

Confronting the Emerging Epidemic of HCV Infection Among Young Injection Drug Users

Ronald Valdiserri, MD, MPH, Jag Khalsa, PhD, MS, Corinna Dan, RN, MPH, Scott Holmberg, MD, MPH, Jon Zibbell, PhD, Deborah Holtzman, PhD, Robert Lubran, MPA, MS, and Wilson Compton, MD, MPE

Hepatitis C virus infection is a significant public health problem in the United States and an important cause of morbidity and mortality. Recent reports document HCV infection increases among young injection drug users in several US regions, associated with America's prescription opioid abuse epidemic. Incident HCV infection increases among young injectors who have recently transitioned from oral opioid abuse present an important public health challenge requiring a comprehensive, community-based response. We summarize recommendations from a 2013 Office of HIV/AIDS and Infectious Disease Policy convening of experts in epidemiology, behavioral science, drug prevention and treatment, and other research; community service providers; and federal, state, and local government representatives. Their observations highlight gaps in our surveillance, program, and research portfolios and advocate a syndemic approach to this emerging public health problem. (*Am J Public Health*. 2014;104:816–821. doi:10.2105/AJPH.2013.301812)

Hepatitis C virus infection is a significant public health problem in the United States and an important cause of morbidity and mortality, surpassing HIV as a cause of death in 2007.¹ An estimated 2.7 to 3.9 million persons in the United States are currently living with HCV infection,² and yet the majority of persons who are infected are unaware of their infection^{3,4}—placing them at greater risk for cirrhosis, liver cancer, and premature mortality.⁵ In 2010, the Institute of Medicine reported that the lack of knowledge and awareness of the seriousness of chronic viral hepatitis among health care providers, policymakers, and at-risk populations—in combination with inadequate resources—has impeded an effective national public health response.⁶

Although the incidence of this bloodborne virus has declined in the past 2 decades because, in part, of the screening of the national blood supply initiated in 1992,³ as well as HIV-prevention interventions aimed at persons who inject drugs, the US Centers for Disease Control and Prevention (CDC) conservatively estimates that approximately 17 000 new HCV infections occur annually in the United States.⁷ Furthermore, recent reports document increases in HCV infection among adolescent

and young adult injection drug users (IDUs) in several US regions including New York,⁸ Massachusetts,⁹ and Wisconsin.¹⁰ The parenteral transmission of HCV has long been recognized, but emerging epidemiological data point to several distinct features of these young IDUs who are becoming infected with HCV.

When describing the HCV-infected population of the United States from 1999 through 2002, researchers analyzing data from the National Health and Nutrition Examination Survey noted that HCV antibody prevalence was significantly higher among men than women, among non-Hispanic Black relative to non-Hispanic White persons, and among those aged 40 to 49 years.¹¹ This is in contrast to the findings emerging from outbreak investigations of adolescent and young adult (i.e., ranging from 15 to 29 years of age) IDUs newly diagnosed with HCV who are equally likely to be male or female, predominantly White, and of a younger age.^{8–12} The CDC has reported increases in newly identified HCV infections among those aged 15 to 24 years in Massachusetts⁹ and persons aged younger than 30 years in New York⁸ and Wisconsin.¹⁰ Another telling feature of this emerging epidemic is the observation that the IDUs who are becoming

infected with HCV are often found in suburban and rural communities^{9,10,13}—not just in urban settings—and that many of these young men and women report a history of oral prescription opioid abuse before the initiation of injection drug use.^{10,12,14}

In fact, an important observation related to the discussion of emerging HCV infections among younger drug users is its temporal, geographic, and situational overlap with America's epidemic of prescription drug abuse. Over the past 2 decades, prescription drug abuse—the intentional use of a medication with intoxicating properties outside a physician's prescription¹⁵—has increased among youths and young adults in the United States.^{16–18} In its 2011 national survey of youths in public and private schools, grades 9 through 12, the CDC reported that nationwide, 20.7% of students had taken a prescription drug without a doctor's prescription 1 or more times during their life.¹⁹ The survey also reported that taking prescription drugs without a doctor's prescription was more frequent for White students (22.9%) than for Hispanic (19.4%) or Black (14.7%) students.¹⁹ Furthermore, ethnographic work suggests that prescription opioid abuse is a key factor in the transition to injection drug use; this observation has been made among both urban²⁰ and rural drug users.²¹

