Open Forum Infectious Diseases

PERSPECTIVES

A Road Map to Hepatitis C Elimination: Yesterday, Today, and Tomorrow

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There are an estimated 3.5 million people with hepatitis C virus (HCV) infection in the United States, resulting in 15 000 HCV-related deaths in 2019 and approximately $7 billion annually in healthcare costs. Although the United States had experienced declining incidence, since 2010 hepatitis C infections have rebounded. The history of HCV treatment can be seen as a series of scientific triumphs that should be celebrated as the accomplishments that they represent. But new treatments will only get us so far: Social determinants of health drive the majority of health outcomes. Without addressing the factors that impact the lives of our patients, we will fall short in the outcomes we seek. Public health systems, hospital networks, and governments must work more cohesively to eradicate hepatitis C. We have the tools, both biomedical and social. The end of hepatitis C depends on our willingness to make use of them.

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"Would you be interested in treatment?" the physician asked the young woman. They were seated in our outreach van, a converted recreational vehicle parked on a deserted street in west Baltimore. The woman, whom we will call "Donna," had been diagnosed with hepatitis C virus (HCV) years prior but was never treated. Her eyes flickered for a moment before meeting his. "Look, it's not that I don't want treatment," she explained. "I want to take care of myself. But it won't work. Where am I going to put my medication?" She gestured outside. "When you live in the streets, there is no place to brush your teeth, to take a shower, and even less a place to put your medications." Although this story belongs to one of the authors, each of us has had countless similar conversations with patients.

We are uniquely privileged as infectious diseases doctors in that we often have the opportunity not just to *treat* a disease, but to *cure* it. From penicillin to modern antibiotics to the antiretroviral drugs that have converted human immunodeficiency virus into a chronic, manageable condition, we have no shortage of miracle drugs, and the newest treatments for HCV are no exception, allowing us to eliminate what was formerly a chronic, mostly incurable and deadly disease with just one pill a day in as little as 6 weeks, with few to no side effects. Despite this progress, treatment rates for HCV remain stagnant and infections continue to rise [1]. Something is failing, and it isn't the medication: *it is us.*

An estimated 3.5 million people are living with HCV infection in the United States (US) today, representing $7 billion annually in economic costs, with more than 15 000 HCV-related deaths in 2019 [2, 3]. Since 2010 HCV infections have dramatically risen, coinciding with the worsening opioid epidemic and increased injection drug use in the US [4].

The introduction of interferons in 1986 represented the first curative treatment for the disease [5]. From a biomedical lens, the recent history of HCV treatment can be seen as a series of scientific triumphs. In 2014, we saw the blockbuster approval of direct-acting antivirals, a treatment capable of fully curing the disease with few to no side effects [6]. Now, the future promises us even more, with efforts to develop a single, one-time injectable cure: another "game changer" [7]. Because of these advancements, experts years ago forecast the elimination of HCV by 2030 [8], but these dreams have yet to materialize, and the question is "why?" The failures are all too evident. These deficiencies are not biomedical; we have excellent treatments. Rather, they demonstrate a lack of attention to the social determinants of health (SDoH) in the lives of our patients.

What this means is that, unfortunately, miracle drugs like HCV treatments by themselves are not enough. Less than a quarter of people living with HCV have been offered treatment [9], and many

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remain undiagnosed. A pill or injection only works if it is used. This is echoed by the findings of our recent study, "An analysis of social determinants of health and their implications for hepatitis C virus treatment in people who inject drugs: the case of Baltimore" [10]. We looked at the relationship between SDoH and peoples' awareness of their HCV infection, and their treatment status. What we observed is a strong relationship between an individual's SDoH and their awareness of their infection with HCV, and their engagement in treatment. As with Donna, the women in our study were both more likely to be aware of their HCV infection, and yet less likely to be treated, presumably because women like Donna who are living in the streets are more likely to experience violence and extreme marginalization.

Improving the HCV care cascade requires focusing on 4 key areas—outreach, testing, treatment uptake and delivery, and follow-up—while addressing SDoH throughout the care continuum to enhance success.

OUTREACH

Innovative approaches to integrating HCV and substance use care through facilitated telemedicine, as demonstrated in a recent study, and coadministering treatments in outpatient settings show promise [11, 12], especially in rural settings. Structurally competent, trauma-informed care delivered via mobile vans in high-prevalence areas, along with community navigators who have lived experience, can build trust and relationships. Network-based referrals, incentives, and low-barrier digital systems for those with internet access can improve outreach.

TESTING

Testing for HCV presents numerous challenges, with patients often refusing laboratory testing. For those who do test, the process for diagnosing HCV usually requires several visits, leading to loss of patients to follow-up. The recent US Food and Drug Administration approval of point-of-care tests for HCV could help identify more cases and facilitate confirmatory testing and care linkage. Making use of these tests will require facilitation of rapid referrals to HCV treatment, both in primary care clinics, as well as in facilities focused on substance use. HCV screening should be conducted in all emergency rooms to better understand the problem's scope and develop targeted community interventions. Hot-spotting has been used in places such as Massachusetts [13] to identify geographic areas with high transmission rates of HCV, and can be an effective tool for directing resources to these efforts.

TREATMENT UPTAKE

To effectively address HCV, it is crucial to understand the disease's burden and related SDoH. This understanding will help to allocate resources to community health centers and broad health campaigns to address SDoH and reduce barriers to care. All healthcare providers, including those in obstetrics and gynecology, gastroenterology, and primary care, should be enabled to prescribe HCV treatment and should be trained in concepts of pain management, HCV treatment, and trauma-informed care, especially for those treating substance use disorders.

TREATMENT DELIVERY

We must not only advocate for adequate budgets to provide free and efficient medication delivery, but also address the SDoH that prevent patients from being able to complete treatment. One innovative approach is the Infectious Disease Elimination Act (IDEA) Exchange in Miami, a "medication locker" program to provide a safe space to store medications for patients like Donna who are experiencing homelessness [14]. Investment is needed in community navigation resources to leverage existing clinics and support systems, aiding retention and adherence. Additionally, funding and support for community organizations are crucial for education, awareness, and mental health support, and empowerment of patients to actively participate in their treatment and to foster self-sufficiency.

FOLLOW-UP

Delivering medications and engaging with people who use drugs offers a unique opportunity to build trust and sustainable infrastructure. We must continue outreach efforts, providing resources like phones and understanding community dynamics to form treatment coalitions. Community workers and peer navigators should be supported through funding. Follow-up care should extend beyond testing for a cure and address mental health, comorbidities, and substance use disorders.

The development of additional promising therapies for HCV and other diseases should be celebrated. But new, even groundbreaking treatments will only get us so far; a whole-person approach is essential to achieving the health outcomes we seek. Public health systems, hospital networks, and governments should work more cohesively and intentionally to address social determinants. We have the tools, both biomedical and social, to avoid leaving patients like Donna behind. The end of HCV depends on our willingness to make use of them.

Note

Potential conflicts of interest. All authors: No reported conflicts.

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