Use of Enhanced Surveillance for Hepatitis C Virus Infection to Detect a Cluster Among Young Injection-Drug Users—New York, November 2004—April 2007

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Infection with hepatitis C virus (HCV) is a leading cause of chronic liver disease in the United States. Chronic hepatitis B and C virus infections were added to the nationally notifiable diseases list in 2003.1 Approximately 3.2 million persons in the United States have chronic HCV infection.2 The most common risk factor for HCV infection is illicit drug use (specifically injection-drug use [IDU]).3,4 Although approximately one third to one half of cases have no identified risk factor4 (New York State Department of Health [NYSDOH], unpublished data, 2008). Because approximately 80% of acute HCV infections are asymptomatic and no serologic markers for recent infection exist, distinguishing recent from distant infection based on serology alone is challenging2 and establishment of national HCV infection incidence is difficult. CDC provides funds to enhance surveillance for HCV infection and other forms of viral hepatitis in New York State (NYS) and seven other areas. One project of enhanced surveillance is to identify those HCV infections most likely to have been acquired recently. Since January 2006, NYSDOH has prioritized follow-up of positive laboratory markers for HCV infection among persons aged <30 years because they are more likely to be newly infected than older persons.5 In February 2007, NYSDOH detected a cluster of HCV infections among persons in this age group by using the prioritized algorithm. This report describes the subsequent investigation by NYSDOH and the Erie County Department of Health (ECDOH), which identified a group of patients with histories of IDU who were linked through a single high school that all the patients had attended at some time. The findings demonstrate how targeted enhanced surveillance can effectively detect clusters and outbreaks and guide appropriate interventions.

In 2004, the enhanced viral hepatitis surveillance project was launched in 34 of the 57 NYS counties outside of New York City. Detection and follow-up of reports of newly identified persons with HCV infections among NYS residents are given high priority to (1) collect accurate risk factor data, (2) guide prevention efforts, and (3) ensure patient referral to appropriate treatment. NYSDOH hepatitis surveillance staff members prioritize for immediate investigation any positive laboratory reports for markers of HCV infection among persons aged <30 years. Each week, the NYSDOH Electronic Clinical Laboratory Reporting System generates databases containing any HCV-positive laboratory reports for persons aged <30 years; these data are then sent to local health departments. Investigation is conducted by local health department staff members with NYSDOH assistance and includes complete laboratory results collection, health-care provider interview, medical record review, and patient interview.

In February 2007, NYSDOH staff members noticed an apparent high number of newly identified HCV infections among persons aged <30 years who resided in the same postal code (postal code A), corresponding to a suburban community of Buffalo, New York. An initial retrospective review found eight cases dating back to May 2006 in persons who resided in postal code A (case numbers 11-18), one of which was in a patient who had acute hepatitis C. All but one of the eight initially identified cases were in persons who reported a history of IDU. Further analysis of cases in persons residing in postal code A indicated that during November 2004—April 2007, a total of 20 HCV-positive persons aged <30 years had been reported. Fifteen of the 20 cases were diagnosed in 2006 or 2007. The community (2000 population: 42,000) in which postal code A is located is part of Erie County and had 47.5 new reports of HCV infection per 100,000 population; two suburban postal codes with similar populations, socioeconomic composition, and proximity to the inner city as the investigated community had 7.0 and 4.9 new reports of HCV infection per 100,000 population, respectively. Because the incidence of new reports in the community per population appeared to be approximately twice that of the county and approximately six times greater than that of any similar suburb, further investigation to characterize the cluster was warranted.

With initial detection of the cluster, an epidemiologic investigation was launched by NYSDOH in collaboration with ECDOH. Patients were interviewed in person by a two-person team at various locales, including correctional facilities, rehabilitation clinics, patient residences, and other locations. Current CDC case definitions for acute and chronic hepatitis C were used.4 Four (20%) of the 20 patients had evidence of elevated serum alanine aminotransferase levels. Eight (40%) had serologic markers consistent with acute hepatitis C. The remaining 12 cases were classified as chronic hepatitis C. Of the 12 cases classified as chronic hepatitis C, eight had evidence of elevated serum alanine aminotransferase but no serologic markers consistent with acute hepatitis C. Twelve (60%) of the 20 patients had evidence of elevated serum bilirubin. Twelve (60%) of the 20 patients had no evidence of elevated serum bilirubin.