On February 26 and 27, 2013, the US Office of HIV/AIDS and Infectious Disease Policy, Office of the Assistant Secretary for Health, hosted a national consultation to better define and identify strategies to address the emerging epidemic of HCV infection among young adults who initiate drug use with oral opioids and then transition to injection drug use. Forty-eight experts in epidemiology, behavioral science, and drug prevention and treatment joined other researchers; representatives of federal, state, and local government; and community service providers to share

information, identify knowledge gaps, and suggest approaches that could be undertaken to enhance the public health response to this emerging health problem. The discussions were structured around a primary focus of preventing HCV infection but were, by design, multidisciplinary in nature. This summary presents selected highlights from the presentations and a high-level synthesis of the meeting discussion, including recommendations that emerged for confronting this serious public health issue. Information is framed around 4 cross-cutting themes: epidemiology and surveillance of HCV infection, HCV prevention among IDUs, drug abuse treatment as an HCV-prevention strategy, and multidisciplinary research priorities to address knowledge gaps. Strictly speaking, this was not a consensus conference; instead, the observations and recommendations contained in this commentary were developed by the consultants in small-group breakout sessions.

EPIDEMIOLOGY AND SURVEILLANCE OF HCV INFECTION

Viral hepatitis case reports are received electronically from state health departments via CDC's National Electronic Telecommunications System for Surveillance, based on case definitions developed and approved by the Council of State and Territorial Epidemiologists and CDC.⁷ As noted by CDC, the current surveillance system was designed for reporting acute infectious diseases for which a single laboratory test confirms a diagnosis; in terms of hepatitis C, an average of 4 lab tests or reports are required to identify each case of acute HCV infection.⁷ Because a majority of acute HCV infections are asymptomatic and given the reality that health departments may not have access to the necessary clinical and laboratory data needed to meet the case definition for acute HCV infection—or the capacity to collect this information⁶—it is not surprising that current surveillance efforts “substantially underestimate the incidence of acute viral hepatitis” in the United States.^{7(p9)}

With the current limitations in national HCV surveillance efforts, a major observation of the assembled consultants was the need to improve and enhance the quantity and scope of information about acute and chronic HCV

infection in the United States. Mounting an adequate public health response to HCV infection among adolescents and young adults who have transitioned from opioid prescription abuse to injection drug use requires that we better characterize the populations at highest risk and those with acute HCV infection, including a more detailed understanding of the social networks through which these persons are being exposed to HCV. The consultants cited the need for additional resources and endorsed the importance of expanding the capacity of state health departments to perform HCV infection surveillance and data collection, but they also recognized resource constraints and the reality that discrete categorical resources may not be available to develop a free-standing viral hepatitis surveillance system—similar to what exists in the United States for HIV infection.²² As such, the consultants underscored the importance of looking for opportunities to leverage existing infectious disease surveillance capacity to collect information about viral hepatitis, including hepatitis C.

One specific recommendation was to foster collaborations with payers and large health care systems to access information about viral hepatitis from their databases, as was exemplified by the work of Spradling et al. who described viral hepatitis infection prevalence among persons in private health care organizations in the United States.⁴ Implementation of an integrated, national electronic medical record was cited by the group as a potential boon to our collective ability to enhance hepatitis C surveillance data. But citing concerns about the confidentiality of patient or client data—particularly in drug treatment facilities—consultants opined that federal agencies must work collaboratively to meaningfully address confidentiality issues.

Looking more broadly at opportunities to better understand the emerging epidemiology of HCV infection among young IDUs, participants identified cancer registries, prescription drug databases, mortality records, and other large databases as sources of relevant information. To improve the quality of information from youths and young adults at risk for or infected with HCV, the expert consultants recommended alternative strategies for collecting information, including

individual incentives and the use of social media rather than traditional paper and pencil surveys. Finally, it was strongly emphasized that sound community-based partnerships will be necessary to promote outreach and access to populations at risk to ensure the success of epidemiological investigations and effective public health response.

