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Hepatitis C Virus Infection Preceding an Outbreak of Human Immunodeficiency Virus Among Persons Who Inject Drugs—Kanawha County, West Virginia, 2019–2021

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Abstract

Of 65 cases during a human immunodeficiency virus (HIV) outbreak among persons who inject drugs (PWID) in West Virginia (2019–2021), 61 (94%) had hepatitis C diagnosed a median of 46 months prior to HIV diagnosis. Hepatitis C diagnosis among PWID should trigger improved access to prevention and treatment services.

Keywords

hepatitis C; human immunodeficiency virus; outbreak; epidemiology; prevention

By 2016, several central Appalachian states, including West Virginia, experienced increases in acute hepatitis B [1] and acute hepatitis C [2]. The increases were associated with injection drug use and occurred disproportionately among non-Hispanic White young adults [1, 2]. By 2019, West Virginia had the second highest rates of acute hepatitis B and acute

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hepatitis C in the nation [3], and the state's first human immunodeficiency virus (HIV) outbreak in persons who inject drugs (PWID) had been reported in Cabell County [4].

In previous outbreaks of HIV among PWID, hepatitis C virus (HCV) coinfection rates have been as high as 92% [5]. In a 2015 Scott County, Indiana, outbreak of HIV among PWID, 4 hepatitis C cases in the largest HCV transmission cluster (n = 130) preceded the HIV outbreak by 5 years [5]. In a 2015–2018 HIV outbreak among PWID in northwest Massachusetts, hepatitis C diagnosis preceded HIV diagnosis by a median of 45 months [6].

When a second HIV outbreak among PWID was reported in Kanawha County, West Virginia [7], we investigated temporal patterns of viral hepatitis coinfection among cases with HIV.

METHODS

Setting and Patient Population

Outbreak cases were defined as confirmed HIV diagnoses on or after 1 January 2019 in PWID who lived in Kanawha County at the time of HIV diagnosis. Cases were included if they had at least 1 healthcare encounter at Charleston Area Medical Center (CAMC), a large integrated health system, or at West Virginia Health Right, a community clinic serving PWID, during the 1 year prior to HIV diagnosis through 18 June 2021.

Data Sources

Demographics, HIV transmission risk factor, and HIV diagnosis date were obtained from the enhanced HIV/AIDS Reporting System (eHARS), the West Virginia HIV surveillance database. HIV diagnosis date was defined as the specimen collection date for the first reactive HIV test.

The West Virginia Electronic Disease Surveillance System (WVEDSS), an integrated information system, houses viral hepatitis laboratory and case investigation data. A cross-match between eHARS and WVEDSS was performed to identify outbreak cases with a laboratory test indicating current or past HCV, hepatitis B virus (HBV), or hepatitis A virus (HAV) infection. Current or past HCV infection was defined as a reactive HCV antibody screen or positive result for HCV RNA or genotype. Current or past HBV infection was defined as a positive hepatitis B surface antigen, hepatitis B e antigen, total antibody to hepatitis B core antigen, or HBV DNA test. Past HAV infection was defined as a confirmed case of hepatitis A. Date of diagnosis for hepatitis C, hepatitis B, and hepatitis A was defined as the specimen collection date of the first positive laboratory test.

In West Virginia, all vaccines administered to children from birth through age 18 years are required to be reported into the West Virginia Statewide Immunization Information System (WVSIIS), a population-based web application. All adult vaccinations administered by pharmacists and local health departments are recorded in WVSIIS, and historic vaccinations for adults are sometimes recorded when documentation is available. WVSIIS was reviewed for hepatitis A and B vaccination status among outbreak cases. CAMC and West Virginia Health Right medical records were used to populate additional demographic, laboratory, and vaccination data.

Data Processing and Analysis

Public health surveillance and medical record data were abstracted and entered into a deidentified REDCap database. The data were analyzed descriptively using frequency distribution, percentage, and measures of central tendency. Median and interquartile ranges (IQRs) were used to summarize numerical variables. Frequency and percentages were used to summarize categorical variables. Data were analyzed using SAS version 9.4 (SAS Institute, Cary, NC).

