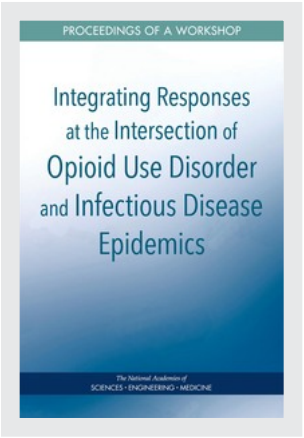

Integrating Responses at the Intersection of Opioid Use Disorder and Infectious Disease Epidemics: Proceedings of a Workshop

DETAILS

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Integrating Responses at the Intersection of Opioid Use Disorder and Infectious Disease Epidemics

PROCEEDINGS OF A WORKSHOP

Anna Nicholson, *Rapporteur*

Board on Population Health and Public Health Practice

Health and Medicine Division

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

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[1] The National Academies of Sciences, Engineering, and Medicine's planning committees are solely responsible for organizing the workshop, identifying topics, and choosing speakers. The responsibility for the published Proceedings of a Workshop rests with the workshop rapporteur and the institution.

Reviewers

This Proceedings of a Workshop was reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the National Academies of Sciences, Engineering, and Medicine in making each published proceedings as sound as possible and to ensure that it meets the institutional standards for quality, objectivity, evidence, and responsiveness to the charge. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We thank the following individuals for their review of this proceedings:

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Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the content of the proceedings nor did they see the final draft before its release. The review of this proceedings was overseen by **HUGH H. TILSON,** University of North Carolina. He was responsible for making certain that an independent examination of this proceedings was carried out in accordance with standards of the National Academies and that all review comments were carefully considered. Responsibility for the final content rests entirely with the rapporteur and the National Academies.

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BOXES

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Acronyms and Abbreviations

ACA	Patient Protection and Affordable Care Act
ACO	accountable care organization
AHRQ	Agency for Healthcare Research and Quality
ART	antiretroviral therapy
ASAM	American Society of Addiction Medicine
CDC	Centers for Disease Control and Prevention
CER	clinical effectiveness research
CMS	Centers for Medicare & Medicaid Services
CROI	Conference on Retroviruses and Opportunistic Infections
DOPE	Drug Overdose Prevention and Education
DUHI	Drug User Health Initiative
ED	emergency department
HBV	hepatitis B virus
HCUP	Healthcare Cost and Utilization Project
HCV	hepatitis C virus
HHS	Department of Health and Human Services
HIV	human immunodeficiency virus
HRSA	Health Resources and Services Administration

ICER	incremental cost-effectiveness ratio
IDSA	Infectious Diseases Society of America
IDU	injection drug use
IMPACT	Improving Addiction Care Team
MAT	medication(s) for addiction treatment (or therapy); medication-assisted therapy (or treatment)
MERT	medically enhanced residential treatment
MOUD	medications for opioid use disorder
MSM	men who have sex with men
NHANES	National Health and Nutrition Examination Survey
NIS	Nationwide Inpatient Sample
NOSE	Naloxone prescription for Opioid Safety Evaluation
NSP	needle services program
OAT	opiate agonist therapy
OHSU	Oregon Health & Science University
OWH	HHS Office on Women's Health
PCORI	Patient-Centered Outcomes Research Institute
PDMP	prescription drug monitoring program
PICC	peripherally inserted central catheter
PrEP	preexposure prophylaxis
PWID	people who inject drugs
PWUD	people who use drugs
RODS	rapid opioid dependence screen
SAMHSA	Substance Abuse and Mental Health Services Administration
SEP	syringe exchange program
SFDPH	San Francisco Department of Public Health
SSP	syringe services program
SUD	substance use disorder
WWID	women who inject drugs
WWUD	women who use drugs

Medications

Term	Definition
Buprenorphine	A partial opioid agonist
Naloxone (also known as naltrexone)	An opioid agonist
Suboxone	Trade name for a combination of buprenorphine and naloxone
Vivitrol	Trade name for an extended release form of naltrexone

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Introduction

In his welcoming remarks, Admiral Brett Giroir, Assistant Secretary for Health at the Department of Health and Human Services (HHS), recounted a set of sobering statistics that reflect the mounting havoc and devastation that the opioid epidemic wreaks on the lives of people across the country. According to the Centers for Disease Control and Prevention (CDC), 115 Americans die each day from an opioid overdose, which averages one death every 12.5 minutes. Between 1999 and 2016, the number of drug overdoses catapulted by 300 percent, with injection drug use increasing by 93 percent between 2004 and 2014 and opioid-related hospital admissions increasing by 58 percent over the past decade. An inexorable sequela of the opioid epidemic is the spread of infectious diseases, he said. CDC reports that hepatitis C virus (HCV) infections nearly tripled between 2010 and 2015, including an increase in HCV among pregnant women that increased the associated risk of perinatal transmission. Hepatitis B virus (HBV) infections had been decreasing in recent decades, but they increased by 20 percent between 2014 and 2015. Human immunodeficiency virus (HIV) infections among people who inject drugs have increased by 4 percent between 2014 and 2015. Hospitalizations for serious infections associated with opioid use have also quadrupled in the last decade at an added cost of nearly $15 billion to the health care system, according to estimates using data from the Agency for Healthcare Research and Quality. The increase in injection drug use appears to be the main driver for these infections.

Carlos del Rio, Hubert Professor and chair of the Department of

Global Health at the Rollins School of Public Health and professor of medicine in infectious diseases at the Emory University School of Medicine, reflected on his experience in the field of infectious disease, drawing parallels between the HIV epidemic that was emerging when he began his career and the opioid epidemic that the country faces today. Both of these public health crises have a particular impact on younger people, and the crises have been shaped and intensified by social stigma and discrimination. The latter components in the opioid epidemic outstrip the stigma and discrimination faced by people with HIV, he said; many providers will blatantly refuse to treat people whose lives are being destroyed by opioid use disorders. This underscores the need for an integrated response that calls for more than just treating the disease; it warrants close examination to intervene against the social determinants of health that are the epidemic's underlying drivers, said del Rio. Addiction and its root causes are at the center of the opioid epidemic, and they can no longer be "someone else's problem," he warned. This is a critical juncture that offers an opportunity to divert the path of the epidemic's destructive course, he said, and there are valuable lessons to be gleaned from the response to the HIV epidemic. He tasked workshop attendees with finding ways to move forward and integrate strategies into robust structures that already exist, such as settings for HIV and HCV care.

WORKSHOP OBJECTIVES

To address these infectious disease consequences of the opioid crisis, a public workshop titled Integrating Infectious Disease Considerations with Response to the Opioid Epidemic was convened on March 12 and 13, 2018, by the Board on Population Health and Public Health Practice in the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine. Participants discussed the scope of the problem, giving particular attention to viral hepatitis, HIV, and endocarditis. Attention was given to reducing the infectious disease comorbidities of injection drug use, especially strategies that emphasize empathy, respectful treatment, and patient satisfaction. Attention was also given to the specific impact on women. Speakers at the workshop presented on how the opioid epidemic has changed the epidemiology of infectious disease. In panel and open discussion, participants discussed strategies to prevent and treat infections in people who inject drugs, especially ways to work efficiently though the existing public health and medical systems. Effective novel strategies were also discussed. Attention was paid to strategies that seem realistic, making efficient use of existing resources, as well as those that could not be implemented without additional funds. See Appendix C for the Statement of Task.

The workshop was sponsored by HHS's Office of HIV/AIDS and Infectious Disease Policy (OHAIDP) and Office on Women's Health (OWH) and was structured into four sessions held over 1.5 days. The first session addressed the scope of the problem. The second session focused on addressing opportunities for, and barriers to, treatment and prevention programs. The third session featured a roundtable discussion with representatives from two professional societies, the Infectious Disease Society of America and the American Society for Addiction Medicine, as well as a representative from the Patient-Centered Outcomes Research Institute. During the final fourth session, participants discussed potential ways forward in addressing the epidemic. The workshop featured discussions among presenters, panelists, and participants during each session.

In accordance with the policies of the National Academies, the workshop did not attempt to establish any conclusions or develop recommendations about needs and future directions, focusing instead on issues identified by the speakers and workshop participants. In addition, the organizing committee's role was limited to planning the workshop. This workshop proceedings was prepared by workshop rapporteur Anna Nicholson as a factual summary of what occurred at the workshop.

CHARGE TO THE WORKSHOP ATTENDEES

Quantifying the infectious disease consequences of the opioid epidemic, said Giroir, is merely the first step toward envisioning and implementing an aggressive new agenda to respond to the current crisis while also taking proactive steps to prevent future crises. He asked workshop participants to consider new and innovative ways to deploy the 6,500 members of the U.S. Public Health Service who are dedicated to protecting, promoting, and advancing the health and safety of the nation. Many service members are already stationed in communities of extreme need, working to respond to the opioid epidemic and the infectious disease crises in collaboration with agencies such as the Indian Health Service and the Bureau of Prisons; other commissioned officers are working with the Food and Drug Administration, National Institutes of Health, and CDC, implementing and managing critical programs to support our response to the epidemics. He envisioned the corps as playing an ever-increasing role in the national fight against opioids, infectious disease, and persistent health inequalities.

Giroir urged participants to explore ways to engage the full range of sectors being affected by the opioid epidemic and to find ways to integrate efforts into existing programs as well as to build new programs. Similarly, he suggested leveraging existing tools and services that are known to be effective. CDC statistics estimate that as many as 75 percent

of the new HIV and HCV infections can be prevented through the provision of comprehensive services including counseling, education, HIV and HCV testing, hepatitis A and HBV vaccination, access to sterile syringes, preexposure prophylaxis, and referral to substance use disorder treatment. Effective treatments are also at hand, he said. Treatment of HIV with appropriate regimens, adhered to correctly, can lead to very effective viral suppression that almost eliminates the chance of transmission. New treatments for HCV can result in a complete biological cure of the disease.

His department's commitment to solving the opioid crisis is underpinned by its five-point plan for improvement in the following areas: better treatment, prevention, and recovery services; better targeting of overdose-reversing drugs; better data on the epidemic; better research on pain and addiction; and better pain management. He explained that OHAIDP leads the implementation and monitoring of the National HIV/AIDS Strategy as well as the National Viral Hepatitis Action Plan. Both of those national plans provide a framework designed to facilitate collaborations across sectors, to improve outcomes among priority populations, and to embark on the path towards eliminating HIV, HBV, and HCV. His office has committed to improving health through enhanced partnerships that extend beyond the academic community to the nonprofit, business, and law enforcement communities.

In his charge to the attendees, Richard Wolitski, director of the Office of HIV/AIDS and Infectious Disease Policy at HHS, was optimistic that the workshop would represent an inflection point towards a new paradigm that recognizes fully the urgent need for a more inclusive and comprehensive approach that addresses the disastrous consequences of the opioid epidemic and the life-threatening infectious diseases that are intertwined with each other. These infections are shortening the lives of Americans, challenging families and communities, straining service delivery systems, and adding to an already increasing health care cost, he said. He challenged attendees to draw a line of demarcation between the old status quo and this new approach that leverages all available resources to the maximum benefit of the patient. The old approach was defined largely by siloed funding streams and organizational structures that kept responses separate and lacking in force. The new approach should bring to the forefront the needs of people battling opioid use disorder above all else, ensuring them the longest and healthiest lives possible, keeping their families together and keeping them employed and out of jail. This approach could prevent their immune systems from collapsing, their livers from being destroyed, and their heart valves from failing, he entreated. This new approach should apply whether the client was encountered in an HIV testing program, an emergency room, a drug treatment program, a syringe services program, or the criminal justice system. Wolitski said

the new approach should leverage and coordinate the resources of multiple systems to provide comprehensive services that are responsive to the most urgent needs of the individual and their readiness to make change in one or more aspects of their lives.

The new system envisioned by Wolitski would facilitate the delivery of integrated, coordinated care while minimizing the amount of traveling needed, the number of different appointments required, and the number of times the same information is requested on a stack of intake forms. This coordinated approach builds a relationship with clients over time and extends that relationship to other programs and to other providers. All of those providers should share the common goal of seeing the client and the client's family live healthier lives that are free of opioid use disorders and infectious diseases. Finally, he said, this new approach should not put the onus entirely on the client to maintain the patient–provider relationship: it should build in ways to retain patients in care, reengage them when they reenter through any entry point, and to find and reach out to patients who have dropped out of care by providing a path to bring them back in when they are ready. Health care systems should be accountable for their ability to retain patients in care for a given period.

Wolitski conceded that developing and implementing such a system will not be easy, but there are precedents for success in integrated care in the numerous HIV programs that have broken down the walls of clinics and have created new interactions and partnerships for information sharing among health care providers, health departments, and community-based organizations that allow people to be retained in care. Other movements are already under way that align with this approach, he added. HHS is undergoing a transformation that includes strategic shifts toward putting people at the center of its programs, making the department more innovative and responsive, generating efficiencies through streamlined processes, and leveraging the power of data. His office coordinates the National HIV/AIDS Strategy and the National Viral Hepatitis Action Plan, which are road maps to fighting these infections that affect more than five million Americans. Both plans recognize the importance of addressing the risks of injection-drug users, he said, but neither anticipated the overwhelming growth of the opioid epidemic and the destruction that it has left in its wake. Both plans expire in 2020, but new plans are being developed to update them through 2030, he said, so the workshop represents an opportunity to inform those plans. Wolitski concluded his charge by imploring attendees to make the future he described a reality in order to better serve the men, women, and families whose lives have been torn apart at the intersection of these public health crises.

Jessica Tytel of the HHS Office on Women's Health, speaking on behalf of the office director, Nicole Greene, remarked that the workshop

BOX 1-1
Impact of the Opioid Epidemic on Women

Evidence is mounting about how the opioid epidemic affects women in very different ways than it does men, said Tytel. Implicit in any conversation about women and opioid misuse are the realities of co-occurring mental health conditions and experiences of violence and trauma. The epidemic is having an increasingly significant effect on women's health, she added. Between 1999 and 2015, the rates of death from prescription opioid overdoses increased by 471 percent among women (compared to an increase of 218 percent among men), and heroin deaths among women have increased at more than twice the rate of deaths among men. The picture of substance use is different for women compared to men, Tytel explained. Biological differences between women and men appear to influence susceptibility to substance abuse, which has implications for prevention and treatment interventions. According to the National Institute on Drug Abuse, women tend to use substances differently than men. Women tend to use smaller amounts of drugs for a shorter amount of time before they become dependent; women may also experience more cravings than men. Psychological and emotional distress have been identified as risk factors for hazardous prescription opioid abuse among women, but not among men. Women are also more likely to experience chronic pain and use prescription opioid medications for longer periods and at higher doses than men. Some of these women may then transition to injection drug use, thereby putting themselves at risk for viral hepatitis and HIV. Notably, new cases of hepatitis C among women increased by more than 260 percent between 2010 and 2014, likely increasing the risk of perinatal hepatitis C transmission to their infants. Finally, Tytel said, women who are parents and family caregivers may face additional barriers to accessing health care services including treatment for substance use disorders, such as lack of childcare.

SOURCE: Adapted from the opening remarks by Jessica Tytel at the workshop Integrating Infectious Disease Considerations with the Response to the Opioid Epidemic on March 12, 2018.

is the latest in a series of collaborations between OWH and OHAIDP that seek to expand the conversations around the intersections between infectious diseases, women's health, and the opioid epidemic. She explained that her office was established within the office of the HHS Secretary in 1991 to improve the health of American women by advancing and coordinating a comprehensive women's health agenda throughout HHS. Today, the office provides national leadership and coordination to improve the health of women and girls through policy, education, and model programs. The office collaborates on women's health initiatives across HHS to educate and motivate women and girls to live healthier lives by giving them clear and accurate health information. For 2018, they chose to focus on seven key priority areas: preventing opioid misuse among

women and girls, reducing childhood obesity, addressing mental health issues, promoting health across the life course, reducing health disparities, addressing violence and trauma, and supporting health care services for women. Since 2015, the office has partnered with public health and medical experts, policy makers, community groups, and women with lived experience to address the specific impact of opioid use on women's health.

In 2016, the office convened the first-ever national meeting on opioid use, misuse, and overdose in women, where experts and stakeholders examined issues associated with the opioid crisis focused through the lens of women's health. The meeting provided an opportunity to foster a national conversation about best practices in opioid use disorder prevention and treatment for women, resulting in a white paper and a final report. Together, those publications highlight the unique aspects of this epidemic and how it affects women across age, race, geography, and income. The Office on Women's Health also works closely with the Substance Abuse and Mental Health Services Administration to develop policies and guidelines for the treatment of pregnant women who use opioids and their substance-exposed infants. These resources include information about the link between opioid use and the risk of viral hepatitis and HIV, and the potentially significant effect on the health of both the mother and the baby. Tytel hoped that the workshop would provide opportunities to gain new insight into how the opioid epidemic affects women's health across the life course and how it affects their access to health care services (see Box 1-1).

ORGANIZATION OF THE PROCEEDINGS

This Proceedings of a Workshop is organized into five chapters. Chapter 2 focuses on the scope of the problem of opioid use disorder and its associated infectious diseases. Chapter 3 examines opportunities for, and barriers to, treatment and prevention in public health, in hospital settings, and in rural areas. Chapter 4 features presentations and discussions centered on the roles of correctional health, law, and law enforcement in addressing the opioid epidemic. Chapter 5 explores research directions, policy initiatives, and potential ways forward to integrate infectious disease considerations with the response to quell the epidemic and its infectious disease consequences. Throughout the proceedings generic names are used for the medications discussed. A brief description of these medications follows the acronyms and abbreviations list. The use of these medications is referred to in addiction medicine as medication-assisted treatment (or therapy) and as medication for addiction treatment. The proceedings uses these interchangeably, as used by the speaker. The acronym MAT refers to either of those terms.

2

The Scope of the Problem

This chapter includes summaries of presentations during the workshop that focused on the scope of the opioid epidemic and its infectious consequences. Patrick Sullivan, professor of epidemiology in the Rollins School of Public Health, Emory University, sketched the geography of infectious diseases related to the opioid epidemic. Natasha Martin, associate professor in the Division of Global Public Health, University of California, San Diego, described how infectious disease epidemic modeling can be used to identify the scope of the response needed to prevent human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infections among people who inject drugs (PWID) in the United States. An economic perspective on the implications of infectious disease treatment programs was provided by Benjamin Linas, associate professor of medicine at Boston University. Perspectives of patients and providers were offered by Seun Falade-Nwulia, assistant professor at the Johns Hopkins School of Medicine, and Veda Moore, a resident of Baltimore, Maryland.

GEOGRAPHY OF INFECTIOUS DISEASES RELATED TO THE OPIOID EPIDEMIC

Patrick Sullivan explored the geography of infectious diseases related to the opioid epidemic, particularly HIV and HCV, providing an epidemiological perspective about how infectious diseases can serve as a sentinel system for those epidemics. He also highlighted how lessons learned

from mapping HIV and HCV can inform monitoring systems for opioid use and prevention.

Importance of Infectious Diseases in the Opioid Epidemic

Many infectious diseases are associated with opioid epidemics, said Sullivan, but they vary in their usefulness as adjunct data to understand opioid epidemics. This is because of variable surveillance infrastructure, inconsistent funding of systems, and quirks related to the infections themselves that cause different degrees of sensitivity and specificity as sentinel events of needle sharing. Infectious diseases and their transmission are inextricably intertwined with needle-sharing behaviors. This relationship has important programmatic implications, such as the need to screen people who are contacted about opioid use treatment for related infectious diseases. The relationship also strengthens the value and effectiveness of programs to reduce opioid use, because concomitant reductions in needle sharing have secondary benefits of reducing the risks of related infectious diseases. Examining how data have been used successfully to inform programmatic responses to other infectious diseases, such as HIV, can also serve as models for new opioid-focused programs. Underlying social determinants of health—such as poverty, income inequality, and lack of health insurance—may also be jointly associated with the infectious diseases and opioid use epidemics, he added, and these shared, contextual factors may also inform a better understanding of the epidemics.

Infectious Diseases as Sentinels for Opioid Epidemics

Sullivan provided an epidemiological perspective on how infectious diseases can serve as a sentinel system for opioid epidemics. To illustrate quantitatively the relationships between infectious diseases and the opioid epidemic, he cited data estimating the efficiency of HIV and HCV transmission through needle sharing. For every 10,000 acts of needle sharing with an HCV-positive partner, 250 HCV transmissions would be expected; for every 10,000 acts of needle sharing with an HIV-positive partner, 63 HIV infections would be expected (Corson et al., 2013). This suggests that HCV is a more sensitive sentinel for needle sharing than HIV, he explained.[1] Sullivan described five dimensions that jointly determine the usefulness of a given infectious disease as a sentinel for an opioid use outbreak in a particular geographic setting:

[1] For context, Sullivan reported that the risks of HIV transmission per 10,000 acts of receptive anal intercourse and receptive vaginal intercourse are 138 and 8, respectively (Patel et al., 2014).

1. Surveillance: are there surveillance systems in place?
2. Specificity: are there competing causes or routes of infection? That is, are there potential competing causes or routes of infection other than needle sharing?
3. Sensitivity: what is the likelihood of a single episode of needle sharing resulting in the infection?
4. Latency: how long does it take from exposure to detection through a surveillance system?
5. Durability: is the infectious state related to needle sharing persistent? That is, what is the likelihood that the infection will be sustained, rather than resolving spontaneously or resolving after treatment without recognition of an underlying needle-sharing event?

These five dimensions vary across HIV, HCV, skin infections, and infectious endocarditis, so he comparatively assessed the relative potentials of those infectious diseases to serve as sentinel events. HIV has a well-established surveillance system, with HIV infection reportable in all U.S. states; routine evaluation demonstrates that HIV recording has a high level of completeness. Although HIV surveillance is good and the infection is durable, its sensitivity and specificity related to injection drug use render it less than ideal as a sentinel for an outbreak of injection drug use. In terms of specificity, only about 6 percent of new HIV infections in the country are attributable to needle sharing and, in terms of sensitivity, HIV has a relatively lower per-act risk of infection than HCV. Latency is the weakest dimension for HIV as a sentinel: in the absence of a screening program, there is a long latency period before the infection becomes clinically evident after the infection has been established.

The HCV surveillance system is less well developed, and many areas lack the support needed to report HCV cases with high levels of completeness, although there are several pilot-enhanced surveillance sites that are making progress in this regard. However, HCV probably does better than HIV in terms of specificity, because most new HCV infections are related to injection, and it does better than HIV in terms of sensitivity, because the per-act risk of transmission is higher. HCV and HIV are similar in terms of latency and durability. Skin infections and infectious endocarditis do not have surveillance systems and probably are not very sensitive or specific, said Sullivan, although they both have quite short latent periods. However, the durability is low for both types of infection, with skin infections being the most likely to resolve spontaneously or after treatment but without recognition of the underlying cause.

Mapping the HIV Epidemic

Sullivan described AIDSVu, a project that has been mapping the HIV epidemic in the United States for 8 years.[2] It is a compilation of interactive online maps that allows users to visually explore the HIV epidemic in the United States alongside critical resources, such as HIV testing and treatment center locations. AIDSVu's mission is to make HIV prevalence data widely accessible, easily understandable, and locally relevant. AIDSVu provides users with an intuitive, visual way to connect with complex information about persons living with an HIV diagnosis. National, state, and local maps provide data on the number of people living with an HIV diagnosis by state, county, zip code, census tract, and neighborhood, as well as the number of people newly diagnosed with HIV by state and county, year by year. These data are also mapped alongside data on social determinants of health (e.g., poverty, insurance, and education) and on HIV transmission modes. To ensure that these are "data for action," AIDSVu also provides service locators for centers that provide HIV testing, treatment, and preexposure prophylaxis (PrEP) as well as information about HIV prevention, vaccine, and treatment trials sites that are funded by the National Institutes of Health. AIDSVu also provides information about housing opportunities for people with HIV.

Sullivan reported that in recent years, the overall rates of new HIV diagnoses according to transmission category have been stable to decreasing. However, this slightly contracting number of new HIV diagnoses is predominantly driven by male–male sexual contact. Between 2010 and 2015, the proportion of new diagnoses of HIV infection among adults and adolescents (in the United States and six dependent areas) attributed to male-to-male sexual contact increased from 60 percent to 66 percent. However, the same period saw decreases in the proportions of diagnoses attributed to injection drug use (representing slightly more than 5 percent) and those attributed to heterosexual contact with a person known to have (or at high risk for) HIV infection (less than 25 percent).[3]

Sullivan explained that AIDSVu allows researchers to focus in specifically on people living with diagnosed HIV attributed to injection drug use. The top map in Figure 2-1 shows the results of decades of accumulation of HIV infections associated with injection drug use. States that have intense shading represent the intersection of high prevalence of HIV related to injection drug use with large populations. The bottom map in Figure 2-1 depicts the numbers of HIV cases attributable to injection drug use at a finer level of geographic detail. The top map suggests, owing to the shad-

[2] The project is available online at https://aidsvu.org (accessed April 15, 2018).

[3] Data have been statistically adjusted to account for missing transmission category; "other" transmission category not displayed as it comprises less than 1 percent of cases.

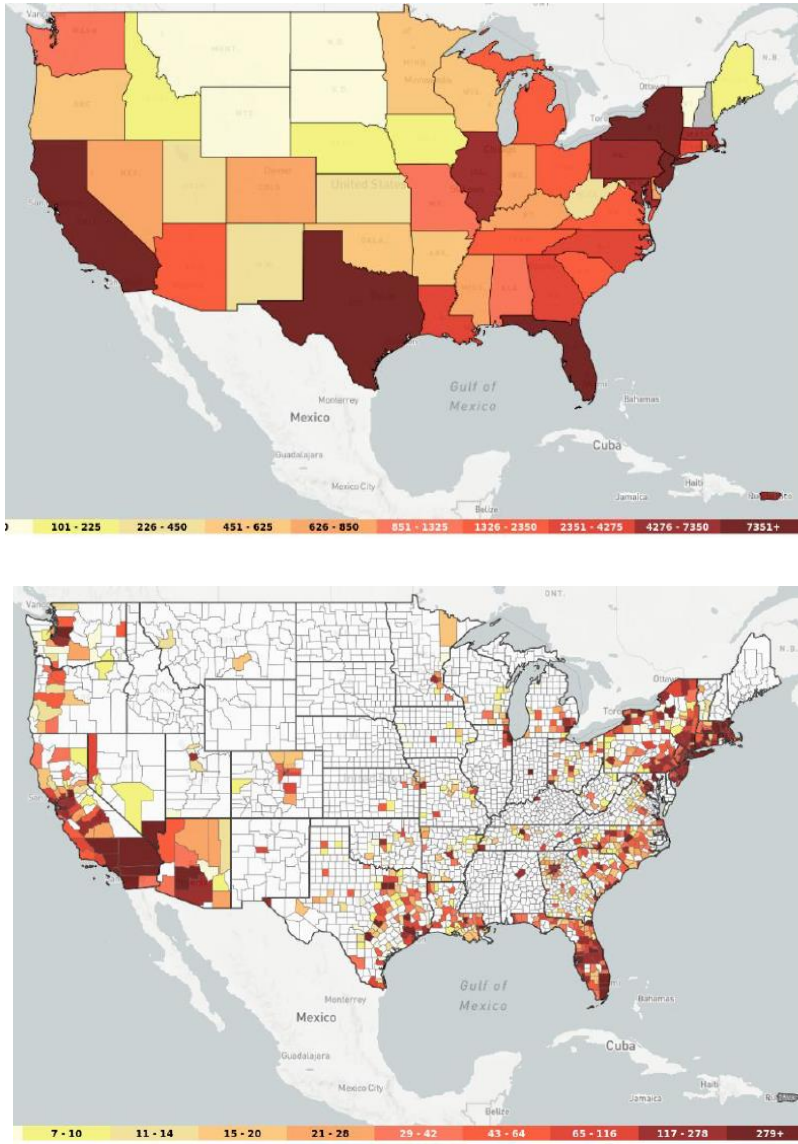


FIGURE 2-1 Number of persons living with diagnosed HIV attributed to injection drug use (2014) from a state-level perspective (top) and a county-level perspective (bottom).
SOURCES: As presented by Patrick Sullivan at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; AIDSVu, 2018.

ing, that the states that were highly affected were uniformly affected, but the bottom map reveals that a large number of counties (shown in white) had only four or fewer people living with HIV attributed to injection drug use. This demonstrates the extent to which PWID have historically been geographically concentrated in urban areas in the HIV epidemic.

The AIDSVu maps can also be used to illustrate differences in HIV between men and women, Sullivan added. In a state-by-state comparison, the rates of men living with diagnosed HIV infection in 2014 were higher than the rates of women. However, the proportion of those infections attributed to injecting drugs is greater for women than for men. At an even more local level of geographic granularity, these types of maps can be useful when correlated with service data and with indicators of substance abuse. He illustrated this by presenting a map of the numbers of new HIV diagnoses in the Atlanta metropolitan statistical area—that is, areas where HIV testing and HIV prevention services are most needed. When overlaid with the locations of the major interstates in the city, it reveals that the greatest numbers of new diagnoses are in the city's southwest quadrant. Factoring in the density of residents in that quadrant by race reveals that the area has a largely African American population. Overlaying the coordinates of HIV testing locations provides a visualization of the distribution of HIV testing locations, which should (ideally) be aligned with areas of the highest HIV incidence, Sullivan said. While the distribution matches the need in the areas of the southwest quadrant that are closest to the center of the city, areas further away from the city center have high rates of new HIV diagnoses (and presumably high incidence) without high coverage of testing sites.

Using the same base map of new HIV diagnosis rates, he overlaid the locations of PrEP providers. It demonstrates that most PrEP providers are located in the northern parts of the city, where the intensity of new diagnoses is lower, and illustrates the substantial gap in PrEP provision in the southwest quadrant where incidence is high. Based on these findings, a colleague of Sullivan at Emory University has developed a system to reach people who live in areas without brick-and-mortar PrEP service provision locations, by delivering PrEP entirely through telemedicine and mail-out kits. Mapping these types of gaps between indicators of need and service provision locations underscores the need to develop more innovative ways to place services where they are most needed, through mobile vans or telemedicine, said Sullivan.

Mapping the Hepatitis C Virus Epidemic

According to Sullivan, preliminary analyses suggest that there are correlations between HCV data and opioid abuse indicators, some of

which probably represent certain long-term historical trends, but they may also highlight departures between data about historical infections and more recent indicators that may suggest emerging areas of epidemics. HCV is an infectious disease that has interesting dynamics with substance use because the per-act risk of transmission is quite high, he said, but HCV surveillance is not yet systematic enough. He explained that broadly, the natural history of HCV has two phases. After an exposure to HCV and the establishment of infection, about 25 percent of people will have a mild acute illness that resolves itself, while 75 percent may have no symptoms. About one in four people go on to spontaneously clear their active infection while maintaining antibodies to HCV; three out of four people go on to develop lifetime infection with progressive liver damage. Diagnostics have two key formats: an antibody test that screens for lifetime exposure to HCV (even if the infection is cleared) and an RNA detection test that diagnoses current infection with HCV that needs to be treated.

Sullivan used a side-by-side comparison to demonstrate that there are actually two different HCV epidemics in the United States. Figure 2-2 shows the broad arc of the recent history of the HCV epidemic in the United States. In the early 1980s, levels of acute HCV infections were high and largely attributed to blood transfusions. Surrogate testing for HCV by testing blood levels of the liver enzyme alanine aminotransferase was introduced in October 1986, and testing for the hepatitis B core antigen was introduced in January 1987. Those interventions resulted in a precipitous drop in transfusion-related HCV transmission through the early 1990s. The subsequent introduction of anti-HCV antibody tests licensed during the mid-1990s supported further prevention efforts and drove further declines in the remnant HCV cases among injection drug users, which dropped to a very low level by the mid-2000s, as indicated by the red box in the figure. Figure 2-3 provides a more complete picture, he explained, of the reductions in acute HCV incidence stratified by age group. The incidence declined through the period of 2003 to 2005—dropping as low as 0.5 per 100,000 population. However, incidence then began to resurge in all age groups, but especially among people aged 20 to 39 years. Sullivan surmised that a substantial part of this reemergence is related to opioid epidemics.

Sullivan remarked that HCV has interesting characteristics as a potential indicator for better understanding opioid epidemics, but without national surveillance, it has not been possible to estimate HCV prevalence across the United States in a systematic way. He reported that his colleagues Eli Rosenberg and others at the Centers for Disease Control and Prevention (CDC) have worked on this problem using data from four population-based data sources to develop estimates of HCV prevalence that can be compared from state to state. The work draws upon four pri-

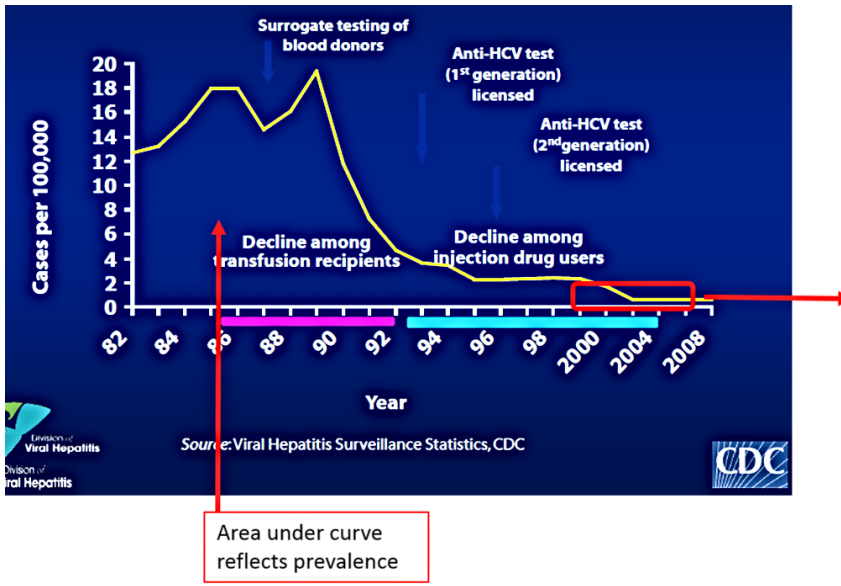


FIGURE 2-2 Incidence of reported acute hepatitis C in the United States (1982–2008).
NOTES: Area under the curve reflects prevalence; HCV = hepatitis C virus.
SOURCES: As presented by Patrick Sullivan at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; CDC, 2017.

mary data sources, he said. The first was the National Health and Nutrition Examination Survey (NHANES), a national probability sample that includes antibody testing for HCV as well as RNA testing. The other three were the 2010 U.S. Census, U.S. Census intercensal data, and the National Vital Statistics System; the latter provides data on deaths in which HCV was listed as an underlying or contributory cause of death.

The general approach was to first use the NHANES data to estimate the number of people living with HCV antibodies in the United States, and then to allocate the NHANES total of HCV cases to each state based on the distribution of demographic variables through a process of indirect standardization. Rosenberg and colleagues identified 24 demographic strata based on known characteristics of HCV, such as men, African Americans, and people born between 1945 and 1965 are most heavily affected. Then they analyzed each state's distribution within these demographic strata and provisionally allocated HCV cases from the national epidemic to each state based on the population characteristics. Because the demographic structure of states is not the only driver of HCV levels, the CDC

team developed the other state effects using data from the death records to look for deaths related to HCV that were greater than the number predicted by the demographic characteristics. To calculate the state effects, the predicted HCV death rate in each stratum in each state was compared to national averages for each strata. The provisional NHANES case allocations were multiplied by the state effects in each strata, providing estimates of HCV cases within each state and each strata. The number of estimated cases was divided by the population (per the 2010 U.S. Census) to calculate the estimated prevalence in each state. According to Sullivan, this statistical approach has the advantage of exactly standardizing the two data systems, both of which are population based, to each state. Consequently, nearly all residual biases are related to the underlying data and data systems, rather than the statistical model choice. This method, combined with the large-size data sets, permitted the detection of higher-order demographic group and state interactions.

The outcome of this work was mapped to represent the total number of people with HCV antibodies present in 2010 (around 3.9 million), around 25 percent of whom would have cleared their infection, leaving around 2.8 million people living with chronic HCV at the turn of the decade (HepVu, 2018) (see Figure 2-4). Sullivan noted that this

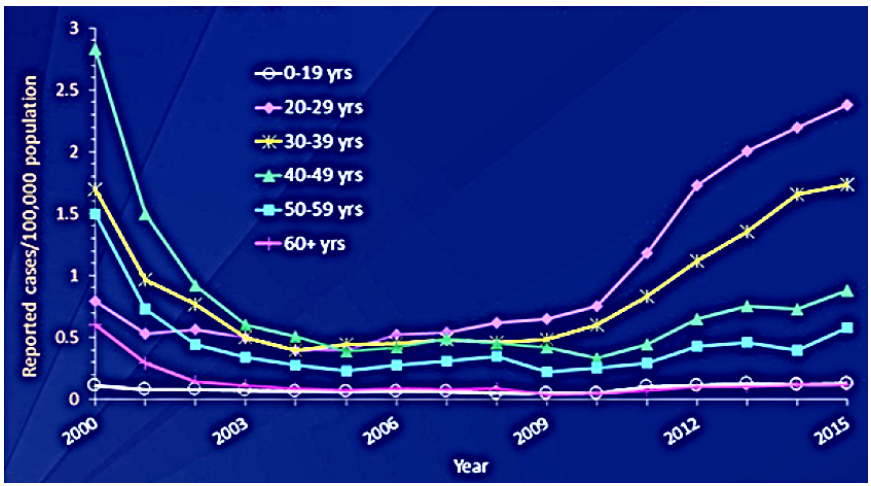


FIGURE 2-3 Incidence of acute hepatitis C by age group in the United States (2000–2015).
NOTES: Area under the curve reflects prevalence; yrs = years.
SOURCES: As presented by Patrick Sullivan at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; CDC, 2017.

