> • Glass-related damage or injuries related to progressive intoxication and impairment of coordination, that is, glass containers thrown or dropped • Glass shards can be used as weapons in bar fights 	<ul style="list-style-type: none"> • Glassware bans have been shown to reduce harmful events related to glass injuries, that is, using aluminum cans or plastic containers • Some pubs in Scotland use a special type of glass which shatters into very fine particles, preventing use of shards as weapons⁴⁶
Public Health Initiatives	Potential Harms Addressed:	Interventions/Implementation/Feasibility:
College Education Programs ^{47,48}	<ul style="list-style-type: none"> • Missed classes or other poor academic performance • Increased rates of emotional, physical, or sexual assault • Increased rates of STDs • Increased rates of vandalism or property damage on campus 	<ul style="list-style-type: none"> • Infusing awareness and education into coursework or campus orientation events • Strong evidence found that education programs by themselves were ineffective in reducing student alcohol use and related problems • Two published, commonly implemented programs achieved National Institute on Alcohol Abuse and

Server or Vendor Education Programs ⁴⁹	<ul style="list-style-type: none"> • Increased rates of binge drinking episodes if given easy or cheap access to alcohol • Despite the idea that limiting beverage sales may impact venue profits, it has been shown that venues with more responsible serving practices attract more customers⁴⁶ 	<p>Alcoholism (NIAAA) Tier 1 intervention status that have resulted in significant reductions in harmful alcohol use on campus:</p> <ul style="list-style-type: none"> ◦ Alcohol Skills Training Program based on cognitive behavioral principles ◦ Brief Alcohol Screening and Intervention for College Students based on motivational interviewing <ul style="list-style-type: none"> • Avoiding self-service models • Avoiding volume discounts, that is, extended happy hours • Restrictions on supply such as keg bans or keg registration may also serve to limit binge consumption⁵⁰ • Charging higher prices for higher proof alcohol products • Substituting higher proof beverages for lower proof selections • Offering a wider selection of light or nonalcoholic drinks to help reduce overall alcohol intake without impacting subjective perceptions about drinking volume⁴⁶
Public Policy Initiatives Prices	<p>Potential Harms Addressed:</p> <ul style="list-style-type: none"> • Lower prices increase consumption 	<p>Interventions/Implementation/ Feasibility:</p> <ul style="list-style-type: none"> • Increasing price of alcohol leads to decrease in consumption rates according to studies in the general population⁴⁸ • Effect seems mediated by culture and age as well as the types and quantities typically consumed⁴⁸ • Heavier drinkers appear less affected by variations in price than others, though younger heavy drinkers such as college students may be an exception⁴⁸
Taxes/Addressing Unrecorded or Illegal Alcohol Consumption	<ul style="list-style-type: none"> • Increased rates of compensatory drinking of illegal or unrecorded products such as moonshine or other homemade preparations 	<ul style="list-style-type: none"> • Tax hikes on approved alcohol products do not appear to lead to compensatory drinking

Advertising Bans	<ul style="list-style-type: none"> • These carry the rare but well-described risks from methanol or other contaminants⁵¹ • Advertising alcohol broadly may lead to increased salience and increased consumption 	<ul style="list-style-type: none"> • Buy backs for homemade alcohol products to limit potential harms have been implemented in some countries, though this may not be efficacious or cost feasible in the United States • Research is limited, but available evidence from the general population suggests that banning alcohol advertising seems to reduce alcohol abuse in some circumstances⁴⁸
Restricting Licenses for Retail Sales of Alcohol	<ul style="list-style-type: none"> • Significant relationships between density of alcohol licenses per population size, rates of consumption, and related issues such as violence or crime 	<ul style="list-style-type: none"> • May be restricted by making licenses more difficult to attain that is, increasing cost, density of stores per area • Mixed conclusions regarding restrictions of days or hours of sale
Minimum Legal Drinking Age (MLDA)	<ul style="list-style-type: none"> • Increased risks of harm with youth drinking and inexperienced, intoxicated drivers 	<ul style="list-style-type: none"> • By 1988, all states had established the minimum legal driving age to be 21, hence MLDA being the most well studied alcohol control policy⁵⁰ Studies have shown that higher legal drinking age is related to:
Lowered Blood Alcohol Concentration (BAC) Limits	<ul style="list-style-type: none"> • Higher BAC leading to increasingly impaired driving ability • People incorrectly estimating their BAC when deciding to drive 	<ul style="list-style-type: none"> • Reduced alcohol consumption • Decreased rates of traffic crashes • Decreased rates of suicide, homicide, vandalism • States that lowered legal BAC limits from 0.10% to 0.08% experienced a 6% greater post-law decline in alcohol-related fatal crashes in which drivers had blood alcohol levels of >0.10% than states that retained the 0.10% standard⁴⁸ • Providing BAC information to would be drivers did not influence perceptions of driving safety risk, with limitations including: <ul style="list-style-type: none"> ◦ Minimal impact on risk-averse individuals who would abstain from driving regardless of BAC level ◦ Potentially negative impact on risk-tolerant individuals who may use