This activity was reviewed by the Centers for Disease Control and Prevention (CDC) and conducted consistent with applicable federal law and CDC policy [7].

RESULTS

Sixty-five (97%) of 67 HIV cases met inclusion criteria as of 18 June 2021; of these, 54% were male (n = 35) and most were non-Hispanic White (n = 60, 92%), aged 20–40 years at the time of HIV diagnosis (n = 54, 83%), and had experienced homelessness or housing instability (n = 40, 62%). The vast majority were seropositive for HCV infection (n = 61, 94%) with detectable HCV RNA levels (n = 55, 85%); of these, only 1 received HCV treatment during the review period.

Of 61 persons diagnosed with past or current HCV infection, hepatitis C diagnosis preceded HIV diagnosis for 50 individuals (82%) with a median interval of 46 months (IQR, 29–71; Figure 1). Three (5%) individuals had HCV infection diagnosed after HIV diagnosis (range, 4 months–1 year). Eight individuals (13%) experienced HCV diagnosis simultaneously or within 1 week after HIV diagnosis.

A history of HAV (n = 11, 17%) or HBV (n = 10, 15%) infection was detected exclusively among persons seropositive for hepatitis C. Two persons had a history of infection with HCV, HAV, and HBV. Hepatitis A diagnosis preceded HIV diagnosis in all cases by a median of 22 months (IQR, 15–31). Overall, 21 persons (32%) had received at least 1 dose of hepatitis A vaccine; no persons with a history of HAV infection had received hepatitis A vaccine. HBV infection was detected prior to or on the date of HIV diagnosis for 7 (70%) cases; among these 7, the median time from detection of HBV infection to HIV was 30 months (IQR, 2–67). Only 22 (34%) persons had received at least 1 dose of hepatitis B vaccine, including 2 persons with a history of HBV infection, and up to 27 (42%) may have been HBV-susceptible, including 19 (29%) with serologic markers indicating susceptibility and no record of vaccination and an additional 8 (12%) with neither hepatitis B test results nor immunization records.

DISCUSSION

Similar to prior investigations of HIV outbreaks among PWID [5, 6], we documented high rates of hepatitis C preceding HIV diagnosis by a median of 46 months among cases in an HIV outbreak associated with injection drug use. At a population level, a positive association between hepatitis C prevalence and HIV prevalence has been noted, beginning at a threshold of 30%–40% hepatitis C prevalence among PWID in North America, Europe,

and Asia [8]. Hepatitis C appears to be a sensitive leading indicator for HIV outbreaks among PWID.

These findings have important implications for prevention. The combination of sufficient sterile injection paraphernalia for all injections and medication for opioid use disorder (MOUD) reduces hepatitis C transmission by 74% [9]. These critical hepatitis C prevention measures also prevent HIV transmission [10]. Unfortunately, PWID in Kanawha County reported stigma when seeking health services and had limited access to sterile injection supplies and MOUD at the time of the outbreak [7]. In addition to syringe services and MOUD, expanded access to hepatitis C and HIV testing and treatment as prevention and vaccination for hepatitis A and hepatitis B are needed for PWID in Kanawha County. Such services could be offered in low threshold settings, such as community clinics, syringe services programs, and mobile clinics, and would likely prevent many adverse outcomes related to addiction and injection drug use, including viral hepatitis and HIV infection. In summary, Figure 1 indicates multiple missed opportunities for HIV prevention among PWID with hepatitis C in Kanawha County, West Virginia.

We identified a few limitations to this investigation. First, we were limited to reviewing medical records at 2 facilities in Kanawha County. However, according to data in the West Virginia Health Information Exchange, the majority of case visits occurred at these 2 facilities. Second, dates of hepatitis C and HIV diagnoses were based on surveillance data, which can be delayed and incomplete. In addition, most acute HCV and HIV infections are asymptomatic, so the interval between the 2 infections cannot be known with certainty. However, limited molecular sequencing data identified molecular clusters, suggesting that HIV transmission was recent [7]. Third, adult vaccinations are not legally required to be reported in the WVSIIS; thus, we may have underestimated immunization rates for this population.