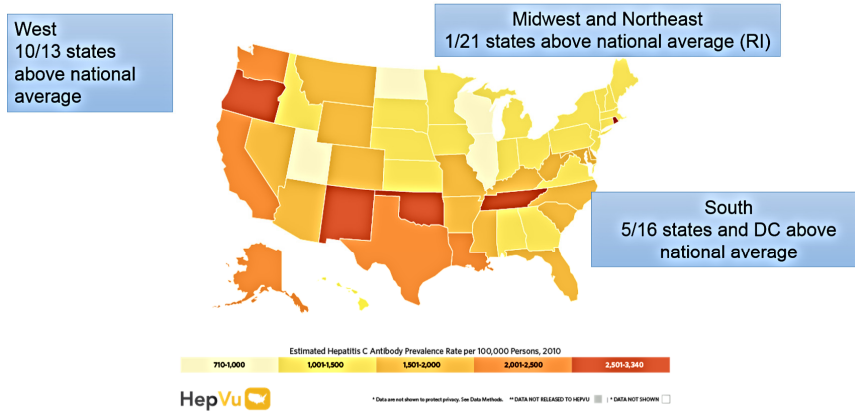


FIGURE 2-4 Estimated hepatitis C antibody prevalence rate per 100,000 persons (2010).
SOURCES: As presented by Patrick Sullivan at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; HepVu, 2018.

largely represents an accumulation of older infections—some of which are decades old. A map that takes into account both the prevalence of HCV within states and the population size reveals a more detailed picture. States such as New Mexico, Oklahoma, Oregon, and Tennessee emerge as having higher estimates of HCV prevalence relative to other states, he noted, which may to some extent be a historical depiction of HCV. There are also fairly clear regional patterns: the West has 10 of 13 states above the national average of HCV prevalence, but Rhode Island (which has a relatively high urban-to-rural ratio) is the only state in the entire region of the Midwest and the Northeast to have prevalence above the national average. In the South, 5 of 16 states and Washington, DC, are above the national average. He added that data on prevalence and mortality data from HepVu can also be used to illustrate differences between men and women. In general, men are affected by HCV to a greater extent than women, which is borne out in the state-by-state mortality data from 2014 in which the mortality cases attributed to HCV among males exceed the mortality cases among females.

Opioid Indicators and Correlation

Infectious diseases can serve as indicators in a surveillance approach aimed at better characterizing epidemics, Sullivan said, but they also

can figure into a more broad, comprehensive approach to surveillance. In addition to HIV and HCV, other possible indicators include infectious endocarditis, antecubital abscesses, skin infections, drug-related overdose deaths, naloxone units used, needle sales in pharmacies, use of drug treatment services, and hotline calls. These and many other indicators may be helpful in trying to understand opioid epidemics but also in providing early warnings when there are emergent situations that need attention. Sullivan said the overall aim should be to develop a comprehensive set of potential indicators, both infectious and noninfectious, that have been evaluated with respect to their potential performance as part of a system to direct attention to needle sharing, for example. Like HIV and HCV, each of these indicators should be evaluated for their usefulness along the dimensions of surveillance, sensitivity, specificity, latency, and durability. For example, there are questions around the sensitivity of drug-related overdose deaths. Many coroners do not mark deaths as overdoses because they want to spare the family from stigma and allow families to receive life insurance compensation (which is not provided if a person dies engaged in illegal activity). These deaths may be coded as aspiration or heart attack, which are truthful data that nonetheless lead to undercounts of actual overdoses.

To address this, states including Georgia and Kentucky are considering putting a tick box on the reporting form (but not on the death certificate) that would allow coroners to indicate a suspected overdose and would be available as a surveillance mechanism. Because of intertwined issues of depression and substance use, he said, there is also concern that overdoses designated as unintentional might actually be intentional. Ideally, medical records would capture substance abuse data for people who present with infectious diseases like endocarditis, cellulitis, and abscesses, but usually they do not. He reported that as a step toward improving specificity, his colleagues have developed an algorithm based on location to detect injection-related infectious endocarditis, cellulitis, and abscesses, which includes excluding cases with other known etiologies.

Having disclosed the indicators' limitations in terms of drug overdose death rates as well as the likelihood of substantial undercount, Sullivan reported that since the turn of the century, there has been a consistent increase in the age-adjusted overdose death rates in the United States, which have consistently been higher in men than in women. Figure 2-5 illustrates the breakdown of age-adjusted drug overdose rates by opioid category. He explained that when considered as a surveillance system, such data suggest that the specificity of drug overdose deaths as an indicator of certain opioid-related injections has likely changed over time. In the past 6 years, for example, overdoses attributed to synthetic opioids (other than methadone) have overtaken deaths attributed to other types

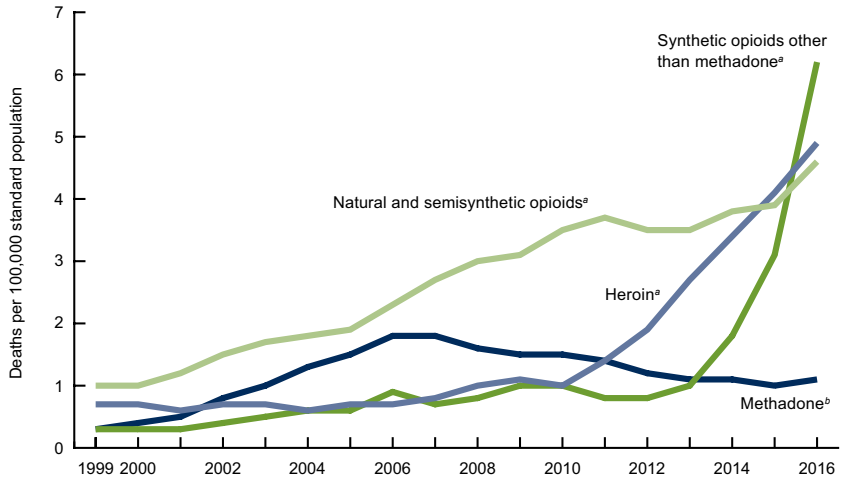


FIGURE 2-5 Age-adjusted drug overdose death rates, by opioid category, United States (1999–2016).

NOTES: Deaths are classified using the *International Classification of Diseases, Tenth Revision.* Drug-poisoning (overdose) deaths are identified using underlying ICD-10 cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. Drug overdose deaths involving selected drug categories are identified by specific multiple-cause-of-death codes: heroin, T40.1; natural and semisynthetic opioids, T40.2; methadone, T40.3; and synthetic opioids other than methadone, T40.4. Deaths involving more than one opioid category (e.g., a death involving both methadone and a natural or semisynthetic opioid) are counted in both categories. The percentage of drug overdose deaths that identified the specific drugs involved varied by year, with ranges of 75–79 percent from 1999 to 2013, and 81–85 percent from 2014 to 2016.

[a] Significant increasing trend from 1999 to 2016 with different rates of change over time, $p < 0.05$.

[b] Significant increasing trend from 1999 to 2006, then decreasing trend from 2006 to 2016, $p < 0.05$.

SOURCES: As presented by Patrick Sullivan at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; Hedegaard et al., 2017.

of agents; there has also been an increase in the representation of heroin in these drug overdose deaths. These trends have changed the performance characteristics of these indicators in terms of their relationships to opioid epidemics. Sullivan noted that in terms of indicators, opioid overdose emergency department (ED) visits may offer a potentially interesting source of data to understand trends in opioid use. Through CDC's

Enhanced State Opioid Overdose Surveillance Program, opioid overdose ED visits are tracked and reported in 16 states.[4] The data show the heterogeneity in trends among the included states.[5] However, it falls well short of a comprehensive surveillance system because 34 states do not report data.

Correlation of Service Data and Opioid Indicators

In terms of the correlation between service data and opioid indicators, Sullivan said that there is a wealth of downloadable data about substance abuse treatment locations available from the Substance Abuse and Mental Health Services Administration (SAMHSA), a branch of the Department of Health and Human Services (HHS). These data can be used to find substance abuse and mental health service location points and sort them by service provisions, including

- types of care (e.g., substance abuse treatment, detoxification, or accepts clients on opioid medication);
- service settings (e.g., hospital inpatient, outpatient, or day treatment);
- payments accepted (e.g., Medicaid, private insurance, or cash);
- payment assistance availability (e.g., sliding fee scale or payment assistance);
- special programs or groups covered (e.g., veterans, seniors, persons with HIV/AIDS, or persons who have experienced trauma);
- age groups accepted;
- gender accepted;
- buprenorphine physicians; and
- health care centers.

Researchers have made a first attempt to combine data from SAMHSA with amFAR's opioid indicator database (another online resource), said Sullivan. They created a base map to represent the intensity of drug overdose deaths per 100,000 overlaid with the locations of substance abuse treatment facilities that accept clients on opioid medications and prescribe

[4] See https://www.cdc.gov/vitalsigns/opioid-overdoses/infographic.html#graphic2 (accessed May 1, 2018).

[5] Sullivan said that among the states reporting percent changes from July 2016 through September 2017, five states had a decrease in ED visits (Kentucky, Massachusetts, New Hampshire, Rhode Island, and West Virginia), three states had an increase of between 1 and 24 percent (Missouri, Nevada, and New Mexico), four states had an increase of between 25 and 49 percent (Indiana, Maine, North Carolina, and Ohio), and four states had an increase of greater than 50 percent (Delaware, Illinois, Pennsylvania, and Wisconsin).

or administer buprenorphine and/or naltrexone (per the SAMHSA database). At a high level, it shows that some areas are fairly well served in terms of current substance use provision locations while other areas may need more providers, such as the area encompassing Indiana, Kentucky, Virginia, and West Virginia,. He emphasized that this effort to "mash up" indicators generates hypotheses in the sense that they lead to questions about how service needs are (or are not) being met, including commute time required for certain types of services.

Comparisons corroborate state-level data on HCV prevalence rates, he reported. In the map of HCV antibody prevalence in 2010 (see Figure 2-4), certain states, including New Mexico, Oklahoma, and Tennessee, stand out, albeit largely owing to historical trends in HCV transmissions. When opioid-related deaths per 100,000 in the same year are mapped, some of the same areas continue to stand out. However, there is a cluster of counties around West Virginia and Kentucky that seem to be different than the historical data. This demonstrates how comparing data sources can identify areas where more recent clusters of needle-sharing behavior would show up in the overdose deaths, but would not have the same prominence in the map of historical antibody prevalence. According to Sullivan, these analyses "give us an idea about this interplay between infectious diseases—which have their own timelines and chronicities and stories—and other indicators of opioid use [that can] lead us to generate hypotheses about where we may have opportunities to improve service provision."

Sullivan concluded by arguing that improved surveillance systems are needed to ensure consistent and complete reporting for acute HCV cases, as well as for other infectious diseases and for indicators of opioid use as parts of a more broad, comprehensive, national surveillance system. This would allow for maximizing indicators according to their particular strengths in terms of latency, sensitivity, specificity, and so forth to provide a better overall view. He emphasized that indicator data for HIV, HCV, and opioids suggest that there are important differences between men and women, which call for stratified analyses around the idea that women may use opioids in different ways that might require different programmatic interventions.

Discussion

Carl Schmid of the AIDS Institute commented that HBV is also increasing in many areas because of the opioid epidemic and injection drug use. Sullivan replied that as new infectious diseases emerge and are characterized descriptively as outbreaks, one of the challenges is figuring out how they fit into the picture more broadly. However, it can be a

long, slow process for surveillance systems to mature and for indicators to develop as they have for HIV and HCV. In the meantime, he suggested leveraging the contributions of the existing surveillance systems and indicators, upon which descriptions of outbreaks like HBV can be layered.

Judith Feinberg of West Virginia University suggested that heat maps by county serve as adequately sensitive indicators to demonstrate that in the southern part of West Virginia there is almost a complete correlation for acute HCV and overdose mortality. Sullivan replied that national-level heat maps can provide a broader perspective and inform hypothesis generation, but they are not intended to replace the important work done at the local level. Local-level work enriched by nuanced understanding of local context and conditions can be used to develop the picture in greater geographic resolution and identify relevant indicators. All surveillance is fundamentally local, he added, so these types of observations are critical to health departments' responses.

Dawn Fishbein, infectious disease physician at MedStar Washington Hospital Center, warned that because much of the disseminated surveillance data is older, funding agencies may have the false impression that there are not problems in areas that are known to be affected. Sullivan suggested investing more in surveillance, particularly for HCV. The data he presented from HepVu represents data through 2010, but further data have now been obtained from NHANES that will allow those estimates to be extended by another 5 or 6 years and posted on HepVu. Data will also be updated to reflect emerging signals that are believed to represent increasing numbers of recent infections in younger people, because signals differ demographically in the ways to indicate transmissions in more contemporary opioid-related outbreaks.

A balance needs to be struck, Sullivan said, between striving for more current surveillance data and using the existing data in other ways in the interim. Another delicate balance is needed between state-level and national-level surveillance analyses of data. State-level work is always better informed about the issues at play in each state, but before HepVu estimates were developed, many states had no state-specific estimates of HCV based on surveillance data. He noted that high-quality scientific data can be developed in different ways to address existing gaps in surveillance and limitations in different states. It is important to recognize the limitations of data and address them synthetically, he added. All surveillance data requires triangulating with multiple approaches and data sources. When state-level perspectives differ from those provided by a national modeling approach, Sullivan said, it provides opportunities for states to learn about the surveillance system and for national researchers to learn about modeling approaches. Fishbein also suggested that

prescription opioids should be explored as a marker for the epidemic in injection opioid use, given the dearth of good surveillance data.

Josiah "Jody" Rich, professor of medicine and epidemiology at Brown University, commented that syringe access is a key variable. Rhode Island, for example, is an outlier in the data due to its syringe access laws. During the 1990s, possession of a single syringe was a felony offense vigorously enforced and punishable by 5 years' incarceration. People who were injecting drugs would use syringes and then leave them behind, where they would continue to be used by other people. As a result, Rhode Island was one of only four states at the time with more than half of AIDS cases related to injection drug use. He also suggested law enforcement data on drug testing could be useful. Sullivan said that law enforcement data can very helpful within a jurisdiction, but they are driven by local policing decisions to the extent that biases become quite large across jurisdictions and across states. However, they would need to be analyzed within a framework that examines such data as surveillance systems using CDC's guidelines for evaluation for timeliness, availability, sensitivity, specificity, and completeness of reporting in order to characterize those biases.

Corinna Dan of HHS noted that CDC had recently released new estimates on opioid overdose deaths, which increased substantially between 2016 and 2017. She asked if the proliferation of fentanyl and fentanyl analogues and the changing drug use picture will affect the way that drug overdose tracks with HCV. Sullivan replied that when multiple indicators are rolled together and change, then interpreting those changes only makes sense if the contributions of the underlying components remain fairly proportional. This calls for looking at more granularity and perhaps trying to standardize the contributions of different components to overdose deaths, he said. In practice, however, changes such as the emergence of fentanyl and fentanyl analogs will muddy the water with respect to interpreting trends over time. Given that the landscape will likely continue shifting, he suggested prospectively breaking those changes out and looking at more granular levels of available cause-specific data to better understand the mix of the actual substances used and the way they are compounded.

Carlos del Rio, professor of Global Health and Medicine at Emory University, noted that the Active Bacterial Core surveillance (ABCs)[6] is a very strong, robust surveillance system that has been ongoing since the mid-1990s. He suggested finding ways to integrate and layer such

[6] Active Bacterial Core surveillance (ABCs) is CDC's active laboratory- and population-based surveillance system for invasive bacterial pathogens of public health importance. More information is available at https://www.cdc.gov/abcs/index.html (accessed March 12, 2018).

systems to look at opioid trends and epidemics, citing a recent paper that suggests a relationship between opioid use and pneumococcal infections that was unexpected (Wiese et al., 2018).

MODELING THE PREVENTION OF INFECTIOUS DISEASES AMONG PEOPLE WHO INJECT DRUGS

In her presentation, Natasha Martin described how infectious disease epidemic modeling can be used to identify the scope of the response needed to prevent HIV and HCV infection among PWID in the United States. She began by describing the effectiveness of harm reduction interventions in preventing two of the main infectious disease consequences of opioid addiction, HCV and HIV. Opiate agonist therapy (OAT) is highly effective at preventing fatal overdose among PWID. OAT's effectiveness in reducing an individual's reported injecting risk behavior has been known for many years, but only relatively recently has evidence emerged about the effectiveness of this intervention against HIV incidence and HCV incidence among PWID. Recent systematic reviews and meta-analyses have shown that OAT reduces an individual's risk of acquiring HIV by about 54 percent, as well as reducing an individual's risk of acquiring HCV by about half (Aspinall et al., 2014; MacArthur et al., 2012; Platt et al., 2017). The evidence for syringe service programs is slightly more mixed, but systematic reviews and meta-analyses have indicated that they are associated with a reduction in HIV incidence by 34 percent and reduction in an individual's risk of acquiring HCV by as much as 76 percent. She noted that the latter estimate pertains to the efficacy among studies conducted in Europe; the evidence from North America is less strong and quite mixed. The Cochrane systematic review found that combined harm reduction (that is, OAT plus high-coverage needle and syringe programs) could reduce an individual's risk of acquiring HCV by nearly 75 percent.

HIV treatment is effective at both reducing HIV-related mortality as well as reducing HIV transmission among PWID, Martin explained, and harm reduction and HIV treatment can work synergistically to lead to better outcomes and reduce HIV transmission. For example, a systematic review and meta-analysis found that OAT is associated with a 69 percent increase in the recruitment rate of individuals onto antiretroviral treatment (ART), a two-fold increase in ART adherence, a 23 percent decrease in the odds of ART attrition, and a 45 percent increase in the odds of viral suppression (Low et al., 2016).

New direct-acting antiviral therapies for HCV are highly effective and highly tolerable, said Martin. Cure rates for PWID treated for HCV reach 94 percent among individuals who are on OAT as well as among those who are not (Dore et al., 2016; Grebely, 2017; Grebely et al., 2016; Zeuzem

et al., 2015). However, HCV treatments are restricted by reimbursements to health care providers, both in the United States and worldwide. For example, 2017 Medicaid restrictions for HCV therapy in many states impose restrictions based on drug and alcohol use, including abstinence-based restrictions, despite clinical recommendations that recent drug use should not be a contraindication to HCV treatment. Some states also impose restrictions based on liver damage, with treatment prioritized for individuals with more advanced fibrosis. Martin explained that this is relevant because the PWID who are infected with HCV who pose the greatest risk of transmitting HCV to others tend to be recent drug users and they tend to be younger, with less advanced liver disease. Having restrictions based on liver damage and on abstinence both in place exclude most PWID from HCV therapy eligibility. Despite highly effective therapies for HCV, few PWID at the core of the HCV epidemic receive treatment in the United States.

Modeling Elimination of Hepatitis C Among People Who Use Drugs

Martin explored what is needed to eliminate HCV among PWID in the United States, noting that the National Academies of Sciences, Engineering, and Medicine and the World Health Organization (WHO) have both set the goal of eliminating viral hepatitis as a public health threat by 2030, with specific impact targets of reducing the number of new HCV and HBV cases by 90 percent and reducing HCV- and HBV-related mortality by 65 percent (NASEM, 2017; WHO, 2016). As more national and state governments become interested in achieving these elimination targets, epidemic modeling can contribute to understanding the exact level of intervention and what mixture of interventions will be required to achieve these targets. Epidemic modeling is useful for forecasting the epidemics into the future as well as assessing what level of intervention is required to reduce new infections. Epidemic modeling is unique in that it mechanistically models a disease epidemic among individuals so that incidence is generated as an output. Reaching an incidence target requires epidemic modeling that generates projections of future incidence. This enables an assessment of what level of interventions are needed to prevent new infections.

Treatment as Prevention for Hepatitis C

Epidemic models have been used successfully to look at the effects of various coverage levels of interventions on the HCV epidemic among PWID, said Martin. Her research group has done work showing that harm reduction—although very important in averting infections in set-

tings where it has been scaled up—is not likely to be able to achieve HCV elimination in isolation (Martin et al., 2013a; Vickerman et al., 2012). HCV response requires additional interventions layered on top of harm reduction, she explained. Given that HIV treatment is prevention, Martin said, substantial interest has been garnered in HCV treatment as prevention. Unlike HIV treatment, HCV treatment has the additional advantages of being finite and curative. However, because HCV treatment does not prevent reinfection, there are concerns about the reinfection risk and the economic consequences of treating individuals who may become reinfected and require retreatments. She and others have carried out theoretical modeling work indicating that modest increasing levels of HCV treatment among PWID could substantially reduce HCV prevalence and incidence among that population (Martin et al., 2013a,b; Zelenev et al., 2018). "We don't need to treat everyone . . . modest levels of treatment could actually have a substantial impact on the epidemic," she said.

Martin compared work on HCV prevention among PWID carried out in one urban setting and two rural settings that are facing different types of epidemics: San Francisco, California; Perry County, Kentucky; and Scott County, Indiana. All of the settings have high prevalence among PWID, but their incidence rates are very different. The country is highly heterogeneous in terms of its HCV epidemics among PWID, she said, which necessitates responding with approaches that are specific to the setting. San Francisco has a very high prevalence of HCV among PWID, Martin said, with more than 80 percent of that population chronically infected. At around 12 per 100 person-years, the HCV incidence rate in the city is high in absolute terms, but low relative to the high prevalence; in fact, it has the lowest stable incidence of all three settings. Modeling results for HCV chronic prevalence and HCV incidence among PWID in San Francisco predict a fairly stable epidemic, she reported (Fraser et al., in preparation). That is, without any additional interventions, the chronic prevalence would be sustained at around 70 to 80 percent. Further increasing harm reduction would have a relatively modest effect because the city already has high coverage of syringe service programs. But despite the extremely high prevalence of HCV among PWID, she maintained, WHO incidence elimination targets for 2030 could be achieved by providing a full harm reduction package with relatively modest treatment rates of about 50 per 1,000 PWID per year.

Martin explained that Perry County, Kentucky, also has a high prevalence rate of HCV among PWID, although it has a moderate but stable incidence rate of around 20 per 100 person-years. The HCV epidemic is slowly expanding among PWID, but in contrast to San Francisco, modeling predicts that scaling up to full harm reduction (syringe service programs plus medication-assisted treatment [MAT]) would substantially

reduce incidence and prevalence by 50 percent or more by 2030 (Fraser et al., in preparation). However, full harm reduction would not achieve the elimination target of a 90 percent reduction in incidence by 2030. Achieving elimination is possible, she said, but it would require a scale up of harm reduction combined with HCV treatment at rates of less than 50 per 1,000 PWID annually.

Scott County, Indiana, also has a relatively high prevalence of HCV among PWID, coupled with an expanding epidemic. Incidence is highest of the three settings—greater than 40 per 100 person-years—and the rate is increasing rather than stable. Modeling of chronic prevalence indicates that between 2008 and 2010, there was a temporary drop in chronic prevalence among PWID that was likely attributable to the expansion of drug use in the population resulting in an inflow of new susceptible (not infected) injectors (Fraser et al., 2018). After 2010, however, chronic prevalence increased substantially, to around 55 percent in 2015, owing to the increasing HCV transmission risk in that previously noninfected population. The model projects a continued increase in HCV chronic prevalence in Scott County that could rise to roughly 83 percent by 2030 in the absence of intervention. The projected burden of infection is substantial, she said, and requires an urgent public health response. Full harm reduction (50 percent MAT plus 50 percent high-coverage syringe services programs) is key to prevention and can reduce both chronic prevalence and incidence, she added. However, it cannot reverse the increasing incidence trend, which can only be stabilized with the expansion of harm reduction. Combined harm reduction and HCV treatment, at a rate of 20 per 1,000 PWID per year, would stabilize the prevalence, and then any additional treatment could drive down the prevalence as well as drive down the incidence.

The Scott County epidemic also highlights the importance of re-treating reinfections, said Martin, despite concern about the high costs of treatment. If re-treatment of reinfections is not allowed in Scott County, then the HCV epidemic could rebound because of reinfection (see Figure 2-6). Provision of high-coverage harm reduction could maintain the treatment-as-prevention effect and sustain a low prevalence and incidence of infection, but it would be insufficient to reach the National Academies' and WHO's target of 90 percent reduction in incidence. Tackling these epidemics, she argued, will require willingness to re-treat reinfections in addition to comprehensive harm reduction and treatment.

This comparison among settings underscores the need for more intervention in locations where epidemics are expanding, Martin remarked. The rates of treatment per 1,000 PWID that would be required to achieve a 90 percent reduction in incidence by 2030 varies according to the stability of the epidemic. With a treatment-as-prevention strategy that is not cou-

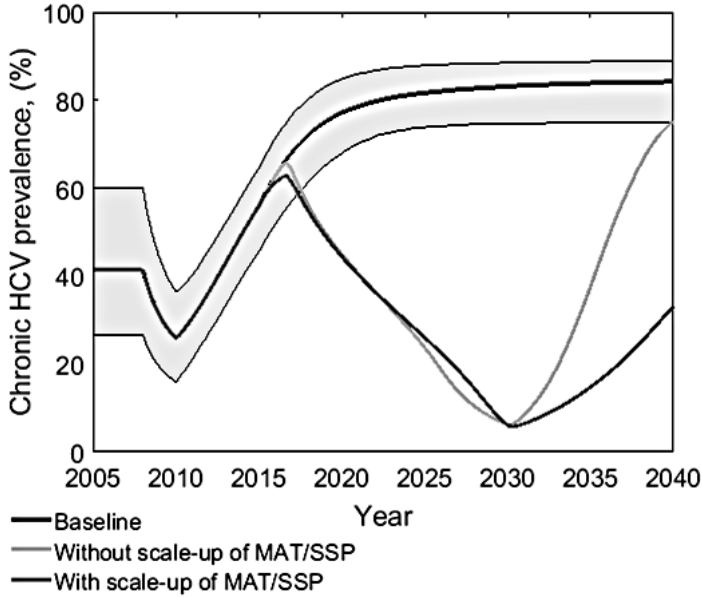


FIGURE 2-6 Rebound in chronic HCV prevalence if HCV treatment is halted after achieving a 90 percent decrease in prevalence or incidence in 2030.
NOTE: Figure shows chronic HCV prevalence per 100 person years at baseline and with and without MAT/SSP scale-up if treatment is stopped in 2030 when 90 percent decrease from 2016 is achieved.

pled with harm reduction scale up, treatment rates of below 75 per 1,000 PWID annually could achieve elimination in San Francisco and in Perry County (Fraser et al., 2018). Because the incidence is higher and increasing in Scott County, the required treatment rates need to be threefold higher than if it were a stable incidence setting. However, the treatment rates required to achieve elimination could be even lower with combined harm reduction scale up and HCV treatment, she reported. It would cut in half the number of treatments needed in Perry County and Scott County, although there would be slightly less effect in San Francisco owing to its higher baseline-level needle services program (NSP) coverage. Martin stated that with regard to whether specific PWID should be targeted for HCV treatment, the answer is complicated by variable network effects among PWID (see Box 2-1).

BOX 2-1
Network Effects in Hepatitis C Treatment Targeting Specific People Who Inject Drugs

Martin addressed the question of whether specific PWID should be targeted for treatments by citing two studies on the effects of the injection drug use networks on HCV transmission among PWID. Not enough data exist to develop a dynamic model by overlaying disease epidemics on top of injecting drug use networks, hence the paucity of research in this area. One study among PWID in Melbourne, Australia, indicated that based on the network characteristics, a "treat-your-friend" strategy may have more effect. This strategy involves treating someone who has HCV and then treating all of the friends around them who are infected, with the twin aims of preventing reinfection among that primary case as well as disrupting transmission among individuals clustered together in the network (Hellard et al., 2014). However, a more recent study indicated that a random treatment strategy had the most effect (Zelenev et al., 2018). According to Martin, this demonstrates how the characteristics of injecting networks vary by setting. Therefore, the setting will determine how network considerations might be taken into account when planning allocation of HCV treatment.

SOURCES: Martin presentation, March 12, 2018; Hellard et al., 2014; Zelenev et al., 2018.

Modeling Prevention of HIV Among People Who Inject Drugs

Interventions for preventing HIV among PWID in the United States are similar to those used to prevent HCV, said Martin. Various studies on harm reduction and treatment have looked at variances in the care cascade, said Martin. One study used modeling to identify the care continuum gaps that contribute most strongly to HIV transmission (Skarbinski et al., 2015). The study estimated the numbers of new transmissions among individuals within different groups (including those who engage in male-to-male sexual contact, men and women who use injection drugs, and men who have sex with men and also inject drugs) at different steps of the care cascade: HIV infected but undiagnosed; HIV diagnosed but not retained in medical care; retained in care but not prescribed ART; prescribed ART but not virally suppressed; and virally suppressed. Among PWID, the vast majority of new transmissions come from HIV-diagnosed individuals who are not retained in medical care. In addition to illustrating the need to initiate more people on ART, she noted, it pinpoints this step in the care cascade as the best target to have the strongest prevention response. The second group to target are individuals who are HIV infected but undiagnosed, which underlines the need for both screening and linkage to care in the population (see Figure 2-7).

Another study performed a similar analysis with data from New York City aimed at identifying the care continuum gaps contributing to HIV transmission among PWID. Their modeling found that in that city, undiagnosed HIV-infected PWID represent 33 percent of the total population of PWID, but they contribute more than half of the new infections. This means that in New York City, the undiagnosed population should be targeted to disrupt transmission. The second highest contributor group was the 30 percent of the PWID population who are diagnosed and not on ART; they are contributing an estimated 30 percent of new infections. This points to the need for increased HIV diagnosis as well as retention in care, she said, but also suggests that New York City may have fewer individuals who are diagnosed and diagnosis rates that are lower than the national average. New York City may want to focus first on that population, she added. The two studies came to slightly different conclusions, which bolsters the importance of setting-specific responses. "A national picture is helpful, but a regional and local picture is really key when we're thinking about how we plan our response," she said.

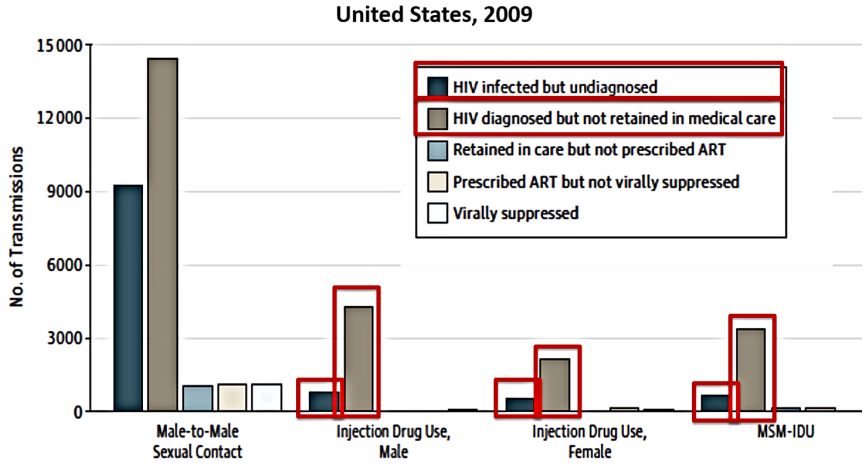


FIGURE 2-7 Estimated number of transmissions among individuals in U.S. care cascade (2009).
NOTE: ART = antiretroviral therapy; HIV = human immunodeficiency virus.
SOURCES: As presented by Natasha Martin at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; adapted from Skarbinski et al., 2015.

Combination Prevention Maximizes Impact Cost-Effectively

Martin described another study that modeled HIV incidence among PWID in New York City in 2040 (Marshall et al., 2014). With no scale up of interventions, the model predicts an incidence of 2.13 PWID per 100 person-years. The model predicted that scaling up individual interventions would yield the following reductions in HIV incidence rates: increasing HIV testing (1.87); improving substance abuse treatment (1.57); increasing NSP coverage (1.40); and scaling up treatment as prevention (1.17). However, the maximum effect in reducing HIV incidence among PWID was derived from a combination prevention strategy that combines harm reduction with treatments. Cost-effectiveness analysis feeds into decisions about how to allocate limited resources in the prevention portfolio, noted Martin, and highlights the role of harm reduction as the backbone of infectious disease responses. A recent study examined the cost-effectiveness of HIV prevention portfolios in the United States, demonstrating the cost-effectiveness of a combination prevention portfolio (Bernard et al., 2017). In terms of priority, the study indicated that the first intervention implemented in the combination should be to scale up OAT to low, medium, and then high coverage. The next step should be to scale up NSPs, and then scale up HIV testing and treatment. The study also indicated that PrEP to prevent HIV in PWID is likely not cost-effective, she added.

Exploring Challenges and Opportunities Among Incarcerated People Who Inject Drugs

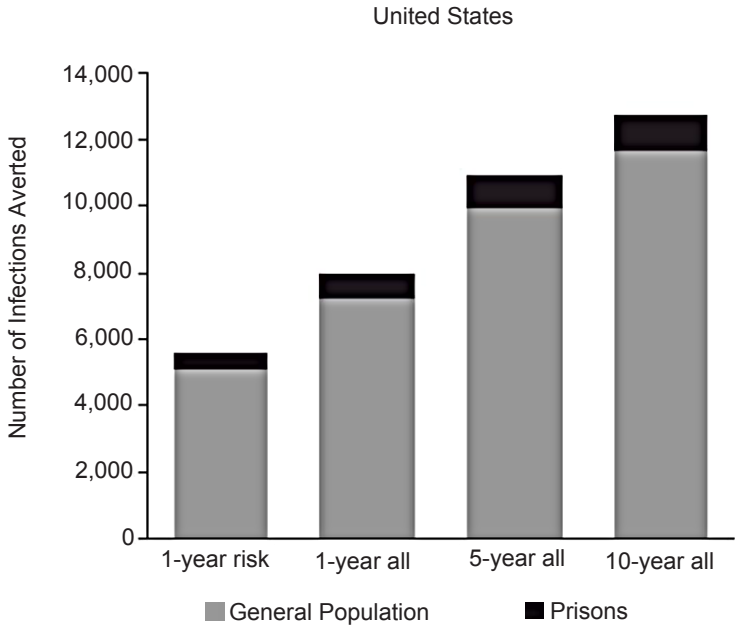
Martin explained that there are high burdens of PWID in prisons who experience high rates of infectious diseases; prison appears to increase their risk of transmission of these diseases. A recent systematic review and meta-analysis found that compared to nonrecent incarceration, recent incarceration significantly increases the risk of acquiring HIV by an estimated 81 percent and increases the risk of acquiring HCV by an estimated 62 percent among PWID (Stone et al., 2017). This risk appears to persist after release, she added. However, reforming drug laws to be more oriented towards public health could help to reduce HIV among PWID, said Martin. To illustrate, she described a case study from Mexico. In 2009, Mexico decriminalized possession of select drugs for personal consumption and mandated drug treatments at third apprehension. But to date, the limited knowledge of this public-health-oriented drug law reform has hampered its implementation and thus it has resulted in little effect among PWID in Tijuana, Mexico (Arredondo et al., 2017). However, based on the small effect observed in reductions of syringe confiscations, modeling has estimated that even this small change in policing could avert 5 percent of new HIV infections among PWID in Tijuana between 2018 and

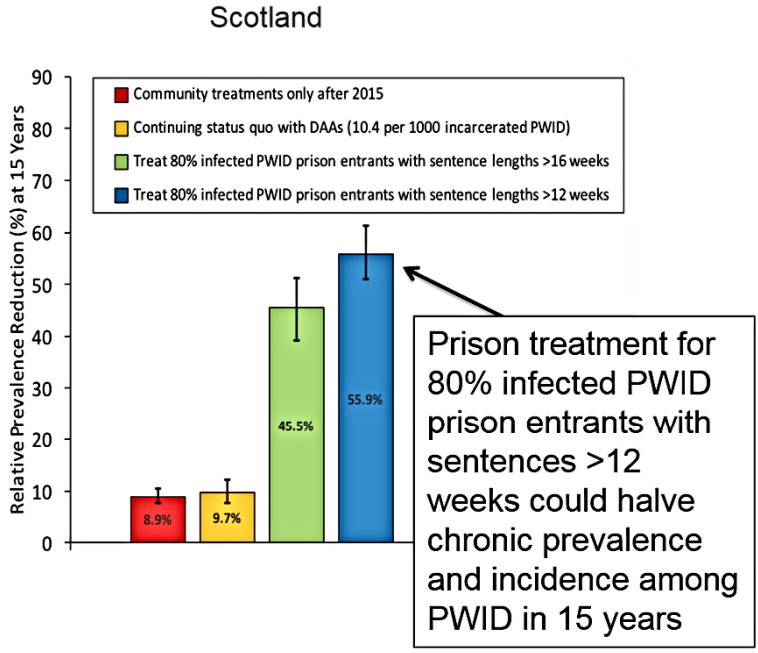
2030. She reported that if the reforms were implemented properly—that is, if no syringes were confiscated and OAT were provided instead of incarceration for 80 percent of PWID—then these changes could avert 21 percent of new HIV infections among PWID in Tijuana between 2018 and 2030.

Prison also provides an excellent access point to engage people both in treatment and in harm reduction, Martin said, and researchers are now looking at the community benefits of treatment and harm reduction in prisons. Another case study in Mexico estimates that providing ART to PWID while they are in prison and upon their release could avert 12 percent of new HIV infections between 2018 and 2030 (Borguez et al., in preparation). The modeling suggests that during the same period, OAT could have a similar effect if provided in prison and on release (around 13 percent) and that combined ART and OAT could avert 18 percent of new HIV infections among PWID in the community. Martin said that HCV screening and treatment in prisons also have the potential to substantially avert new HCV infections in prisons and in the community, as well as reducing the incidence of HCV among PWID (see Figure 2-8).

Potential Ways Forward

Martin emphasized the urgent need to tackle HCV and HIV epidemics among PWID, especially in outbreak settings. Modeling indicates that the lack of harm reduction, coupled with restrictions on HCV therapy, may result in a very high HCV burden among PWID in some settings. She also highlighted the need to scale up combination harm reduction as well as HIV and HCV screening and treatment for prevention. The treatment rates required to control the epidemics are achievable (<100 per 1,000 PWID per year) and could eliminate HCV by 2030, but doing so will also require retreatment of HCV reinfections without stigma and without the imposition of insurance restrictions. Public-health-oriented drug law reform could promote positive change in preventing the risk of infectious diseases associated with incarceration among PWID; incarceration can also serve as an access point to provide harm reduction and treatment. Finally, she reiterated the importance of setting-specific approaches that are tailored to local epidemiology. While national-level pictures are helpful, the epidemics among PWID are highly heterogeneous and one setting's requirements may differ substantially from the level of intervention required in another setting. Refining these models, she suggested, will require better epidemiological data for forecasting epidemics and assessing the interventions required. Modeling can also be employed to examine differences in epidemics and in the differential effect of interventions among subpopulations—such as gender, race, ethnicity, and so





forth. She advised that future work should examine both the effect and the economic consequences of drug policy changes on infectious disease risk and transmission among PWID.