HCV PREVENTION AMONG INJECTION DRUG USERS

Hepatitis C is a bloodborne virus.⁴ Although sexual transmission of HCV can occur,²³ in both the United States and abroad, injection drug use is the major mode of transmission.^{3,24,25} The incidence of HCV infection among IDUs can be quite high (40 per 100 person-years), especially among those newly injecting.^{3,26} Although HCV and HIV share a common mode of transmission—that is, through exposure to infected blood—they represent 2 different families of virus and differences in the 2 etiologic agents have an impact on prevention approaches. Of note, it has been observed that HCV transmission following a single needle stick is more likely than HIV transmission.²⁷ Also, although it has not been exhaustively studied, HCV appears to be more environmentally stable than HIV, lasting longer outside the body on contaminated surfaces and other fomites.²⁸

Differences between HIV and HCV may explain, in part, the observation that harm reduction strategies that have led to declines in HIV infection in the United States have not been equally successful for hepatitis C.²⁹ In a 2011 meta-analysis of interventions to prevent HCV infection in persons who inject drugs, only 1 study in 7 found a significantly lower risk for HCV seroconversion associated with participation in a syringe-exchange program.³⁰ These findings suggest that reductions in needle and syringe sharing may not adequately reduce risk of HCV transmission if the virus is effectively transmitted through the sharing of other injection paraphernalia, including “cookers” (containers used to mix and heat drugs), cotton filters, and rinse water.³¹ Based on evolving evidence, this appears to be the case. In a prospective study of more than 800 IDUs aged 15 to 30 years recruited from 5 US cities, 37% of the HCV seroconversions

were estimated to be attributable to the sharing of drug preparation equipment.²⁸

In light of these circumstances, consultants voiced the pressing need to update evidence-based hepatitis C prevention guidance for both providers and persons who inject drugs—especially regarding the differences between HIV and HCV transmission risk associated with injection drug use. They identified at least 3 groups of key providers who need updated information about HCV prevention strategies: staff working in needle and syringe exchange programs, social service and correctional facility staff who come in contact with youths and young adults, and medical providers who care for youths and young adults (e.g., pediatricians and school nurses). Mobilizing and enlisting professional organizations was cited as one way to increase awareness of this emerging public health problem within the medical community.

Consultants endorsed the need for targeted outreach to young people who inject drugs and access to sterile injection equipment. They also identified the lack of developmentally appropriate and culturally competent hepatitis C prevention materials for young IDUs as an important barrier to prevention efforts. They advised that social media should be tapped as a key channel for reaching young people at risk for HCV infection. In terms of direct outreach to young persons who are at risk for or injecting drugs, consultants stressed that broad-based drug awareness programs in schools, though helpful to support overall awareness of hepatitis C, are not adequate to serve the specific HCV-prevention needs of adolescents and young adults who inject drugs. Instead, they recommended using ethnographic techniques to create social maps (i.e., a visual representation of a social network), particularly in suburban and rural areas where community-based organizations serving IDUs may not exist. Social maps can inform decisions about how, when, and where to target hepatitis C prevention interventions and help to provide insights into how information about drugs and injection practices are disseminated among the populations of interest.

Increased access to HCV testing was endorsed as a strategy to promote awareness among people who inject drugs as were the use of social and other incentives to engage and

retain these persons in HCV prevention and care services. For IDUs who cannot or will not stop injecting drugs, the consultants recommended improving access to sterile injection equipment and paraphernalia, especially in rural areas where advocacy and support for sterile injection equipment and other drug-use related services may be sparse—if not nonexistent. Effectively reaching and serving persons in rural areas who inject drugs will require innovative approaches such as mobile services (e.g., HCV testing, prevention services). The group observed that access to HCV diagnostic and treatment services for IDUs is currently not adequate and recommended the active expansion of HCV “test and treat” models as a strategy to prevent HCV infection, as has been proposed by European colleagues.³²

DRUG ABUSE TREATMENT AS AN HCV PREVENTION STRATEGY

Successful treatment of the underlying opioid abuse is an obvious and important strategy for removing the risk of HCV acquisition or transmission that accompanies the preparation and injection of illicit drugs. Medication-assisted treatment has been effective in facilitating recovery from opioid addiction for many patients.³³ This approach employs the use of pharmacological agents along with necessary supportive services such as psychosocial counseling and treatment of co-occurring disorders. Methadone, a full opioid agonist, is the most well-studied and utilized pharmacological agent for the treatment of opioid dependence.³⁴ Methadone must be administered daily to prevent withdrawal and currently its administration is highly structured and regulated at both the federal and state level. Buprenorphine is a partial opioid agonist that is well-tolerated and effective in reducing illicit opioid use.^{35–37} Naltrexone, an opioid antagonist, is also approved for the treatment of opioid dependence.³³ However, a recent review of oral naltrexone therapy suggests that, because of low rates of client retention in the evaluated studies, additional studies may be required to assess the real-world effectiveness of maintenance therapy with oral naltrexone for opioid dependence.³⁸ A long-acting, injectable formulation of naltrexone, approved by the Food and Drug Administration in 2010, is