Administrative License Revocation	<ul style="list-style-type: none"> • Repeat offenders may be more likely to continue driving impaired 	<p>BAC information to justify driving while intoxicated, albeit under the legal .08 limit⁵²</p> <ul style="list-style-type: none"> • Legally mandated license revocation for drinking-and-driving offenses and mandatory seat belt use have resulted in decreases in alcohol-related fatalities⁴⁸ • The density of active rideshare trips near a crash site was associated with decreased odds that the crash involved alcohol⁵³ • “Nez Rouge” (“Red Nose”) program in Quebec—community-based service providing two drivers (one for the drinker and one for their car) to anyone who has had too much to drink at a party or licensed establishment to be able to drive home safely⁴⁶ • College campus free ride or shuttle services to nearby establishments in the area—decrease risks of drunk driving incidents on campus
Rideshare Programs	<ul style="list-style-type: none"> • Increased rates of impaired driving if no other commuting options exist • Safety and convenience of rideshare services such as Uber or Lyft may tip the decision-making away from impaired driving, perhaps even to a greater extent than do conventional public transportation, that is, bus, taxi 	

of bupropion higher in the treatment algorithm for cessation attempts, with better data for the SR formulations compared with extended release (XL) formulations.⁵⁷

Electronic nicotine delivery systems/vaping

The use of e-cigarettes or vapes, broadly referred to as electronic nicotine delivery systems (ENDS), remains controversial despite their increasing popularity and media attention. These devices not only address the physiological dependence on nicotine but also potentially address the behavioral and sensory aspects of cigarette use that is lacking from most standard pharmacologic nicotine replacement therapies aside from the Nicotrol inhaler. Although a previous small review had found ENDS helpful with long-term cessation compared with placebo⁵⁸, a more recent systematic review concluded that there is very limited evidence regarding the impact of ENDS of smoking cessation, reduction, or adverse effects.^{59,60} The benefits are considered in the context of relatively minimal rates of adverse effects associated with ENDS.^{58,59}

There remains a lack of evidence about more specific questions such as the differences between high- and low-concentration nicotine ENDS products, differences between daily or non-daily users, or the differences between earlier generation ENDS with newer products. Issues around quality control, production, and manufacturing add to inconsistencies in described benefits and may pose risks to consumers. Differentiating the effects of nicotine dose from the effects of device type/preference, or related sensory aspects, is likely to be challenging. These represent new frontiers of research that need to be pursued for providers to be able to speak with patients about

safe and responsible use of these new and emerging products and consider them as harm reduction strategies when treating patients with tobacco use disorder.

FDA approval

In an unexpected decision, the food and drug administration (FDA) recently (October 2021) granted its first market authorizations through the Premarket Tobacco Product Application pathway for three new ENDS products from RJ Reynolds, permitting the sale of these products but not conveying an official FDA approval or acknowledgment of safety. FDA concluded that the benefits of reduced cigarette smoking in current adult smokers, that is, reduction in exposure to harmful chemicals evidenced by urinary and blood biomarkers, outweighed the potential risks of exposing youth to these nicotine products. Existing data suggest that there is a low intention to purchase these products among adult nonusers and the most youth who use ENDS start with fruit or candy flavors and continue to prefer these products to the tobacco-flavored products that were approved in the recent announcement. The FDA implemented post-marketing restrictions on media advertisements to reduce youth exposure and retained the ability to suspend or withdraw the marketing order if the products are found to no longer be “appropriate for the protection of the public health, such as if there is a significant increase in youth initiation.”