Discussion

Jay Butler, chief medical officer at the Alaska Department of Health and Social Services, described using sofosbuvir to treat a patient with HCV genotype 1 who would cycle between actively injecting drugs and long-term abstinence. The patient achieved sustained virologic response but was reinfected with genotype 4 after a relapse. Given the public health impact of treatment and the effects of sustained virologic response on community transmission, Butler asked if modeling has factored in evidence that there may be lower risks or higher rates of spontaneous clearance among people who are reinfected. Martin replied that the majority of existing models do not currently incorporate any kind of effect that treatment may have on an individual's posttreatment injecting risk. Current models conservatively assume no change in behavior after HCV treatment and that an individual's risk of reinfection is similar to their risk of primary infection as a legacy of the time when the effect of treatment on injecting behavior, spontaneous clearance rates, and immunity were unknown. However, evidence suggests that in many settings, engaging with health care providers may provide a catalyst for a person to find housing and employment, for example, which can have a positive effect on the individual's injecting drug use trajectory. She said that models will be refined as more data emerge on the effect of HCV treatment on posttreatment risk behavior, spontaneous clearance rates, reinfection rates. The effect of HCV treatment as prevention may be greater than expected, she added.

FIGURE 2-8 Effect of HCV screening and treatment on new HCV infections in the community: (top) number of HCV infections averted through screening and treatment in prisons (United States); (bottom) relative reduction in HCV prevalence through screening and treatment in prisons (Scotland).
NOTE: DAA = direct-acting antiviral; PWID = people who inject drugs.
SOURCES: As presented by Natasha Martin at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; top figure from He et al., 2016; bottom figure adapted from Stone et al., 2017.

del Rio suggested that modeling could incorporate the effect of the different interventions that she proposed in states that have expanded Medicaid versus those that have not, given that Medicaid pays for many of the treatments and that ensuring access to health care for PWID is a critical component in stopping this epidemic. Martin commented that availability of treatment does not guarantee uptake. In the United Kingdom, for example, the nationalized healthcare system has provided free and widely available HCV treatment for PWID for a decade, but the uptake has been poor. The advent of the new treatments has inspired enthusiasm among PWID to request treatment, and there is less stigma from providers. Martin said it is important to monitor policies as well as the actual treatment uptake rates to identify barriers to treatment beyond the provider level. Most models indicate that there will be no effect on the epidemic without scale up of treatment, given the extremely low treatment rates among PWID historically and in recent years.

ECONOMIC IMPLICATIONS OF TREATMENT PROGRAMS

Benjamin Linas provided a health-economic perspective on the implications of treatment programs, exploring strategies for setting value-driven priorities to address the opioid epidemic and its infectious disease consequences. To provide a slightly different perspective on the epidemic, he presented data on BlueCross BlueShield plans among commercially insured individuals in the United States, showing the increase in the prevalence rate of opioid disorder over time. The rate spiked from 2.8 per 1,000 members in 2015 to 8.3 per 1,000 members in 2016,[7] said Linas, which suggests an epidemic of opioid use disorder growing even in that pool of largely employed, commercially insured people. His presentation focused on the numerous viral and bacterial sequelae of the opioid use epidemic and injection drug use: HCV, HIV, endocarditis and bloodstream infections, skin and soft tissue infections, and osteomyelitis. He noted that much research has focused on the viral sequelae, but it is becoming clear that the growing bacterial consequences are probably underresearched and underdiscussed.

Overview of Cost-Effectiveness

Turning to the concept of economic value, Linas maintained that maximizing the effect of every available dollar is critically important

[7] The figure is available at https://www.bcbs.com/the-health-of-america/reports/americas-opioid-epidemic-and-its-effect-on-the-nations-commercially-insured (accessed April 12, 2018).

because resources are always limited, and when addressing substance use there is often little political will to expand the resource pool. He defined cost-effectiveness research as the branch of decision science and health economics that seeks "value." He said that contrary to popular opinion, the goal of cost-effectiveness research is not to save money. The goal is the same as the goal of all public health research: to spend as much money as possible, but to use it well to maximize population-level outcomes and "bang for the buck." To set the stage, Linas provided a brief overview of one of the fundamentals of cost-effectiveness analysis, the incremental cost-effectiveness ratio (ICER) (see Box 2-2).

Another fundamental concept in cost-effectiveness analysis is the willingness-to-pay threshold. ICERs are calculated for various health care interventions to determine how much they cost on a per-quality-gained basis. However, it is unclear what the willingness-to-pay threshold should be. Sometimes analysts set the cost-effectiveness willingness-to-pay threshold at around $50,000 per quality gained, but many use $100,000 per quality gained; Linas noted that many interventions have an ICER of greater than $50,000. He added that the term "willingness to pay" is a misnomer that has become a problem for cost-effectiveness research. The question is not about how much we are willing to pay, he said, but about the opportunity cost: that is, whether money already being spent to maintain the status quo of the health system should be used in a new way. He explained, "Anything that we can do with our money that would

BOX 2-2
Incremental Cost-Effectiveness Ratio

According to Benjamin Linas, two outcomes are needed to determine an incremental cost-effectiveness ratio: that is, to demonstrate that something provides good value or that it is cost-effective. The first is cost, usually measured in dollars. The second is some type of measure of effectiveness, such as life expectancy, quality, or quality-adjusted life years. Quality is merely a construct that attempts to integrate the duration of life with the quality of life into a single number. That number can then be used as the denominator of the fraction that is used to calculate an incremental cost-effectiveness ratio, which is used to help answer the question: "If I move from the status quo to something new, how much more will I spend and how much more will I get in terms of health benefits or quality?" The analysis concerns the marginal or incremental benefit of making a change, because simply summing up the cost and dividing it by the life expectancy is not a very meaningful number—the money is already being used.

SOURCE: As presented by Benjamin Linas at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018.

get us better outcomes than we are getting now for the same money is something we should move to. The willingness-to-pay threshold is really meant to be an estimate of, on average, what we get for a dollar in the U.S. health care system. It is not about a moral judgment about how much we are willing to pay or how much your life is worth." He emphasized that cost-effectiveness maximizes population-level benefits of medical therapies, and although it does not seek to minimize cost, it does require explicit decisions about opportunity costs and the bang for the buck in the current health care system, which sometimes make people uncomfortable.

Finding Value in Addressing Hepatitis C Virus

Summary: Health Economics of HCV

HCV is the most common chronic infectious sequela of injection drug use, but despite that fact there has been robust national debate about the high cost of HCV treatment and the proper approach to HCV in PWID. However, the cost-effectiveness of HCV treatment is well established from a health economics perspective, said Linas. Routine testing for HCV and HCV treatment are both high-value interventions. Eliminating HCV transmission will require treating persons who inject drugs, he added. Testing and routine treatment for HCV value are high-value interventions that provide rare opportunity for a cure.

HCV Testing

Since 2012, both CDC and the U.S. Preventive Services Task Force have both recommended routine, one-time HCV testing for all adults born 1945 to 1965, coupled with targeted testing for high-risk people born after 1965. These recommendations were based on a cost-effectiveness study indicating that the prevalence of HCV in the baby boomer cohort (born 1945 to 1965) is so high that trying to target test to that group misses too many cases, so expanding and routinely offering testing to that group provides great value, Linas said. However, the scenario has changed since 2012, with CDC incidence data on HCV indicating there are steeply increasing incidence rates between 2010 and 2015 among the groups of people aged 20 to 29 and aged 30 to 39, neither of which are currently recommended for routine testing. New literature is emerging that is documenting the cost-effectiveness of testing in various settings, which are finding that it would be cost-effective to expand the recommendation for routine one-time testing for HCV to all adults in the United States, similar to HIV recommendations (Barocas et al., 2018). Linas said the finding is so robust that it is difficult to find venues and situations in which it is not a

cost-effective opportunity to screen for HCV routinely. It is cost-effective and provides good value in venues where the prevalence is high, but also when the prevalence is similar to the general population prevalence, when linkage rates to care are low, even when treatment prices are high, and even when the risk of reinfection is high (Assoumou et al., 2018; Schackman et al., 2015, 2018).

HCV Treatment

Multiple effective antiviral drugs for HCV are available, said Linas, including five currently preferred regimens for genotype 1A infection and four alternative regimens, all of which are all-oral regimens with cure rates approaching 100 percent. Research is emerging around the cost-effectiveness of the new HCV therapies, indicating unanimously that they are robustly cost-effective in every genotype, with shorter treatment regimens, in injection drug users and other analyses (Leidner et al., 2015; Linas et al., 2015; Martin et al., 2012; Morgan et al., 2018; Rein et al., 2015; Younossi et al., 2017). Despite the demonstrated cost-effectiveness of the therapies, treatment costs are restricting access because of payer restrictions based on disease stage and drug use. Linas attributed this to the misconception that cost-effectiveness is equivalent to affordability.

Decisions around running an insurance plan require a fundamentally different approach to cost-effectiveness or value-based research. In the context of value, the central question in cost-effectiveness is how to get the best possible outcomes given the resources currently available. In running a health care plan, the central question is very different: "If we treat all HCV-infected people in our plan, how much will we spend this year?" Linas noted that HCV drug costs have decreased substantially in the United States with respect to the catalog price—although the drug market actually operates on lower negotiated prices—but the "sticker" price of curing HCV has declined to around $20,000 to $30,000 for most people in the United States, which is not necessarily good or fair, but it is much lower than the persistent image of HCV medication as a bottle full of "diamonds" costing $1,000 per day. When decision makers and payors make decisions about what to cover or not based on false information, he warned, they make bad policy.

Finding Value in Addressing HIV

HIV is probably the best studied and best resourced viral infection affecting injection drug users, said Linas. It is also a field that has embraced cost-effectiveness research, likely because a lot of people working in HIV are outside the United States and in resource-limited settings.

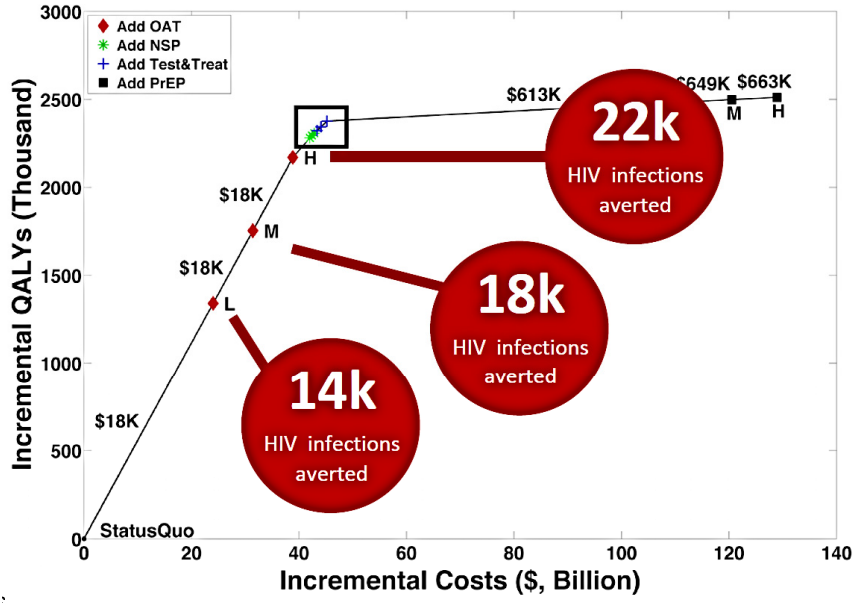


FIGURE 2-9 Efficiency frontier of HIV prevention packages.
NOTES: L, M, and H refer to low, medium, and high coverage. NSP = needle services program; OAT = opiate agonist therapy; PrEP = preexposure prophylaxis.
SOURCES: As presented by Benjamin Linas at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; adapted from Bernard et al., 2017.

He presented Figure 2-9 to illustrate the "efficiency frontier" of HIV prevention packages, which visually represents an ICER (Bernard et al., 2017). Each of the points on the graph represents a type of HIV prevention package for persons who inject drugs, with red dots representing OAT, also known as medications for opioid use disorder (MOUD). Green stars represent adding more NSPs, blue crosses represent adding test-and-treat for HIV for the injection drug users, and black squares represent PrEP. The vertical axis is denominated in terms of quality-adjusted life years lived by the cohort, and the horizontal axis is the incremental cost expressed in billions of dollars. The slope of the line that connects any two points on this graph represents how much benefit will be obtained (the rise) over how much cost (the run). The steeper this line is, the more value is gained from the intervention; flat parts of the curve represent spending more money but not getting as much benefit. In the figure, the steepest part of the curve goes from the status quo to all levels of more MOUDs

and PrEP is at the far right of the curve. That is, if the goal is to prevent HIV infection, and only one intervention is possible, then it should probably be more MOUDs. Depending upon the level of implementation, MOUDs are estimated to avert between 14,000 and 22,000 HIV infections. "MOUDs are HIV prevention the same way that PrEP is HIV prevention, perhaps even more so than PrEP is HIV prevention," he said, and urged decision makers around priorities for HIV research to prioritize MOUDs as highly as PrEP.

Finding Value in Addressing Endocarditis and Skin and Soft Tissue Infections

Linas shifted to finding value in addressing endocarditis and skin and soft tissue infections (SSTIs). A national inpatient sample examined the burden of hospitalization for endocarditis in the United States, which is increasing among the youngest age group (15–34 years) of injection drug users to the extent that it overwhelms the decrease in admissions among the older age groups (≥35 years) (Wurcel et al., 2016). Similar data from North Carolina demonstrate that the burdens of endocarditis and SSTIs

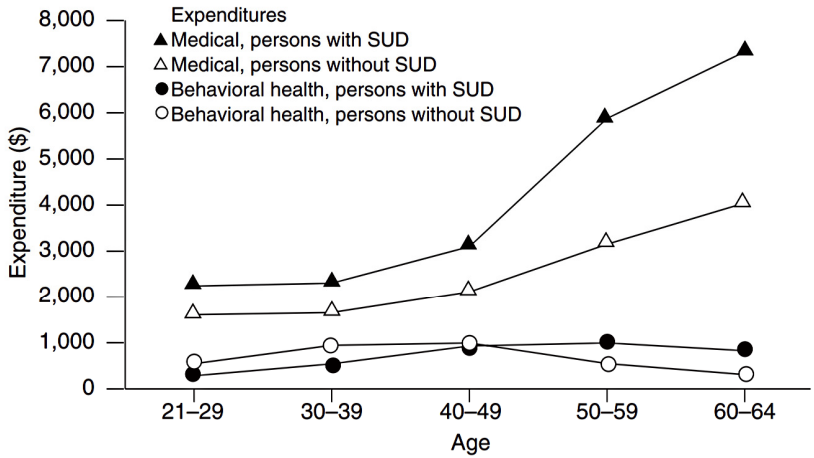


FIGURE 2-10 Effect of substance disorders on medical and behavioral health expenditures by age group.
NOTES: SUD = substance use disorder.
SOURCES: As presented by Benjamin Linas at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; Clark et al., 2009.

are becoming more costly, he added. Between 2010 and 2015, the burden of endocarditis related to drug use increased 1,800 percent or 18-fold in 5 years. However, there is little existing evidence to inform cost-effective interventions around substance use and the effect on endocarditis and SSTI.

Expenditures for Patients with Substance Use Disorder

Linas concluded by noting the continuing transition into an era of the accountable care organization (ACO), which provide capitated payments based on the number of patients covered and (theoretically) align their financial incentives with quality of care. Data on medical expenditures and behavioral health expenditures for patients who have a substance use disorder indicate that among every age group, the people with substance use disorders cost more (Clark et al., 2009) (see Figure 2-10). Studies also show that these patients often have worse outcomes, as well. However, he warned against ACOs being construed as a panacea for substance use disorders. Anecdotally, he has heard providers express some concerns around the effect on the ACO if these patients both cost more and have worse outcomes. Even if ACOs are explicitly forbidden from excluding people because of their substance use, there are myriad ways to indirectly exclude them. He was hopeful that ACOs will align their incentives with quality care for substance use disorders, because better outcomes for people with substance use disorders may lower costs in the long term.

PERSPECTIVES OF PATIENTS AND PROVIDERS

A provider's perspective on the infectious disease consequences of the opioid epidemic was shared by Seun Falade-Nwulia, who was the past medical director of the Baltimore City Health Department HIV Early Invention Initiative program, which provides HIV and HCV care in the public health clinics. She is currently an assistant professor in the Division of Infectious Diseases of the Johns Hopkins University School of Medicine and drew upon her range of experiences working on the inpatient service, seeing patients in an infectious disease clinic, and working in the community. A large proportion of cases she sees on the infectious diseases consult service are patients with injection-related infections such as septic arthritis, osteomyelitis of the spine, endocarditis, and cellulitis.

Falade-Nwulia is frequently consulted on patients who inject drugs who have been readmitted to the inpatient service for these infections that have progressed despite previous discharge to a facility on an appropriate course of prolonged (e.g., 6 weeks) of intravenous antibiotics. Invariably, these patients often relapse into drug use after taking only a couple of

weeks of their antibiotics, are discharged from the facility, and then re-present to the hospital with progression of their infection. As an infectious disease specialist, this poses a difficult situation—a longer duration of antibiotics would generally be recommended, but she knows it is likely that the treatment will not succeed as patients who do not also receive addiction care will often relapse into drug use prior to completing the prescribed course of antibiotics. This underscores the need to provide addiction care for patients wherever they access health care. Health systems need to be able to respond to patients with opioid use disorders who have true pain that needs to be addressed but who also need to complete prolonged (e.g., 6 weeks) of therapy, she explained. For example, the system should have programs that include rapid start of buprenorphine in the inpatient setting and potentially, T linkage to methadone programs, so that patients can successfully complete their prescribed therapies at the patient rehabilitation facilities where they are sent to complete these antibiotics.

In her work in outpatient settings, Falade-Nwulia often sees new cases of HIV, HCV, and HBV that could have been prevented. She maintained that comprehensive programs must be able to engage PWID at whatever point they enter health care system—be it in the ED, the inpatient setting, or the community fair. These patients need to be screened and provided with the appropriate follow-up even if they do not have current infections. Patients without HBV need to be vaccinated; patients without HIV should be considered for PrEP; patients without HCV should receive counseling on HCV risks and prevention.

Falade-Nwulia noted that her program tries to lower the barrier to care by providing linkages to treatment for hepatitis for patients in the ED, so that patients who have HCV are automatically referred to the viral hepatitis clinic. However, she recounted a sad situation involving a patient in her program whose insurance did not approve coverage of HCV therapy caused by low stage of liver fibrosis. The clinical team was able to get her free HCV care through a patient assistance program, but she fell out of care because she could not wait the 6 to 8 months it can take to access those programs. She re-presented to the ED and was pregnant, with her baby at risk of perinatal transmission of HCV. She observed,

> There's nothing sadder for me than for a patient [with HCV] who has overcome the fear of the stigma they are going to receive in the health care system . . . and actually made it to my clinic, and I have to say to them "I have treatments that are simple and can guarantee you a cure of your hepatitis C infection. But guess what? I cannot get you the drug, because I practice in Maryland where we have restrictions on access to hepatitis C treatment—if you have stage F1 or lower liver disease, [and you are insured by Medicaid] you cannot access HCV treatment."

In her practice, Falade-Nwulia has found that engaging patients in HCV or HIV care provides an opportunity for engaging them in harm reduction. The therapeutic relationships that patients develop with the providers, and especially with the nurses and social workers that patients see frequently, help them to make vast strides in controlling their drug use. But when patients cannot engage in care because of barriers like HCV therapy restrictions, it squanders the opportunity to engage them in harm reduction that could improve their drug use trajectory. To try to combat this, she has integrated buprenorphine prescription into her practice and is increasingly trying to use other tools like extended-release naltrexone injection, but it can be very challenging in settings that are not appropriately equipped. She commended initiatives such as Baltimore's Hub and Spoke program, through which drug treatment programs serve as hubs; they then work with providers in the community who serve as spokes to ensure the easy transfer of patients and support for the provision of addiction services such as buprenorphine prescription to patients in community settings. She emphasized the importance of establishing comprehensive programs to meet PWID where they are, rather than expecting them to come to the addiction services. She reiterated the need to incorporate screening for infectious diseases and more effectively deploying existing preventive tools, such as treatments to prevent transmission of HCV and HIV, linking to harm reduction through NSPs, and providing MAT.

A patient's perspective was offered generously by Veda Moore, a resident of Baltimore, Maryland. She traced her journey from the beginning of her drug use after trauma at an early age, through her treatment and ultimately her graduation from college and her current work helping people access care themselves. Her story, in her own words, is provided in Box 2-3.

Todd Korthuis, program director for the Oregon Health & Science University's Addiction Medicine Fellowship, thanked Moore for sharing her powerful story. He asked about her secret to going 18 years without using drugs. Moore replied, "The secret is there's no secret. I just follow good orderly direction. I met a sponsor and I still have a sponsor and a network today, so I don't make any major decisions on my own." Korthuis asked what she would say if she could go back and talk to the emergency room staff she met in her early encounters, who did not treat her well. She said she would tell them not to be so judgmental. She left the hospital and went back to using drugs, but if someone had talked with here and intervened at that point, her drug use may have stopped then.

BOX 2-3
Veda Moore's Story

I grew up in the projects of Baltimore with two older brothers and my mom, who had to work hard to provide for us, so I was home alone a lot. But I had to go to church every Sunday and school every day. My mom expected certain things of us, so I learned to be sneaky at a young age. At around 11 years old, I was touched inappropriately, and I didn't know what to do with that information. I had a mom that I knew would protect me, but for some reason, I wouldn't tell her what happened. I don't know why I was afraid. . . . Maybe the fear was her going to jail and me not having her around. After that happened, I started using drugs. It went from drinking and smoking cigarettes to popping pills. By age 15 I was actually snorting heroin.

Being touched inappropriately at that young age made me hate who I was. I wanted to be light skinned and have long hair and light blue eyes. I wanted to be bow-legged and be able to stand back on my legs, and I was none of those things. I went through a lot of my life hating who I was. I would dress up the outside real good, by any means necessary. I would steal to get the things I needed, whatever I needed for somebody to say, "Wow, you look good." I managed to go all through school without ever raising my hand. I thought I was stupid for some reason. I did finish school, but continued on using drugs.

It seemed like I always got in relationships that were toxic. Eventually I got married, and that didn't work out, and my children pretty much raised me. Even though I was in the house with my children, I wasn't there with my children. They learned to cook and clean and they went to school every day—all of my children excelled in school. Although I never injected drugs, I popped pills and I drank. Whatever was available at the time that deadened the feeling, that's what I would use. But through that drug use, I met this guy. I contracted HIV in 1994 through sexual contact. So on top of being touched inappropriately and hating who I was, now I'm dealing with HIV. I said I would die never telling anybody I had HIV. But I continued to use, and as I used, I was starting to lose a lot of things. I remember being evicted from my home and watching my children walk up the street from school and not knowing where we were going to go. Then I got real sick, and I went to the hospital. They let me wait there 4 or 5 hours, in that pain, just because I was a drug user. A young lady came over to me and said, "Girl, if you want to get waited on, you need to act like a crazy person. That's how I get waited on early, because they want to hurry up and get you out of here, keep you from making all that noise." Needless to say, I didn't do that. I went through the pain and with no information, I left there, went back home, and continued to use.

I used to smoke cocaine, and I was working for these drug dealers who would watch me from the end of the block. One day I'm sitting in front of my door with a pocket full of cocaine, and I wasn't looking at them, because if I did they would tell me come down the street, so I could sell the drugs. But on this particular day I just didn't want to do it, and this guy from a church group came over to me and he was ministering to me. I don't remember exactly what he was saying, but in my mind I was having a conversation with God. I was saying, "If you show me how to live, and be positive, I'll never use drugs again. All I know is I'm watching the children run up and down and I want to feel like that again." I'm at the point where I'm asking, "Who can I tell a lie to in order to get money?" Then as soon as

continued

BOX 2-3 Continued

you got money you get the drugs, and you're already thinking, "How am I going to get another 10 dollars?" We would run out of food at my house, and my younger children would call my older son to tell him. He would come over and say, "Ma, you better take this money and get some food." But he was talking to a drug addict. If he gave me $100, I would keep half and give the rest to the children to go get food.

But the guy is ministering to me and I'm having this conversation with God. Something in my head was saying, "You have AIDS, you are going to be dead next week." But something else said, "You ain't dead yet. You need to try something else." So I'm saying, "You show me how to live with HIV and AIDS, and I will never use again, because it's that big stigma. People are not going to want to hug you or even to want to sit near you."

Then I got real sick again and had to be taken back to the hospital. There I met my angel—I still call her that today, and she always calls me Doctor Moore. She asked me, "Do you use drugs?" They had done the blood work and the urine and she knew I used drugs, but I think she just wanted to know if I was going to tell a lie. One part of me was saying, "Girl, say you don't use drugs," but another part was saying "No, you better go ahead and be honest." It flew out of my mouth, "Yeah, I use drugs." At this time, drug dealers are living in my house with me and my children, but I still said yes. This on a Tuesday, and she said, "If I could get you a bed, would you go today?" And I said yes. She asked about my children and I said, "Well, they're taking care of me. I think they'd be okay while I go in treatment." So she checks it out and says, "I can't get you anything until Friday, but if you make it back up here on Friday, I'm going to make you sure you get up to Bayview to go in treatment." Friday came, and I owed one of my neighbors $10. I was receiving disability and my check hit the bank on the same day I was supposed to go into treatment. She used drugs, too, but when I said, "I know I owe you some money, but I'm supposed to go in treatment, can I pay you when I get back?" She said she would wait until Monday. Even the drug dealers who were living in my house got to a point where they were telling me I needed to get some help. They even said they'd make sure the house gets cleaned and the children fed and off to school. So I went into treatment after 30-some years of using off and on.

Before I came home, they asked me to go to a Hopkins aftercare program. They told me I couldn't start right away, but I could come down every day and sit in a holding group to find out what the program's all about. So I went every day, but I'm sitting there saying, "I'm not telling them none of my business." Then this guy

Discussion

Within the rubric of meeting patients where they are, regardless of the setting, Korthuis asked if all available treatments for substance use, HIV, and HCV are offered to an individual at the same time, or if they are considered in a more sequential way. He also asked about barriers to integrating interventions such as buprenorphine and extended-release naltrexone

got up there and said he'd been shot like five or six times, he had hepatitis C, HIV, and cancer—still he'd had a year clean. I'm 4 days clean saying to myself, "Damn, he went through all that and he's still clean. You can do this." Another person said, "This program is 90 percent listening, 10 percent sharing" and another speaker said, "If you're sitting here thinking you got some business . . . if you walked in that door, you don't have no business." It was like they could read my mind, so I knew that was where I needed to be. I didn't know how to stay stopped. The speaker got up there saying, "Try it for 30 days, and if you don't like it, you can go right back out there, because wherever you came from, the drugs are still there." I gave it a try. I went to the groups. It was an 8-month program and when the end was getting close, I went to my counselor and said I was afraid to leave. Change is hard. Every time I had to change, it seemed like it was a struggle. She let me stay a little longer, then she said it was time for me to go.

After the program, they asked me to go to 90 meetings in 90 days. I went to about 2,300 in 90 days. I made up my own meeting slip, and people started stealing it because I had so many meetings on it. I would go to meetings everywhere. A group of us who met in treatment all got together and caught the bus and just started chasing meetings. I still have a sponsor today. I used to tell my sponsor that I would love to have a college degree, because I'm the only one in my family who hadn't been to college. My sponsor said, "Well, you've been in this program 5 years. You could have been working on a second one!" That was the light bulb moment. I went down to the community college, just to find out what you have to do to get into college. I was scared but I took a placement test and actually did pretty good on it. So I got into school, and ended up on the Dean's list every semester. I graduated and received the President's Cup. That was nothing but God's work. I volunteered at Johns Hopkins for 2 or 3 years, then a job opportunity came up, and eventually ended up getting hired as a community health worker in another program later.

So today I am a community health worker. I run across people who are addicted and when they come to me with their stories, sometimes they don't believe I ever used drugs. It's been a long journey, but I don't know if I didn't go this route, I probably wouldn't be standing here. I have 18 years clean. I have lived 23 years with HIV. I started out taking about 14 pills a day and I now take one pill a day. That's my story and I'm sticking to it.

SOURCE: As presented by Veda Moore at the workshop Integrating Infection Disease Considerations with Response to the Opioid Epidemic on March 12, 2018.

into practice. Falade-Nwulia replied that providing MAT appropriately requires full psychosocial support, including dedicated social workers and psychiatrists to provide treatment for co-occurring mental health disorders, but it can be difficult to convince decision makers that it is worth the initial expenditure required to set up the program. Another barrier is getting insurance coverage of therapies in certain settings; she has dealt with cases in which insurance would not approve coverage for

a patient who would have benefited from extended-release naltrexone injection because it was prescribed in an infectious disease clinic. The patient was unwilling to receive the therapy in a drug treatment program where coverage had previously been approved. Services need to be available anywhere that patients are willing to access them, she recommended.

Korthuis asked about the experiences in accessing care among people who need treatment for addiction, HIV, and HCV. Moore responded that addiction needs to be dealt with first for people in that situation, because patients who are using drugs often do not care about their HIV or HCV status because of their overwhelming focus on the "next fix." She reminded the group that people have a right to make bad decisions and they have to be willing to deal with the core reasons that they are using drugs in order to engage with treatment. She reiterated the importance of the mental health component of treatment and emphasized that patients will remember how providers made them feel, even in situations in which they make the decision not to pursue treatment. "Maybe they're not ready this time, but if they feel like a provider is a person who cares, they'll remember who to go to when they're ready."

Korthuis followed up by asking how to help people transition to readiness and make that leap into engaging with treatment. People who have a lived experience with addiction have much greater power to affect someone who is in the throes of addiction compared to someone in a white coat making recommendations, said Falade-Nwulia. Community-based qualitative work with PWIDs who have successfully accessed the health care system suggests that these PWID are willing to pay it forward and tell other people where they can go for testing and linkage to care in a safe and supportive environment. The power of being in a place where one feels welcomed is so important, she explained. They have also considered offering warm meals and other incentives or providing peer support and navigation services. This type of out-of-the-box thinking is critical for engaging patients in addiction and infectious disease care.

To make HIV clinics and hospitals more welcoming for people who use drugs, Falade-Nwulia suggested simply smiling when engaging with patients. Moore said that she felt welcome at Hopkins, where she received treatment. The social worker she met was very compassionate, genuinely concerned, and did not pressure here to start treatment. "It's important how providers engage with people, because they can tell when the provider is being real or whether they're here because they're getting a paycheck. Patients can tell the difference," added Moore.

Asked how treatment settings in the United States could expand the role of peers in recovery, Falade-Nwulia said that they can have a substantial effect. Further research is needed on different models to determine which components work most effectively and how to tailor them to local

settings and specific populations. For example, women who use drugs are more likely to engage in sex in exchange for money or drugs, placing them at higher risk of sexually transmitted diseases. Rates of HCV in women of childbearing age has more than doubled, which brings up the risk of perinatal transmission of HCV. She advised that the best way to intervene is by setting up comprehensive "one-stop shops," to facilitate coordination of care and to stop expecting patients with addiction to travel to multiple care settings. According to Moore, policy makers should understand that people who use drugs are just that—people. Most are articulate, intelligent people who have made a bad decision that diverted them to a different path. She suggested consulting recovering addicts who have "walked that path" for help in identifying needs and developing programs.

del Rio concluded the panel by reflecting that it underscored the need to consider the role of patients in this epidemic. He reminded the group that many of the advances in HIV were possible because of strong community involvement, participation, and activism front and center. del Rio recommended exploring how patients and people who use drugs are involved in decision making in programs and clinics, as well as how to involve communities in order to advance those programs. "The community needs to be telling us how to make those programs work . . . to keep the patient at the center of the response," he said.

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3

Exploring Opportunities for, and Barriers to, Treatment and Prevention in Public Health, Hospitals, and Rural America

This chapter comprises presentations and discussions about setting-specific opportunities for, and barriers to treatment and prevention in public health, hospitals, and rural America. Matthew La Rocco, community liaison with the Louisville Metro Syringe Exchange Program in Kentucky, described the establishment of harm reduction programs in his community and some of the specific challenges faced by women who use drugs in accessing treatment. Katie Burk, viral hepatitis coordinator at the San Francisco Department of Public Health, provided an overview of hepatitis C virus interventions in her city. Honora Englander, associate professor of medicine at Oregon Health & Science University (OHSU) School of Medicine, described opportunities for improving care for hospitalized adults with substance use disorder. Challenges and opportunities in delivering care in rural areas of the United States were explored by Nickolas Zaller, associate professor of public health and director of the University of Arkansas for Medical Sciences Office of Global Health.

ROLE OF PUBLIC HEALTH DEPARTMENTS

Harm Reduction Programs

Matthew La Rocco, community liaison with the Louisville Metro Syringe Exchange Program in Kentucky, explored the role of harm reduction in reducing the transmission of infectious diseases. He drew on his experience as a certified drug and alcohol counselor who is also in long-

term recovery for drugs and alcohol. He explained that *syringe services programs* (SSP) is the preferred terminology over *needle exchange* or *syringe exchange*, because it more accurately reflects the multiple services, other than needle exchange, that these programs provide. He also noted that *people who inject drugs* (PWID) and *people who use drugs* (PWUD) are preferred terminology because they are people-first language, and a word like *addict* can be very stigmatizing in its focus on just one element of an individual's life—one that often carries a great deal of shame with it owing to societal constructs around drug use. "We ought to talk about people who use drugs as people first . . . their drug use is a part of their life, but isn't the defining characteristic," he said. He also prefers the term *syringe services program* (SSP).

Political Boons and Barriers to Syringe Services Programs in Kentucky

Kentucky Senate Bill 192 was introduced on February 13, 2015, representing a momentous state-level response to the opioid epidemic with respect to both syringe exchange and treatment funding, said La Rocco. On February 25, the health department in nearby Scott County, Indiana, announced that within the past 2 months, they had confirmation of 26 new human immunodeficiency virus (HIV) diagnoses and four preliminary positives. A month later, Scott County's health department reported 55 newly diagnosed cases and 13 preliminary positives and opened an SSP 2 weeks later, by which time there were 84 newly diagnosed cases and five preliminary positives. By May 19 of that year, the numbers had snowballed to 157 diagnosed cases and one preliminary positive. Senate Bill 192 had been signed by the governor of Kentucky on March 25, La Rocco explained, not because the state was exceptionally forward thinking and progressive; the driving force for passing the bill was the HIV epidemic exploding just over the state line. He explained that Senate Bill 192 allows health departments to operate SSPs, but it requires the approval of the local board of health—which has not been an issue in most counties trying to start a program—as well as the approval of the city's or county's legislative body (e.g., a city council or board of magistrates). As a result of the latter stipulation, stigmatic thinking around drug use and misperceptions about SSPs have impeded the development and the effectiveness of SSPs across the state. For example, in some high-risk counties identified by the Centers for Disease Control and Prevention (CDC) as being at risk for hepatitis C virus (HCV) outbreaks, SSPs are open for only several hours on only 1 day per week and cannot effectively mitigate or stop the spread of infectious diseases.

La Rocco observed that although they did not encounter significant political barriers to the start of SSPs in Kentucky, they did face signifi-

cant political barriers that hamper the use of evidence-based best practices models to most effectively reduce the transmission of HIV, HCV, infectious endocarditis, staph, methicillin-resistant *Staphylococcus aureus* (MRSA), cellulitis, soft tissue infections, and so on. Louisville opened the first SSP in Kentucky on June 10, 2015, he said. The program opened with a needs-based negotiation model in a single fixed site at the health department, but then quickly partnered with Volunteers of America Mid-States for additional community sites. The initial needs-based model allowed PWID to bring any number of syringes into the SSP and they would receive a full week's worth of syringes in return, regardless of the number they brought in or brought back. The program received pushback at the state level because of the exchange rates, and by 2015 Republican representatives began lobbying for a one-to-one exchange, ostensibly because of concerns about the risk of needle sticks in the community and resultant HIV and HCV exposure, which La Rocco said are unfounded (see Box 3-1).

Kentucky's attorney general responded to the pressure and provided a formal opinion supporting SSPs and their autonomy in choosing their

BOX 3-1
Misperceptions Around One-to-One Needle Exchange

Policy makers may lobby to require one-to-one needle exchange in syringe services programs based on arguments about the potential for accidental needle sticks to transmit HIV or hepatitis C virus (HCV) infection. In fact, La Rocco explained, the likelihood of contracting HIV or HCV in such circumstances is incredibly low, even from a fresh needle stick; a needle that has been sitting in a park's sandbox for 5 days is even less likely to transmit HIV or HCV. Such misperceptions also build on the stigma around the idea that people who inject drugs and who are given needles will not dispose of them safely. This is not an accurate assumption, per anecdotal evidence from his own program and empirical evidence from research. When people are educated about how to properly dispose of needles and provided with sharps containers, he said, they tend to dispose of them safely. In his program's current model, from return participants they get back about 75 percent of the needles provided and for the entire program, more than 55 percent are returned. La Rocco added that not only is the one-to-one exchange model ineffective at mitigating disease transmission, in some cases it has exacerbated the problem. Another important development in Louisville is that people who inject drugs are not charged for syringe possession, eliminating the reason to dispose of it improperly in order to avoid being caught.

SOURCE: As presented by Matthew La Rocco at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018.

own operating models. Democrats introduced House Bill 160 to lay out the specifics of needle disposal by health departments, with no reference to needle exchange rates, but the bill was amended by the Republican senate to mandate a one-for-one exchange and then ultimately died when it went back to the House.

Local Challenges in Louisville

La Rocco surveyed some of the local challenges that they have faced in Louisville. The city and county have merged into a very large area of almost 400 square miles. The health department is working to address drug use across the county, but there is a pervasive perception that drug use is limited to the West End of the city where poverty is more widespread. In the East End of the city, denial of the reality of drug use and "not in my backyard" attitudes abound. The reality, he said, is that drug use happens across the city and everyone is susceptible to addiction—rich, poor, young, old, black, and white. These misperceptions around the geography of PWUD and PWID in Louisville have created barriers to establishing treatment centers, residential programs, halfway houses, SSPs, and other opportunities for people to engage in treatment where they live.

Barriers to Treatment

Many PWID and PWUD have had negative experiences with medical providers, leading to reduced engagement with preventive and ambulatory care, said La Rocco. He recounted the story of a patient who had the incredibly painful experience of having an abscess lanced, drained, and packed without any kind of general anesthetic or numbing. These types of experiences can engender serious distrust of the medical system and leave PWID hugely disincentivized to seek treatment of any kind until their condition is very severe. These delays in diagnosis and treatment for conditions such as abscesses and endocarditis significantly increase the cost of treating the patients. It also compounds the impact that these infectious diseases have on the individuals and their quality of life, for example, if they require surgery that could have been avoided by earlier treatment. He added that this aversion to seeking treatment also leads to missed opportunities for infectious disease screening and treatment that are provided when a person seeks medical care from a primary care physician or in the emergency department (ED) for some other reason.