also available for treating opioid dependence.³⁹

A recent review of nonmedical use of prescription medications among adolescents aged 12 to 17 years indicated that the nonmedical use of prescription pain relievers was more prevalent than use of stimulants, sedatives, and tranquilizers, with nationally representative studies reporting prevalences of prescription pain reliever use between 4% and 11%.⁴⁰ However, it also is known that adolescents with prescription opioid use disorders markedly underutilize treatment because they do not perceive that they have a problem, because of concerns about the negative opinions related to substance use treatment, or because of the lack of adequate services—especially in rural areas.⁴¹ Consultants agreed that there is a need to expand both the accessibility and capacity of developmentally appropriate drug use prevention and treatment services for adolescents and young adults—and it was also noted that there is a dearth of information about the pharmacotherapy of opioid addiction among adolescents and young adults. Consultants noted the need to expand the availability of oral substitution therapy and promote evidence-based models of care that address the specific needs and preferences of adolescents and young adults. Rural areas present unique challenges given the dearth of specialists in addiction treatment. To increase the capacity of primary care providers to screen for and successfully treat opioid use disorders, the consultants suggested an expanded use of webinars and other distance-based training modalities, especially through the federally funded Addiction Technology Transfer Centers.⁴²

Specific models of care for adolescents at risk for or currently abusing opioids were highlighted by the consultants as promising approaches. More extensive use of evidence-based juvenile drug courts⁴³ was cited as a means of improving substance abuse–related outcomes with the secondary benefit of decreasing behaviors that facilitate the transmission or acquisition of HCV. Furthermore, drug courts represent a logical locus onto which hepatitis C education and testing programs could be linked. The convened experts also cited the Affordable Care Act and its emphasis on integrated care models,⁴⁴ such as patient-centered medical homes, as an ideal

means of coordinating the substance use, mental health, and primary care needs of adolescents with opioid use disorders who may also be infected with HCV. And, finally, there was a strong endorsement of promoting the availability of HCV testing and linkage to hepatitis care in all substance use treatment facilities and among providers who are treating opioid use disorders in outpatient settings.

RESEARCH PRIORITIES TO ADDRESS KNOWLEDGE GAPS

The convened group identified a number of knowledge gaps and research priorities. These are summarized under the categories of epidemiological research, basic and clinical research, prevention research, and operational research.

In terms of epidemiological research, consultants underscored the need to better characterize populations and communities at incipient risk for HCV infection as a result of injection drug use. Particular emphasis was given to efforts that might identify adolescents and young adults who have not yet transitioned from oral to injection opioid use, given the experts' collective assessment that the existing surveillance system in the United States is not "nimble" enough to provide this information in a timely manner. The consultants noted that progress has been made in understanding HCV transmission risks, but that additional research on transmission risks associated with environmental contamination and the sharing of injection preparation equipment could better inform HCV prevention strategies. Finally, it was suggested that longitudinal cohort studies of young IDUs, especially those residing in rural and suburban areas, would be a sound approach to monitor trends in HCV infection and reinfection risks and rates.

Consultants agreed that continued investment in research to create a safe and effective vaccine against HCV should be an ongoing priority in basic science and clinical research. Other research priorities raised under the rubric of basic science and clinical research included studies to research viral dynamics during acute HCV infection, development of an inexpensive and effective biocide to clean surfaces and drug preparation and injection equipment, and field-based testing technologies

that can rapidly distinguish between acute and chronic HCV infection.

A host of knowledge gaps were identified during discussions related to HCV prevention research, reflecting the need for additional studies in this domain. In light of the syndemic nature of opioid abuse and HCV acquisition and transmission, much of the discussion was focused on the need to identify and test community-level interventions—especially those that can be mounted in settings where persons who use illicit drugs can gather without shame or stigma. Consultants strongly endorsed the need for community-based participatory research as a key strategy to address this gap. Among the needed community-level interventions highlighted were those to prevent the transition from oral opioid to injection drug use (including efforts focused on families, schools, churches, and other social organizations) and broader community strategies to raise awareness of and support for hepatitis C prevention, treatment, and care services.

Throughout the discussion of research priorities a recurrent theme was the need to test and develop interventions that are developmentally appropriate—because prevention approaches that are effective among adults may not necessarily achieve the same results when applied to adolescent and young adult populations. Finally, consultants agreed that packages of prevention interventions should be tested to determine the optimal combination of biomedical, behavioral, and structural interventions that would result in the maximal reduction in HCV transmission and acquisition among adolescents and young adults who inject drugs. Related to this last point was a call for additional modeling studies to inform nascent discussions of HCV treatment as a strategy to reduce viral transmission among IDUs.