Integration of Harm Reduction with Traditional Addiction, Psychiatric, and Medical Treatment

The integration of harm reduction with other treatment services can be conceptualized in two main ways. One involves the genuine adoption of the principles (humanism, individualism, and so forth) and philosophy of low barrier access to care as well as the acceptance that total abstinence from all substance use is not the only acceptable goal/outcome of successful treatment. The other involves the actual inclusion of traditional harm reduction services (syringe exchange, overdose prevention, and so forth) into traditional medical, psychiatric, and addiction treatment settings as well as the integration of or easy access to medical, psychiatric, and addiction treatment services in traditional harm reduction settings.

Incorporating humanism, individualism, and autonomy can be achieved by speaking to patients in a nonjudgmental manner and taking the time to understand ongoing decision-making around their substance use, understanding that there may be perceived benefits from otherwise outwardly harmful behaviors. It is paramount to create a treatment space where patients feel comfortable speaking with their providers, feel safe making their needs known, and where they are encouraged to take agency in their treatment planning and decision-making.

The principle of pragmatism may stand in opposition to moral and abstinence-based programs, which may estrange those where complete abstinence may not be their personal goal. Abstinence-based programs which frown on medication-assisted treatments may also alienate those who truly do require pharmacologic assistance and subsequently diminish chances at ongoing engagement and support. It is worth noting that for some patients, abstinence and “perfect” health decisions are unattainable due to social determinants of health. This is where the divide between the two ideologies can best be bridged, whereby continued engagement with these patients affords the opportunity to address these social determinants (ie, provision of or referral to ancillary vocational and housing services) and may indeed help move someone toward complete abstinence. Incrementalism may also manifest itself in the form of motivational interviewing, where listening out for and encouraging change talk can lead to progress in their journey toward abstinence. By continuing to engage

with those who cannot immediately or easily achieve complete abstinence, providers can position themselves to help make ongoing use as safe as possible until abstinence is attainable or realistic for the individual.

Syringe services programs, supervised consumption facilities, and managed alcohol programs that make treatment providers available in their settings allow for increased psychoeducation and engagement in treatment. Individuals who continue to use substances may fluctuate between different stages of motivation at different times, and providing consistent access to a mental health or addiction professional can help reduce ambivalence and reinforce incremental positive changes toward less harmful use. These endeavors implement similar approaches, namely aiming for objective provision of information and engagement to the extent that individuals are willing. Drawing similarities to management of other chronic illnesses with behavioral components such as obesity also serves to reduce the stigma accompanying the use of harm reduction principles to address substance use disorders.

Until recently, the provision of harm reduction services or messaging within traditional medical, psychiatric, and addiction treatment programs was seen as “enabling” of substance use and a violation of the “Hippocratic Oath.” A gradual shift over recent years has resulted in many traditional treatment settings now providing easy access to naloxone and overdose education. Similarly, many more providers are providing information on SSPs and safer injection techniques with some addiction treatment programs even offering syringe services within the program. Although these examples of integration are promising, it is imperative that all providers work to increase this integration in the settings in which they work. It is also important that providers advocate with local and national policy makers to help make harm reduction a routine part of all medical care.

CLINICS CARE POINTS

- The principles of harm reduction should be integrated in to all medical, psychiatric, and addiction treatment programs.
- The basic philosophy that total abstinence from all substance use is not the only acceptable goal/outcome of successful treatment has become much more acceptable in the current addiction treatment world.
- Efforts should be made to reduce the barriers to accessing care and for individuals using substances.
- Providers should familiarize themselves with local harm reduction services and refer patients to them readily.

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REFERENCES

1. Lopez G. Covid-19's big public health lesson: ask people to be careful, not perfect harm reduction works. Covid-19 has proved it. Vox. Available at. <https://www.vox.com/22315478/covid-19-coronavirus-harm-reduction-abstinence>. Accessed January 24, 2022.