Maintaining a Low Threshold

La Rocco explained that in Louisville's SSP, they try to maintain a very low threshold for services. This means that rather than pressuring people to be screened for HIV and HCV—thus raising the threshold for services—they try to be very careful in the language they use with people. Strongly encouraging HIV testing, for example, creates an intractable power dynamic with people who engage with the SSP, most of whom are expecting to be treated poorly and are surprised when they are not. When program staff ask a PWID or PWUD to be tested, it communicates implicitly that the staff member really wants the person to be tested, and will be disappointed or unhappy if the person chooses not to, this can discourage people from coming to the SSP. At his SSP, they address this by asking their staff to use very intentional language to raise awareness of testing services and the benefits of testing, but without raising the threshold. They might remark that people like to know their HIV and HCV status just because it gives them better information and enables them to make better choices for their health, for example:

> If you would like a test today, we can get you tested. If you go, man, I'm good, but maybe something happens in the next week or two weeks or few months, maybe you share a syringe, have unprotected sex, a risk factor pops up, and you go, "Man, I really need to get tested." Whenever you are ready to test, you just come in here and we will get you tested. If you are positive, we can get you referred for services.

La Rocco explained that this puts the ball back in the person's court, but with the subtlety that at some point, the person will be ready to test. However, it does not put pressure on them to test and does not raise the threshold for services.

Challenges Faced by Women Who Use Drugs

La Rocco cautioned that women who use drugs (WWUD) and women who inject drugs (WWID) tend to face higher levels of stigma than men do. Drug-related stigma and internalized shame put these women at significant risk for contracting infectious diseases and delaying treatment for those diseases. A key challenge, he said, is that these women are less likely to access annual reproductive health care, which provides opportunities for infectious disease screening, education, and referral for treatment as needed. Pregnant women and women with children often face more stigma than their male counterparts. Because of unfair cultural pressures and expectations placed upon mothers, WWID and WWUD can experience a significant amount of self-shaming as well as shaming from

others. Internally, they tend to self-shame because of what, ultimately, is an unfair cultural expectation for them, he added. These women become less likely to seek treatment and more likely to delay treatment for soft tissue infections, sexually transmitted infections, septicemia, and endocarditis. Often, they resist going to the hospital because of fears that child protective services will become involved and they will lose custody of their children, or fears that people will treat them poorly for being a mother who uses drugs.

Intimate partner violence is another critical issue for WWUD and WWID, said La Rocco. Women who experience intimate partner violence are often not in control of the drug supply or the rituals surrounding drug use, including access to safe syringes or other equipment. "They don't often get to determine when they use drugs, how much they use, who they are using with, or what equipment they are using," he explained. This lack of control places them at higher risk for acquiring an infectious disease. Furthermore, women who are experiencing intimate partner violence might not be allowed to go to an SSP, or their partner might come to the SSP but fail to share the information about safe practices and disease prevention. Other women experiencing intimate partner violence may come into the SSP, but are accompanied by their partner, which can limit their level of honesty around their drug use or what is happening in their home. Housing services for women who experience intimate partner violence may also exclude WWUD from engaging in services. La Rocco said that this may be too much ask of someone who has a substance use disorder and is dealing with significant past and current trauma but who is ready to leave the domestic situation that is preventing them from being healthy and more functional. Women who cannot access services or escape their domestic situation can end up feeling hopeless, he explained, which has the potential to increase their drug use and thus their risk of infectious diseases.

Women in relationships are often tasked with the domestic responsibilities as well as the responsibilities for acquiring drugs, earning money to buy drugs, and getting a better deal on drugs, noted La Rocco. This can leave them with less time to access services where they can be educated about preventing infectious diseases, screened, and referred for treatment. Additionally, WWUD, especially those with felony records, have far more difficulty securing well-paying jobs than their male counterparts. This puts those women at higher risk for engaging in sex work in exchange for money or drugs, placing them at higher risk for HIV and sexually transmitted infections. He suggested that female condoms give women more power over the use of condoms because they are not dependent on the man's cooperation, but the high cost of female condoms relative to male condom limits SSP's ability to provide them in the same quantity.

Developing Partnerships

La Rocco said that in Louisville they are actively looking to develop partnerships to better help people engage in infectious diseases treatment by mitigating some of the consequences and risks associated with injection drug use (IDU), both for the community that uses drugs and then the community that engages them. La Rocco and the Louisville Metro Syringe Exchange Program have a relationship with the Kentucky Care Coordination Program to connect people living with HIV to care coordination providers located very near the SSP, as well as relationships with nearby local hospitals that are working to treat HCV. Additionally, they are exploring a partnership with physicians at the University of Louisville Hospital to increase early treatment of soft tissue infections and endocarditis to help reduce the number of ED visits, among other benefits. The partnership would ensure that people who are concerned they have an infection related to their IDU have access to trained, polite, and respectful physicians. This would benefit PWID because it reduces the risks associated with delaying treatment, he said, and it would benefit physicians because it allows for early diagnosis. It would also reduce congestion in EDs, which benefits hospitals and reduce costs for Medicaid payors when more patients can be treated with oral antibiotics at earlier stages of infection.

Discussion

Brian Edlin, chief medical officer of the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention at CDC, asked if there are PWUD who also care about their health enough to engage in treatment for their HCV without first receiving addiction treatment. La Rocco maintained that most people dealing with a substance use disorder are concerned about their health (including himself when he was actively using) and the presumption otherwise is yet another stigma faced by PWUD. Having an issue with addiction does not disqualify somebody from caring about their health, just as it would be unfair to say that people who are overweight or have high blood pressure cannot care about their health. The simple fact that a PWUD has come to a syringe exchange to get sterile syringes, bandages, antibiotic ointment, and alcohol swabs—facing potential stigma or being seen by police—suggests that the person is very concerned about their health. The blanket recommendation that addiction must be dealt with first does not take into account the different ways that addiction can affect people, La Rocco argued. People with substance use disorders have different levels of functionality. Some would never be suspected of dealing with the disorder because they have so-called recovery capital: they have jobs, financial means, education, sup-

portive family members, and so forth. There is no reason that they could not engage in and effectively complete services, said La Rocco, even in the midst of their continued drug use. Many people are not fortunate enough to have that level of capital, however, and may be homeless or dependent upon shelters and food pantries. These people may need a higher level of support and services, including the provision of treatment services through services they are already attending regularly (such as shelters). Studies have shown that if they are engaged in SSP-type services, people who are actively using during HCV treatment do not have a higher risk of reinfection than the non-drug-using community, he added.

Carlos del Rio, professor of global health, epidemiology, and medicine at Emory University, asked how health departments could better link up with local-level organizations—such as SSPs—that provide services that the health departments are unable to provide because of legislation or financing. La Rocco remarked that public health is inclusive of mental health as well as physical health, which are inextricably linked. In situations where the political climate or legislative barriers preclude the public health department from establishing SSPs, he said, the department should be a champion for drug treatment programs and other programs that reach out to PWUD and provide low threshold access to wraparound services. Health departments can assist programs applying for grants, for example, by writing letters of support or offering the services of a grant writer. Health departments cannot always deliver programming, La Rocco said, but they can certainly support and work collaboratively with smaller agencies.

Overdose, Hepatitis C Virus, and Drug User Health

Katie Burk described the response of the San Francisco Department of Public Health (SFDPH) to the overlapping public health crises of overdose, HCV, and drug users' health. She reflected that the recent focus on dramatic increases in overdoses and HCV rates in rural areas—for good reason—has created a narrative that somewhat obscures the story of cities like San Francisco that have *always* been affected by high rates of substance use, HCV, and overdoses. She reported that San Francisco has an estimated 22,500 active PWID (Chen et al., 2016). An estimated 22,000 people are HCV seropositive, among whom around 12,000 people are believed to be viremic (Facente et al., 2018). Around 16,000 people in the city are living with HIV, of which about 6 percent are PWID and 15 percent are men who have sex with men and PWID (SFDPH, 2017). San Francisco has the highest rate of liver cancer in the United States, she said, which is driven by high HBV and HCV rates.

Intertwined epidemics require integrated responses, Burk main-

tained. SFDPH is implementing comprehensive prevention programs that can provide people with all the services they need, "no matter what sort of door they are walking in." She noted that many PWID experience multiple health consequences—overdose, HCV, and HIV—that are often related to the same or overlapping risk factors. For example, many people are not currently engaged in primary care. If they are engaged in syringe exchange programs they should, if needed, be able to receive HCV treatment and/or be induced to begin methadone or buprenorphine treatment in that setting. She cited two examples of these types of integrated care models. The 6th Street Harm Reduction Center, a program of the San Francisco AIDS Foundation, is a harm reduction drop-in center that provides syringe access services and naloxone. They have added HCV education and group treatment interventions, as well as buprenorphine initiation services. The county jail also provides testing for HIV, HCV, and sexually transmitted diseases (STDs). PWID can start methadone or buprenorphine while in jail and then continue their treatment when they are released; HCV treatment programs have also recently been implemented.

Drug User Health Initiative

SFDPH has an internal working group called the Drug User Health Initiative (DUHI), said Burk, focused on addressing the needs of PWUD in San Francisco with integrated programs. DUHI's mission is to support drug users in caring for themselves and their communities through strengthening and aligning services and systems promoting drug user health; its vision is a system of care and prevention that supports health equity for drug users and ensures that all people who use drugs are treated with dignity and respect throughout San Francisco. She said that a system where "any door is the right door," for example, would allow people coming in for sexual health services also to receive opioid agonist therapy if needed. Burk outlined DUHI's key five initiatives:

1. overdose prevention, education, and naloxone distribution;
2. syringe access and distribution;
3. HIV/HCV prevention, screening, and treatment;
4. alcoholism prevention; and
5. a harm reduction workforce development.

Four essential components of DUHI's drug user health infrastructure are syringe access and disposal; naloxone overdose education, low-threshold methadone and buprenorphine, and the End Hep C SF initiative. There are multiple models for opioid replacement therapy, including six

methadone programs that are equipped to allow people to start same-day treatment. To help address the barrier of primary care providers' reluctance to induce people on buprenorphine, an Office-Based Buprenorphine Induction Clinic (OBIC) uses pharmacists to do the induction work. Once the person is stable, their prescriptions are transferred to their primary care clinics. She explained that this is part of a wider effort to provide lower threshold access for buprenorphine, which also includes a street medicine team providing low-threshold buprenorphine for homeless individuals. Burk explained that syringe access and disposal sites in San Francisco are another key component of SFDPH's outreach and engagement with vulnerable San Franciscans. Services are provided 7 days per week and although sites are more concentrated in the downtown area, an extensive peer-run secondary exchange network expands program reach into the outer neighborhoods of San Francisco. Naloxone access is available at all sites, and HIV and HCV testing are available at most sites.

Response to Drug Overdoses: NOSE and DOPE

Turning to their overdose prevention work, Burk highlighted SFDPH's two overarching strategies: SFDPH's Naloxone prescription for Opioid Safety Evaluation (NOSE) project and the Drug Overdose Prevention and Education (DOPE) project, which is housed at the Harm Reduction Coalition, which is funded by SFDPH. Burk explained that the NOSE project was launched in response to the problem of opioid analgesic deaths in the city, which exceeded 100 each year between 2000 and 2012, and were continuing to persist despite significant reductions in heroin-related overdose deaths. They began a program in which providers were encouraged to coprescribe naloxone to any patient prescribed opioids long term in six primary care "safety net" clinics in the system that were highly affected by overdose. Analysis of the intervention found that prescribing naloxone to 29 patients averted one opioid-related ED visit in the following year (Coffin et al., 2016). Furthermore, the analysis found that in-clinic conversations with a patient about why naloxone was being co-prescribed was an important intervention in and of itself, because it helped the patients understand that opioids are potentially dangerous drugs.

Burk explained that the DOPE Project has taught overdose prevention and response to drug users, their friends, their family members, and service providers since 2001. Since 2010, naloxone has been distributed under standing order from SFDPH to people most at risk of experiencing or witnessing an overdose; distribution occurs at 15 sites serving PWUD, including all of the SSP programs and sites. More than 9,000 people have been trained through the program, and there have been 4,000 reported reversals, including 1,247 in 2017 alone. Since 2004, the numbers of nal-

oxone enrollment, refills, and reversal reports to DOPE have all been increasing, with the trend escalating sharply since 2013. This illustrates that the number of lives saved is directly related to the amount of naloxone that is put into the hands of PWUD out in the community, she said, and it demonstrates that the most effective first responders to the overdose crisis are PWUD and their friends and families.

Burk said that together, the NOSE Project and the DOPE Project have managed to hold at bay the dramatic increases in overdose death rates ongoing in the rest of the country and in other parts of California—and has done so despite all indications that opioid use is continually rising in San Francisco. Although ED visits, hospital admissions, and treatment admissions related to opioid use have generally increased in San Francisco since 2006, the death rate has declined for the most part. Figure 3-1 illustrates the number of overdose deaths by opioid in San Francisco since 2006. She said that the DOPE Project has been leading the charge to help the community adapt to the changes in the drug supply. Fentanyl-related overdose deaths can be prevented with the same tools employed to respond to a heroin-related overdose. However, deaths caused by fentanyl-related overdoses take much less time than heroin-related overdoses so a quick response as well as efforts to avert an overdose in the first place are essential.

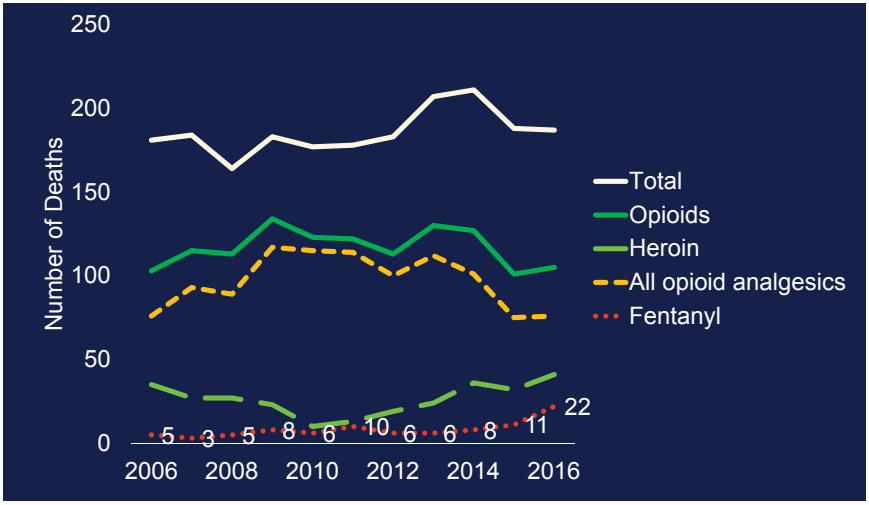


FIGURE 3-1 Overdose deaths by opioids in San Francisco (2006–2016).
SOURCES: As presented by Katie Burk at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; Phillip Coffin, San Francisco Department of Public Health.

Hepatitis C Virus Elimination Initiative

Burk said that SFDPH has developed its HCV programming in ways that are integrated with its overdose programs and HIV programs. San Francisco's drug user health infrastructure makes HCV elimination a feasible goal, said Burk, because SFDPH already provides good access to a suite of interventions around prevention, testing, linkage to care, and treatment access (relative to the rest of the country). However, planning for elimination will require coordinating responses and aligning existing work to appropriately scale up.

Burk described End Hep C SF, San Francisco's HCV collective impact community-led elimination initiative, which was launched in 2015 with the vision of ending HCV as a public health threat and eliminating HCV-related health inequities. Its diffused leadership model relies on 32 community partner agencies engaging with each other such that their activities become mutually reinforcing. For example, if advocates successfully increase funding into the system to address HCV, then health departments can fund crucial HCV services. The staff of drug treatment programs and SSPs can in turn focus on outreach, education, testing, and linkage to providers for treatment and cure. People treated through the system can then become peer navigators who go out into the community to talk about the positive effect that HCV treatment has had on their lives, thereby inspiring new groups of people to seek HCV testing and curative treatment.

Hepatitis C Education and Prevention Campaign

At the initiative's outset in 2015, focus groups were implemented with PWUD to understand their awareness of the new HCV treatments and how they would like to be talked to about the treatments. Three key messages emerged:

1. "Sharing equipment spreads HCV. Come get sterile stuff."
2. "We can't treat Hep C if we don't know we have it."
3. "Living with Hep C? New treatments have changed the game."

The messages were replicated through an education and prevention campaign delivered through social marketing under the primary message: "There is new hope for people with Hep C. . . . Come visit us to talk about the new cure." Posters placed at agencies that provide HCV prevention, testing, and linkage services feature photographs of those agencies' staff that reflect the demographics of the patients that use their programs.[1]

[1] Resources are available for download at www.EndHepCSF.org (accessed April 11, 2018).

These messages served as an invitation for community members to ask about HCV services and curative HCV treatments.

Community-Based Hepatitis C Testing

End Hep C SF partners have worked hard to scale up rapid community-based HCV testing in community settings where the target population were already seeking services, said Burk. Community providers, supported by SFDPH, added HCV testing in settings where naloxone was being distributed and drug users were already successfully engaged in interventions: syringe access programs, homeless shelters, the county jail, single-room occupancy hotels, methadone programs, residential drug treatment programs, transgender wellness groups, and STD clinics. She reported that since the End Hep C initiative started in January 2016, there have been increases in the number of HCV tests while the 15 percent rate of reactive antibody tests has been maintained throughout the scaled-up testing. This demonstrates that SFDPH is using HCV rapid testing resources in high-prevalence settings and successfully engaging the highly affected populations, she added.

Treatment Access Strategies

When direct-acting antiviral treatment for HCV became available in 2014, Burk said, SFDPH realized that accessing the liver clinics was a barrier for many people, particularly marginalized populations, such as people who have been incarcerated, use drugs, have mental health issues, and/or are homeless. Burk explained that in 2015, demand was great at the primary care clinics with a high prevalence of HCV among their patient population. A pool of known HCV infected patients had developed within the San Francisco Health Network, and liver clinic referrals were becoming a bottleneck for that population. Because the HCV treatments are so well tolerated, treatment in a specialty setting was no longer necessary for the majority of cases. To improve treatment access, SFDPH designed an initiative to train and empower primary care physicians to treat HCV themselves. Components of this capacity-building initiative for primary care physicians in the San Francisco Health Network include in-person training, electronic referral consultation services with experienced providers, and individualized clinical technical assistance with developing a workflow.[2] Pre- and postintervention analysis found that the total number of patients treated increased by 112 percent and the total clinics

[2] The San Francisco Health Network is a group of 12 primary care clinics under the umbrella of SFDPH.

represented among those treated increased by 140 percent (Facente et al., in preparation). She said that primary care providers report that they enjoy treating their patients for HCV, because it is powerful for them to be able to tell patients that they are cured.

Having done this work to bring treatment into primary care, Burk said, SFDPH is now working to expand treatment outside of traditional clinical settings. Given the valid reasons why PWUD may not want to engage in traditional care systems, she said, SFDPH is trying to be creative in reaching them through other channels. To improve access to treatment outside of primary care, SFDPH is working to scale up smaller programs and pilots to treat HCV at the county jail, a syringe exchange, a gay men's sexual health clinic, homeless shelters, through street medicine teams, and the opiate treatment outpatient program at University of California, San Francisco. She said, "We are doing some incredible life-changing work with these populations by embodying the experience of harm reduction and meeting them where they are, literally." Burk highlighted the national Patient-Centered Outcomes Research Institute (PCORI) Hero study on patient-centered models of HCV care for PWID as evidence that this work can and does happen outside of San Francisco. This study is comparing patient navigation to directly observed therapy for this population in eight states. Thus far, 1,553 PWID have been screened, of which 50 percent (775) were eligible for treatment; nearly 500 PWID have now started treatment.[3]

Best Practices and Lessons Learned

Burk surveyed some best practices and lessons learned from the experience in San Francisco. She suggested that peer-driven program models are essential to reaching at-risk populations through programming organized around where the target population is already located. Achieving population-level reductions in overdose deaths requires naloxone saturation in the community in addition to educating people about how to prevent and respond immediately to an overdose. Different drug-using communities necessitate different interventions, she noted, which requires understanding and continually assessing local-level data and demographics as well as being nimble in response. For example, the DOPE Project and SFDPH are now working to adjust their systems to the influx of fentanyl into the drug supply. Multidisciplinary teams are key to advancing agendas, she added. Potential starting points for interventions are community engagement, micro and macro policy changes, and leadership buy-in. She emphasized that it is critical to integrate HCV and HIV awareness activi-

[3] Data source: Kimberly Page, University of New Mexico.

ties into opioid safety efforts, and vice versa. Viral hepatitis coordinators with very limited program funding are often advised to leverage existing infrastructures, such as HIV or injury prevention, she said, and suggested modeling this strategy in federal-level funding proposals.

Discussion

Dace Svikis, professor at Virginia Commonwealth University, asked how HCV programs in San Francisco are tailored to the unique needs of women. Burk said that one of the syringe exchange sites has a long-running and well-attended weekly ladies' night, which includes dinner, and creates a safe, women-identified space for syringe exchange and overdose prevention work. Citywide, programs are responding to needs of their target populations by ensuring that programs delivering services are staffed by people who represent the demographics of the people they serve.

Referring back to Edlin's question of whether some PWUD care about their health enough to engage in treatment for HCV prior to receiving addiction treatment, Burk remarked that part of the spirit of the End Hep C SF initiative is that it tries to be consumer and community led. Organizers who are designing initiatives are eager to have PWUD involved in leadership and meetings; they also create lower threshold engagement opportunities so the community has options for how to contribute to the initiative. She described a recent community meeting entitled "Get Cured; Stay Cured" that included a panel of six self-identified PWUD who had accessed HCV treatment, either through the syringe exchange program or through the PCORI study for active injectors. The panelists described their treatment and how they were planning to avoid reinfection. At a similar event, "Tales from the Cured Community," a panel discussed how they had been cured of HCV and what felt possible in their lives because of that cure. Burk suggested that such peer-to-peer presentations and conversations are often more effective than anything that can be done by health administrators, health department staff, or through pharmaceutical company commercial campaigns. Experience in San Francisco suggests that PWUD can be engaged effectively in HCV treatment, although they may need more support. She observed that many people receive HCV treatment before they have addressed all their other issues and stabilized in every possible way, but once they have been cured of HCV, they feel empowered to the extent that they become more adherent to their HIV medications, reduce their substance use, get housing, go back to work, and enact other positive changes.

To del Rio's question about linking health departments to local-level service providers, Burk said that the End Hep C SF initiative has demon-

strated that part of this work falls under the auspices of traditional public health (e.g., testing and treating) and part involves community organizing. The latter does not need to be led by the health department, although it does help if it is supportive. Much of the work in building a community response to HCV involves identifying leaders in different systems, having those leaders identify what is needed, and determining how people can contribute. Anyone who wants to contribute can present an overview of HCV at shelters, drug treatment programs, mental health programs, and other settings. It is critical that anyone who engages with highly affected populations be empowered to explain what HCV is, how to get tested, and that it can be treated and cured. These presentations can also help to identify leaders among the various systems when they express interest in integrating HCV into their programs. Burk described an End Hep C SF survey tool that can be used to evaluate services around HCV in a specific setting; it has also been used to measure citywide capacity to address HCV and to ask agencies how they can be supported to do more.

Benjamin Linas, associate professor of medicine at Boston University, commented that the 15 percent seropositivity rate for HCV in San Francisco was interpreted as indicating that right spots are being reached, but he suggested that public health departments take such rates as indicating that not enough is being done and approaches need to be broader. Although the "right" positivity rate is unclear, the rate of 15 percent suggests overspecificity and not enough sensitivity about who is being screened. A lower positivity rate would suggest that all of the people are being found, which includes PWUD who engage with SSPs and others with risk for HCV who do not engage with SSPs (who are being missed if testing is only done in places where the seropositivity rate is 15 percent). Burk clarified that the rate of 15 percent reflects only one spoke of the work around HCV testing, such as community-based testing in high-prevalence settings using rapid HCV testing kits deployed by trained staff, as well as social media outreach. The resources are targeted to settings where high HCV prevalence is expected, and SFDPH would expect to see lowered prevalence in the coming years. The public and private sectors require different strategies to deal with HCV, given that the prevalence estimate is likely undercounting baby boomers who have been living with HCV for many years. End Hep C SF is doing academic detailing work with private clinics and systems to ensure that providers in lower-prevalence settings know that patients need to be tested and referred for treatment, because there is no longer any reason to wait for treatment.

IMPROVING CARE FOR HOSPITALIZED ADULTS WITH SUBSTANCE USE DISORDER

In her presentation on improving care for hospitalized adults with substance use disorder (SUD), Honora Englander drew upon her experiences as a hospitalist and as the director of the Improving Addiction Care Team (IMPACT) at OHSU. IMPACT is an interprofessional inpatient addiction consult service that includes linkages to community addiction care for medically complex patients with SUD. To highlight some of the key issues that catalyzed her to take action as a clinician to improve SUD care, Englander described the case of a young woman who died after multiple hospitalizations for opioid use disorder (see Box 3-2).

Rationale for a Hospital-Based Addiction Medicine Service

Opioid-related hospitalizations are on the rise across the United States, Englander warned. She cited data from the Agency for Healthcare Research and Quality (AHRQ)[4] showing that between 2014 and 2015, there was a 64 percent cumulative increase in hospitalizations related to opioid use disorder (AHRQ, 2017) (see Figure 3-2). Costs are skyrocketing because of SUD, driven by high rates of hospitalizations and readmissions as well as lengthy hospital stays. Inpatient hospital charges in the United States related to opioid use disorder alone reached $15 billion in 2012, with more than $700 million charges related to serious infections such as endocarditis (AHRQ, 2009; Ronan and Herzig, 2016). Despite these intense and palpable costs—both financially and in terms of human lives—the health system has been very slow to respond, said Englander. Hospitalization often addresses patients' acute medical illnesses but not the underlying cause of SUD, which leads to significant waste and very poor patient outcomes. Effective treatments exist but they are underused; despite such frequent interactions with hospitals, most people with SUD are not engaged in SUD treatment.

To begin exploring ways to improve the health system response to this mounting crisis, Englander and her colleagues led a mixed-method needs assessment at OHSU between September 2014 and April 2015 that surveyed 185 hospitalized adults (Englander et al., 2017; Velez et al., 2017). The results of the assessment revealed that "hospitalization is a reachable moment" that can be used to intervene, but it is not being effectively leveraged. Among the people surveyed, 57 percent of the high-risk alcohol users and 68 percent of the high-risk drug users reported that they wanted to cut back or quit; many of them also wanted to start medica-

[4] AHRQ is in the Department of Health and Human Services.

BOX 3-2
Case Example of a Patient with Opioid Use Disorder

Englander related the case example of a young woman she cared for while working as general internist and hospitalist. The patient, a 23-year-old woman with a history of intravenous heroin and methamphetamine use, was first admitted to an area hospital with MRSA endocarditis in August 2012. She was treated with intravenous antibiotics and discharged to a skilled nursing facility, where she told providers that she had last used drugs 2 months before her admission. Several weeks later, the woman was admitted to the OHSU hospital with widely disseminated infection: abscess surrounding her aortic root and septic pulmonary emboli. During that 25-day hospitalization, she underwent heart surgery to repair her aortic and mitral valves. According to Englander, the patient had limited engagement with the social work consult, although she was encouraged to seek treatment for the substance use disorder with which she was clearly struggling. She was discharged from the hospital with 120 tablets of hydromorphone. Englander met the patient on her third hospital admission around a month later with severe chest wall pain. During her 5-day hospital stay, social work was consulted again. However, the woman had not engaged with substance use disorder treatment and was grieving the death of her boyfriend from an opioid overdose the previous month, said Englander. Sadly, the woman died several months later, with her family at her bedside, after suffering from septic shock and heart failure in the intensive care unit. Englander reflected, "I tell this story because despite really extensive physical health care, four hospitalizations, two cardiac valve replacements, and the intentions and best efforts of the hospital team, we were not able to effectively support her. The outcome was quite tragic. But her story, though exemplary, is not at all unique."

SOURCE: As presented by Honora Englander at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018.

tion for addiction treatment (MAT) in the hospital. The study also found that there were significant gap times for patients between hospitalization and initiating SUD treatment in community settings, indicating that the waiting lists are long. She explained that this delay undermines the effectiveness of care; for people who are started on methadone in the hospital, for example, having to wait for a week or more to receive community-based treatment can seem like a lifetime. The ability to start someone on a medication such as methadone or buprenorphine in a timely fashion will require building systems to facilitate rapid, streamlined access to care after hospitalization. She noted that the study also revealed that patients strongly value treatment choice as well as providers who understand SUD.

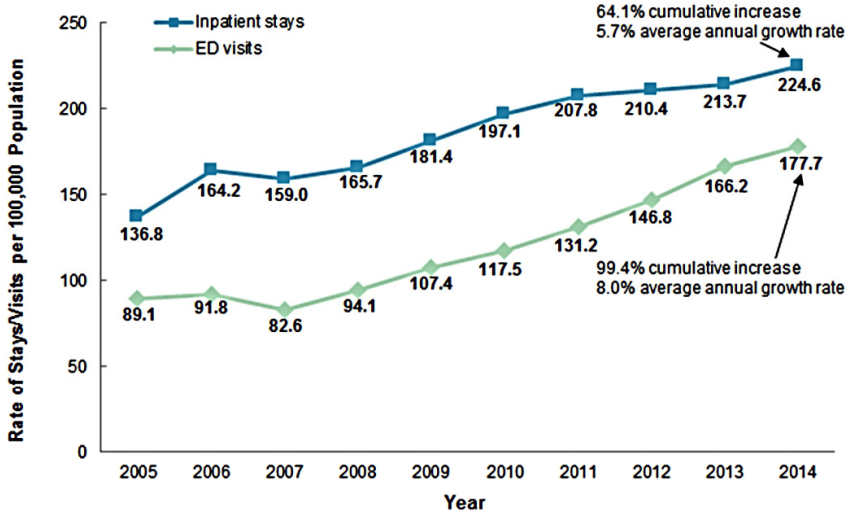


FIGURE 3-2 Opioid-related hospitalizations in the United States (2005–2014).
NOTE: ED = emergency department.
SOURCES: As presented by Honora Englander at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; adapted from AHRQ, 2017.

Designing a Hospital-Based Addiction Medicine Intervention

Englander explained they designed the IMPACT intervention by mapping the findings from the needs assessment onto the intervention's key components. IMPACT's inpatient addiction medicine consult service was developed to address the finding that OHSU hospital lacked the expertise to assess, engage, or initiate treatment for SUD and to leverage the reachable moment of hospitalization. She emphasized that this lack of existing expertise is widespread across hospitals nationwide. Initially, the service included a physician, a social worker, and a peer recovery mentor with lived experience in recovery, but the team has since expanded considerably to include more staff and now includes a part-time nurse practitioner and physician's assistant. To address the lack of pathways to outpatient addiction care and the long wait times for community services, they developed rapid-access pathways to community SUD treatment. These pathways are supported through liaisons who have one foot in the SUD treatment world and one foot in the hospital, splitting their time between both teams and services.

Englander explained that the IMPACT team adopted a specific strategy to address the prolonged length of hospital stays for patients with SUD; she presented data showing that the actual length of stay tends to far exceed the expected length (Englander et al., 2017). She said that this is driven largely by patients with osteomyelitis and/or endocarditis, who require extremely long length of hospitalization because of social—not medical—vulnerability. She noted that patients stayed in the hospital for extended durations because there were no safe or supportive outpatient systems to complete a course of prolonged intravenous (IV) antibiotics through a peripherally inserted central catheter (PICC) line, which goes from the outside of their body directly into the patient's heart. To address the prolonged length of hospital stays for such patients and to increase community treatment options, IMPACT evolved a new care model called a Medically Enhanced Residential Treatment Model (MERT); launched in 2015, MERT integrates the provision of IV antibiotics into residential addiction treatment.

Outcomes

Englander provided an overview of some initial outcomes of the IMPACT interventions. Between September 2015 and December 2017, 710 patients were served (mean age: 44.3 years; 59 percent male gender), 57 percent of whom were living in the Portland metro area and 45 percent of whom were homeless. Among those served, there was a wide and overlapping distribution between those with opioid use disorder (61 percent), alcohol use disorder (44 percent), and stimulant and methamphetamine use disorders (38 percent). Eighty-nine percent of people referred to IMPACT engaged with the team, meaning that they met IMPACT in the hospital and agreed to continue working with IMPACT on some level. The average number of physician encounters per patient is 3.3 (range: 0–33), and the average number of social work encounters per patient is 4 (range: 0–31). In terms of treatment, around 59 percent of people have had linkage recommended to community SUD treatment and 57 percent have had MAT, either in the hospital only or—more commonly—in hospital with a planned linkage after hospitalization. Englander commented briefly on some of the IMPACT intervention outcomes that are not yet ready for formal reporting. They are tracking data that reflect hospital length-of-stay savings of approximately 450 to 500 hospital days per year. Studies are ongoing using Oregon Medicaid data to determine linkage to SUD treatment, health care use, and cost of care.

Perspectives from Patients and Providers

Englander shared data from qualitative work exploring perspectives of patients and providers about the IMPACT intervention (Englander et al., 2018). Before IMPACT, providers described widespread moral distress—and the feelings of futility, chaos, and anxiety—that arise from the struggles and burnout involved in caring for people with SUD. She quoted a cardiac surgeon as saying:

> [Patients] ended up either dead or reinfected. Nobody wanted to do stuff because we felt it was futile. Well of course it's futile . . . you're basically trying to fix the symptoms. It's like having a leaky roof and just running around with a bunch of buckets, which is like surgery. You gotta fix the roof . . . otherwise they will continue to inject bacteria into their bodies.

Englander reported that when asked to reflect on their experiences with IMPACT, providers described it as a "sea change" that "completely reframes" their understanding of addiction as "a medical condition that actually has a treatment." She quoted one ward nurse as saying: "I think you feel more empowered when you've got the right medication . . . the knowledge and you feel like you have the resources. You actually feel like you're making a difference." The interprofessional providers IMPACT spoke with said that they highly valued rapid-access pathways to treatment. She quoted one provider as saying, "This relationship with [community treatment] ... it's like an answer to prayers," and another hospitalist as remarking, "Starting them on [methadone or buprenorphine-naloxone] and then making the next step in the outpatient world happen has been huge. That transition is so critical; that's been probably the biggest impact" (Englander et al., 2018).

Englander said that they are also carrying out work to understand the role of peers who have lived experience in recovery and are working as part of the IMPACT interprofessional team. According to one IMPACT patient:

> [IMPACT peer] singularly, out of the whole group of them, she was honest, sincere, kind, didn't put words in my mouth, didn't say offensive things. . . . And she went to bat for me in the hospital, with my legal situation, with my family. She was there for me to help me with my son, wheeled me out on the wheelchair so I could smoke. Just an amazing person, very helpful, very good at her job.

Another patient said, "When [IMPACT peer] came in, she basically said if you wanna quit, great, if you don't wanna quit, maybe we can get a plan figured out. She put the ball in my court, and she didn't judge me.

She made me feel very comfortable." From her perspective as a physician on the interprofessional IMPACT team, Englander remarked that when she works with people who have experienced significant trauma—who may be contemplative, precontemplative, or just not ready to engage—the experience is completely different when she is supported by a peer, who she will often ask to take the lead in initiating the conversation. Peers can serve a hugely valuable role as "cultural brokers" and can demonstrate to the patient, in very clear and believable ways, that IMPACT—and Englander as a physician on the team—values the patient's own experience.

Medically Enhanced Residential Treatment Model Outcomes

Englander noted the experience in implementing the part of the intervention, which integrated IV antibiotics into residential treatment, called MERT. To implement MERT, OHSU hospital partnered with a residential addiction treatment setting. Typically, residential addiction care involves 20 hours of groups per week, 1 hour of individual therapy per week, and onsite medication for addiction. With MERT, OHSU enhanced that treatment model to provide once daily IV antibiotic infusions as well as adding a new component of nursing care (including care management, accompaniment to medical visits, and medication support). OHSU also supported the team with weekly telemedicine rounds with the hospital's infectious disease team.

Englander reported that despite the IMPACT team's rigorous efforts to engage and recruit participants, only 7 of 45 potentially eligible participants were enrolled during the pilot period. Of those seven patients, only three completed their IV antibiotics and four left residential against medical advice before completing their antibiotics (Englander et al., 2018). They found that despite all of the efforts toward designing the model, it was not actually what patients wanted. She outlined some of the key lessons learned from a mixed-methods study to understand and describe the feasibility and acceptability of MERT, to understand implementation factors, and explore the lessons learned (Englander et al., 2018). In terms of recruitment barriers, the study found that patients were ambivalent toward residential treatment, they wanted to prioritize physical health needs, and they were afraid of untreated pain. Challenges related to retention for the seven patients who did enroll included: high demands placed upon patients by residential treatment; restrictive practices due to vigilance around PICC lines on the part of staff and other patients; and perceptions by staff and other residents that MERT patients "stood out" as "different." Despite these challenge, the key informants interviewed

did feel that MERT was a positive construct and they were interested in exploring sort of future models.

Englander maintained that the finding that this group of high-risk hospitalized adults did not want to go to residential treatment is one key implication of the MERT experience. Other implications include the need for flexible postacute care models that can engage patients across the precontemplative stage to the action stage of change, as well as the importance of integrating pain management, physical health care, and SUD treatment. While the experience with IMPACT demonstrates that hospitalization is a reachable moment, residential treatment represents a higher bar. The experience with MERT also highlights the role of iterative design processes that include ongoing feedback from adults with SUD. In developing IMPACT, OHSU carried out a patient needs assessment with a broad array of community stakeholders that included people from SUD treatment settings and other community mental health providers. She suggested that with MERT, they were not iterative enough in the design process with respect to engaging with active users and with people in recovery.

Future Directions

According to Englander, one future direction for IMPACT is to develop an IMPACT extension team to further address care needs for patients with SUD who need antibiotics. Her hope is that the extension team—which would be part of the IMPACT hospital-based team—would extend the team's capacity to go into the community. The plan is to partner with transitional housing or a medical respite team through one of their key community partners (Central City Concern) in order to provide IV antibiotics and SUD care in those settings. They are also considering ways to extend care into skilled nursing facilities by providing new types of support in those settings, because the current skilled nursing facility model is highly problematic for many patients. It is difficult to convince skilled nursing facilities to accept patients who need SUD care, she explained, and those who are accepted often face perceived discrimination and other challenges around the patient experience.