There was broad agreement that additional information is needed to better understand the specific barriers that impede engagement in care, both for drug use and HCV treatment, for adolescents and young adults. Consultants noted the need to develop and test models of care that are responsive to the needs of young people in a variety of settings and circumstances, including rural locales, community venues, primary care settings, substance abuse clinics, drug-using venues, drug courts, and correctional settings. Models that can

successfully integrate HCV diagnosis and treatment services into existing substance use treatment facilities were acknowledged as critical to the ultimate prevention of HCV infection among IDUs.

CONCLUSIONS

We are at a unique, some might even say historic, point in time vis-à-vis our ability to respond to the public health threat of HCV in the United States. Millions of people are currently unaware that they are infected with this potentially deadly bloodborne pathogen, but updated clinical guidelines recently released by the CDC² and the US Preventive Services Task Force⁴⁵ now recommend 1-time HCV screening for all persons born between 1945 and 1965. The CDC estimates that routine HCV screening of baby boomers will result in more than 800 000 persons with previously undiagnosed HCV infection coming into care.² Moreover, with the current availability of curative treatment of HCV and the amazing pace of HCV therapeutic advances,⁴⁶ there is a real opportunity to avert tens of thousands of cases of cirrhosis, liver cancer, and the other serious sequelae of chronic viral hepatitis—not to mention opportunities to interrupt the transmission of virus from those who are chronically infected yet remain untreated.

Yet, against this backdrop of tremendous promise for successful public health action, we are confronted by a newly emerging challenge: increases in incident HCV infections among young injectors who have recently transitioned from oral opioid abuse. The significance of this challenge was recognized and highlighted by the US Department of Health and Human Services in its 2011 "Action Plan for the Prevention, Care and Treatment of Viral Hepatitis."⁴⁷ Among other actions, the Department of Health and Human Services' first comprehensive national plan to address viral hepatitis in the United States calls for additional study of the "recent emergence of injection drug use and HCV transmission among young persons in suburban and rural communities" and more "prevention research to intervene and prevent HCV among young IDUs."^{47(p47)}

The multidisciplinary consultation described in this brief commentary is a direct response to the national viral hepatitis action plan's call for

a better understanding of re-emerging HCV infection. The broad range of recommendations provided by this well-informed group of expert stakeholders outline multiple actions that would bolster our public health response to the re-emerging HCV epidemic among adolescent and young adult persons who inject drugs. Their observations highlight strategic gaps in our current surveillance, program, and research portfolios and remind us that no single intervention alone will provide an adequate public health response.

Perhaps the most relevant operational construct arising from the diverse array of consultants' recommendations is the concept of a public health "syndemic"—a set of synergistic, interrelated, and mutually reinforcing health problems and social circumstances.^{48–50} Embracing a perspective that recognizes the syndemic nature of emergent HCV infection among adolescent and young adult IDUs requires a commitment to simultaneously address substance use and its social antecedents as well as to confront the ongoing and powerful stigma associated with substance use disorders and persons who inject drugs. Successful interventions to reduce HCV incidence in this population will require the full participation of affected communities to develop and deliver youth-informed strategies in community and clinic-based settings. Also necessary are improved pharmacotherapies for opioid abuse as well as easier-to-deliver treatments for HCV infection. Removing barriers to HCV prevention, treatment, and care and supporting behavioral, biomedical, and epidemiological research to better inform our efforts will move us closer to the goal of reducing HCV incidence as stated in the national viral hepatitis action plan⁴⁷ and break the silence surrounding this deadly epidemic. ■

About the Authors

Ronald Valdiserri and Corinna Dan are with the Office of HIV/AIDS and Infectious Disease Policy, US Department of Health and Human Services, Washington, DC. Jag Khalsa and Wilson Compton are with the National Institute on Drug Abuse, Bethesda, MD. Robert Lubran is with the Substance Abuse and Mental Health Services Administration, Rockville, MD. Scott Holmberg, Jon Zibbell, and Deborah Holtzman are with the Centers for Disease Control and Prevention, Atlanta, GA.

Correspondence should be sent to Ronald O. Valdiserri, US Department of Health and Human Services, 200 Independence Ave SW, Room 443-H, Washington, DC 20201 (e-mail: ron.valdiserri@hhs.gov). Reprints can be

ordered at <http://www.ajph.org> by clicking the "Reprints" link.

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Contributors

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Human Participant Protection

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