2. Reduction International Harm. Global state of harm reduction 2020 2020. p. 7. Available at. https://www.hri.global/files/2021/03/04/Global_State_HRI_2020_BOOK_FA_Web.pdf.
3. Harm Reduction Coalition. Principles of Harm Reduction. Available at. <https://harmreduction.org/about-us/principles-of-harm-reduction/>. Accessed January 15, 2022.
4. Hawk M, Coulter RWS, Egan JE, et al. Harm reduction principles for healthcare settings. *Harm Reduct J* 2017;14(1):70.
5. See I, Gokhale RH, Geller A, et al. National public health burden estimates of endocarditis and skin and soft-tissue infections related to injection drug use: a review. *J Infect Dis* 2020;222(Supplement_5):S429–36.
6. Szalavitz M. *Undoing drugs: the untold story of harm reduction and the future of addiction*. First edition. Hachette Go; 2021.
7. Des Jarlais DC. Harm reduction in the USA: the research perspective and an archive to David Purchase. *Harm Reduct J* 2017;14(1):51.
8. Patel MR, Foote C, Duwve J, et al. Reduction of injection-related risk behaviors after emergency implementation of a syringe services program during an HIV outbreak. *J Acquir Immune Defic Syndr* 2018;77(4):373–82.
9. Rogers H. Congress ends ban on federal funding for needle exchange programs. 2016. Available at. <https://www.npr.org/2016/01/08/462412631/congress-ends-ban-on-federal-funding-for-needle-exchange-programs>. Accessed January 21, 2022.
10. Sanchez DP, Tookes H, Pastar I, Lev-Tov H. Wounds and skin and soft tissue infections in people who inject drugs and the utility of syringe service programs in their management. *Adv Wound Care* 2021;10(10):571–82.
11. Lupick T. *Fighting for space: how a group of drug users transformed one city's struggle with addiction*. Arsenal Pulp Press; 2017.
12. Semaan S, Fleming P, Worrell C, Stolp H, Baack B, Miller M. Potential role of safer injection facilities in reducing HIV and Hepatitis C infections and overdose mortality in the United States. *Drug Alcohol Depend* 2011;118(2–3):100–10.
13. Mays J, Newman A. Nation's first supervised drug-injection sites open in New York. *New York Times*. 2021. Available at. <https://www.nytimes.com/2021/11/30/nyregion/supervised-injection-sites-nyc.html>. Accessed January 21, 2022.
14. Guta A, Perri M, Strike C, Gagnon M, Carusone SC. "With a PICC line, you never miss": The role of peripherally inserted central catheters in hospital care for people living with HIV/HCV who use drugs. *Int J Drug Policy* 2021;96:103438.
15. Veve MP, Patel N, Smith ZA, Yeager SD, Wright LR, Shorman MA. Comparison of dalbavancin to standard-of-care for outpatient treatment of invasive Gram-positive infections. *Int J Antimicrob Agents* 2020;56(6):106210.
16. 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):1324–32.
17. Paulozzi LJ, Kilbourne EM, Desai HA. Prescription drug monitoring programs and death rates from drug overdose. *Pain Med* 2011;12(5):747–54.
18. Johnson H, Paulozzi L, Porucznik C, Mack K, Herter B. Hal Johnson consulting and division of disease control and health promotion, florida department of health. decline in drug overdose deaths after state policy changes-Florida, 2010-2012. *MMWR Morb Mortal Wkly Rep* 2014;63(26):569–74.
19. Jegu J, Gallini A, Soler P, Montastruc JL, Lapeyre-Mestre M. Slow-release oral morphine for opioid maintenance treatment: a systematic review: Slow-release