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n nine transaminase levels and discrete symptom onset and were classified as having acute hepatitis C. Sixteen (80%) other patients were asymptomatic or had illness that did not meet the acute case definition and were classified as having chronic HCV infection. Median age of the 20 patients was 19 years (range: 17-29 years), all were white, 15 (75%) were male, and 19 (95%) reported a history of IDU. Nineteen (95%) of the 20 patients attended or had attended one of the two high schools in postal code A (high school A). Fourteen (70%) had evidence of viremia by polymerase chain reaction; three (21%) of these 14 had a viral genotype reported. NYSDOH and ECDOH staff members successfully interviewed 11 of the 20 patients (one with acute hepatitis C and 10 with chronic HCV infection) using an integrated interview tool and a chart abstraction tool developed for this investigation; the remaining nine patients could not be contacted.

At the time of interview, all of the 11 interviewed patients were aware that they had tested HCV positive. However, three (27%) of the patients interviewed believed that their test results were false and that they were no longer (or never were) HCV infected. Ten (91%) interviewed patients reported previous but not current IDU (including use of heroin, cocaine, loritab, oxycodin, morphine, valium, or crack cocaine) and sharing of drug-use equipment; some patients shared equipment with other identified patients. All 10 patients reported purchasing heroin in the same inner-city Buffalo location. Noninjectable-drug use, reported by 10 (91%) patients, was initiated at a median age of 14 years (range: 9-17 years); IDU was initiated at a median age of 16.5 years (range: 14-26 years).

At least four partnerships involving drug equipment sharing and high-risk sexual activity were reported among the 20 patients. The members of these partnerships knew other members who had experienced symptoms consistent with acute hepatitis, such as jaundice. However, documented HCV infection in these members, as evidenced by a report in the NYSDOH Chronic Hepatitis Registry, could not be verified.

Among interviewed patients, median reported number of lifetime sex partners was 10 (range: four to 100). Six (54%) patients claimed they had private health insurance, two reported having Medicaid, and three reported that they had no health insurance. Seven of the interviewed patients reported having a primary-care physician; four of these seven reported seeing a specialist for their HCV infection. None of the interviewed patients had received HCV treatment. Several barriers to potential treatment were cited, including concerns regarding the side effects of medication, lack of information regarding treatment services, lack of health insurance reimbursement, and a perceived lack of health-care providers capable or willing to treat HCV in patients with comorbidities such as IDU or mental health issues.

Several initiatives were launched by NYSDOH and ECDOH throughout Erie County to address the apparent clustering of HCV infection among injection-drug users. Staff members from NYSDOH, the NYS Office of Alcoholism and Substance Abuse Services, and ECDOH conducted cross-training sessions and developed a resource manual to help identify primary care, sexually transmitted disease (STD)/human immunodeficiency virus (HIV) screening, drug treatment, harm reduction, and HCV treatment services for patients. All interviewed patients were referred to ECDOH counselors for HIV/acquired immunodeficiency syndrome (AIDS) risk assessment and personalized intervention development. ECDOH conducted multiple events held at various community locations and ECDOH clinics, offering HCV, HIV, and STD screening, referral for services, and education on prevention, risk reduction, and family planning; these services are ongoing at all five ECDOH clinics. Presentations on hepatitis epidemiology, diagnosis and testing, and prevention were conducted at medical practices that serve high-risk communities throughout Erie County. ECDOH also collaborated with the Erie County Department of Mental Health to integrate HCV messages into existing prevention programs and implement screening programs in target areas with high HCV infection rates. Finally, ECDOH worked with school district representatives and high schools to address prevention of IDU and HCV transmission.

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**CDC Editorial Note:** One goal of the CDC-funded enhanced viral hepatitis surveillance protocols is high-priority follow-up of cases that are likely to represent acute HCV infection. Another goal is detection of clusters or outbreaks of such cases, as this report describes. The markedly elevated number of new reports of HCV infection per population detected among persons aged <30 years in postal code A, compared with the number of reports in the surrounding community, indicated an apparent cluster of recently infected patients. Nearly all of the identified patients in the cluster reported a history of IDU, and partnerships involving drug equipment sharing, which have been described previously, were identified among the cluster. The cause of this cluster likely was IDU with shared, inadequately cleaned equipment. Because the investigation targeted only cases in persons aged <30 years, more direct links among members of this cluster involving persons aged ≥30 years might exist within the community. Furthermore, although infections identified in persons aged <30 years are more likely to be new infections than those identified in persons aged ≥30 years, not all infections in the population aged <30 years are new; a portion of the patients in this cluster likely had been infected with HCV for years.