Implications for Policy Makers

Englander concluded by outlining a set of implications for policy makers, the first being that hospitalization is a reachable moment to initiate and coordinate addiction care. It provides opportunities to reach people with severe medical illnesses and SUD who do not otherwise engage in primary care or behavioral health care. Treating SUD in hospital

settings also creates opportunities to improve providers' experiences and help reduce provider burnout. Using a hospital-based team has the potential to reduce unnecessary hospital days and save costs, she added. Additional implications for policy makers are the need to establish treatment pathways spanning the hospital and community SUD treatment and the need to develop new care models that integrate IV antibiotics and SUD care. She also reminded the group that treating SUD in the hospital can and should be the standard of care.

A highly important implication is the value of an interprofessional team, said Englander, who reported that data from their experience with IMPACT strongly supports the complementary roles of providers (including physicians, nurse practitioners, and physicians' assistants), social workers, and peers with lived experience in recovery. Peers represent a new workforce in most hospital settings, and when planning the workforce, it is critical to take into account the supervision, training, and support that these peers need to be successful in a very hierarchical hospital model. She advised that partnering with human resources, legal, and risk departments early on is very important, and noted that many peers have histories of incarceration that can pose stumbling blocks along the way. She also noted that peers can play a key role in patient engagement and system redesign.

Discussion

Carlos del Rio, professor of global health, epidemiology, and medicine at Emory University, asked Englander to elaborate on the barriers they faced when bringing peers into the hospital and how they overcame those barriers. Englander replied that it was not easy, but it was worth it. When discussing how to best initiate an addiction medicine consult service in hospital settings, she explained that defining the business case was very important, as was developing relationships with senior leadership in the hospital. When specifically discussing how to integrate peers into hospitals, she had presented the leadership with highlights from the patient needs assessment that underscored issues around institutional trauma and patient engagement. Before they began the hiring process, she convened a meeting with the hospital's human resources, legal, and risk departments' senior leadership to explain the program's rationale and gain buy-in early on. She noted that OHSU also collaborated with an agency (Mental Health America of Oregon) to contract their peers. She also suggested leveraging relationships with community partners, who can help to make the case to hospital leadership based on their own experiences in nonhospital care settings.

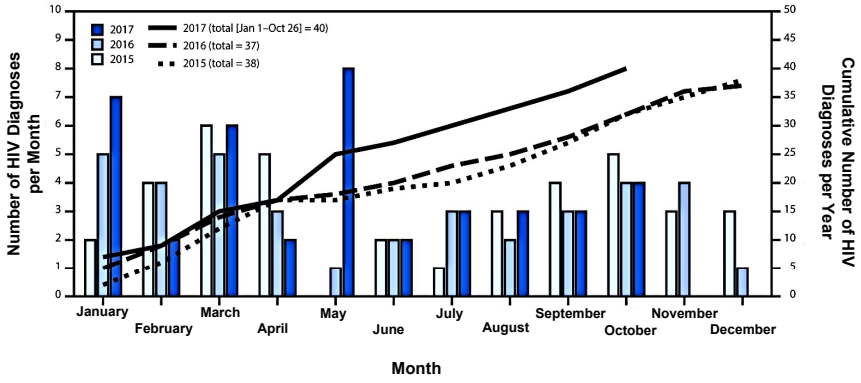
EXPLORING CHALLENGES AND OPPORTUNITIES IN RURAL AMERICA

In his presentation, Nickolas Zaller explored the convergence of poverty, opioids, and infectious diseases in the American South, which he termed a "Southern syndemic." The consequences of the opioid crisis in the United States are largely symptoms of deep-rooted, entrenched inequities stemming from poverty and other factors, which calls for broadening the conversation about addiction to include these causal forces. He focused on the rural South and the region's vulnerability to opioid use and its complications. Many communities in rural America have not traditionally had to deal with opioid use because abuse of alcohol and simulants such as methamphetamines, crack, and cocaine have historically been the primary concerns. As a result, many communities in the South are ill equipped and ill prepared to deal with the opioid epidemic and associated surges in HIV incidence and prevalence. In those areas, access is very limited to the prevention and HIV care needed to deal to address this "perfect storm" of poverty, opioids, and infectious diseases.

More than half of new cases of HIV in 2016 in the United States were reported in the South, Zaller said, and more than half of the 50 poorest counties in the United States are located in the broader Southern region (CDC, 2017). This overlap between rural geography in the South and very significant poverty has fueled the opioid epidemic, increases in HIV, and other consequences. Further compounding these problems are significant gaps in the continuum of care in rural areas throughout the country, but especially in the South. Systematic harm reduction programs and programs to address the root causes of HIV acquisition, such as opioid addiction, trauma, and poverty, are largely absent from many areas in the South (Schafer et al., 2017). He noted that in Scott County, Indiana, there was no access to syringe exchange and the state refused to authorize access until it was too late. Although Southern states accounted for 52 percent of all new HIV diagnoses in 2016, those states represented only 30 percent of all preexposure prophylaxis (PrEP) users in 2016.[5] There is an extreme scarcity of PrEP prescribers in states like Mississippi, which has one of the highest incidences of HIV in the country.

Zaller presented data on the spikes of HIV and HCV infections in rural areas of Southern states (see Figure 3-3). The top figure illustrates rising trends in the numbers of HIV diagnoses in rural West Virginia that warrant serious concern (Evans et al., 2018). Many of the diagnoses are attributable to injection drug use among people who have recently started

[5] Data on rates of persons using PrEP in the United States in 2016 are from https://aidsvu.org (accessed April 12, 2018).



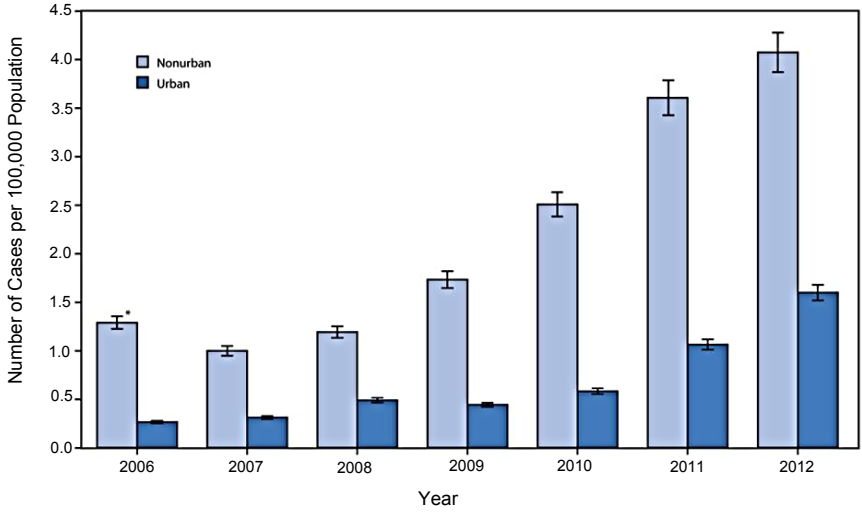


FIGURE 3-3 Increasing rates of infectious diseases in the rural South: number of HIV diagnoses per month and cumulative number of diagnoses per year in 15 West Virginia counties (2015–2017) (top), and
incidence of acute hepatitis C among persons over age 30, by urbanicity and year, in Kentucky, Tennessee, Virginia, and West Virginia (2006–2017) (bottom).
* 95% confidence interval.
SOURCES: As presented by Nickolas Zaller at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; Evans et al., 2018; Zibbell et al., 2015.

injecting and lack access to sterile syringes. The steady increase in HCV among people younger than 30 in rural areas of Kentucky, Tennessee, Virginia, and West Virginia (illustrated in the bottom figure) also demonstrates how this epidemic is sweeping across the country among people who start out using and then misusing prescribed opioids, with some transitioning to heroin (Zibbell et al., 2015). Increases in infectious diseases are striking communities that do not have the historical level of prevention and preparedness that other communities have, warned Zaller.

Opioid Use in the South: Transition from Prescribed Opioids to Heroin

Zaller traced the advent of opioid use in the South in recent years. There has been a tremendous surge in prescribing medications for pain to people in rural areas who often have jobs associated with a higher risk of injuries, such as coal mining and agricultural labor. He suggested that a cultural phenomenon has emerged whereby no amount of pain is acceptable: patients expect to receive medication for pain; providers are willing to prescribe them; and opioids are aggressively marketed. The heretofore low prevalence of opioids, coupled with the rural geography, means that there are limited prevention and treatment services. The transition from prescribed opioids to heroin is the other component of the epidemic, Zaller said, although good surveillance data on PWID is currently lacking across the South. One of the largest analyses found that incident use of heroin was 19 times more likely among those with prior nonmedical use of prescription opioids (Muhuri et al., 2013); another study found that the transition from nonmedical prescription opioid use to heroin appears to occur at a relatively low rate (Compton et al., 2016). However, overdose and treatment admissions associated with heroin are increasing in rural areas.

According to data from CDC on the age-adjusted deaths per 100,000 population from heroin in 2014 and 2015 by region, the South has an increasing number of heroin overdose deaths, but the rate is not increasing at the same magnitude as it is in the Midwest and the Northeast.[6] He attributed this to lower rates of people who inject heroin and lower levels of fentanyl in the drug supply compared with the Northeast. Treatment admissions for opioid use are on the rise across Kentucky, Tennessee, Virginia, and West Virginia, said Zaller. Between 2007 and 2012, the proportion of admissions to substance abuse treatment centers (among people aged 12–29 years) that were attributed to any opioid injection increased from around 5 percent to more than 18 percent, far exceeding

[6] Data source: https://wonder.cdc.gov (accessed April 12, 2018).

the increase in admissions attributable to other drug injections (around 2 percent to 4 percent) (Zibbell et al., 2015). He noted that this increase in treatment admissions for heroin or injection opioids unsurprisingly overlaps with increases in HCV in those states during the same period.

Zaller explained that this "tidal wave" of opioid use and its infectious disease consequences can be tracked spreading from the northeast of the country into Kentucky, North Carolina, West Virginia, and southern parts of Indiana and Ohio. Primary prevention is urgently needed in rural communities with extremely limited access to harm reduction resources and drug treatment, he cautioned. Urban areas that have been dealing with injection drug use for decades are seeing increasing proportions of overdose associated with fentanyl-laced heroin, but those areas often have more resources in place to stem the tide. This is evidenced by the locations of SSPs for PWID. One study found that in 2013, there were only 14 total SSPs in the entire South, compared with 43 in the Northeast and 61 in the West (with 20 SSPs in Washington state alone) (Des Jarlais et al., 2015). Of the few SSPs that do exist in the South, only one is located in a rural location. This problem is aggravated by the existing climate of tremendous stigma that makes it extremely challenging to provide syringe access in rural areas. Prevention from injection-related harms is not the only concern, continued Zaller. Access to physicians who have waivers to prescribe buprenorphine is very poor in large swaths of the South, compared to the high levels of coverage in the Northeast and along the West coast (see Figure 3-4). He noted that the states in the South that have many counties with no buprenorphine prescribers are the same states that have skyrocketing rates of opioid prescribing (Rosenblatt et al., 2015).

Prevention Opportunities in Arkansas

Zaller presented a case study on a prevention opportunity in Arkansas. He described the state as in some ways representative of the South, although he was wary of overgeneralizing about this very complicated region, in which each state has its own local culture, flavor, and politics. Arkansas ranked second in the nation in terms of opioid prescribing rates in 2016, with almost 115 prescriptions per 100 residents for its three million residents.[7] According to data from the state's prescription monitoring program from 2016, opioids were the most frequently sold drug type with almost 240 million pills sold; this is more than double the number of depressants sold and more than three times the number of stimu-

[7] Data on state-by-state opioid prescribing rates is available at https://www.cdc.gov/drugoverdose/maps/rxstate2016.html (accessed April 12, 2018).

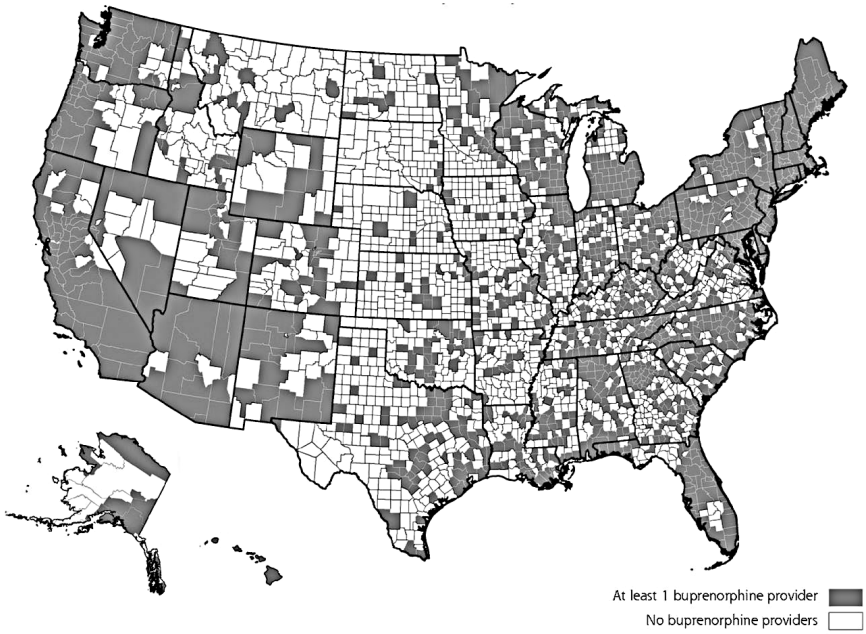


FIGURE 3-4 U.S. counties with physicians with waivers to prescribe buprenorphine. SOURCES: As presented by Nickolas Zaller at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; Rosenblatt et al., 2015. Copyright 2018 by the Annals of Family Medicine, Inc.

lants sold.[8] Similar trends of astronomical prescription rates occurred in states like Kentucky and West Virginia, he warned. In Arkansas, they are in the process of "shutting off the spigot" by going after so-called super-prescribers, but that alone will not solve the problem. Arkansas also ranks third in the nation for its high rates of nonmedical use of prescription pain relievers among people 12 and older (Center for Behavioral Health Statistics and Quality, 2015).

The data available show that heroin eventually becomes cheaper when people engage in nonmedical use of prescription opioids to a great enough extent. According to data from the state prescription monitoring program, Arkansas differs somewhat from other states in that women tend to get prescribed opioids at a significantly higher rate than men. The

[8] Data on prescription drugs sold by class in Arkansas is available at http://www.arkansaspmp.com (accessed April 12, 2018).

proportion of overdose deaths among women in 2016 in Arkansas was 46 percent, ranking it third in the nation.[9] Older people are highly vulnerable to overdose and are also receiving opioid prescriptions at a high and increasing rate, he added.

To work toward quelling the opioid epidemic, Zaller highlighted the importance of providing more treatment resources. A recent analysis found that the counties in Arkansas and Kentucky with the highest rates of overdose mortality are all very rural and all lead their respective states in opioid overdose deaths mortality. Four of those five counties in Arkansas with the highest overdose mortality rates (ranging from 20 to 22 per 100,000) have no physicians waivered to prescribe buprenorphine. According to anecdotal accounts, Zaller said that medical examiners in Arkansas are reluctant to classify overdose deaths because of the high level of stigmatization, which calls the accuracy of overdose death numbers into question. Kentucky has much higher rates of overdose mortality among its six most affected counties (ranging from 51 to 79 per 100,000), but five of those counties have no waivered physicians. This demonstrates the lack of infrastructure and capacity for treatment that is urgently needed in those communities, he said.

Ongoing Surveillance in County Jail

Zaller explained that Arkansas is situated in the "super-incarceration belt" that spans the South; the jail system in Arkansas has expanded to such an extent in just 5 years that it is now third in the nation, behind Texas and California. He described efforts to carry out ongoing surveillance of nonmedical use of prescription opioids at the county jail in Little Rock, Arkansas. They began by screening people who enter the jail for opioid use disorder and of almost 1,000 people screened, around 10 percent were identified as opioid dependent (Wickersham et al., 2015). Zaller surmised that this relatively low prevalence rate is attributable to underreporting because people are reluctant to admit their illegal opioid use, but he said it serves as a reasonable proxy that can be used as a baseline for monitoring and tracking over in subsequent years. More than 60 percent of jail detainees are African American, illustrating that there is a significant racial disparity at play in Arkansas—and across the South—in the disproportionate incarceration of African Americans. However, most

[9] Data on opioid overdose by gender is from a Kaiser Family Foundation analysis of CDC, National Center for Health Statistics. Multiple Cause of Death 1999–2016 on CDC WONDER Online Database, released 2017. Data are from the Multiple Cause of Death Files, 1999–2016, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Data source: http://wonder.cdc.gov/mcd-icd10.html (accessed April 12, 2018).

of the detainees who were identified as having opioid use disorder in this sample were white. As an additional step, the jail staff began screening for HIV risk among those who reported injecting drugs; they also received funding to look at linkages to PrEP postrelease from the county jail. In January 2018, 77 detainees had reported injecting drugs prior to their most recent incarceration. They also found that while only around 20 percent of detainees in the jail are female, 30 percent of the sample is female—nearly 25 percent of whom reported sharing syringes. This is a serious concern, warned Zaller, because there is no access to SSP in the county where the jail is located.

Next Steps in Arkansas

Efforts are under way to address the lack of primary prevention in Arkansas, Zaller said. Partnerships with correctional facilities, such as the county jail, are enabling plans to link detainees to PrEP upon their release and facilitating research aimed at improving the quality of surveillance. Because the quality and reliability of surveillance in Arkansas is generally very poor, he noted, it is difficult to garner resources. The 21st Century Cures Act is expected to provide state treatment and response funding to support naloxone distribution as well as MAT expansion in primary care and in correctional institutions. This is critical because the state has very limited access to MAT. Methadone access is virtually nonexistent, and the numbers of buprenorphine prescribers per capita are very low; extended-release naltrexone is available but not yet covered by the Medicaid formulary. Zaller concluded by underscoring the urgent need for more data and resources for prevention, particularly in counties in the South where there are literally no services available to engage people.

Discussion

del Rio commented that Zaller carried out work in the Republic of Georgia years ago, which found that prescription opioids were also the most commonly injected drug and people who injected prescription opioids were less likely to be infected with HBV and HIV than people who injected street drugs. He asked whether safe injection sites have been considered as an intervention in Arkansas. Zaller said that they have not yet been considered, and furthermore, they do not actually know how prevalent injection is because of deep structural issues such as the tremendous amount of stigma surrounding both substance use and HIV. Some providers refuse Ryan White funding because they do not want to care for HIV patients. The state's initial-phase focus is now on reigning in doctors' excessive prescribing of opioids for pain, which Zaller described as out of

control. Efforts to ramp up treatment access and distribute naloxone are being considered, he said, but resources will be the biggest barrier going forward. In Arkansas, Medicaid expansion set forth various restrictive work requirements, but the Patient Protection and Affordable Care Act (ACA) opened up unprecedented access to behavioral health care. If the ACA is repealed, he warned, it will be critical to find alternative ways to cover addiction treatment.

Judith Feinberg of West Virginia University reflected on her experience doing research in southern West Virginia, the center of the coal industry and the part of the state that is poorest and hardest hit by the opioid epidemic. Because the population is scattered across tiny communities in a state that is essentially one big mountain, the basic ability to travel from one community to another is the primary problem they face. "It really comes down to not having money for the gas or a car or a car that works," she said. When social determinants of health are discussed, conversations should focus on how to get things done in the most practical way, she recommended. County health departments offer free testing for HBV, HCV, and HIV, but people cannot access them because most of those counties have no public transportation. They have discussed using ride-sharing services, she added, but cell coverage is very poor. Zaller remarked that other settings with large proportions of rural geographies face similar problems, because people without a source of transportation cannot be reasonably expected to travel long distances. They are already using telemedicine for basic services, such as stroke care and prenatal care for pregnant adolescents and other women with high-risk pregnancies who cannot access care otherwise (Arkansas has the highest rate of adolescent pregnancy in the nation). Given the success of those programs, he suggested that telemedicine could also be used to help treat addiction or to provide other mental health and psychiatric services. Another potential avenue would be to incorporate strategies used in global health to deal with access issues, he said, such as peer support and community health workers.

PANEL DISCUSSION

Sandy Springer, associate professor at the Yale School of Medicine, shared work she had recently presented at the Conference on Retroviruses and Opportunistic Infections pertaining directly to the overlap between treatment of opioid use disorder and the HIV care continuum. Given that drug treatment is HIV prevention, she said, the aim should be to find the best and fastest way to start medication treatment for PWID and people who use opiates. Specifically, the goal with respect to HIV is to have 90 percent of patients with suppressed viral loads within 2 years

and to have every patient suppressed by 2030. Older data show that people who are incarcerated can get their viral loads suppressed before they are released, but 3 months after release, most of them are no longer suppressed—relapse to drug use is one of the major factors. She has been examining the use of effective, evidence-based interventions including medications that can treat opiate use disorder. A previous study with buprenorphine in a nonrandomized control trial showed that staying on buprenorphine improves viral load suppression. Springer presented the results of their recent randomized, double-blind, placebo-controlled trial among people who were incarcerated, which looked specifically at the effect of extended-release naltrexone on HIV viral suppression and whether people would continue to take naltrexone after release from the correctional facility.[10] Eligibility criteria were designed to be minimally exclusive; participants could have a co-occurring substance use disorder or mental illness. The intent-to-treat analysis demonstrated that the baseline characteristics of participants were broadly representative of the U.S. criminal justice system: predominantly racial/ethnic minorities, homeless people, and high rates of HCV comorbid infection. Within 6 months, participants who received placebo did not have improved viral suppression rates from baseline, but those given extended-release naltrexone were able to statistically significantly improve their viral suppression at 6 months postrelease. Multivariate regression analysis of other potential predictors indicates that the only one that stayed significant was receipt of extended-release naltrexone, which had an odds ratio of 2.902 in predicting viral suppression at less than 50 copies at 6 months postrelease. These results were replicated in another cohort as well. These results show that MAT for substance use disorder combined with HIV treatment can lead to improvements in the continuum of care for people who are released from correctional facilities, said Springer.

del Rio pointed out a training gap: physicians need to be trained in opioid use disorder and how to provide MAT. Springer replied that there needs to be a systemic paradigm shift toward the idea that health care providers should treat everyone, including people with opiate addiction. del Rio commented on a related systemic issue—providers tend to feel like they have done their job just by giving patients a referral for substance abuse treatment and then hoping for the best. He asked about system interventions that could be used to address this problem. Todd Korthuis, program director for OHSU's Addiction Medicine Fellowship, replied

[10] She clarified that she was not endorsing extended-release naltrexone per se; it was chosen because at the time, it was the only long-acting injectable medication that could be started before release and then continued after release. Subsequently a long-acting buprenorphine (SUBLOCADE) has been approved by the Food and Drug Administration.

that the easy step is to make a concerted effort to encourage infectious disease physicians to obtain buprenorphine waivers. The harder steps involve building capacity to support providers working within a busy clinic schedule, in which HIV-infected patients are seen every 30 minutes or less. He suggested dovetailing with the emerging field of addiction medicine fellowships, as there are more than 45 1-year fellowships across the country already. He also raised the possibility of combining addiction medicine and infectious disease training for dual board certification. Zaller added that there are no infectious disease physicians in large parts of the country, so prevention will need to be provided by primary care and family medicine physicians who will need training.

Ellen Eaton, assistant professor in the University of Alabama at Birmingham School of Medicine's Division of Infectious Diseases, asked Englander if they encountered problems obtaining buy-in from physicians for the IMPACT intervention, given how burdened physicians are by clinical demands and by the challenges they face caring for SUD patients; for example, the challenge of getting patients to actually show up to mental health and SUD services when they are referred. Englander replied that these types of frustrations—which are common among all hospital providers, not just physicians—are not necessarily inevitable. The IMPACT experience and evaluation supports that SUD treatment can change the culture and change providers' understanding of the disease of addiction (Englander et al., 2018). With IMPACT, she said that providers not only bought in but welcomed the intervention with huge relief, even as IMPACT has expanded from medical services to surgical services. It has been beneficial to have experts available for support and mentorship, she added.

Dawn Fishbein, infectious disease physician at MedStar Washington Hospital Center, asked about the economics of implementing IMPACT on an inpatient and outpatient basis. Englander responded that the work has been largely hospital funded, with additional funding by one of their Medicaid coordinated care organizations. An advantage of not being grant funded, she said, is that the intervention has been a systemic one. For the hospital, the business case largely centers around length-of-stay savings, she explained.[11] Their hospital is often at capacity, she added, so any reductions in length of stay allow new patients to be accommodated. This is essentially their revenue source, she said, although there are other savings in terms of the actual cost of the hospitalization.

Korthuis asked Englander about the role of concomitant methamphetamine use in patients with opioid use disorder and about potential

[11] Englander noted that more detail on the business case is provided in Englander et al., 2017.

ways to address that in the context of endocarditis and complicated osteomyelitis. Englander replied that concomitant use is a huge issue with tremendous overlap. They have found that medications for opioid use disorder can help stabilize the overall picture, and unfortunately, there are no proven medications for methamphetamine use disorder. At her hospital, the universal approach is to focus on patient engagement as well as medication adherence—they make an explicit effort to focus on certain cardiac medications, owing to the prevalence of advanced heart failure as a complication of methamphetamine use. It has also been helpful to involve the pharmacy more closely and to consider the primary care and physical health care continuum in addition to the behavioral health care continuum.

Regarding the overlap between opioid use disorder and methamphetamines, Zaller remarked that stimulant addiction is more challenging to treat than opiate addiction because MAT is not available and patients need more intensive behavioral therapy, which requires integrating care with clinical psychologists and behavioral therapists. He noted that this therapeutic component is often overlooked in treating people with opioid use disorder, but merely giving a patient medication will not be sufficient to address an addiction. A common refrain is that the easy part is to stop using the drugs, he said, but the real work is for patients to put their lives back together and live drug free. In terms of priorities and how resources are provided, both in federal dollars and insurance and beyond, it is challenging to cover long-term behavioral therapy in so many different areas, Zaller said. He added that the broken mantle of health care reform needs to be picked back up again, even if the ACA is dismantled. He urged people working in this field to advocate and continue applying pressure to ensure that PWUD have coverage for the care they need.

In discussions around MAT, Feinberg called for focusing on the therapy piece as much as the medication piece. She said that West Virginia is trying to crack down on "buprenorphine mills" that have taken the place of "oxycodone mills"; people buy large amounts and take it with no accompanying therapy. It also winds up on the streets—whether that is good or bad is arguable, she said. They have found that in rural areas, the real issue is how the needed therapy will be provided even when physicians are waivered to prescribe the medication (see Box 3-3 for a more detailed description of the multiple epidemics that West Virginia is facing). She agreed that infectious disease physicians can be the ones to initiate therapy, especially for people who start to go into withdrawal in the hospital and are started on buprenorphine, but the therapy piece has to be collocated. Most clinicians are not trained as therapists.

Given the lack of existing capacity, Benjamin Linas, associate professor of medicine at Boston University, asked whether MAT could be

BOX 3-3
Multiple Epidemics in West Virginia

Feinberg said that West Virginia has the sad distinction of having the highest rate of all the worst consequences of the opioid epidemic: highest opioid fatality rate, highest rate of acute HBV, highest rate of acute HCV, and highest rate of babies born in withdrawal. Now, an HIV outbreak has emerged. Alerted by the number of new HIV cases in rural counties that had previously had around one diagnosis per year, CDC came in to investigate and provide Epi-Aid. They identified 60 people, the majority of whom were men who have sex with men, but some of whom were also injectors. CDC is now carrying out viral genealogy to see how closely related the HIV found in the MSM group is to the HIV found in injectors. She noted that people travel out of rural West Virginia to other cities to do sex work, commonly to Washington, DC, which has a high HIV rate. Testing is the key piece of the public health approach that has fallen by the wayside in both urban and rural areas of West Virginia. HIV testing is not being carried out anywhere in the state—as demonstrated by the 20 percent of people who had AIDS at HIV diagnosis—nor is testing for HBV or HCV. The epidemic is likely to be bigger than currently estimated because not everyone could be located by CDC. People in the state live in fairly isolated rural communities, where infectious disease could be promulgating in local pockets. Even with telemedicine and programs like Project Extension for Community Healthcare Outcomes (ECHO) for MAT for HCV and HIV, the extreme scarcity of health care providers in these rural communities will likely intensify the epidemic; some counties only have one or two physicians for populations of 20,000 people. West Virginia is also a very poor state, with its resources primarily being federal grants or federal pass-throughs in the form of State Targeted Response grants. This is a powder keg, she warned, that extends beyond West Virginia.

SOURCE: As presented by Judith Feinberg at the workshop Integrating Infectious Disease Considerations for Response to the Opioid Epidemic on March 13, 2018.

expanded more rapidly if only medication is provided and not the therapeutic component. Springer said ample data support the assertion that additional counseling on top of medication treatment for opiate use disorder does not do much more than the medication alone. Furthermore, she suggested, mandating behavioral treatment for people receiving MAT may actually be a detriment to them. While additional counseling services should be made available for those who need them, she argued, it should not be a prerequisite to getting the MAT that can keep people from dying of opiate overdose as well as preventing or keeping them on treatment for HIV and HCV. She surmised that such prerequisites are a barrier to MAT expansion in very rural areas. Zaller provided a different perspective, although he agreed that medication is necessary, He warned that the

mantra of medicalizing addiction has entered dangerous terrain. When addiction is overmedicalized, people are not being supported in dealing with serious sexual, physical, or emotional trauma that may underlie their addictions.

Korthuis remarked that, on the one hand, all of the counseling in the world will not prevent an overdose in a patient whose brain is dependent on opioids. Studies that compared the role of buprenorphine treatment with minimal counseling during a typical medical visit to more formal and intensive counseling found there was essentially no effect of counseling beyond the effect of buprenorphine itself for decreasing opioid use (Fiellin et al., 2006; Weiss et al., 2011). On the other hand, opioid use is not the whole story. He referred to the Walter Ling test. Walter Ling, a pioneer of addiction treatment, in general, and buprenorphine treatment, in particular, says that at the end of the day what patients *really* want is to pass the "get-a-life test." As people begin to recover, they rediscover their need to address their marriage, address their job, get out of debt, and rebuild all the things in their lives that were on the backburner while they were using drugs. This life-rebuilding process is the highest goal of treatment. Counseling is likely to help benefit people in this respect, but the first step should be to address the neurobiology of addiction through the use of medications.

Springer noted that similar issues are seen in the incarcerated population and in women and men who experience intimate partner violence—these types of issues start to emerge after their addiction is treated, for which support services are needed. She remarked that every single person she has treated with buprenorphine and even with extended-release naltrexone (a completely blocking opiate antagonist) uses again at some point, if only once. When asked if they got high and felt anything, they say things like, "No. My boyfriend hit me, and I can't take it anymore, so I just did what I used to do. I know it wasn't the right choice." These are things that need to be discussed, and providers should be aware of these issues. Deep, intensive cognitive-behavioral interventions are not always needed, but providers need to be open to exploring these types of issues that do come out with substance use disorders.

Linas added that if the choice were between MAT alone or MAT plus deep cognitive-behavioral therapy for all patients, comprehensive therapy is obviously preferable. However, the real choice in practice is between more MATs for many more people or MAT with therapy for fewer people; Linas would choose the former. Feinberg observed that the discussion is one-sided because it does not include addiction medicine experts. She clarified that therapy is generally provided in group settings rather than one on one. She has seen the positive effect of it (although maybe more so for some people than others) and reminded the group of the magnitude of

the trauma that some people are facing. She recounted a drug court judge in the south of West Virginia saying that the youngest person to appear before him had been shot up with drugs for his 11th birthday by his own father. "I don't know how you are going to get over something like that unless you have somebody to talk to…. Parents are supposed to be your defenders, not your initiators. That type of occurrence happens relatively frequently in my part of the world."

David Serota, an infectious disease fellow at Emory University, said that he is certified to use buprenorphine, but very few people in his system have the experience to supervise him or offer advice on minimal options. He noted that many hospitals do not have buprenorphine in their formularies, and there is often a lack of buy-in among the surgical and medical teams. He talked about strategies for breaking this institutional-level paralysis. Springer said that as soon as buprenorphine became approved for primary care, she felt compelled to become board-certified in addiction medicine through her infectious disease board. Despite her enthusiasm, it was made unnecessarily difficult and complicated. She emphasized that hospitals must be persuaded to provide buprenorphine for their patients—the Substance Abuse and Mental Health Services Administration (SAMHSA) guidelines clearly state that a provider can start a patient addicted to opiates with buprenorphine safely in the hospital. It can be done in the community, although issues related to extended-release naltrexone may make a hospital setting preferable.

The other issue is getting providers to treat people with opiate addiction in the community, said Springer. Even if patients are started in a hospitalized setting, colleagues in the community need to get onboard. The onus is on those who understand the guidelines to go out and educate people about how easy it is to start someone on treatment. Burk described a parallel example related to training primary care physicians to treat HCV. Through an intervention that was not high cost, dozens of providers were trained and hundreds of patients being treated as a result of building political will and peer-to-peer outreach among providers. Linas suggested that Project ECHO for buprenorphine is another model that could be used to find short-term supervision and to train a long-term onsite supervisor. Korthuis said that Project ECHO is an exciting innovation that is also applicable to rural America, because it is a Web-based telementoring system. In Portland, for example, doctors from around the state log in weekly for an hour to present their toughest patients (e.g., a patient that may start buprenorphine) and receive expert feedback from an interdisciplinary panel of specialists. That model has been replicated in HCV and HIV treatment settings, he said, and there may be some potential for synergy in the HCV and HIV ECHOs around buprenorphine

support. A workshop participant suggested that an additional resource for finding a potential remote mentor for buprenorphine or methadone is the Physician Clinical Support System.

Christopher Matthews, medical director of the Owen Clinic at the University of California, San Diego, asked whether evidence indicates that physicians' opioid prescribing practices for pain management (per the 2016 CDC opioid guidelines) is contributing to increased risk of non-prescription opioid use. Zaller did not know if it has been modeled yet, as the current focus is directed toward ensuring that physicians have read the guidelines or even know about them; it is also unclear how many providers who do know about the guidelines are adhering to them. He described an approach in Arkansas in which pharmacists ask doctors to reduce the number of pills prescribed to patients that come in over 90 morphine equivalents. Patients who do not agree cannot have prescriptions filled at the same pharmacy anymore.

Korthuis said that the Oregon Health Authority has looked at admissions for heroin use disorder. Earlier in the decade, the majority of people had their first exposure to opioids as prescription opioid misuse and then progressed to heroin. But in recent years, heroin is the initial opioid for more people (especially younger people) admitted to treatment facilities for heroin use disorder. A CDC grant is working to link the state's prescription drug monitoring program (PDMP) data with its Medicaid data to look at people on chronic prescription opioids who are ultimately diagnosed with heroin use disorder, Korthuis said, so more information will be available in the next year. A practical consideration is that treatment is starting to get ahead of empirical evidence, he added. Some doctors see patients who are unable to taper from high-dose prescription opioids for chronic pain to safer dosages recommended by CDC guidelines, and they may prescribe buprenorphine to those patients instead. This is a grey zone, because opioid use disorder can be challenging to diagnose in patients with chronic pain and patients without opioid use disorder may still benefit from sublingual buprenorphine, which is not currently approved for treatment of pain. It is an exciting opportunity for research, Korthuis said, but the field needs a randomized trial of patients with chronic pain comparing continued opioid taper according to CDC guidelines versus switching to buprenorphine.

Linas highlighted concerning evidence that physician prescribing is driving the epidemic, but she acknowledged the risk of a huge pendulum shift. Acute pain and chronic pain are different, but people are being lionized for having a total knee replacement without taking any opioid for pain, for example. This message that all prescribing is bad and that the strong can go through surgeries with no opioids is oversimplified, he maintained. Opioids work well for acute postoperative pain, and

there is no need for pain management to regress to the Civil War era, when patients were biting on sticks. The critical moment to intervene, he said, is when a patient has a 7-day prescription for opioids after surgery and comes back for a refill. An absolute lockdown on all opioids for all patients is not the appropriate strategy, he said. del Rio noted that the United States consumes 90 percent of prescription opioids without having an equivalent amount of the world's pain—the global inequity in access to opioids for pain treatment is huge. He suggested that we improve knowledge of pain management for providers and that simple system-level interventions within electronic health records (EHRs) be implemented.

Zaller remarked that Arkansas state law mandates that physicians check the state's PDMP prior to prescribing opiates, and Epic, an EHR, has been reconfigured to reflect this. Anika Alvanzo of Johns Hopkins University said that as of July 2017, Maryland required anyone with a controlled dangerous substance license to register with the PDMP and in July 2018, providers will have to document that they checked the PDMP before writing an initial prescription; for ongoing prescriptions, providers must verify that they are checking the PDMP every 3 months. Johns Hopkins has started an initiative called the Opiate Clinical Community to specifically targeting opiate prescribing. Patients with chronic pain attend a perioperative clinic prior to receiving any elective procedures, to consult with a pain specialist and develop a pain management program.

Sharon Morgan of the American Nurses Association suggested that the potential practitioner pool comprises nurse practitioners, physician assistants, and pharmacists. She noted that a sizeable portion of people involved in infection prevention are registered nurses and that certified nurse midwives can support women who have opioid use disorders and are pregnant. Springer concurred that nurses, nurse practitioners, and physician assistants are critical because they are the ones administering extended-release naltrexone, and they could also administer more buprenorphine if excessive restrictions on the numbers of patients were lifted. Using visiting nurses to administer medication is another potential avenue supported by good data, she said, which may come to the fore when new long-acting injectables (such as long-acting, 30-day buprenorphine) become available. She also suggested lifting the prescribing limit on buprenorphine. Korthuis maintained that such limits should only be lifted beyond the current limit of 100 patients for primary care providers without special expertise if providers are supported in high-quality prescribing practices, or it could increase the risk of overprescription, even though buprenorphine is a partial agonist that is safer than any of the full agonists. He warned that the medical and nursing communities missed the boat on oxycodone overprescribing. He agreed that the medical treat-

ment community needs to support best practices in buprenorphine prescribing or the same thing could happen again.

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4

Exploring Opportunities in Correctional Health, Law, and Law Enforcement

This chapter summarizes presentations and discussions about opportunities for treatment and prevention in correction health, law, and law enforcement. Josiah "Jody" Rich, professor of medicine and epidemiology at the Warren Alpert Medical School of Brown University, described the interplay between correctional health and the opioid epidemic. Leo Beletsky of Northeastern University's School of Law and Bouvé College of Health Sciences and University of California, San Diego, School of Medicine explored the use of law as a tool for addressing addiction and its consequences. Captain Katie Goodwin of Anne Arundel County Police Department, Maryland, provided a law-enforcement perspective on the opioid epidemic.