- oral morphine for opioid maintenance treatment. *Br J Clin Pharmacol* 2011;71(6): 832–43.
20. Oviedo-Joekes E, Brissette S, Marsh DC, et al. Diacetylmorphine versus methadone for the treatment of opioid addiction. *N Engl J Med* 2009;361(8):777–86.
 21. Sordo L, Barrio G, Bravo MJ, et al. Mortality risk during and after opioid substitution treatment: systematic review and meta-analysis of cohort studies. *BMJ* 2017;j1550. Published online April 26.
 22. Ferri M, Davoli M, Perucci CA. Heroin maintenance for chronic heroin-dependent individuals. In: *Cochrane Drugs and Alcohol Group*, editor. *Cochrane database syst rev*. 2011.
 23. Gaston R, Best D, Manning V, Day E. Can we prevent drug related deaths by training opioid users to recognise and manage overdoses? *Harm Reduct J* 2009;6(1):26.
 24. Walley AY, Xuan Z, Hackman HH, et al. Opioid overdose rates and implementation of overdose education and nasal naloxone distribution in Massachusetts: interrupted time series analysis. *Bmj* 2013;346.
 25. Franklin G, Sabel J, Jones CM, et al. A comprehensive approach to address the prescription opioid epidemic in Washington state: milestones and lessons learned. *Am J Public Health* 2015;105(3):463–9.
 26. Paone D, Tuazon E, Kattan J, et al. Decrease in rate of opioid analgesic overdose deaths—Staten Island, New York City, 2011–2013. *MMWR Morb Mortal Wkly Rep* 2015;64(18):491.
 27. Ciccarone D. Fentanyl in the US heroin supply: a rapidly changing risk environment. *Int J Drug Policy* 2017;46:107–11.
 28. Cicero TJ, Ellis MS, Surratt HL, Kurtz SP. The changing face of heroin use in the United States: a retrospective analysis of the past 50 years. *JAMA Psychiatry* 2014;71(7):821.
 29. Compton WM, Jones CM, Baldwin GT. Relationship between nonmedical prescription-opioid use and heroin use. In: *Longo DL*, editor. *N Engl J Med* 2016;374(2):154–63.
 30. Jones CM, Lurie P, Woodcock J. Addressing prescription opioid overdose: data support a comprehensive policy approach. *JAMA* 2014;312(17):1733.
 31. Fry Dolan JK, Craig McDonald David, Fitzgerald John, Trautmann Franz, Kate. Drug consumption facilities in Europe and the establishment of supervised injecting centres in Australia. *Drug Alcohol Rev* 2000;19(3):337–46.
 32. *Addiction EMC for D and D*. Drug consumption rooms: an overview of provision and evidence. *European Monitoring Centre for Drugs and Drug Addiction Lisbon*; 2018.
 33. Marshall BD, Milloy MJ, Wood E, Montaner JS, Kerr T. Reduction in overdose mortality after the opening of North America's first medically supervised safer injecting facility: a retrospective population-based study. *Lancet* 2011;377(9775): 1429–37.
 34. Davies G. A critical evaluation of the effects of safe injection facilities. *J Glob Drug Policy Pract* 2007;1(3).
 35. Featherstone S. Cheap, unpredictable and hard to regulate, synthetic marijuana has emergency responders scrambling to save lives. *N Y Times*.2015:6.
 36. Kruger JS, Kruger DJ. Delta-8-THC: Delta-9-THC's nicer younger sibling? *J Cannabis Res* 2022;4(1):4.
 37. Fregonese M, Albino A, Covino C, et al. Drug checking as strategy for harm reduction in recreational contexts: evaluation of two different drug analysis methodologies. *Front Psychiatry* 2021;12:596895.