CONCLUSIONS

Recent infections with hepatitis C among PWID are an important indicator of risk for further infectious complications of injection drug use, including HIV. In the setting of increased HCV transmission, health departments should collaborate with community providers to enhance access to needs-based syringe services, MOUD, hepatitis A and hepatitis B vaccination, and treatment for hepatitis C, as well as HIV testing, prevention, and treatment services [11, 12].

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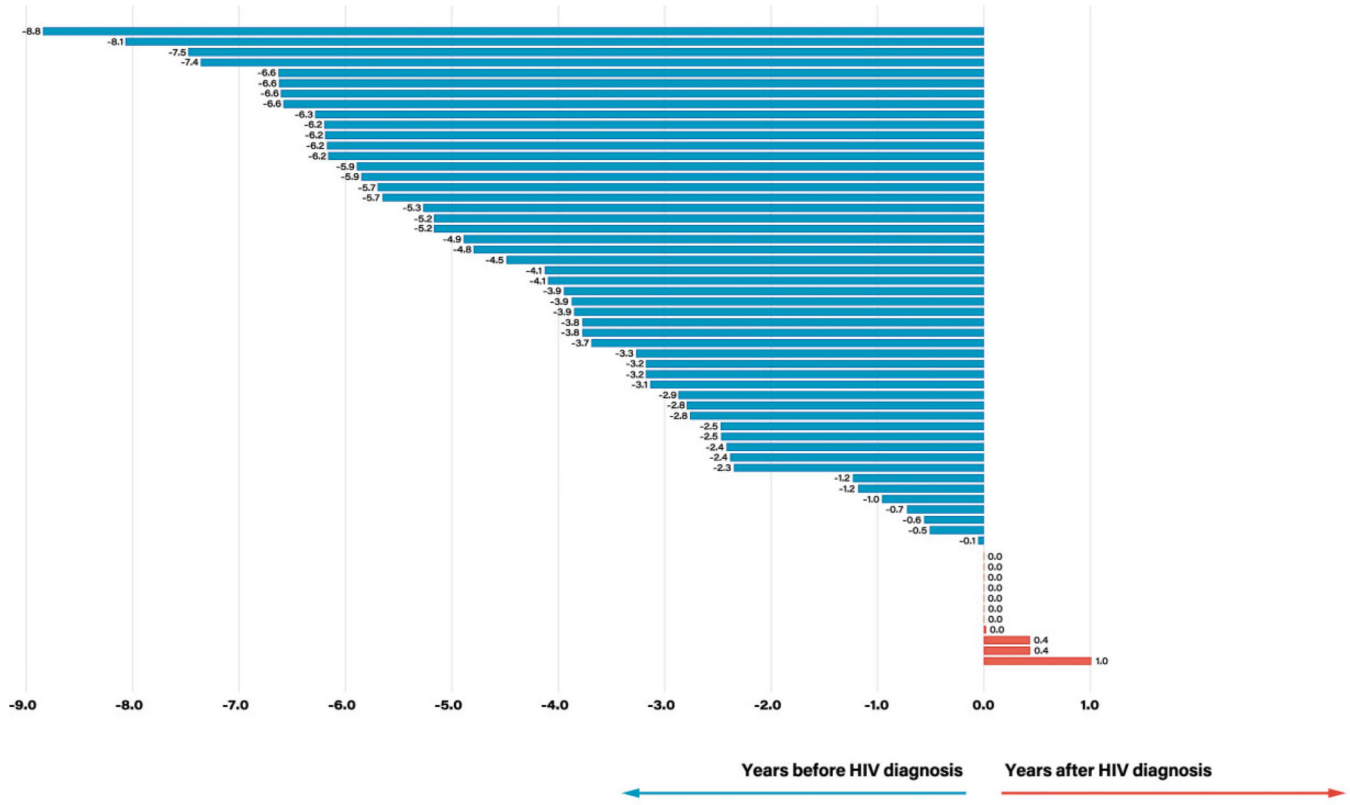

Figure 1.

Years from diagnosis of hepatitis C to diagnosis of HIV during an outbreak of HIV infection related to injection drug use, Kanawha County, West Virginia, 2019–2021. Abbreviation: HIV, human immunodeficiency virus.