CORRECTIONAL HEALTH AND THE OPIOID EPIDEMIC

Jody Rich focused on the opioid epidemic in correctional health settings, drawing on two decades spent working in prison health care. In the midst of an epidemic of incarceration, he observed, the United States also has an epidemic of opioid use disorder. The natural history of opioid use disorder often leads to involvement with the criminal justice system, he added, and the system has the potential to play an important role in reducing the opioid epidemic and its infectious disease consequences. Despite a glut of resources being poured into the criminal justice system supposedly aimed at dealing with addiction, he stated that punishment does not work against addiction. He cautioned that resources are being

squandered by filling jails and prisons, which is exacerbating the opioid epidemic in correctional facilities rather than mitigating it. He observed that prisoners, minorities, poor people, and people living with HIV are all very stigmatized populations, but people with addiction are the most stigmatized of all: the perception that they are the "lowest of the low, the subhuman" pervades the culture. While the focus on eliminating the opioid epidemic and associated infections is critical, he said, it should also be used as an opportunity to examine the stigma around people with this disease, the people that provide care, and the programs that provide care.

Epidemic of Incarceration

Concerns about increasing rates of incarceration in the United States first came to the fore in the early 1980s, explained Rich, and subsequent years saw the U.S. state and federal prison populations explode from around 400,000 people in 1982 to almost 1.5 million people in 2015. The racial disparities in prisons across the country are striking, he added. The lifetime likelihood of imprisonment is 1 in 9 for all men, but the likelihoods are 1 in 3 for Black men, 1 in 6 for Latino men, and just 1 in 17 for white men (Bonczar, 2003). The disparities in likelihood of imprisonment among white women (1/111) versus Black women (1/18) and Latina women (1/45) are less extreme but still striking, he added. More than half of people in U.S. prisons have a diagnosis, or dual diagnosis, of drug dependence, alcohol dependence, and/or serious mental illness; the rate of opioid use disorder hovers around 15 percent (Baillargeon et al., 2009; James and Glaze, 2006; Peters et al., 1998).

There are substantial overlaps between infectious diseases and incarceration and between incarceration and addiction, Rich said. Prisons and jails across the country have a huge amount of turnover, with around 10 million people coming in and out of incarceration each year. A study on the percent of the total burden of infectious disease passing through correctional facilities in 1997 found that between 20–26 percent of people with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) cycled through prisons and jails that year, as did 12–16 percent of people with chronic hepatitis B virus (HBV), 29–32 percent of people with hepatitis C virus (HCV), and around 38 percent of people with tuberculosis (Hammett et al., 2002). The dramatic drop in age-related deaths countrywide in the mid-1990s due to effective antiretroviral therapies was mirrored in correctional settings, Rich said, which indicated that some people were receiving treatment inside.

However, very little is known about health care provided in correctional settings owing to lack of accountability (other than through litigation), lack of standardization, and lack of evaluation of the care and treat-

ment prisoners receive. A retrospective cohort study followed more than 2,000 HIV-infected inmates who were discharged from the Texas prison system with 10 days of antiretroviral medication. They were required to refill the prescription within 5 days to continue their therapy, and only 5 percent filled the prescription within 10 days, and only 30 percent had done so within 60 days (Baillargeon et al., 2009). Therefore, 95 percent of people on HIV treatment interrupted their therapy upon their release and were thus more likely to transmit the infection at a time when they were likely to reengage or newly engage in sexual relationships and/or relapse to drug use. Even though care is provided inside the prisons and outside the prisons, he added, the transition out of prison is a critical point at which care is interrupted.

Opioid Epidemic

Turning to the opioid epidemic, Rich emphasized that drug overdoses are now the leading cause of death for Americans under the age of 50. He reported that up to 65,000 people are estimated to have died from overdose in the United States in 2016 alone, surpassing the peaks for gun violence deaths (just under 40,000 in 1993), HIV deaths (more than 45,000 in 1995), and car crash deaths (just under 55,000 in 1972). The proliferation of fentanyl is further promulgating the epidemic in all corners of the country, said Rich, as are the high rates of incarceration and social determinants of health such as poverty, income inequality, poor education, lack of health insurance, lack of health care, and lack of Medicaid expansion. Rich explained that addiction is a primary, chronic brain disease that is poorly understood, but has defining characteristics of compulsive drug seeking, continued use despite the adverse and harmful consequences, and cycles of recurrence and remission.

Three types of factors contribute to the development of opioid use disorder. The first, genetics, is likely the most powerful. The second are situational characteristics, such as peer pressure and experiences of trauma and/or abuse both before and after opioid use—the latter is almost universal among women but also common in men, he added. The third component is exposure, because people cannot develop opioid use disorder if opiates are not available; on the contrary, the market is now flooded with millions of prescription opiates. A person who uses prescription opiates is then at risk of transitioning to cheaper heroin, and then starting to inject it because of increased tolerance.

Rich explained that opiates have two fundamental characteristics—tolerance and withdrawal—both of which can occur within days or weeks of first using an opiate. Figure 4-1 provides a visual representation of how tolerance and physical dependence on opioids can develop. Increased

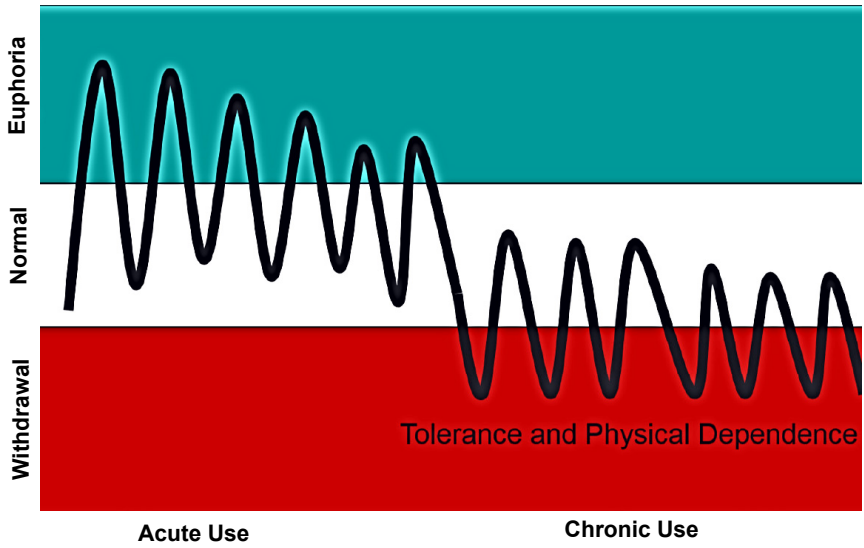

FIGURE 4-1 Opioid euphoria and withdrawal.
SOURCES: As presented by Josiah Rich at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; adapted from Dole et al., 1966.

tolerance necessitates increasingly higher doses to get the same euphoric effect. Rich likened the withdrawal phenomena to feeling like you are going to die. This causes people to resort to desperate measures to obtain more drugs and stop the withdrawal. Over time, people may not even experience the feeling of euphoria anymore—they just want to feel normal by using to get out of withdrawal. He added that incarcerated patients who have not used opiates in years, can experience physiologic withdrawal symptoms just from talking about using opiates, despite the drugs having had such disastrous consequences in their lives.

"When you think about all of the challenges of transitioning from being incarcerated to being back in the community … it is a wonder that anybody is able to make that transition without relapsing," Rich said. However, medications for addiction treatment can and do save lives. Baltimore ramped up opioid agonist therapy (OAT) and drove down overdose deaths by almost 80 percent by 2009. Three very effective medications are available that work through different mechanisms to block a patient from getting high and keeping the patient out of withdrawal (see Figure 4-2). Despite clear science that medications for addiction treatment are effective, people often face stigma that they are not actually "clean" if

they are on medication. This type of attitude—which may be espoused by the patient's family, policy makers, and even clinicians—leads to higher risks of relapse and overdose, he warned, and detoxification itself is not a treatment that helps people stay off drugs (Ling, 2016).

Rapid Access to Treatment in Correctional Facilities

Rich described his experience as part of the Rhode Island Governor's Taskforce on Overdose Prevention. An estimated 20,000 of Rhode Island's population of 1 million people have opioid use disorder, so the taskforce decided to provide medications for addiction treatment in every possible setting—emergency departments, hospitals, mental health clinics, and addiction treatment clinics. He noted that when emergency departments start patients on MAT, the rate of treatment success 1 month later is doubled. The taskforce also decided to provide MAT throughout the entire correctional system, including prisons, jails, courts, law enforce-

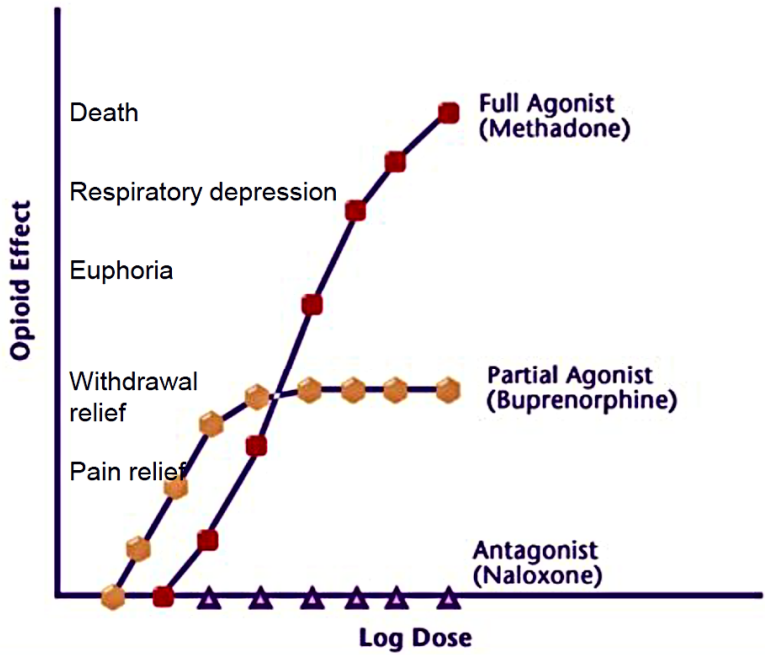

FIGURE 4-2 Opioid effect versus log dose for opioid agonist, partial agonist, and antagonist.
SOURCES: As presented by Josiah Rich at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 12, 2018; CSAT, 2004.

ment, probation services, and parole services. Previously, people in correctional facilities had been treated for opioid use disorder during their incarceration and then released without continuity of care. "When you take them off their illicit opiates, their tolerance goes down. You let them out and they are set up for fatal overdose," he explained. The state budgeted $2 million to establish a MAT program in the Rhode Island Department of Corrections that would screen everyone entering the system for opioid use disorder, offer the best possible treatment for each individual, and then link patients to treatment when they are released. The program began in the summer of 2016.

A recently published study compared data on mortality caused by opioid overdose in the general population to individuals with an incarceration in the 12 months prior to their death in Rhode Island during the periods of January–June 2016 (prior to the start of the program) and January–June 2017 (Green et al., 2018). The study found a 12 percent decrease in overdose mortality statewide, at a time when mortality curves elsewhere in the country were continuing to climb. Among people who had been released from incarceration within the previous 12 months, there was a 65 percent absolute decrease, representing a relative risk reduction of 61 percent in overdose mortality by connecting people with medications for addiction treatment in incarceration within 1 year of starting the program. He argued that based on these results, providing MAT in correctional facilities is clearly the right direction. However, he cautioned that MAT programs outside of the correctional system need to be ramped up because "There is almost no point in starting a treatment program behind bars if you don't have someplace to connect people to."

Discussion

Sandy Springer, associate professor at the Yale School of Medicine, wondered how expanding MAT for populations coming out of prisons and jails would affect the HIV and HCV epidemic, both for those who are living with HIV and with respect to improving the HIV continuum of care. Rich contended that the preliminary results of the intervention in Rhode Island indicate that it has great potential to mitigate the epidemic. He noted that the initial report only looks at overdose deaths, which is only the tip of the impact's iceberg, which also includes improvements in HCV and HIV care. A workshop participant asked how the Rhode Island correctional system was convinced to provide agonist therapy, because more correctional systems tend to prefer antagonist therapy. Rich explained that all three types of medications were available to patients. Of the first 1,000 patients, approximately half ended up on methadone and half on buprenorphine; only about a dozen patients opted for depot

naltrexone. He emphasized that 99 percent of correctional facilities across the country offer nothing and the ones that do offer treatment primarily offer an extended-release naltrexone program without follow-up.

Evidence suggests that the drug is effective, but a 60 percent reduction will not be achieved if only one medication is offered—the medication offered should be tailored to the specific person's symptoms and biological response, said Rich. To convince correctional authorities, the taskforce emphasized that providing the medication in a public institution (i.e., a correctional facility) is a public health intervention to address a nationwide public health epidemic. He acknowledged that diversion is a real problem that warrants security enhancements, given the abuse potential of methadone among people who are addicted to drugs. However, Rich argued that correctional facilities should not be permitted to make such decisions about which medications they provide. "This is a public health epidemic," he said, "We can't just let those 60 percent of people drop dead after they walk out of our facility because we don't believe in these agonist therapies. . . . That is absolutely unacceptable. That is morally wrong."

USING LAW TO ADDRESS ADDICTION AND ITS CONSEQUENCES

In his presentation, Leo Beletsky explored how law can be used as a tool to address infectious diseases and other negative health consequences of opioid use and misuse. Law and its enforcement are structural determinants of drug user health that have shaped the current opioid crisis faced today. Law can also help shape how infectious disease prevention research is translated into policy and how that policy is implemented on the ground, he explained. Law has both led and followed innovation in the realm of addiction and infectious disease, with current best practices evolving out of acts of civil disobedience. Policy change has been a bottom-up process in the broader field of infectious disease prevention as it applies to substance use in the United States. It often begins with local experimentation and percolates upwards to state-level adoption of interventions such as syringe exchanges, pharmacy reforms, and—potentially—safe consumption facilities. Policy tools and legal mechanisms are critical as enablers of effective implementation of these sorts of innovations, he said.

Beletsky sketched out a conceptual framework to explain how laws can have direct, indirect, and normative effects on the health of people who use drugs (PWUD). In terms of the direct effect, drug laws shape access to syringes and condoms; public health prevention efforts like syringe exchange programs (SEPs) and OAT require a legal basis (Blankenship and Koester, 2002; Davis et al., 2017; Green et al., 2012, 2018). Indirectly, drug laws shape drug user behaviors such as rushed injections,

syringe sharing, and overdose while incarceration drives disease transmission, substance use, and fatal reentry (Beletsky et al., 2013, 2015b). Normatively, laws can shape societal views and norms around certain risky behaviors, given that the very role of criminal law is to codify and project stigma. Marginalization further impedes public health efforts and is an entry point to isolation, discrimination in health care, criminal justice involvement, and so forth, Beletsky continued. On the positive side, law can also enable risk reduction through structural interventions to change the environmental conditions that shape health. The evolving field of public health law and public health law research focuses on designing and deploying laws as structural interventions with methodological rigor to improve public health (Beletsky et al., 2012; Burris et al., 2010). Legal interventions that have been advanced and propagated to reduce infectious disease risk include

1. decriminalization of syringe and drug possession;
2. authorization of syringe exchange, pharmacy sales, and OAT;
3. antidiscrimination laws;
4. access to health care, health insurance, housing, and wraparound services; and
5. due process and other procedural protections.

More structural-level legal interventions can also create an enabling environment to understand whether interventions are working in practice, said Beletsky. A caveat to legal interventions rooted in implementation science is how interventions translate to the ground level. Laws "on the books" are shaped to improve the risk environment for PWUD. However, their fidelity on the ground will not necessarily be perfect or even reflective of that objective, because laws "on the streets" shape how formal laws are implemented at the street level (Burris et al., 2004). This tension, he said, creates an imperative among people who use empirical tools to understand the policy transformation process to work on aligning street-level communication with the theory of structural interventions.

Beletsky drew a parallel between medical remedies and laws as structural interventions, by modeling society as the patient and law as the remedy. Within the clinical science realm, remedies must first be tested to understand the range of responses they can elicit in different individuals. This diversity makes it challenging to tailor an intervention to a specific individual. Like drugs, legal interventions have something like a "therapeutic window" within which the intended effect will be produced in different jurisdictions. Below the window's threshold, an intervention may produce no effect; above the threshold, it can have a toxic effect that calls for adjusting the intervention.

Beletsky explained that the trajectory of the opioid crisis has been substantially shaped by policy interventions throughout its evolution, from overdoses involving prescription drugs (the first phase) to overdoses involving heroin (the second phase). The current third phase is defined by a stratospheric increase in fentanyl-related overdoses, although both heroin and prescription opioids continue to be important factors. Modal policy interventions have included

- prescribing limits and guidelines;
- prescription drug monitoring programs;
- pill-mill laws and trafficking enforcement;
- prosecution of unscrupulous prescribers and dealers;
- reformulation and withdrawal of prescription drugs; and
- harm reduction interventions including Good Samaritan laws, naloxone access, and syringe exchanges.

Beletsky suggested that the prevailing focus on addressing the supply of opioids has come at the expense of addressing the underlying structural issues at play in shaping the crisis (Dasgupta et al., 2018). Legal and policy interventions have been major drivers of the large numbers of people who have transitioned to injection drug use, along with a variety of additional push and pull factors. Policy interventions, such as changes in the prescription drug supply, have shaped a range of negative collateral consequences in terms of infectious disease risk (Broz et al., 2018).

Although research has demonstrated policy responses that are helpful in addressing injection-related infectious disease risk, said Beletsky, that research has not been translated into policy. For example, syringe exchange is one of the best-studied and well-proven interventions, but it has been legally authorized by only 20 states as of 2018. In fact, 29 states continue to criminalize syringe possession despite evidence showing that criminal law does not deter people from engaging in drug injection (Burris, 2017). Only 11 of those states have legal exemptions for syringe possession related to public health activities, including syringe exchanges.

OAT is also well studied and proven to prevent disease transmission, he added, but the dismal access to OAT across the country has various legal drivers. In 16 states, methadone is not covered by Medicaid, one of the principal payors (amfAR, 2017). The 21st Century Cures Act (2016) created a funding push from the federal level to support MAT, infectious disease prevention, and recovery support. However, the law was framed at the agency level such that it did not specifically maintain that the money had to be used for MAT or OAT. As a result, preliminary data suggests that some states are using funds for MAT and others are using the funds for treatment options that are not evidence based (Beletsky, in press;

MDPH, 2017). Progress has been made, he said, but much work remains in translating effective policy interventions into an enabling policy environment for infectious disease prevention. Many states still lack optimal, evidence-based laws and those that have been established are fragile and may be repealed. He urged researchers to play a stronger role in actively educating and advocating for evidence-based policy.

Implementing Policy on the Street Level

Beletsky shifted to the implementation of laws on the street level, which is lacking even in states that do have evidence-based policy. For example, Kentucky has authorized syringe exchange, but still had very poor coverage in dozens of counties at high risk for HIV and HCV outbreaks as of January 2017 (see Figure 4-3). He noted that Massachusetts

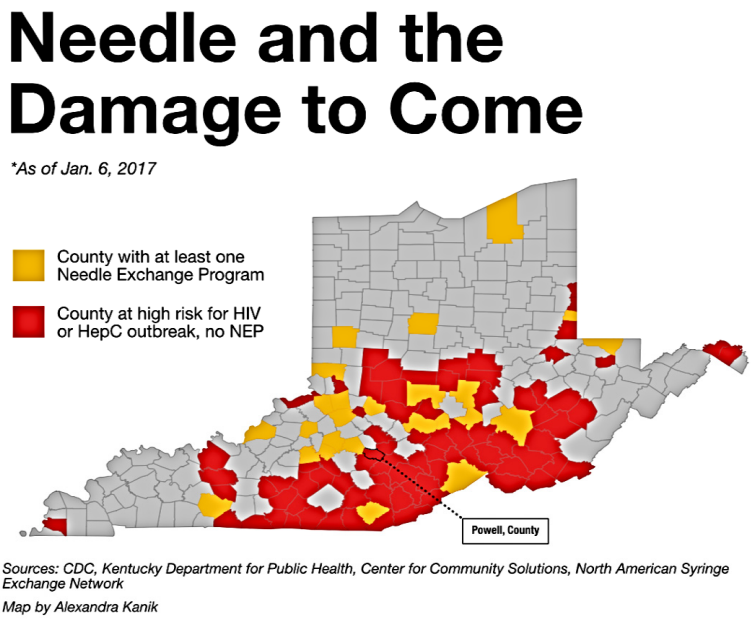

FIGURE 4-3 Distribution of Kentucky counties with needle exchange programs and high infectious disease risks (January 2017).
NOTE: SEP coverage data from Kentucky sourced from CDC, the Kentucky Department of Public Health, the Center for Community Solutions, and the North American Syringe Exchange Network.
SOURCES: As presented by Leo Beletsky at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 13, 2018; Kanik and Young, 2017.

has all the recommended policy elements in place, but still has very poor rates of OAT adherence and access. According to data from the state's department of health, only around 5 percent of people who had a nonfatal, opioid-related overdose had engaged in OAT treatment in the subsequent year (during 2013–2014) (MDPH, 2017).

Harm Reduction, Law, and Law Enforcement

Beletsky provided an empirical perspective on the role of law-enforcement interventions. Although law enforcement plays a critical role in the process of implementing laws on the ground, they can also aggravate the risk of infectious disease (Beletsky et al., 2011a,b,c; Blankenship and Koester, 2002; Burris et al., 2004; Davis et al., 2005; Kerr et al., 2005). Encounters with police such as arrest, syringe, or condom confiscation are associated with risk behavior and increased levels of infectious disease. While police interference with public health programs reduces their effect and can fuel epidemics, police can (and do) facilitate harm reduction by providing security and referring clients to services, for example. Aligning policing with public health warrants a multipronged approach that comprises law reform, changes in institutional policies and guidelines, police training, collaboration structures to bridge sectors, changing incentives, and surveillance and monitoring (Beletsky et al., 2005, 2012; Silverman et al., 2012). To illustrate, he described case studies from Baltimore, Maryland, and Tijuana, Mexico.

The Baltimore project sought to track police encounters around SEPs to understand the structural role of police in shaping access to syringe services (Beletsky et al., 2015a). Registered clients in the SEP are protected by state law in Baltimore City, and the police department policy specifically protects SEPs and their clients. However, police encounters that were theoretically prohibited by the policy (e.g., syringe confiscation and other harassments) were still commonplace. To address this, they developed a program of annual in-service training for police covering occupational safety, drug policy, and the rationale for public health programming.

An ongoing intervention study in Tijuana, Mexico, seeks to transform the role of law enforcement from acting as a structural barrier to facilitating access and contributing to an enabling environment for prevention (Strathdee et al., 2015). In partnership with the local police academy, the intervention is training police officers using a framework focused on the police's intrinsic motivation, such as concerns about occupational safety (e.g., needle sticks) and frustrations around the lack of appropriate tools for working with people who inject drugs (PWID) and other vulnerable populations (Beletsky et al., 2005, 2013; Cepeda et al., 2017). After 3 months, attitudes and knowledge among police had shifted significantly

and were more in line with public health goals regarding SEPs, OAT, and referrals to health and social services (Arredondo et al., 2017). Police behaviors had also changed, with decreases in the frequencies of confiscated syringes (of almost 7 percent), in arrests for heroin possession (of more than 11 percent), and an increase in the frequency of drug users referred to services (more than 8 percent). The intervention is promising in terms of cost-effectiveness, Beletsky said, but additional interventions are needed to motivate more of the officers.

The framework of implementation science is cyclical, said Beletsky. It requires translating evidence-based policies to the street level, coupled with monitoring and evaluation to tailor and adjust laws as necessary based on empirical evidence (see Figure 4-4). Laws can both enable and hamper infectious disease prevention in context of current crises, thus effective translation and implementation are both critical in achieving public health goals. He concluded with a warning that in several jurisdictions where the policy environment has improved, major efforts are under way to reverse the progress. For example, Indiana has seen two of its

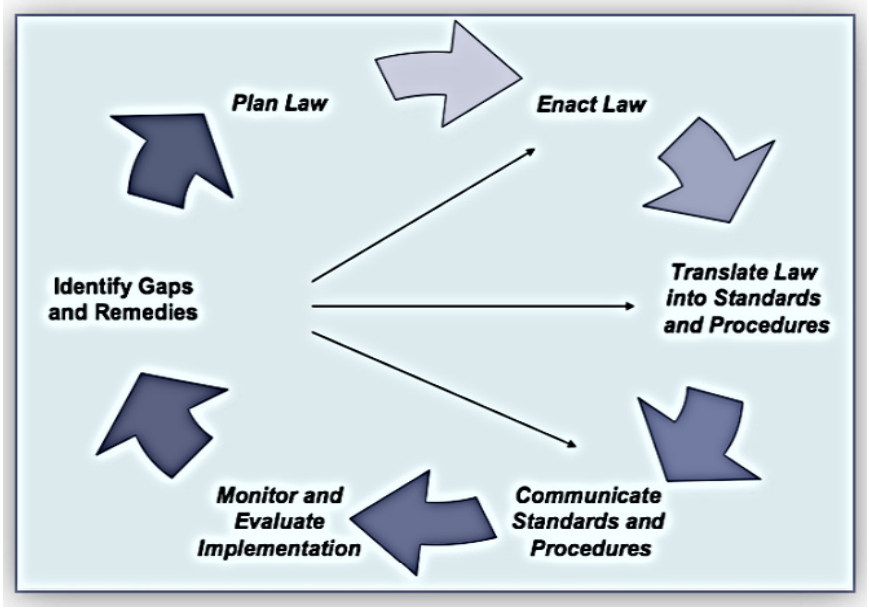

FIGURE 4-4 Cycle of implementation science.
SOURCE: As presented by Leo Beletsky at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 13, 2018.

five SEPs closed within 1 year and a similar situation is evolving in West Virginia, where opponents are calling for closing established SEPs and recriminalizing syringes. "This puts the onus on us to assist those who are trying to work towards more evidence-based policy environments," he maintained.

OPPORTUNITIES FOR LAW ENFORCEMENT AND FIRST RESPONDERS

Like many communities across the country, Anne Arundel County in Maryland has faced rising numbers of overdoses and fatalities related to opioid use since around 2014. The police department soon realized that they would not be able to "arrest their way out of the problem," said Katie Goodwin. She explained that the police department is working to tackle the opioid epidemic by shifting their paradigm to a three-pronged approach encompassing law enforcement, treatment for people who use drugs, and education about the opioids. Strong partnerships with the health department and the state attorney's office serve as the foundation for the approach, she added.

Law Enforcement and Prosecution of Dealers

The law enforcement prong is centered upon the prosecution of dealers who supply and deal opioids, said Goodwin. She emphasized that they are not targeting people who use opioids with criminal charges, such as when they respond to a house where someone has overdosed. Rather, they view people who use opioids as victims that need support and treatment.

Good Samaritan Law

Goodwin described how the department has been working to increase the community's awareness of the county's Good Samaritan law, which protects people from being arrested or criminally charged if they call emergency services to help someone who has overdosed and needs medical care. The law was put in place because people were reluctant to call 911 due to fear of being arrested if the overdose occurred in a setting where drugs and paraphernalia were present, for example. "Our whole goal is to get us there on the scene, so we can help that individual, so they don't die," she said. "Saving lives is outweighing us locking up these [people who call 911], which we know isn't going to do any good for them or for the system." She reported that the law has encouraged more people to call emergency services in a range of settings where they would

otherwise have been reluctant to call, such as parking lots, convenience store bathrooms, or residences.

Heroin Taskforce and Fatal Overdose Unit

To strengthen the law enforcement approach to addressing the increasing numbers of opioid-related overdoses and fatalities, the Anne Arundel County Police Department created a heroin taskforce and a fatal overdose unit. Goodwin reported that the county had more than 150 opioid-related fatalities in 2017 and 35 fatalities as of March 2018, which exceeds the 21 fatalities that had occurred by the same point in 2017. The heroin taskforce is a dedicated team that primarily investigates dealers who are bringing narcotics into the county and particularly dealers who sell opioids linked to overdoses. The interagency taskforce comprises seven members including three Anne Arundel County narcotics detectives, state police officers, and officers from neighboring jurisdictions of Annapolis City and Baltimore City. Thus far, several major dealers have been prosecuted, some of whom had brought drugs into Anne Arundel County from as far away as California, New York, and Texas.

The fatal overdose unit, created in the summer of 2017, includes a sergeant and four detectives who are only responsible for dealing with victims of fatal overdoses. If toxicology analysis indicates that the person who died tested positive for opioids, the unit is responsible for investigating the death as if it were a homicide. She said that 35 people are under investigation by the unit and three people have been charged with manslaughter thus far. The first person charged with manslaughter will go on trial in 2018 and will serve as a litmus test for how future trails are likely to unfold. She noted that a manslaughter charge actually carries a lighter jail sentence that a charge of opioid distribution, so they are working to change the law and make manslaughter a stiffer charge so that it serves as a greater deterrent for dealers.

Treatment of People Who Use Drugs

The second prong of the police department's approach is focused upon treating people who use drugs. All officers on patrol carry naloxone as part of their issued equipment, so that they can quickly administer it as first responders on the scene of an overdose. Goodwin reported that naloxone needs to be administered by one of their officers on a daily basis in the county. Each officer now carries two vials of naloxone with them, for two reasons. First, it often takes multiple doses of the drug to revive people who have overdosed—in one case, it took seven doses to save the person's life. The second vial is also carried to protect officers' safety if

BOX 4-1
Ensuring the Safety of Responding Police Officers

Goodwin explained that like many communities, Anne Arundel County is facing a rising scourge of overdoses related to fentanyl. Of the 35 fatal overdoses in the county between January and March 2018, 11 of the 13 completed toxicology reports came back positive for fentanyl (and only one for heroin). She said that fentanyl is also posing a serious threat to police offers responding to the scene of an overdose. When they enter a person's residence fentanyl and heroin may be present that is airborne and can be ingested by officers and cause them to experience side effects of overdose. During the discussion, Goodwin elaborated that extremely small amounts of fentanyl can cause overdoses. She said that two officers have had to be physically transported by medics to the hospitals for treatment. In the region, several officers have had serious consequences of exposure, including one who went into cardiac arrest. To protect their safety, each officer now carries two vials of naloxone so that first responders can be treated if necessary. Furthermore, officers are no longer permitted to field test drugs found at the scene of a response and they no longer carry out testing at the police station. All drugs found at a scene are packaged using safety precautions and sent to a laboratory for testing.

SOURCE: As presented by CAPT Katie Goodwin at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 13, 2018.

they are exposed to opiates when responding to a scene, especially given the escalating influx of fentanyl in the drug supply (see Box 4-1).

Mobile Crisis Unit

The police department has a robust partnership with the department of health, meeting regularly and sharing information weekly. Overdose information is used to map overdoses and fatalities and monitor trends to investigate spikes in certain areas. Goodwin said that a key component of the partnership was the creation of a mobile crisis unit staffed by trained clinicians. The unit was established to assist officers on the scene in dealing with individuals with mental health issues, for example, who have not done anything criminal but clearly need support and treatment. The mobile crisis unit has now been integrated into overdose response, to support family members and recovering victims at the scene of an overdose. The unit is also geared toward trying to help overdose survivors access care in treatment facilities. However, a serious barrier is the lack of available treatment facilities for people to enter immediately when they

request treatment; they can face delays of up to 30 days, said Goodwin, during which time many of them will continue injecting drugs and risk fatal overdose.

Safe Stations Program

The "safe stations" program began in April 2017 as another way to help engage people in treatment, said Goodwin. The campaign encourages people who wish to seek treatment to come to any of the police or fire stations in the county, where they can turn in their drugs and paraphernalia for disposal with no risk of being criminally charged. The mobile crisis team provides support in helping people who self-present to access treatment as quickly as possible. The program has been very successful, with 250 people presenting themselves (mainly at fire stations, caused by lingering hesitance around bringing drugs into a police station) for treatment in 2017, among whom there has been a treatment success rate of greater than 60 percent. As an additional form of outreach, everyone arrested in Anne Arundel County for any reason is issued a letter that provides information about how to get help for a drug or alcohol problem.

Educating Communities and Providers

Educating communities is critical in stemming the tide of opioid-related overdoses and fatalities in the county, said Goodwin. A vital component of the education prong of the police department's approach is called the "Not My Child" program, a traveling panel composed of representatives from law enforcement, the fire department, the state attorney's office, the department of health, and a treatment facility. Often the panel includes a recovering addict as well as a person who has lost a loved one to opioids (see Box 4-2 for vignettes of two of the people who frequently participate in the panel). The program was developed to counteract the prevailing attitude among the community that the epidemic will not affect their own neighborhoods and families, when in fact the epidemic is sweeping across all demographic, socioeconomic, and geographic lines and through people in all walks of life—she has seen doctors, lawyers, teachers, and law enforcement officers become addicted. The panel works to emphasize that the epidemic will ultimately affect everyone, either firsthand or through someone they know. Goodwin is passionate about tackling the opioid epidemic because of the destructive swath that it cuts through families and communities, killing people and devastating their entire families.

According to Goodwin, they are planning to visit every high school and middle school in the county with the Not My Child panel to educate

BOX 4-2
Personal Stories of "Not My Child" Panelists

To put a personal inflection on the devastating effect of the opioid epidemic in Anne Arundel County, Goodwin shared the experiences of two frequent panelists in the Not My Child program, which aims to educate communities about the consequences of opioid use.

"One woman, the mother of twin boys, talks about how they both got addicted to heroin. She says it all started with sports and with those painkillers. Believe it or not, heroin is a lot cheaper than oxycontin and it is a lot easier to get. That is part of the problem: these kids get hooked on it because they have gotten into sports, they have gotten injured, and now they have gotten hooked on these pain killers. Then when they can't get any more painkillers, they go out and they get turned onto heroin. One of her twin sons went through five different treatments. Unfortunately, he ended up passing away due to a fatal overdose. But just 2 weeks ago, she lost her second son, who had also been recovering. He was 5 years sober. It is heartbreaking."

"One very courageous young lady sits on our panel all the time. Do you know how she got into drugs? Because she was at a family event, a Christmas party, and her aunt gave her a glass of wine to try at the age of 16. She liked it a lot. She started drinking a lot. Then all of a sudden, she started smoking marijuana. Then she got introduced to something that was put into her marijuana, which happened to be cocaine, which led to heroin. And now she is 6 years sober, but she has gone through six recoveries."

SOURCE: As presented by CAPT Katie Goodwin at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 13, 2018.

students and their parents, as well as holding open town hall meetings. Goodwin encourages parents to bring their children to the panel and start the conversation about opioids with them starting as young as fifth grade. She urges parents to remember that their job is not to be their child's friend and strongly discourages them from falling into the trap of allowing their adolescents to consume alcohol and drugs in their homes, under the false assumption that they will be safe. Parents are often reluctant to attend Not My Child discussions owing to fear of social stigma, but they are trying to convince parents that the program is about promoting open discussion around opioids and providing resources to support people who need help.

Goodwin said the police department is also working to educate physicians in order to reduce the rampant overprescription of pain medication, especially to young people. She conceded that parents instinctively want to protect their children from physical pain, but she warned that it can be

dangerous for children to grow up thinking that they will never have to experience pain. She also reminds people that they do not have to take all of the opiates that are prescribed to them. However, extra pills should never be kept in the home, where they could be stolen, nor should they be flushed or thrown in residential trash. All police stations in her county have a pill drop box where people can dispose of their leftover prescriptions to be incinerated safely, and this facility has been very well used by the community, she said.

PANEL DISCUSSION ON LAW AND LAW ENFORCEMENT

Goodwin remarked that when safe needle exchange programs were first being discussed, her initial reaction was that such programs would be enabling and encouraging users, but she came to realize that people are going to use drugs until they can get treatment whether there are programs or not, so it would be better to try to prevent infectious disease and overdosing. She noted that Baltimore City has a robust SEP program in place already. She suggested that further discussions with the health departments about these SEPs and other innovative strategies may help law enforcement to become more open minded, given that their job is to prevent people from dying. Goodwin said that the messaging to the public about the benefits of SEPs should come from health departments, but law enforcement can also play a vital role in publicizing their lack of intent to charge people for possessing drug paraphernalia. Beletsky added that collaboration among sister agencies is critical. He suggested that the best way to bring law enforcement on board is to find common ground, such as by framing discussion in terms of how SEPs and harm reduction programs can benefit the police. Tapping into their intrinsic motivation opens the door to a shift in mindset about harm reduction, especially among street-level and patrol officers.

Beletsky commented on drug-induced homicide or manslaughter prosecution, a police-side policy innovation that is spreading relatively quickly in the United States. He was careful not to make any claims about Goodwin's jurisdiction, but he relayed some of the findings of his ongoing research on this topic. Among people charged with drug-induced homicide or similar prosecutions nationally, they found that actually about half of the people charged were partners or friends of the deceased overdose victim, shedding doubt on the idea that these prosecutions are leveled against bona fide dealers (Health in Justice, 2018; Siegel, 2017). With respect to the race of the people involved, modally it is frequently people of color as a dealer and a white victim (Siegel, 2017). The average sentence imposed is about 7 years. In the context of the opioid crisis, he said, there is a concerning disconnect between these sorts of drug-induced

homicide prosecutions and Good Samaritan law designed to encourage health seeking (Latimore and Bergstein, 2017). In research, PWUD express serious concern about being charged in this way, given the visibility of such prosecutions and how they are publicized as a way to deter drug dealers (Latimore and Bergstein, 2017). This cross-purpose messaging changes the informational environment for PWUD: on one hand, there is an amnesty for people who call 911 but on the other, there are announcements about people doing significant time. He called into question the practice of deploying homicide investigation teams to conduct criminal investigations at the scene of an accidental overdose.

Goodwin clarified that the people being prosecuted in her jurisdiction do not fit the descriptions Beletsky provided and were not associated with each other outside of the narcotics deal, but she conceded that this may not be the case in future. She said that when informed that their loved one would not be incarcerated for reasons related to drug use, families have told officers that they wish their family member would be locked up so that they would not be able to use any more drugs. "That would not have been the answer," she said, "but the desperation of these parents is clear because they don't know what else to do."