38. Fernández-Calderón F, Díaz-Batanero C, Barratt MJ, Palamar JJ. Harm reduction strategies related to dosing and their relation to harms among festival attendees who use multiple drugs: Dosing-related harm reduction strategies. *Drug Alcohol Rev* 2019;38(1):57–67.
39. Pauly B, Brown M, Evans J, et al. There is a Place": impacts of managed alcohol programs for people experiencing severe alcohol dependence and homelessness. *Harm Reduct J* 2019;16(1):70.
40. Muckle W, Muckle J, Welch V, Tugwell P. Managed alcohol as a harm reduction intervention for alcohol addiction in populations at high risk for substance abuse. *Cochrane drugs and alcohol group*. *Cochrane Database Syst Rev* 2012. <https://doi.org/10.1002/14651858.CD006747.pub2>.
41. Martin CS, Rose RJ, Obremski KM. Estimation of blood alcohol concentrations in young male drinkers. *Alcohol Clin Exp Res* 1991;15(3):494–9.
42. Aston ER, Liguori A. Self-estimation of blood alcohol concentration: a review. *Addict Behav* 2013;38(4):1944–51.
43. Ditter SM, Elder RW, Shults RA, Sleet DA, Compton R, Nichols JL. Effectiveness of designated driver programs for reducing alcohol-impaired driving. *Am J Prev Med* 2005;28(5):280–7.
44. Timmerman MA, Geller ES, Glindemann KE, Fournier AK. Do the designated drivers of college students stay sober? *J Safety Res* 2003;34(2):127–33.
45. Price J, Theodoros MT. The Supplementation of alcoholic beverages with thiamine—a necessary preventive measure in queensland? *Aust N Z J Psychiatry* 1979;13(4):315–20.
46. Single E. Harm reduction as an alcohol-prevention strategy. *Alcohol Health Res World* 1996;20(4):239–43.
47. US Department of Health and Human Services. National institutes of health; national institute on alcohol abuse and alcoholism task force of the national advisory council on alcohol abuse and alcoholism. a call to action: changing the culture of drinking at. U.S. Colleges; 2002. Published online.
48. Nelson TF, Toomey TL, Lenk KM, Erickson DJ, Winters KC. Implementation of NIAAA college drinking task force recommendations: how are colleges doing 6 years later?: implementation of NIAAA college drinking task force recommendations. *Alcohol Clin Exp Res* 2010;34(10):1687–93.
49. McKnight AJ. Server intervention. *Alcohol Health Res World* 1993;17(1):76–84.
50. Toomey TL, Wagenaar AC. Environmental policies to reduce college drinking: options and research findings. *J Stud Alcohol Suppl* 2002;(14):193–205.
51. Rehm J, Neufeld M, Room R, et al. The impact of alcohol taxation changes on unrecorded alcohol consumption: a review and recommendations. *Int J Drug Policy* 2022;99:103420.
52. Johnson MB, Voas RB, Kelley-Baker T, Furr-Holden CDM. The consequences of providing drinkers with blood alcohol concentration information on assessments of alcohol impairment and drunk-driving risk. *J Stud Alcohol Drugs* 2008;69(4):539–49.
53. Morrison CN, D'Ambrosi G, Kamb A, MacManus K, Rundle AG, Humphreys DK. Rideshare trips and alcohol-involved motor vehicle crashes in Chicago. *J Stud Alcohol Drugs* 2021;82(6):720–9.
54. Bader P, Boisclair D, Ferrence R. Effects of tobacco taxation and pricing on smoking behavior in high risk populations: a knowledge synthesis. *Int J Environ Res Public Health* 2011;8(11):4118–39.
55. Donny EC, White CM. A review of the evidence on cigarettes with reduced addictiveness potential. *Int J Drug Policy* 2022;99:103436.

56. Strong DR, Pierce JP, Pulvers K, et al. Effect of graphic warning labels on cigarette packs on us smokers' cognitions and smoking behavior after 3 months: a randomized clinical trial. *JAMA Netw Open* 2021;4(8):e2121387.
57. Logan DE, Marlatt GA. Harm reduction therapy: a practice-friendly review of research. *J Clin Psychol* 2010;66(2):201–14.
58. Ries RK, Fiellin DA, Miller SC, Saitz R. *The ASAM principles of addiction medicine*. Lippincott Williams & Wilkins; 2014.
59. McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P. Electronic cigarettes for smoking cessation and reduction. In: *The Cochrane collaboration, editor. Cochrane database of systematic reviews*. John Wiley & Sons, Ltd; 2014. p. CD010216, pub2.
60. El Dib R, Suzumura EA, Akl EA, et al. Electronic nicotine delivery systems and/or electronic non-nicotine delivery systems for tobacco smoking cessation or reduction: a systematic review and meta-analysis. *BMJ Open* 2017;7(2):e012680.