Although the number of new reports of HCV infection per population in postal code A was higher than the overall Erie County number dur-
ing November 2004—April 2007, this analysis could not determine whether this elevated number of reports represented a previously established and ongoing higher rate of HCV infection among persons aged <30 years or a more recent phenomenon. Cases within this apparent cluster likely are a reflection of the ongoing HCV epidemic among injection-drug users in the United States.9 Ongoing educational efforts and increased public awareness of hepatitis C, particularly among injection-drug users, might have led to higher rates of testing, which yielded additional reports. Because the prioritized algorithm was not in place before January 2006, earlier reported cases of HCV infection among this population might have gone unrecognized. Continued enhanced surveillance is needed to complement routine surveillance for HCV infections to better understand the burden of hepatitis C and to identify and prevent new HCV infections.

The results of this investigation demonstrate the potential for improved and consistent national hepatitis C surveillance to identify cases for investigation, estimate the magnitude of HCV infection and disease, detect outbreaks, evaluate response measures, and facilitate research to initiate appropriate prevention measures. Given limited resources, an enhanced surveillance approach to give highest priority to likely new cases of HCV infection, such as those in persons aged <30 years, can be implemented to identify clusters and outbreaks. Establishing effective systems that provide reliable data to detect HCV infections among all populations could have a lasting effect on HCV disease control.

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REFERENCES


**Increased Detections and Severe Neonatal Disease Associated With Coxsackievirus B1 Infection—United States, 2007**

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1 figure, 1 table omitted

**E**nteroviruses generally cause mild disease; however, neonates are at higher risk for severe illness because of the immaturity of their immune systems. Neonatal systemic enterovirus disease, characterized by multiorgan involvement, is among the most serious, potentially fatal conditions associated with enterovirus infection. Typical clinical presentations include encephalomyocarditis (characteristic of group B coxsackieviruses) and hemorrhage-hepatitis syndrome (typical of echovirus 11).1,2 To describe the severity of neonatal illness associated with coxsackievirus B1 (CVB1) infection, CDC analyzed case reports and preliminary data from the National Enterovirus Surveillance System (NESS) for 2007. This report describes the results of that analysis, which indicated that, in 2007, CVB1 for the first time was the predominant enterovirus in the United States, accounting for 113 (25%) of 444 enterovirus infections with known serotypes. In addition, phylogenetic analysis of the 2007 CVB1 strains suggested that the cases resulted from widespread circulation of a single genetic lineage. Health-care providers and public health departments should be vigilant to the possibility of neonatal disease caused by CVB1. Testing for enteroviruses in clinically compatible cases and reporting of identified enteroviruses to NESS should be encouraged.

NESS is a voluntary, passive surveillance system for monitoring enterovirus infections in the United States. Participating laboratories, which include public health and private laboratories and the CDC Picornavirus Laboratory, report enterovirus detections to NESS on a monthly basis. Each report includes age, sex, state, specimen type and collection date, and enterovirus serotype.

Beginning in August 2007, CDC received multiple reports of cases of severe neonatal illness and death associated with enterovirus infection. CVB1 was identified as the causative agent in many of these cases. Previously, no fatal infection of CVB1 had been reported to NESS.3 On the basis of these reports, CDC began a review of clinical, virologic, and surveillance data related to enterovirus for 2007, in collaboration with local and state public health departments and hospitals. A case of CVB1 infection was defined as detection of enterovirus by reverse transcription–polymerase chain reaction (RT-PCR) or viral culture, with the virus typed as CVB1 by molecular (ie, RT-PCR sequencing) or antigenic (ie, neutralization or immunofluorescence) methods.

As of February 1, 2008, NESS had received 514 reports of enterovirus infections in 36 states for 2007. CVB1 was the most commonly detected enterovirus reported to NESS, accounting for 113 (25%) of 444 reports with known...