Beletsky agreed about this level of desperation, noting that people in crisis (typically families) are leaning on the state to coerce their loved ones. Involuntary commitment is becoming increasingly prevalent in the United States, with an increase from 13 to 38 jurisdictions that authorize involuntary commitment. This has created major problems in Massachusetts, he added (Beletsky et al., 2018). In addition to objections around civil liberties, people taken into custody who have opioid use disorder should be given the option of receiving evidence-based treatment, but as a rule, they are not (Beletsky et al., 2018). As a result, with involuntary commitment and incarceration, there is a major problem with fatal reentry. That is, when people are eventually released they will have detoxed but often return using drugs, then relapse and die at alarming rates.

The postincarceration overdose rate in Massachusetts is 56 times the background rate. People who are involuntarily committed into treatment have a 2.2 times higher risk of fatal overdose than those who enter treatment voluntarily (MDPH, 2017). "There is an ethical imperative to figure out how to deploy these interventions that actually reduce harm and not enhance it," he argued. Given that OAT is proven to slash overdose rates by 50 to 80 percent or more, he said, it is shocking that so many postoverdose regimens and interventions do not include access to OAT. Even in Massachusetts with its relatively robust treatment sector, resources for people in crisis to access help on demand are scarce. Before turning to coercive modalities, Beletsky advised, people should be given an opportunity to enter and to seek help voluntarily. Instead, people are being forced

either into the correctional system or the civil commitment system, where they are being warehoused instead of receiving help.

Natasha Martin agreed that people should have access to evidence-based, voluntary treatment services, adding that the government in Tijuana has expanded funding for compulsory, abstinence-based treatments (Rafful et al., 2018). The intervention has been associated with an increase in receptive syringe sharing among PWID, and subsequent modeling work has shown that expanding those programs could fuel the HIV epidemic among PWID, compounding the problems of overdose and infectious diseases (Rafful et al., 2018).

Springer said that she works with incarcerated populations, focusing on the intersection of opioid use disorder and HIV and improving those outcomes. She pointed out that many drug dealers are also drug dependent, so prosecution will not improve their health, given that people incarcerated in the United States have 8 to 10 times the background rate of opioid use disorders, and most incarceration facilities do not provide any effective medications prior to release. The number one cause of death of all released prisoners and jail detainees is opioid overdose, she said, regardless of how long they have been incarcerated. Before incarcerating these dealers, she added, they need to be assessed for substance use disorders, HIV, and HCV, and they need to be linked to treatment and/or harm reduction as needed. Springer noted that many residential treatment programs are detox-based treatments, which are known to be ineffective and are tantamount to forced incarceration. People "failing" treatment at detox facilities should instead be linked to effective medications, like OAT or extended release naltrexone. Many women are not necessarily involved with the drug trade by personal choice, she added, so treatment interventions that involve involuntary commitment to residential treatment programs may effect their ability to stay with their children, as well as other deterrents. Springer suggested linking them with community-based treatment services instead.

Goodwin responded that the police department facilitates voluntary treatment and does not force people into treatment; she said that the health department handles the specifics of the types of facilities where people can access treatment. She added that law enforcement officers are the ones dealing with the families that have lost somebody and are looking for answers about who is responsible for killing their child. It is not different than a man taking a gun and shooting them. Law enforcement officers are very selective about the cases that go forward with prosecuting; usually a person has been linked to five or six other fatal overdoses before being charged. However, they cannot turn a blind eye because law enforcement is in the business of locking up dealers who sell drugs that kill people.

Todd Korthuis, program director for the Oregon Health & Science University's Addiction Medicine Fellowship, commented on legal issues related to patients who face incarceration after hospitalization for life-threatening infections related to opioid use, who have longer lengths of stay and costs of care because they must stay in the hospital until they finish their course of IV antibiotics. Patients who are started on appropriate treatment for opioid use disorder but are then incarcerated often experience gaps in care (as most correctional facilities do not offer buprenorphine or methadone continuation) and may also lose Medicaid coverage depending on the length of incarceration. These patients have a marked risk of relapse, overdose, and rehospitalization due to life-threatening infection. Korthuis asked if policy solutions could bridge this gap between loss of Medicaid and continuation of treatment.

Beletsky explained that laws are societal, normative statements about how substance use and its related harms are approached. The Social Security Act includes a provision that bans the use of Medicaid and Medicare dollars in correctional settings, he explained, although there is no empirical justification for doing so and it drives severe underresourcing of health care in correctional settings. A legal statutory fix is needed and is overdue, he said. Some correctional settings are trying to work with that provision, by electing to suspend rather than cancel insurance policies, Beletsky added, because cancelled policies are much more difficult to reinstate that suspended policies. He emphasized the need for better bridging from correctional settings into the community and across the disciplinary disconnection between corrections, public health, and health care.

Jessica Tytel of the Department of Health and Human Services' Office on Women's Health remarked that women who use drugs or live in a household with PWUD are often hesitant to involve law enforcement or become involved with the legal system due to fear of losing custody of their children. Goodwin agreed and said that her department works to assure women that the goal is not to separate women from their children, but to help women create a healthy environment for them and their children. They have women-only residential facilities, which some women enter voluntarily, with their children, to receive help in overcoming their substance abuse. Anne Arundel County law enforcement visits the facilities regularly to discuss opioids as well as resources for support in dealing with domestic violence. Beletsky said that it was heartening to hear Goodwin's comments, because concerns about child protective services figure prominently in women's willingness to access services and to call for help in an overdose situation. However, he said that it is standard practice for child protective services to become involved when people are on OAT, which can be the basis for loss of custody. Such stigma emerges not only from statute, he said, but also from nonsensical institutional

policies because the known benefits of evidence-based treatment have not been translated to jurisdictions such as child protective services. He noted that many other elements of the policy environment, such as public housing policies around substance use, should be better aligned with advances in public health.

Carlos del Rio, professor of global health, epidemiology, and medicine at Emory University, remarked that there are tensions at play in communities over the change in law enforcement's approach to the opioid epidemic. When opioid addiction and drug problems were primarily problems in African American communities, as they were for many years, the role of police was to incarcerate people. Now that opioid addiction is a problem in white communities, the role of law enforcement is to be compassionate (e.g., Good Samaritan Laws). He asked how the African American community could be expected to trust the police given this history. Goodwin responded:

> African American communities have got to be heard out with law enforcement listening to and validating their concerns. Then trust must be built like anything else. When trust has been broken, which takes very little and has been done repeatedly in those communities, it takes a long time to build it back up. It can't be done overnight.

She said that they have made great strides in developing friendships and partnerships in her county, but there is still work to be done to build trust and help younger generations to see law enforcement in a different light—not as people who are going to come in and lock up their mothers or fathers or friends, their uncles, their brothers, their sisters. Officers in her department engage with communities through sports and through activities and outings with young people. del Rio described similar efforts being made by the Policing Project, an organization run by lawyers and the police that tries to serve as the glue to bring the police and the community together toward building trust. Goodwin added that the philosophy of community-oriented policing has been around for many years, but that philosophy was not upheld and trust was broken. They are working diligently to rebuild that trust and become partners with their communities, she said, because trust has to be in place before a critical incident happens.

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5

Research Directions, Policy Initiatives, and Potential Ways Forward

This chapter features presentations on research directions, policy initiative, and potential ways forward in addressing the opioid epidemic and its infectious disease consequences. William Powderly, Dr. J. William Campbell Professor of Medicine and Larry J. Shapiro Director of the Institute for Public Health at Washington University in St. Louis, offered an overview of the Infectious Disease Society of America. Elisabeth (Els) Houtsmuller described the work of the Patient-Centered Outcomes Research Institute (PCORI), where she is associate director in the Healthcare Delivery and Disparities Research program. Anika Alvanzo, assistant professor of medicine at the Johns Hopkins University School of Medicine, presented some of the advocacy work done by the American Society of Addiction Medicine.

RESEARCH DIRECTIONS AND POLICY INITIATIVES

Infectious Disease Society of America

William Powderly provided an overview of the Infectious Disease Society of America (IDSA), which currently represents more than 11,000 physicians, scientists and other health care professionals who specialize in infectious diseases. IDSA's purpose is to improve the health of individuals, communities, and society by promoting excellence in patient care, education, research, public health, and prevention relating to infectious diseases. Around 19 years ago, IDSA created the HIV Medicine Associa-

tion to represent the diversity of HIV health care providers and promote quality HIV care by advocating for policies that ensure a comprehensive and humane response to the AIDS pandemic.

For years, IDSA has partnered with the American Association for the Study of Liver Disease to maintain very current hepatitis C virus (HCV) guidelines, which are updated on an ongoing basis.[1] Guidelines on chronic pain management for HIV patients were published in October 2017. IDSA also advocates for federal funding for infectious disease and HIV prevention, care, treatment, and research and for other types of evidence-based prevention, including syringe services programs and safe consumption sites. IDSA also provides clinical updates on managing opioid-related infections at IDWeek. During their annual meeting several years ago, it became clear that opioid-related infections were a key concern of members, who were asked to list their top priorities. It revealed that infective endocarditis rates were doubling in many places and it was a major issue across the country. Other top priorities included issues related to skin infection, bone infection, and the transmissible viral infections, HCV and HIV. He noted that the response of members to the question of what they needed most were all around practice related issues—that is, the need to focus on prevention related not to the infection per se, but prevention related to the cause of that infection. Survey respondents said they needed syringe exchanges, safe injection areas and education on safe injection practices, increased access to medication for addiction treatment (MAT) and integration of MAT into primary care and specialty care, and more supportive inpatient facilities to treat endocarditis and addiction.

Key Policy Issues

Powderly explained that IDSA created a working group on the intersection of infectious diseases and opioid use to develop their policy as a professional society, identifying five key policy issues:

1. heightening prevention;
2. increasing epidemiological data and enhancing surveillance;
3. building health care provider capacity through telehealth and provider training;
4. expanding access to HIV, HCV, and other infectious disease treatment and to addiction treatment; and
5. researching and supporting models to co-treat addiction and infections.

[1] The guidance is available at www.hcvguidelines.org (accessed April 14, 2018).

In terms of prevention, Powderly recommended investing new resources in the Centers for Disease Control and Prevention (CDC) to build state and local health department capacity to respond to their local opioid epidemics, as well as expanding access to syringe services programs and supporting jurisdictions implementing safe consumption sites. National HIV, HBV, and HCV screening guidelines also need to be fully implemented. He pointed to the disconnection between developing guidelines, laws, and policies and then actually implementing them; the same holds true for existing technology that has not yet been fully implemented. Funding should be increased to expand surveillance for HCV and to generate and track national epidemiologic data (including morbidity and mortality) on infectious endocarditis and other infections associated with opioid use, he recommended. He warned that putting this into policy without resources to support it will just generate bad data that is done poorly, or not at all—yet another unfunded mandate will just cause problems.

Building health care provider capacity is critical, Powderly said. More than half of the hospitals in the United States do not have an infectious disease specialist, including 70 percent of hospitals in rural areas hardest hit by the epidemic. He suggested leveraging telehealth or other technologies to expand access to infectious disease and addiction treatment. Training is an important policy initiative, which could be supported by increased funding at the Substance Abuse and Mental Health Services Administration (SAMHSA) and the Health Resources and Services Administration for addiction training for clinicians—including infectious disease specialists—on the frontlines of the opioid epidemic. Resources should also be provided for support of frontline clinicians prescribing MAT, such as case managers and onsite counselors. To provide physicians in the places where they are needed most, he suggested attracting addiction and infectious disease or HIV specialists to underserved areas by expanding loan forgiveness opportunities to create a market.

IDSA is advocating for expanded access to addiction treatment and for treatment of HIV, HCV, and other infectious diseases. In addition to building capacity on the provider side, patients should be able to access the therapies they need. Barriers to treatment include insufficient access to MAT nationwide and lack of integration with the delivery of other services. In countries that have integrated health care systems, addiction specialists and infectious disease specialists round together on patients with active infections and have an integrated treatment plan with patients referred immediately for methadone therapy. They receive the remainder of their infectious disease treatment in methadone clinics. Powderly said, "It is not rocket science. No new technologies, and it doesn't require precision medicine investment. It just requires us to be sensible." He pointed to

opportunities within existing programs around HIV that work well and are well resourced, such as fully leveraging HRSA's Ryan White HIV/AIDS Program to improve access to prevention and treatment for people with HIV who also have opioid use disorder. He noted that the rate of substance use (both alcohol and drug) in the HIV population is significantly greater than the general population, for many reasons. Therefore, leveraging what is already in place—and that already works—would be relatively straightforward. Barriers to HCV treatment that must be addressed include coverage restrictions, such as requiring sobriety and limiting the types of providers who can prescribe HCV treatment.

Inpatient and outpatient clinics need to be better integrated, Powderly said, particularly for vulnerable populations of patients who are interacting with the criminal justice system. Better integration is also needed across the realms of addiction specialists, psychiatrists, primary care clinicians, surgeons, and infectious diseases physicians. He offered suggestions for addressing research gaps in service delivery, harm reduction, and treatment. In the context of implementation science, he called for more effective models for co-treating and integrating addiction and treatment for infectious diseases such as endocarditis. A practical issue in the treatment of staphylococcal endocarditis is that long-acting antibiotics have not been approved for anything other than skin or soft tissue infections; there is tremendous interest in their potential to treat patients with endocarditis out of the hospital in the context of integrated addiction treatment. Finally, he recommended that research should prioritize vulnerable populations who are disproportionately affected and face unique prevention and treatment challenges. This requires recognizing that significant poverty-related issues pervade the urban cores and also rural populations. Involving the infectious disease community in advocacy is important because "the language of epidemics is the language of infectious diseases," he said.

Patient-Centered Outcomes Research Institute

Els Houtsmuller provided an overview of the Patient-Centered Outcomes Research Institute (PCORI), an independent research institute authorized by Congress in 2010 and governed by a 21-member board of governors representing the entire health care community. PCORI funds comparative clinical effectiveness research (CER) that engages patients and other stakeholders throughout the research process. Funded studies are required to have two or more comparators (e.g., treatments, diagnostic tools, approaches). PCORI has a unique focus on engaging patients and other stakeholders in the research to seek answers to real-world questions—not purely academic questions—about what works best for

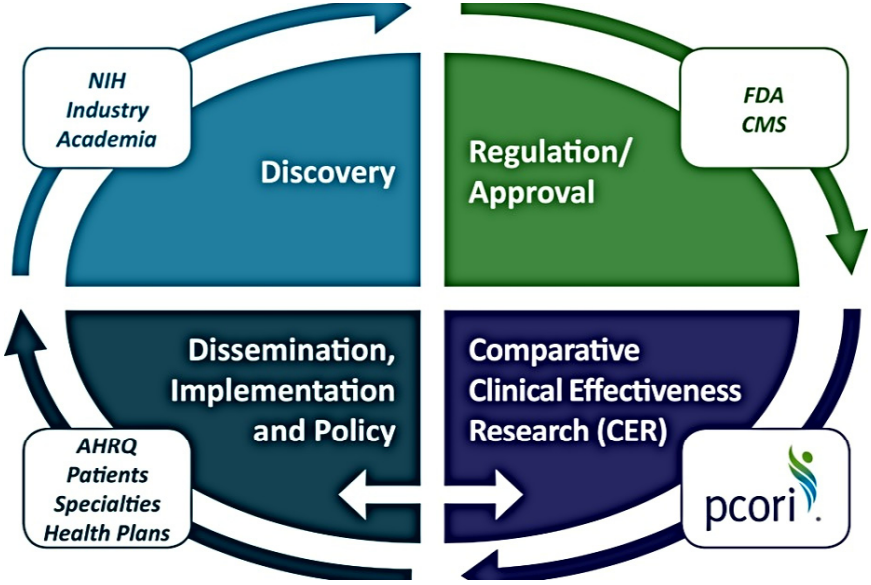

FIGURE 5-1 The Patient-Centered Outcomes Research Institute's complementary role.
NOTE: AHRQ = Agency for Healthcare Research and Quality; CER = clinical effectiveness research; CMS = Centers for Medicare & Medicaid Services; FDA = Food and Drug Administration; NIH = National Institutes of Health; PCORI = Patient-Centered Outcomes Research Institute.
SOURCE: As presented by Elisabeth Houtsmuller at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 13, 2018.

patients based on their circumstances and concerns. Figure 5-1 illustrates how PCORI complements ongoing efforts. PCORI is not focused on discovery nor is it involved in any regulation or approval. They become involved after that process, working closely with institutes such as the Agency for Healthcare Research and Quality and CDC to disseminate results.

Houtsmuller explained that PCORI works somewhat differently than other institutions in that it funds research on which care options work, for whom, and under which circumstances. It focuses on answering questions that are most important to patients and those who care for them and aims to produce evidence that can be easily applied in real-world settings. Stakeholders are engaged throughout the research process, including patients and consumers, payors, clinicians, caregivers and family members, purchasers, policy makers, industry, hospitals and health systems, training institutions, and patient and caregiver advocacy organizations.

Pain and Opioid-Related Research

Houtsmuller reported that as of November 2017, PCORI had awarded $252 million to fund 65 CER studies related to aspects of noncancer pain, including opioid use, and has awarded $74 million to fund 13 CER studies related to opioid use through projects involving 105,000 patients. PCORI's approach spans the entire care continuum. It has funded studies regarding the prevention of unsafe prescribing as well as nonopioid treatment options for pain. Studies on the latter have suggested that opioids are no more effective for either acute or chronic pain than just nonsteroidal anti-inflammatory drugs. It also funds studies in the management of long-term prescription opioid use, looking at patient-centered interventions for people who are on very high doses of opioids, such as dose reduction of opioids or switching from a full agonist to a partial agonist, like buprenorphine, which has a better safety profile. Other studies are funded to look at treatments for opioid use disorder. One study is looking at whether outcomes are improved through personalized MAT delivered in Federally Qualified Health Centers and complemented by a menu of services such as cognitive behavioral therapy and contingency management to increase treatment retention. To ensure that positive study outcomes are implemented, PCORI engages with relevant stakeholders, including payers, before the study even begins. A recent round of funding was announced to look at delivery of MAT specifically for pregnant women.

Houtsmuller provided more detail on studies PCORI has funded on HCV in the context of the opioid epidemic. The incidence of HCV in patients who have substance use disorders is higher than in patients who do not, she said, but access to treatment is especially challenging for this population. New medications are costly, and there are concerns about medication adherence and linkage to care for this population. Two PCORI-funded studies are looking at patient-centered models of HCV care. In the first study of people who inject drugs, one arm was randomized to have a patient navigator meet with them to talk about their care, remind them to take their medications, and so forth. Because it is very difficult to meet somebody in person every day for medication, patients are given a phone with which they take a picture of themselves taking the medication that they then send to their patient navigator (i.e., teledelivery). In the other arm of the study, PWID receiving methadone take the medication through directly observed treatment and receive integrated care in the methadone clinic. The study will demonstrate which model works better for which patients. The second study is being carried out in New York at multiple sites to investigate another teledelivery approach. Among patients with HCV who come to a methadone clinic to receive MAT, half get referred to a specialist (usual care) and half get a teleconnection in the clinic to an HCV infectious disease specialist. That study is

both an access and an integration study, she noted, that will demonstrate for which patients what actually improves outcomes.

American Society of Addiction Medicine

Alvanzo described the American Society of Addiction Medicine (ASAM), which was founded in 1954, as the nation's oldest and largest medical specialty organization representing more than 5,500 physicians and clinicians in the field of addiction medicine. Although primarily a physician-led organization, it also has associate memberships including licensed professionals in addiction care (including but not limited to licensed clinical psychologists, licensed clinical alcohol drug counselors, social workers, nurses, and pharmacists) to facilitate a multidisciplinary team-based approach.

A primary focus of ASAM is increasing access to treatment, said Alvanzo. Prior to the Patient Protection and Affordable Care Act (ACA), approximately 34 percent of enrollees in individual market plans did not have coverage that included addiction treatment services. Medicaid accounts for about one-fifth of all substance use disorder treatment and about one-fourth of spending specifically on medications for treatment of opiate addiction. Medicaid expansion has also been associated with 18.3 percent reduction in unmet need for substance use disorder treatment. Given the attempted repeal of the ACA and reduction in Medicaid expansion, ASAM is continuing to advocate for continued expansion of the treatment and maintenance of coverage gains. ASAM is also working to ensure that whatever subsequent models are proposed would not allow states to waive the essential health benefits and thus do not support any efforts to move toward block grant funding.

Despite overwhelming evidence that supports the use of Food and Drug Administration–approved medications, said Alvanzo, there continue to be limitations placed on access to those medications, such as prior authorizations and fail-first policies. Therefore, ASAM is a proponent of removing any such policies that will limit people's access to evidence-based medications for the treatment of opioid use disorders. The Mental Health Parity and Addiction Equity Act of 2008 continues to have gaps in enforcement, so ASAM is supporting local efforts to enforce the Parity Act and ensure that patients have equal access to addiction and mental health treatment, along with physical health treatment. In terms of products for support, ASAM has released National Practice Guidelines for the use of medications in the treatment of addiction involving opioid use.[2] ASAM

[2] For more information, see https://www.asam.org/resources/guidelines-and-consensus-documents/npg (accessed May 30, 2018).

criteria is a research-validated set of guidelines that provide outcome-oriented and results-based care for the treatment of addiction, and ASAM has also developed CONTINUUM, a Web-based decision-support system that guides health care providers through a structured interview to help them with placement based upon the ASAM criteria.[3]

Alvanzo said that ASAM is currently targeting workforce expansion such as including nurse practitioners and physician assistants. ASAM has been an advocate for Representative Tonko's Addiction Treatment Act, which would codify in statute that addiction specialist physicians may prescribe buprenorphine up to the 275 patient limit and eliminate the sunset date. Coverage would be expanded by allowing nurse practitioners and physician assistants to prescribe buprenorphine, but with a sunset date attached that ASAM wants to eliminate for that prescribing authority. ASAM also supports this bill because it will expand prescribing authority to nurse anesthetists, clinical nurse specialists, and nurse midwives. The society is also in support of expanding the workforce by increasing the number of addiction medicine fellowships across the country, with ASAM working as a leader in the recent recognition of addiction medicine as a medical specialty (the first exam was administered by the American Board of Preventative Medicine in 2017). ASAM is also interested in developing a pathway for physicians who do not have a primary specialty board.

As part of its recent strategic planning process, said Alvanzo, ASAM has included the voices of the patient and the family in its programming and its advocacy efforts. "We realize that addiction is a family disease, so we need to get the voice of the family and the patient. We think that will go a long way to reducing stigma, related to not only the disease of addiction, but to the treatment associated with it," she said. Funding initiatives are urgently needed for both the National Institute on Drug Abuse and the National Institute on Alcohol Abuse and Alcoholism, she added, whose research is critical to better understanding addiction and specifically the intersection between pain and addiction. To engage at the local level, ASAM has added a liaison in its national office who works directly with the state chapters on different policy issues. As president of the Maryland-DC chapter, she vouched that ASAM's support in writing testimony and providing policy information has been hugely beneficial to local chapters.

ROUNDTABLE DISCUSSION

Benjamin Linas, associate professor of medicine at Boston University, commented that for certain patients, it seems appropriate to pre-

[3] For more information, see https://www.asamcontinuum.org (accessed May 30, 2018).

scribe buprenorphine in infectious disease clinics; he asked if IDSA would consider incorporating that into infectious disease fellowship programs. Powderly said that it would be complicated because nationally accredited fellowship programs have both their core and optional components examined; training every infectious disease fellow in an area they are not likely to practice in would not make sense. However, there are opportunities to look at expanding skills and specifically ensuring that fellows who have particular interest in treating vulnerable patients with addiction, for example, can get those skills without having 2 extra years of training. IDSA is looking into dual boarding in both critical care medicine and infectious diseases, for example, with interest from fellows and trainees. IDSA is also addressing antimicrobial stewardship, an example of something that is core infectious disease business and now part of core specialty training. He added that an entire generation of providers came out of infectious disease fellowships before the advent of antimicrobial stewardship, so increasing capability needs to be provided for those interested who cannot take time off work or do a new fellowship. It is a matter of being creative and working with the partner specialty to find ways to train infectious disease physicians to be safe, appropriate providers focused on the interests of patients, but this should not create new bureaucracy.

Sandy Springer, associate professor at the Yale School of Medicine, asked if there are ways to help infectious disease and primary care doctors access training quickly to get their waivers if they are interested, as the 8-hour training session poses a barrier. Alvanzo could not speak to ASAM's position on eliminating the 8-hour requirement, but there is no training required for opiate prescribing. In terms of pharmacology, buprenorphine is safer than full agonist opiates. ASAM is a leader in terms of training physicians who are looking to get waivers and offers a number of different opportunities for that training, including adding core sessions at their annual meetings. This addition for workforce development and expansion is 8 hours for physicians, but it is 24 hours for physician-extended colleagues such as nurse practitioners and physician assistants.

A workshop participant asked the panelists to highlight changes in action, policy, or procedures that would make a meaningful difference at this intersection of infectious diseases and the opioid crisis. The panelists responded as follows:

- Enact straightforward policy interventions to improve access such as preventing gaps in care and addressing Medicaid restrictions (Powderly).

- Create more training opportunities to increase the number of providers (Powderly).
- Ensure that new technology such as telemedicine is financially reasonable, such as remove barriers to reimbursement (Powderly).
- Address barriers administratively rather than legislatively to the degree possible (Powderly).
- Conduct research on long-acting glycopeptides (Powderly).
- Integrate care among HCV specialists, HIV specialists, and addiction specialists in settings where the patients already are (Houtsmuller).
- Use every interaction with a health provider as an opportunity to get people engaged in treatment (Houtsmuller).
- Start patients with opioid use disorder in emergency departments and hospitals on buprenorphine treatment, and link the patient to treatment in an active way, not simply via referral (Houtsmuller).
- Remove barriers to effective evidence-based treatment by working with payers to eliminate prior authorizations for addiction treatment (Alvanzo).
- Expand Medicare coverage to include addiction treatment for the aging population (Alvanzo).

Springer suggested leveraging the HIV model of care to expand MAT and behavioral services. If MAT is conceived of as prevention of HIV, HCV, and overdoses, then other models of care could be used to help reach rural communities. The Conference on Retroviruses and Opportunistic Infections has good examples from resource-limited countries doing successful work in home-based HIV testing, he said, and the same could be done to expand MAT using community health care workers, especially in areas like West Virginia. Providers can learn from what has been done in other countries and bring those strategies to the United States. Todd Korthuis, program director for the Oregon Health & Science's University Addiction Medicine Fellowship, agreed that many of the lessons learned in the HIV epidemic are directly translatable to the opioid epidemic, and mused that "the country is ripe for a Ryan White for opioid use disorder." He noted that the research priority of the Office of AIDS Research focuses exclusively on viral suppression and transmission as outcomes for HIV research, and it misses the opportunity to better understand HIV as an infectious disease consequence of opioid use disorder—"It doesn't help patients to have virologic suppression if they die of an opioid overdose. . . . Research outcomes should incorporate those as high-priority targets," he said. He added that the Rural Opioid Initiative was recently funded as a collaborative project between the CDC, NIH, and the Appalachian

Regional Authority to increase surveillance of HCV and other infectious consequences of opioid use disorder in rural American states.

PRESENTATIONS BY SESSION RAPPORTEURS

During the final session of the workshop, participants who had been designated as rapporteurs provided brief summaries of the presentations and discussions that took place over the preceding three sessions. The rapporteurs' summaries were intended to stimulate discussion during the final question-and-answer session of the workshop. Jonathan Colasanti, assistant professor of medicine at Emory University's School of Medicine and Rollins School of Public Health, served as the rapporteur for the first session, which explored the scope of the problem. Anika Alvanzo, assistant professor of medicine at the Johns Hopkins University School of Medicine, offered her reflections on the second session: opportunities for, and barriers to, treatment and prevention. The rapporteur for the third session—which focused on law, enforcement, and research and policy initiatives—was Ellen Eaton, assistant professor of medicine at the University of Alabama at Birmingham School of Medicine. A summary of selected points highlighted by each of the session rapporteurs is provided in Box 5-1.

BOX 5-1
Highlights from Session Rapporteur Presentations

During the final session of the workshop, session rapporteurs presented brief summaries of the workshop's previous three sessions. Selected highlights from each of the rapporteur's presentations are presented below.

- Epidemiological surveillance systems underpinned by granular, up-to-date, local-level data are needed to inform the locally cultivated and locally driven responses. (Colasanti)
- Modeling is a powerful tool for shaping policy and programmatic responses; for example it can demonstrate to policy makers that hepatitis C virus (HCV) elimination is an achievable goal if adequate numbers of people are reached and treated appropriately. (Colasanti)
- At the center of the epidemic, addiction is a profoundly human experience that is a product of circumstances and not a reflection of an individual's moral character. Patients need to be listened to and surrounded by a supportive community. (Colasanti)

continued

BOX 5-1 Continued

- Because addiction is often fueled by unmet social needs, treatment should extend beyond just physicians to involve multidisciplinary teams spanning social support services, mental health providers, and peers with lived experience; the latter can help engender trust among patients in a system that has often broken it. (Colasanti)
- Clinicians should be aware of how the language used to describe addiction can affect their patients. Partnerships between clinical treatment centers and community-based organizations can strengthen the interface among patients, providers, and support services. (Colasanti)
- Every door should be a portal of entry and a portal of support for treatment. Interventions must be nimble in response to changes in the opioid epidemic. (Colasanti)
- Hospitalization is a reachable moment, but interventions need to be designed, implemented, and refined based on guidance and feedback from patients in all stages of treatment and recovery. (Alvanzo)
- In rural communities across the United States, the so-called syndemic of poverty, opioid use, and infectious diseases is an impending tidal wave that will overwhelm local systems, most of which are severely underresourced and ill prepared to respond. (Alvanzo)
- The intervention in the Rhode Island correctional system demonstrates how huge numbers of lives could be saved by initiating people on MAT while they are incarcerated and linking them to treatment upon their release. (Alvanzo)
- In terms of cost-effectiveness, routine HCV testing for adults and HCV treatment are both high-value interventions. For HIV, providing medications for opioid use disorder is tantamount to prevention and has the greatest potential to save lives. (Alvanzo)
- Addressing the epidemic will require closing the training gap among all providers and expanding the view of the workforce beyond physicians. (Alvanzo)
- Loan forgiveness programs could help with infectious disease and addiction medicine workforce issues in underserved areas. (Eaton)
- Telehealth tools show promise for treating patients and for training physicians (Eaton)
- Law is a tool that can help translate evidence-based practices into policies to address the consequences of infectious diseases and addiction. Law enforcement training can change police attitudes and improve outcomes for people who use drugs. (Eaton)
- Good Samaritan laws can encourage people to report potentially fatal overdoses by protecting them from prosecution. Law enforcement needs to rebuild trust in communities that have been stigmatized and traumatized by the police response to previous epidemics. (Eaton)

SOURCES: Alvanzo, Colasanti, and Eaton presentations, March 13, 2018.

POTENTIAL WAYS FORWARD

Carlos del Rio, Hubert Professor and chair of the department of global health at the Rollins School of Public Health and Professor of Medicine at the Emory University School of Medicine, acknowledged that the epidemic is not going to be solved quickly, but he asked participants for their suggestions about potential integration points, policy issues that need to be immediately addressed, or other cross-cutting interventions that could have a short-term effect in mitigating the challenges ahead. A workshop participant suggested that in terms of implementation, SSPs and HCV surveillance are desperately needed yet woefully underfunded, so working with Congress to approve funding should be the top priority (e.g., additional Ryan White funding). CDC also needs additional funding, the participant added. The President's budget included a $40 million program for CDC to address infectious diseases, opioid use, and injection drug use, said the participant, but it was at the $40 million expense from HIV funding. Interventions must span across disease groups. Any PWID tested for HIV should also be tested for HCV and other diseases. The infectious disease aspect of the opioid epidemic is being debated in Congress; SAMHSA should have an infectious disease component (not necessarily entirely new programs) and may be able to provide more money for local and state health departments and community-based organizations to work on this epidemic if things go well. The participant also noted that relevant funding is often contained in siloed funding streams, which impedes proposing programs that cut across diseases.

Morgan commented that these conversations around the opioid epidemic among the national agencies reminded her of the steps that had to be taken to change seatbelts laws. The three-point seatbelt system was developed in 1955, but it only became a national agenda issue in the mid-1960s and in 2017, Wyoming became the last state to enact seatbelt regulations for children. It took 60 years to change the dialogue and similarly, it will take work to connect the dots to show the complexity of the issue to providers, so they can cohesively work to change the dialogue around the epidemic. She suggested starting that process by developing a template of potential points for intervention as a person passes through the system after visiting a provider.

del Rio noted that the intersections of poverty, lack of education, and lack of opportunity recurred during the workshop, highlighting the importance of considering social determinants of health and the structural interventions needed in communities to address the epidemic. Linas agreed that primary prevention, social determinants of health, and structural interventions are all crucially important in addressing the epidemic. But if the overdose curve is going to be bent now, it will require secondary and tertiary prevention, more research, more funding, and more service

provision. What will save someone tomorrow is treating people with opioid use disorder and having naloxone on site. Prevention work, PDMPs, and other work is crucial, he said, but the 5-year outcomes are going to be affected by secondary and tertiary prevention.

In the HIV model, people can access home-based HIV testing through which patients who are positive are immediately given antiretroviral therapy and patients who are negative are immediately given preexposure prophylaxis, remarked Springer. Opiate overdose is an obvious indication of an opiate use disorder, and patients need to be linked with opiate medication treatment, counseling services, and harm reduction services, so she asked if a similar model could be used for opiate addiction. Del Rio contended that the entry point should be the patient coming in with an infectious complication clearly related to injection drug use—an overdose should not be the threshold for intervention. Springer agreed that in the hospital setting, people who come in with endocarditis or infections related to an opiate use disorder should be immediately screened for opiate use disorder and offered medical and behavioral treatment as needed.

del Rio remarked that in many hospitals, multiple best practices are due to Centers for Medicare & Medicaid Services (CMS) measures which are linked to outcomes; he suggested creating a CMS measure for hospitals around opiate use disorder, such as the percentage of patients with opiate use disorder linked to services. Springer suggested that preventing reinfection and rehospitalization could serve as a powerful incentive.

Nickolas Zaller, associate professor of public health and director of the University of Arkansas for Medical sciences Office of Global Health, commended the Massachusetts model, but argued that there is no single compelling, rational, viable explanation as to why naloxone still requires a prescription, which is the single barrier limiting access. He also suggested that the debate on health care access and health care reform cannot be emphasized enough in an election year, and the counties experiencing the greatest proportion of death and destruction from these epidemics are supporting the very lawmakers who are dismantling the ACA. As these things are debated in their home states and communities, they should be applying significant pressure on our lawmakers to work seriously toward ending an epidemic. CDC and NIH grant funding are not sufficient; insurance companies must step up, take responsibility, and cover addiction treatment, and the only way to do that is to have mandated insurance coverage. Regarding naloxone access, del Rio mentioned that getting permission to stock naloxone in schools is another barrier because they may require that every prescription medication in the nurse's office be linked to a student. He also highlighted the value of co-prescribing naloxone with opioids, even at significant effort and cost. Linas noted that naloxone is available without a prescription in Massachusetts, per standing order.

Korthuis highlighted the opportunity for professional society recommendations regarding quality metrics. For example, ASAM has recently released quality-of-care recommendations for specialty addiction treatment centers linked to various metrics, SAMHSA has similar metrics, and there are metrics related to Ryan White funding through which Health Resources and Services Administration's HIV/AIDS Bureau encourages providers to adhere for HIV care. He suggested that IDSA, ASAM, and other organizations come together around policy measures recommending that everyone who is a willing person with opioid use disorder receives a dose of medication before they leave for treatment. Patients should be started with a referral to care and provided with naloxone rescue kits as they leave, he said. Tuberculosis testing should also be added while patients are hospitalized because it facilitates entry into methadone and residential treatment, which is often a barrier.

Powderly agreed that quality metrics are very important, but they need to be measurable and changeable. For example, if a measurement is the responsibility of an infectious disease doctor who has no ability to control the system that delivers it, then the doctor is penalized for the fault of the system. If quality metrics that CMS would enforce around hospitals are brought in, then hospitals must have the ability to measure that metric so there is a true opportunity to avoid a penalty. The process is complicated and lengthy, he added. If CMS wants to change any rule, it must go up for public review through a federal process. He emphasized that the desired outcome must be achievable, otherwise it creates bureaucracy and "noise for the sake of creating noise." These discussions about fixes on the edges of a broken health care system, he said, make it easiest for hospitals in conservative, nonexpansion states to transfer complicated patients to other hospitals that can actually care for them. Rural hospitals are under a huge threat in this country, he added. If metrics are imposed without adding resources to follow those metrics, it will only increase the burden, resulting in more hospital closures and even less access to quality health care for people in rural America. It is only worthwhile to collect the data about meaningful metrics that can be acted upon, he said.

del Rio remarked that metrics have impacted many providers, such as timed antibiotics in the emergency room following pneumonia. He suggested determining what represents a good outcome, for example, in terms of the percentage of patients who come to the ER with an overdose and leave the ER with medication-assisted therapy. Leaving with that prescription is so simple and would contribute to reducing the number of overdoses, although resources would be required. A participant noted that pregnant women with opioid use disorders face unique issues that need to be considered. For example, judges have refused to let pregnant women off probation until they are in an abstinence-based program,

despite the standard practice of providing MAT during pregnancy and starting detox from the day of delivery. There are issues for pregnant women that should be considered.

Veda Moore, Johns Hopkins HealthCare community care coordinator, remarked that in Baltimore, the health department trains individuals on naloxone administration by going out into the community and providing naloxone supplies and education in areas where drugs are being sold and used. She reminded the group to consider the stigma faced by the LBTGQ community, many of whom are shunned by their families and are forced to live on the street doing whatever they can to survive. They often are addicted to drugs and at risk of contracting HIV and HCV. She then read aloud a poem she had written as she listened to the workshop's proceedings, entitled "What Is This All About?" (see Box 5-2).

BOX 5-2
What Is This All About?

I am dying, but not yet dead.
I refuse to lay down and rest my head.
I come in many colors, races, and religions.
I am tall, I am short, I am thin and stout.
Do you know yet what this is all about?
I can fly, just not like a pigeon.
People walk by me like they don't have vision.
No one can hear me screaming out loud.
No one can see that I am proud.
No one knows what I am feeling.
No one can see that I am not healing.
Up and down, up and down, all through the night,
not realizing that I am headed to the light.
Knowledge, potential, dreams and power, turn around now,
you are heading to the end hours.
Jesus, Jesus, help me, please.
I bow before You on my knees.
Oh, God, I pray You can hear me shout.
Do you know yet what this is all about?

SOURCE: Poem written and read by Veda Moore at the workshop Integrating Infectious Disease Considerations with Response to the Opioid Epidemic on March 13, 2018.

FINAL REMARKS

Corinna Dan of the Department of Health and Human Services (HHS) remarked that the Offices of HIV/AIDS and Infectious Disease Policy and on Women's Health asked the National Academies to develop this workshop on such a condensed schedule because of extreme concerns about the emerging trends related to the opioid epidemic. Every day and every week, increasing numbers of people are being exposed to preventable but potentially life-threatening infections.

She thanked the workshop's organizers and participants and urged them to continue building new partnerships to support, enhance, and sustain these collective efforts to respond to the opioid epidemic. Jessica Tytel, HHS's Office on Women's Health, also offered thanks and praise to all participants for their efforts. She asked the group to continue to explore the specific effects of the opioid epidemic on women with respect to the differences in biology, physiology, social determinants of health, and lived experiences that affect every aspect of women's physical and mental health, including their experiences with opioid use and the resulting infectious disease implications. She highlighted the need for more data on the specific effects of the opioid epidemic and infectious diseases on women, as well as the importance of providing programs and services that meet people where they are, including those that address women's specific needs. This requires acknowledging the relationships between drug use, violence, and trauma and providing services to address those co-occurring realities of women's lives, Tytel said.

Richard Wolitski, director of the Office of HIV/AIDS and Infectious Disease Policy at HHS, concluded the workshop by reflecting on opportunities that exist to turn the tide of the opioid epidemic, which he called "the public health crisis of this generation," in a collaborative way. Beyond calls for funding and establishing new programs, these opportunities should leverage existing available resources to transform the way systems work and make a huge difference in people's lives. To illustrate, he described the Ryan White program, which has set the goal to cure all people who are co-infected with HCV in that program. They have used funding from the Secretary's Minority AIDS Initiative Fund to build demonstration projects that show that how this might be achievable with existing resources. The program is actively planning how best to work toward that goal. The opportunity is at hand to disrupt systems and to fundamentally change them, he said. This will require close scrutiny of processes, implementation, and funding streams, as well as how policies, procedures, systems, and structures are organized in alignment with funding. He discussed the need to think about how issue-specific funding, issue-specific programs, issue-specific delivery of services, and

issue-specific accountability for implementation and results change the way we approach people and the problems that affect their lives.

A minimum need is more braiding of funding at the local level, Wolitski said. Models already exist for doing this, he continued. This does require extra effort that reduces the funds available for direct services. Other opportunities may also exist to implement novel solutions such as braiding funding at the federal level so the local agencies receiving the funding will not bear the burden of counting separate funding streams. He indicated that there is a need to determine what options for providing flexibility are viable and what would be needed to realize the potential of these innovations and integrate funding provided to grantees. For example, CDC's National Center for HIV, Viral Hepatitis, STD, and TB Prevention allows 5 percent of disease-specific funds to be used to address cross-cutting issues. These are the types of models that can shift the system toward putting the patient at the center of everything, regardless of what door the person enters.

Wolitski called on participants to step out of their own self-interests, thinking beyond their academic training and professional positions, about how to generate the largest benefit. The opioid epidemic is a national crisis that can be a catalyst for innovation and more fully integrated delivery systems or we could remain focused on individual threats and fail to create the systems changes that are needed to be more efficient and effective in public health and medical care programs. History has shown that focus on the emergence of one problem, like crack cocaine, can turn things around. It has also shown, however, when we focus narrowly on one issue and other related issues are not addressed, or we let up on our efforts once we have achieved some or all of the progress that was sought, we allow for other issues to emerge or reemerge that can be as bad or worse than the problem we started out with.

Today we have a golden opportunity to broaden the perspective about the constellation of substance use disorders including and beyond opioids, Wolitski said. He concluded the workshop by recommending that the overall dynamics of substance use disorders should be addressed from a higher-level perspective, taking into account addictions and the systems that allow them to grow unchecked. "A whole-person approach and putting the person at the center are the keys to improving individual health, keeping families together, and building strong and healthy communities," Wolitski concluded.

A

Workshop Agenda

National Academies Building
Room 120
2101 Constitution Avenue, NW
Washington, DC 20418

MONDAY, March 12

8:45 Welcome
ADM Brett Giroir, Assistant Secretary for Health

9:00 Introductions and objectives
Carlos del Rio, Planning Committee Chair, Emory University

9:20 Charge to the workshop attendees
Richard Wolitski, Director, Office of HIV/AIDS and Infectious Disease Policy
Nicole Greene, Acting Director, Office on Women's Health
Questions and Answers

Session 1: The Scope of the Problem

9:40 The geography of infectious diseases related to the opioid epidemic
Patrick Sullivan, Emory University

10:15 Modeling what is required to prevent HIV and HCV among people who inject drugs
Natasha Martin, University of California, San Diego

10:45 Discussion
Traci Green, Moderator

11:15 Perspectives of patients and providers
Oluwaseun Falade-Nwulia, Johns Hopkins University School of Medicine
Veda Moore, Resident of Baltimore, Maryland
Todd Korthuis, Moderator

12:00 Lunch

Note: the cafeteria is on the ground floor, and seating is available in the West Court.

Session 2: Opportunities for, and Barriers to, Treatment and Prevention

1:15 The role of public health departments

Harm reduction programs
Matthew La Rocco, Louisville Metro Public Health & Wellness

Hepatitis C prevention programs
Katie Burk, San Francisco Department of Public Health

Discussion
Dace Svikis, moderator

2:15 Improving care for hospitalized adults with substance use disorder
Honora Englander, Oregon Health & Science University

2:45 Challenges and opportunities in rural America
Nickolas Zaller, University of Arkansas Fay W. Boozman College of Public Health

3:15 Break

3:30 Correctional health
Josiah "Jody" Rich, Brown University

4:00 Economic implications of treatment programs
Benjamin Linas, Boston Medical Center

4:30 Session 2 panel discussion
Todd Korthuis, moderator

5:30 Adjourn

TUESDAY, March 13

Session 3: Opportunities in Correctional Health, Law, and Law Enforcement

9:00 Use of the law as a tool to address the consequences of infectious disease and addiction
Leo Beletsky, Northeastern University School of Law

9:30 Opportunities for law enforcement and first responders
Katie Goodwin, Anne Arundel County Police Department

10:00 Discussion
Dace Svikis, moderator

10:30 Roundtable discussion of research and policy initiatives and needs
William G. Powderly, Washington University in St. Louis, Immediate Past President, Infectious Disease Society of America
Elisabeth Houtsmuller, Patient-Centered Outcomes Research Institute
Anika Alvanzo, Regional Director and Board Member, American Society of Addiction Medicine
Sandra Springer, Moderator

11:15 Break

Session 4: Workshop Highlights

11:30 Presentations by session rapporteurs—Highlights of sessions 1, 2, and 3
Jonathan Colasanti, Emory University School of Medicine
Anika Alvanzo, Johns Hopkins University School of Medicine
Ellen Eaton, University of Alabama at Birmingham School of Medicine

12:15 Discussion
Carlos del Rio, Moderator

1:00 Concluding remarks
Carlos del Rio, Planning Committee Chair, Emory University
Richard Wolitski, Director, Office of HIV/AIDS and Infectious Disease Policy
Nicole Greene, Acting Director, Office on Women's Health

1:30 Adjourn

B

Speaker and Planning Committee Member Biosketches

Anika Alvanzo, M.D., M.S., is an Assistant Professor of medicine at the Johns Hopkins University School of Medicine. Her areas of clinical expertise include addiction medicine and internal medicine. Dr. Alvanzo serves as the Medical Director of the Substance Use Disorders Consultation Service. She is also the Regional Director and Board Member, American Society of Addiction Medicine. Dr. Alvanzo received her M.D. from The George Washington University School of Medicine. She completed her residency and a fellowship in internal medicine at Virginia Commonwealth University Health System. Her research interests include screening and brief interventions for at-risk substance use, and race/ethnicity and sex differences in substance use disorders.

Leo Beletsky, J.D., holds a joint appointment at Northeastern University with the School of Law and Bouvé College of Health Sciences. His expertise is on the use of law to improve health, with focus on drug policy, reducing the spread of infectious disease, and the role of the criminal justice system in shaping public health outcomes. By melding legal and scientific methods, he designs and evaluates interventions such as laws intended to curb opioid overdose and police trainings to align enforcement practices with public health goals. Throughout his career, Professor Beletsky has applied his skills and expertise in service to governmental agencies and nongovernmental organizations, including the United Nations, Department of Justice, and the City of New York.

Prior to joining the Northeastern community, Professor Beletsky was

on the faculty of the Division of Global Public Health at the University of California, San Diego, School of Medicine, where he retains an adjunct appointment. He received his undergraduate training in geography from Vassar College and Oxford University, a master's in public health from Brown University, his law degree from Temple University School of Law, and his postdoctoral training at the Yale University Center for Interdisciplinary Research on AIDS. He is a member of the New York State Bar.

Katie Burk, M.P.H., is the Viral Hepatitis Coordinator at the San Francisco Department of Public Health (SFDPH). She has extensive experience in nonprofit and government program development, management, evaluation, and capacity building with a focus on promoting the health and well-being of drug users and other marginalized populations. Ms. Burk is a co-founder and Coordinating Committee member of End Hep C SF, San Francisco's citywide, collective impact hepatitis C virus (HCV) elimination initiative, where she fulfills a leadership role. At SFDPH, she designed and implemented San Francisco's first HCV linkage programs for vulnerable San Franciscans living with HCV who need support connecting to medical care for HCV treatment. She also partnered with local community-based organization Glide in completing formative research and design of the "New Treatments Have Changed the Game" media campaign around HCV treatment. Ms. Burk also supported the planning, design, and execution of the primary care HCV treatment initiative. Ms. Burk also manages the nationally recognized Drug Overdose Prevention Education (DOPE) Program funding contract, as well as contracts for integrated HCV and HIV testing in behavioral health settings.

Prior to her employment at SFDPH, Ms. Burk worked as a Capacity-Building Program Manager at the Harm Reduction Coalition, where she worked nationally to expand syringe access service provision and overdose prevention services. As part of the Health Care for the Homeless team of Public Health Seattle & King County, Ms. Burk evaluated a harm reduction-oriented homeless case management program.

Jonathan Colasanti, M.D., M.S.P.H., joined the Emory University faculty in 2015 as an Assistant Professor with a dual appointment in the School of Medicine (Department of Medicine, Division of Infectious Diseases) and the Rollins School of Public Health (Department of Global Health). He also serves as the Associate Medical Director of the Ponce de Leon Center, Infectious Diseases Program of the Grady Health System. His clinical and research interests focus on the delivery of HIV care to vulnerable populations across the spectrum of the HIV care continuum. In his research, Dr. Colasanti seeks to bridge the implementation gap in order to improve the delivery of HIV care by addressing sociobehavioral, biomedical, and

systems-level barriers. In addition to his Atlanta-based work, he works with a Nicaraguan nongovernmental organization that strives to improve the delivery of primary health care in Nicaragua through a community health worker model.

Dr. Colasanti received his medical degree from the University of Miami Miller School of Medicine in 2008. Subsequently, he completed his internal medicine internship, internal medicine/social medicine and global health equity residency, and public health degree at the University of Miami. He completed his infectious diseases fellowship at Emory University.

Carlos del Rio, M.D., is the Hubert Professor and Chair of the Department of Global Health, a professor of epidemiology at the Rollins School of Public Health, and a professor of medicine in the Division of Infectious Diseases at Emory University School of Medicine. He is also Principal Investigator and Co-Director of the Emory Center for AIDS Research. Dr. del Rio is a native of Mexico, where he attended medical school at Universidad La Salle, graduating in 1983. He did his internal medicine and infectious diseases residencies at Emory University. In 1989 he returned to Mexico, where he was Executive Director of the National AIDS Council of Mexico (CONASIDA, the federal agency of the Mexican Government responsible for AIDS Policy throughout Mexico), from 1992 through 1996. In November 1996 he returned to Emory where he has been involved in teaching and research. Dr. del Rio was Chief of the Emory Medical Service at Grady Memorial Hospital from 2001 to 2009. Dr. del Rio's research focuses on the early diagnosis, access to care, engagement in care, compliance with antiretrovirals, and the prevention of HIV infection. He has worked for over a decade with hard-to-reach populations, including substance abuse users, to improve outcomes of those infected with HIV and to prevent infection with those at risk. He is also interested in the translation of research findings into practice and policy. Dr. del Rio is conducting a National Institute on Drug Abuse–funded study entitled "Improving physician opioid prescribing for HIV-infected patients with chronic pain." He is co-PI of the National Institutes of Health–funded Emory–Centers for Disease Control and Prevention (CDC) HIV Clinical Trials Unit, Clinical Site Leader for the Adult AIDS Clinical Trials Group, and the site PI for the HIV Prevention Trials Network of the National Institute of Allergy and Infectious Diseases. His international work includes collaborations in the countries of Ethiopia, Georgia, Kenya, Mexico, Thailand, and Vietnam. He has also worked on emerging infections, such as pandemic influenza, and was a member of the World Health Organization Influenza A (H1N1) Clinical Advisory Group and the CDC Influenza A (H1N1) Task Force during the 2009 pandemic.

Dr. del Rio is a Member of the Board of Directors of the International Antiviral Society-USA and former member of the HIV Medicine Association Board and of the Infectious Diseases Society of America Board. He is also a past member of the Advisory Committee on HIV, Hepatitis, and STD Prevention and Treatment of the CDC and Health Resources and Services Administration.

John Dreyzehner, M.D., M.P.H., FACOEM, joined Governor Bill Haslam's cabinet on September 19, 2011, as the 13th Commissioner of the Tennessee Department of Health. He is a physician with more than 25 years of service in clinical and public health leadership at the federal, state, and local levels. Dr. Dreyzehner began his medical service in 1989 as a U.S. Air Force (USAF) flight surgeon, where he learned about the critical force multiplier effect of the public health mission, the Baldrige performance excellence framework, and accumulated more than 300 hours in the F-15 Eagle and other aircraft as a member of USAF 94th Fighter Squadron and later, Chief of Aeromedical Assessment for Air Combat Command. He was honorably discharged as a major in 1997. Following several years in the private practice of occupational medicine, he returned to public service in 2002 as the director of a multicounty health district in the tri-cities region of central Appalachia before coming to Tennessee as Commissioner. He also practiced in the field of addiction medicine for several years while working to bring attention to the public health aspects of the now well-recognized epidemic.

Ellen Eaton, M.D., is Assistant Professor in the University of Alabama at Birmingham (UAB) School of Medicine Division of Infectious Diseases, a 2017–2019 Fellow of the National Academy of Medicine, and a UAB PCOR K12 Scholar with an interest in HIV/STI health outcomes and policy. Her current research evaluates patient preferences related to HIV treatment options and the use of decision analyses to compare the effectiveness of HIV treatments and sexually transmitted infection (STI) testing strategies. Dr. Eaton recently conducted a study looking at the budgetary impact of compliance with STI screening guidelines in persons living with HIV. This work was presented as an oral presentation at the 2016 annual IDWeek in New Orleans, and was recently published in the J*ournal of Acquired Immune Deficiency Syndrome*. Dr. Eaton is currently preparing a K23 submission to the National Institutes of Health.

Honora Englander, M.D., is an associate professor of medicine at Oregon Health & Science University (OHSU) School of Medicine. She is the Principal Investigator of a study aimed at understanding substance use needs among hospitalized adults at OHSU and is the Director of the Improving

Addiction Care Team (IMPACT). IMPACT includes an interprofessional inpatient addiction consult service with linkages to community addiction care for medically complex patients with substance use disorders. IMPACT began in July 2015 and has funding support through OHSU and CareOregon.

Oluwaseun Falade-Nwulia, M.B.B.S., M.P.H., is an Assistant Professor of medicine at the Johns Hopkins University School of Medicine. Her areas of clinical expertise include infectious disease. Dr. Falade-Nwulia earned her M.B.B.S. from the University of Ibadan Medical School College of Medicine. She completed her residency at the Johns Hopkins Bayview Medical Center. She performed fellowships in infectious diseases at Johns Hopkins and a fellowship in critical care medicine at the National Institutes of Health.

ADM Brett Giroir, M.D., was sworn in as Assistant Secretary for Health at the Department of Health and Human Services (HHS) on February 15, 2018. The Assistant Secretary for Health leads development of HHS-wide public health policy recommendations, oversees 11 core public health offices—including the Office of the Surgeon General and the U.S. Public Health Service Commissioned Corps, which has approximately 6,500 uniformed health officers who serve in nearly 600 locations around the world to promote, protect, and advance the health and safety of the nation and the world. He also oversees 3 presidential and 11 secretarial advisory committees.

Dr. Giroir is a physician, scientist, and innovator. He is a former medical school executive and biotech startup chief executive officer (CEO), and has served in a number of leadership positions in the federal government as well as academia.

From 2014–2015, Dr. Giroir chaired the Veteran's Choice Act Blue Ribbon Panel to reform the U.S. Veterans Health System. During the Ebola emergency, he directed the Texas Task Force on Infectious and Disease Preparedness Response.

He was executive vice president and CEO of Texas A&M's Health Science Center from 2013 to 2015, having earlier served as vice chancellor of strategic initiatives (2011–2013) and vice chancellor for research (2008–2011) for the entire Texas A&M University system. A pediatric critical care physician and a former member of the American Board of Pediatrics, Dr. Giroir cared for critically ill children for 14 years, and was the first chief medical officer of Children's Medical Center of Dallas (now Children's Health). He was also a professor at the University of Texas Southwestern Medical Center from 1993 to 2003, and held a number of positions in academic and hospital leadership.

Dr. Giroir has had a significant federal portfolio. He directed the Defense Sciences Office of the Defense Advanced Research Projects Agency (DARPA) from 2006 to 2008. In this capacity, he worked regularly with the White House, Congress, and the National Institutes of Health, the Centers for Disease Control and Prevention, the Department of Homeland Security, and the Central Intelligence Agency leadership on national priorities, strategies, and programs. He joined the office in 2004 as Deputy Director, and between 1998 and 2004, was a member of the Defense Sciences Research Council.

Dr. Giroir has authored or co-authored almost 100 peer-reviewed scientific publications and holds patents on a number of biomedical inventions. He is the recipient of numerous honors and awards, including the U.S. Secretary of Defense Medal for Outstanding Public Service, the American Heart Association's President Lyndon Baines Johnson Research Award, and the Society of Critical Care Medicine's Annual Scientific Award. He was the nation's high school debate champion in 1978. He received a bachelor's degree in biology from Harvard University in 1982 and a medical degree from the University of Texas Southwestern Medical Center (Dallas) in 1986.

Captain Katie Goodwin, M.S., was hired by the Anne Arundel County Police Department in 1994, where she worked patrol and then as a detective in the Criminal Investigation Division, Sex Offense Unit. While assigned in this unit, she received the Department Commendation Award for the successful apprehension of a serial rapist. In 2000, she was promoted to Sergeant and assigned to the Intelligence Section, where she oversaw the Executive Protection Unit and provided security for the Anne Arundel County Executive. In 2002, she returned to the Criminal Investigation Division, where she was the commander of the Sex Offense Unit. In July 2005, she was promoted to Lieutenant and has served as a patrol commander and Executive Officer for two districts. In 2012, she took command of the Homeland Security and Intelligence Section and was responsible for implementing the first Gang Unit for the Agency. She was promoted to Captain in June 2015, where she remained as the commander for Western District until September 2017. In September 2017, she took command of the Criminal Investigation Division, which oversees three sections; the Major Crimes Section (Homicide, Sex Offense, Child & Vulnerable Adult Abuse Cases), Organized & Economic Crimes Section (Commercial Robberies, Economic Crimes, Homeland Security & Intelligence), Narcotics & Special Investigations Section (Major Offenders, Heroin Task Force, Vice/Prescription Fraud, Metal Thefts and the Fugitive Apprehension Team), and the Forensic Services. Two distinguished awards Captain Goodwin is most proud of receiving are the Department's

Silver Star Award for her leadership as the Civil Disturbance Unit's Commander during the Baltimore City Riots of April 2015. In addition, the Anne Arundel County Chamber of Commerce recognized her with the award of "Women Who Make a Difference" in 2017.

Captain Goodwin received a Bachelor of Arts Degree in Criminal Justice from the University of Maryland, College Park, and her Master of Science Degree in Business Management from Johns Hopkins University.

Traci G. Green, Ph.D., M.Sc., is Deputy Director of the Boston Medical Center Injury Prevention Center and Associate Professor of Emergency Medicine and Epidemiology at the Warren Alpert School of Medicine at Brown University. She is an epidemiologist whose research focuses on drug abuse, addiction, and injury. She earned a master's in epidemiology and biostatistics from McGill University and a Ph.D. in epidemiology from Yale University. She helped design the ASI-MV, a real-time illicit and Rx drug abuse surveillance system developed by Inflexxion, Inc. Dr. Green helped cofound prescribetoprevent.org, chairs the Drug Overdose Prevention and Rescue Coalition for the Rhode Island Department of Health, and serves as an advisor to the governor on addiction and overdose. Dr. Green serves on the Board of Scientific Counselors for the Centers for Disease Control and Prevention's (CDC's) National Center for Injury Prevention and Control. Her research is supported by CDC, the National Institute on Drug Abuse, the Department of Justice, the Agency for Healthcare Research and Quality, and the Patient-Centered Outcomes Research Institute.

Nicole Greene serves as Deputy Director for the Department of Health and Human Services' Office on Women's Health (OWH) and acts as the primary advisor to the Deputy Assistant Secretary for Health—Women's Health. A former Council for Excellence in Government Fellow and a graduate of the prestigious Leadership for a Democratic Society program through the Federal Executive Institute, Ms. Greene leads change management in the office. One of her first projects at OWH was to lead the restructuring of OWH, improving the efficiency and effectiveness by aligning the mission of the office so it can better serve American women and girls.

Ms. Greene oversees all administrative, financial, and strategic planning, as well as program and management operations, including the office's annual budget and related congressional justifications. She also guides all aspects of personnel management, staff development, and staff performance-related activities. Ms. Greene serves as a spokesperson for OWH, speaking on such topics as domestic violence and National Women's Health Week.

Before joining OWH, Ms. Greene spent more than 20 years at the Health Resources and Services Administration (HRSA), where she most recently served as Senior Administrative Officer and Operations and Administration Team Lead for HRSA's Bureau of Health Professions (BHPr). During her time at HRSA, she also led the Policy and Analysis Branch of BHPr's National Practitioner Data Bank. Ms. Greene also spent many years in various roles within HRSA's Bureau of Primary Health Care, including more than 7 years as a Senior Project Officer for the Community Health Center program. Her dynamic and extensive experience in public health has contributed to her overall proficiency in federal program management and oversight, operations, and administrative management, making her a valuable resource to OWH and the Office of the Assistant Secretary for Health.

Elisabeth Houtsmuller, Ph.D., is an Associate Director in the Healthcare Delivery and Disparities Research program at the Patient-Centered Outcomes Research Institute (PCORI). Before PCORI, Dr. Houtsmuller led the Green Park Collaborative at the Center for Medical Policy Technology, where she also served as vice president of research. Prior to her work there, she was managing editor of health technology assessments (HTAs) at Hayes, Inc., leading a team of writers and the production of numerous HTAs on a wide range of medical and mental health topics. In addition, she led the Behavioral and Mental Health Services program at Hayes, Inc. Earlier, she was an associate professor in the Department of Psychiatry at the Johns Hopkins University School of Medicine, where she served as principal investigator on several research grants, and directed a human subjects research laboratory focused on drug abuse and addiction. Her work has been published in numerous peer-reviewed papers, book chapters, and health technology assessments. Dr. Houtsmuller serves as the Chair of an institutional review board for a small research group in Baltimore. Dr. Houtsmuller received a Ph.D. in physiological psychology from Erasmus University in the Netherlands and completed postdoctoral work at the Johns Hopkins University School of Medicine.

Van Ingram is the Executive Director for the Kentucky Office of Drug Control Policy (ODCP). Mr. Ingram joined ODCP in November 2004, shortly after it was created, with the mission of coordinating Kentucky's substance abuse efforts in enforcement, treatment, and prevention/education.

Mr. Ingram served with the Maysville Kentucky Police Department for more than 23 years, the last 6 as Chief of Police. He is a former President of the Kentucky Association of Chiefs of Police, and was named "Kentucky Chief of the Year" in 2001. He is the 2004 recipient of the

Governor's Award for Outstanding Contribution to Law Enforcement, as well as, the Melvin Shein Award for distinguished service to Kentucky law enforcement. Mr. Ingram is a certified law enforcement instructor and has trained officers across the state on a variety of topics, including community-oriented policing, case management, and "Kentucky Substance Abuse Issues" for Chiefs, Sheriffs and command staff. He is a frequent speaker on a variety of substance abuse issues both in Kentucky and nationally.

P. Todd Korthuis, M.D., serves as Program Director for the Oregon Health & Science University's (OHSU's) Addiction Medicine Fellowship and Co-Director of the Oregon Addiction Education and Prevention Initiative that provides training and support for rural primary care providers in pharmacotherapy for substance use disorders. He is also a practicing general internist, addiction medicine provider, and clinician scientist. He began his clinical career treating patients living with HIV and became board certified in addiction medicine in 2010. His research focuses on improving integration of addiction treatment in diverse health care settings, including HIV clinics. He serves as principal investigator for two international trials funded by the National Institute on Drug Abuse (NIDA): the CTN-0055/0067 CHOICES trial of clinic-based extended-release naltrexone in North American HIV clinics, and the BRAVO trial of clinic-based buprenorphine for opioid use disorder in Vietnamese HIV clinics. He is co-investigator in the NIDA Clinical Trials Network Western States Node, collaborating in clinical trials of opioid, methamphetamine, and cocaine treatment. His honors include the 2008 Lawrence S. Linn Award for research that improves the lives of people living with HIV and a 2012–2013 Fulbright Scholar award to study integration of HIV and addiction care in Vietnam.

Matthew La Rocco, CADC, is the Community Liaison for the Louisville Metro Syringe Exchange Program. Through his work at the Louisville Metro Syringe Exchange Program, he has learned how choosing to "meet people where they are at" increases his ability as a practitioner to help others build motivation for change, elicit change behavior, and experience positive outcomes. Mr. La Rocco is frequently asked to speak about harm reduction, building community, and organizational capacity to effectively engage relationally with people who use drugs, and improving outcomes for patients and staff.

Benjamin Linas, M.D., M.P.H., is an Associate Professor of medicine at Boston University School of Medicine. He is a national leader in hepatitis C virus (HCV) infection and HCV/HIV co-infection comparative- and cost-

effectiveness research using computational biology, clinical epidemiology, and clinical economics methods. Dr. Linas has an excellent track record of productivity, ample funding from the National Institutes of Health and the Centers for Disease Control and Prevention and a growing core of successful trainees. Dr. Linas directs the HIV/HCV core of the Center for Health Economics of Treatment Interventions for Substance Use Disorders, HCV, and HIV, funded by the National Institute on Drug Abuse in collaboration with Cornell University, University of Pennsylvania, and Miami University.

Natasha Martin, D.Phil., is an Associate Professor in the Division of Global Public Health in the Department of Medicine at the University of California, San Diego. She is also an Honorary Senior Lecturer at the University of Bristol. Dr. Martin is an infectious disease and economic modeler with more than 15 years of experience modeling biological systems. She earned her doctoral degree in mathematical biology from the University of Oxford, and her undergraduate degree in mathematics and biology from Stanford University. Following her doctorate, she worked as a postdoctoral fellow at the University of Bristol and London School of Hygiene & Tropical Medicine.

Dr. Martin's work focuses on using dynamic epidemic modeling to evaluate the impact and cost-effectiveness of HIV, hepatitis C (HCV), and hepatitis B prevention interventions among high-risk populations such as people who inject drugs, men who have sex with men, and incarcerated populations. She is one of the leading researchers examining the potential impact and cost-effectiveness of HCV treatment as prevention. Currently she is engaged in a number of HIV and HCV intervention evaluation trials in international settings such as Australia, India, Kenya, Mexico, Mozambique, Ukraine, and the United Kingdom.

Veda Moore is a resident of Baltimore, Maryland. She works as a Johns Hopkins Health Care Community Care Coordinator.

William Powderly, M.D., is the Dr. J. William Campbell Professor of Medicine and the Larry J. Shapiro Director of the Institute for Public Health at Washington University in St. Louis. He is also Co-Director of the Division of Infectious Diseases at the Washington University School of Medicine. From 2005 to 2012, he was the Dean of Medicine and Head of the School of Medicine.

Dr. Powderly has been actively involved in HIV-related clinical research for almost 30 years. He has been a member of numerous advisory groups on HIV and infectious diseases for the National Institutes

of Health, the Centers for Disease Control and Prevention, the Canadian Institute for Health Research, and the European Medicines Agency. As Director of the Institute for Public Health, Dr. Powderly is particularly interested in finding ways to translate the significant advances in biomedical science into improvements in population and community health. He is a Fellow of the Royal College of Physicians in Ireland and of the American Association for the Advancement of Science, and is, currently, President of the Infectious Diseases Society of America.

Josiah (Jody) D. Rich, M.D., M.P.H., is Professor of Medicine and Epidemiology at the Warren Alpert Medical School of Brown University. He is also a practicing infectious disease specialist since 1994 at the Miriam Hospital Immunology Center providing clinical care for more than 22 years and at the Rhode Island Department of Corrections caring for prisoners with HIV infection and working in the correctional setting doing research. He has published close to 190 peer-reviewed publications, predominantly in the overlap between infectious diseases, addictions, and incarceration. He is the Director and Co-Founder of the Center for Prisoner Health and Human Rights at the Miriam Hospital (www.prisonerhealth.org). He is also a Co-Founder of the nationwide Centers for AIDS Research Collaboration in HIV in Corrections Initiative. Dr. Rich has advocated for public health policy changes to improve the health of people with addiction, including improving legal access to sterile syringes and increasing drug treatment for the incarcerated and formerly incarcerated populations. He is the principal investigator of three R01 grants and one K24 grant all focused on incarcerated populations. His primary field and area of specialization and expertise is in the overlap between infectious diseases and illicit substance use, the treatment and prevention of HIV infection, and the care and prevention of disease in addicted and incarcerated individuals.

He has served as an expert for the National Academy of Sciences, the Institute of Medicine, and many others. He has been appointed by Rhode Island Governor, Gina Raimondo, to the Overdose Prevention and Intervention Task Force Expert Team, selected to advise the task force and formulate a strategic plan to address addiction and stop overdose in Rhode Island. The RI Overdose Prevention and Intervention Task Force was created to propose a strategic plan that puts forth the most effective initiatives in the areas of prevention of opioid addiction, reversal of opioid overdose, treatment of opioid addiction, and recovery to reduce addiction and stop overdose death in Rhode Island. Their efforts are targeted at identifying the components for prevention, treatment, reversal, and recovery that will shift the epidemic curve of overdose deaths.

Sandra Springer, M.D., is an associate professor of medicine in the Department of Internal Medicine, Section of Infectious Diseases, at the Yale School of Medicine. She is also the Director of the Infectious Disease (ID) Clinic at the Newington site and an attending ID physician at the West Haven site of the Veterans Affairs Connecticut Healthcare System. She is board certified in internal medicine, infectious diseases, and addiction medicine. She has significant clinical and research experience with persons with alcohol and substance use disorders and with persons living with HIV (PLH). She has completed a 5-year National Institute on Drug Abuse (NIDA) K02 Independent Scientist Award developing interventions to improve adherence to antiretroviral therapy among PLH with comorbid substance use disorders. She was also a former recipient of a NIDA-funded K23 Mentored Career Development Award where she evaluated the use of medication-assisted treatment (MAT) to prevent relapse to opioid use as a conduit to care among HIV-infected, opioid-dependent released prisoners. During this project she developed the first protocol to use buprenorphine to improve HIV treatment outcomes as relapse prevention for opioid dependent HIV positive prisoners.

She has considerable research experience conducting randomized controlled trials with the use of extended-release naltrexone (XR-NTX) and has been a principal investigator (PI) on several R01s, including one funded by the National Institute on Alcohol Abuse and Alcoholism to evaluate XR-NTX to improve HIV treatment outcomes via preventing relapse to alcohol use among HIV-infected prisoners with alcohol use disorders transitioning to the community; PI on a NIDA R01 that evaluated XR-NTX to improve HIV treatment outcomes and prevent relapse to opioid use among opioid-dependent released CJ-populations; and she was recently awarded an R01 from NIDA as co-PI evaluating immunobiological outcomes among persons with opioid use disorders starting MAT. In addition, she has been co-investigator on two R01s funded by NIDA: (1) using buprenorphine to improve HIV and opioid treatment outcomes among HIV+ persons with a history of CJS involvement in Washington, DC, and (2) to implement MAT with XR-NTX with opioid-dependent persons in Ukraine. Thus, she has considerable expertise with HIV and substance use disorders and conducting research.

Patrick Sullivan, Ph.D., D.V.M., is a professor of epidemiology in the Rollins School of Public Health, Emory University. He has worked on HIV testing programs with migrant farm workers, with the inclusion of Hispanic participants in online sexual health surveys. Dr. Sullivan has also investigated methods to increase participation of African American and Latino men who have sex with men (MSM) in his research. Dr. Sullivan has worked with MSM prevention and vaccine studies in Brazil and Peru.

Dr. Sullivan's most current research in the United States focuses on a MSM testing initiative targeting African American and Latino MSM. The MSM testing initiative will have a Spanish language sexual health survey to better target Latino men. Dr. Sullivan acknowledges the large program of research with African American MSM in Atlanta and plans to develop parallel research capacity with Latino MSM in Atlanta.

Dace Svikis, Ph.D., is a professor in the Departments of Psychology, Psychiatry, and Obstetrics/Gynecology at Virginia Commonwealth University (VCU). She is also Deputy Director of the VCU Institute for Women's Health, and Director of the Addiction and Women's Health (AWHARE) Program. Dr. Svikis has been involved in addiction research for nearly 30 years and is best known for her work in perinatal addiction. While at Johns Hopkins University, Dr. Svikis directed the Center for Addiction and Pregnancy, a model multidisciplinary treatment program for pregnant women with opioid and other substance use disorders (SUDs). In recognition of her success integrating research with clinical practice, Dr. Svikis received the Dan Anderson award for Advancement of Scientific Knowledge in Addiction Treatment from Hazelden. During that time, Dr. Svikis also spearheaded acquirement of Ryan White funding to provide primary care and mental health services on the Hopkins Bayview campus to the drug-dependent pregnant and postpartum women who were also living with HIV.

She has served as Principal Investigator or Co-PI on numerous National Institutes of Health grants, including several randomized controlled trials of behavioral, psychosocial, and pharmacological treatments for opioid and other SUDs. She is a member of the Mid-Atlantic Node of the National Institute on Drug Abuse Clinical Trials Network, and for the past 15–20 years has been involved in translational research and the dissemination of evidence-based practices (e.g., motivational interviewing, safer sex skill building) to a broad range of medical and mental health care providers. As Deputy Director of the VCU Institute for Women's Health, Dr. Svikis is particularly committed to the mentoring of students and faculty in the conduct of research, emphasizing the importance of considering sex/gender as a variable from the point of study design through the analyses of data and publication of research findings.

Richard Wolitski, Ph.D., is the Director of the Office of HIV/AIDS and Infectious Disease Policy at the Department of Health and Human Services. This office is responsible for developing, coordinating, and supporting the implementation of policies, programs, and activities related to HIV, viral hepatitis, and other infectious diseases of public health significance, as well as the safety and availability of blood and tissue products.

Dr. Wolitski has worked for three decades as a researcher studying HIV, viral hepatitis, and sexually transmitted disease risks and prevention among gay and bisexual men, people who inject drugs, and other populations. He is the author of more than 130 scientific articles, chapters, and reports and he has co-edited three books. He earned his Ph.D. in community psychology from Georgia State University and his master's degree in psychology from California State University, Long Beach.

Nickolas Zaller, Ph.D., is Associate Professor in the College of Public Health Department of Health Behavior and Health Education, and is Director of the University of Arkansas for Medical Sciences (UAMS) Office of Global Health. Dr. Zaller's approach to public health research is global in scope and multidisciplinary, at times including medicine, pharmacy, the social and behavioral sciences, nursing, and law. Mentoring students, postdoctoral fellows, and medical residents has also been a strong theme throughout his academic career.

Dr. Zaller's interest in international public health dates back to his undergraduate education and now extends to four other continents. While a student at Kansas University, he earned a bachelor's degree in microbiology and East Asian studies. Following graduation, he was a Fulbright Scholar in Beijing, China. He went on to earn a Ph.D. in international health and infectious disease epidemiology from the Johns Hopkins Bloomberg School of Public Health. He returned to China to spend 2 years doing doctoral research on blood donation practices, HIV risk, and cultural beliefs about blood.

While Dr. Zaller was faculty for 7 years at Brown University's Alpert Medical School, his research, teaching, and mentorship activities focused on the interconnection of infectious disease, illicit substance use, and incarceration. He continues to be involved in an interdisciplinary research team composed of colleagues at Brown University and Anhui Medical University and School of Public Health in Anhui, China. The team has examined the health outcomes of rural-to-urban migration, particularly HIV risk among women, and currently is investigating factors that affect HIV testing among men in China who have sex with men and women.
Dr. Zaller has also developed ongoing collaborations with Ukrainian researchers on policy strategies for treating HIV and tuberculosis among injection drug users. He has also has served as a consultant to colleagues in Chile, India, and Kenya.

C

Statement of Task

An ad hoc committee will plan a 1.5-day public workshop on the infectious disease consequences of the opioid epidemic. Participants will discuss the scope of the problem, giving particular attention to viral hepatitis, HIV, and endocarditis. Some attention will be given to reducing the infectious disease comorbidities of injection drug use, especially strategies that emphasize empathy, respectful treatment, and patient satisfaction.

Speakers at the workshop will present on how the opioid epidemic has changed the epidemiology of infectious disease, particularly in Alabama, Florida, Hawaii, Indiana, Kentucky, Louisiana, Mississippi, Montana, North Carolina, Ohio, Tennessee, and West Virginia. In panel and open discussion, participants should discuss strategies to prevent and treat infections in people who inject drugs, especially ways to work efficiently though the existing public health and medical systems. Effective novel strategies should also be discussed, and may include analysis of promising European or Canadian programs. Participants should give equal attention to strategies that seem realistic and make efficient use of existing resources, as well as those that could not be implemented without additional funds.

The public workshop will feature invited presentations and panel discussions. An ad hoc committee will organize the workshop, select speakers and panelists, and serve as discussion moderators. A brief proceedings of the presentations and discussions at the workshop will be prepared by a designated rapporteur in accordance with institutional guidelines.