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## Incident hepatitis among repeat blood donors; a sentinel event signaling possible healthcare associated infection and need for reporting to public health authorities

Anne C. Moorman<sup>1</sup>, Susan L. Stramer<sup>2</sup>, Melissa K. Schaefer<sup>3</sup>, Melissa G. Collier<sup>1</sup>, Anil Suryaprasad<sup>1</sup>, Matthew J. Kuehnert<sup>3</sup>, Zack Moore<sup>4</sup>, Elizabeth Rowan<sup>5</sup>, Katherine Habicht<sup>6</sup>, Kristy Bradley<sup>7</sup>, Mei-chien Fucci<sup>8</sup>, Courtney Hopkins<sup>9</sup>, and Fujie Xu<sup>1</sup>

<sup>1</sup>Division of Viral Hepatitis, Centers for Disease Control and Prevention, Atlanta, Georgia

<sup>2</sup>American Red Cross Scientific Support Office, Gaithersburg, Maryland <sup>3</sup>Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia <sup>4</sup>North Carolina

Department of Health and Human Services, Raleigh, North Carolina <sup>5</sup>Alameda County

Department of Public Health, Oakland, California <sup>6</sup>South Carolina Department of Health and

Environmental Control, Columbia, South Carolina <sup>7</sup>Oklahoma State Department of Health,

Oklahoma City, OK <sup>8</sup>American Red Cross, West Division Biomedical Services, Tulsa, Oklahoma

<sup>9</sup>American Red Cross, East Division Biomedical Services, Columbia, South Carolina

### Suggested keywords

acute hepatitis C virus infection; acute hepatitis B virus infection; blood donor; healthcare associated infections; public health notification

Identification of a recently acquired viral hepatitis infection among repeat blood donors can be a sentinel event signaling a possible healthcare-associated infection (HAI) in the donor, especially in individuals who did not disclose self-reported behavioral risk factors and were test-negative at prior successful donations. With the 2012 update to the Council of State and Territorial Epidemiologists (CSTE) acute hepatitis B and hepatitis C surveillance case definitions, asymptomatic individuals who meet the laboratory criteria for these case definitions should be included among the cases reportable to public health authorities (1,2). This report serves as a reminder of the importance of recognizing incident hepatitis infections in blood donors as a possible sentinel event to uncover previous healthcare-associated transmission clusters, and that identification of a hepatitis B virus (HBV) or hepatitis C virus (HCV) nucleic acid test (NAT) confirmed positive result within six months of a NAT negative result (as may be identified in a repeat blood donor) is reportable to public health authorities. Recent data suggest consideration that this six month period be extended to within one year.

Please address correspondence to: amoorman@cdc.gov.

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Because of extensive behavioral (risk factor assessment) and laboratory (NAT) screening of blood donors, which occur with each donation, repeat donors are considered to be at low risk for hepatitis infection. Thus, an incident infection in these donors is particularly concerning for possible HAI and can serve as a sentinel event indicative of infection control problems at a healthcare facility where the donor previously received healthcare, possibly signaling a larger outbreak. Healthcare-associated transmission resulting from unsafe medical practices has been recognized as an important source of new HBV and HCV infections, particularly among older adults (3). At least four HAI outbreaks or transmissions (Table, 4–8) have been detected since 2008 after public health investigations were initiated following the detection of an incident HBV or HCV infection identified in a repeat blood donor. None of these transmissions were related to donation or receipt of blood products. The cases provided in the Table were either identified through routine tracking by the American Red Cross of donors who converted their NAT results from negative to positive, or identified to public health by the donor or donor's clinician after donor notification. In three of these investigations, recognition of these infections served to identify inadequate infection control practices at a healthcare facility, like syringe reuse, and to identify additional patients who might have been exposed to bloodborne pathogens (Table). In two instances multiple healthcare-associated transmissions were detected after public health investigation (Table).

With this commentary we hope to promote awareness among key staff members at blood collection centers of the CSTE updated acute hepatitis surveillance case definitions and suggest a role for direct reporting by blood collection centers of such cases to alert state or local public health personnel (Figure) for prioritized investigation. Routine laboratory reporting of positive blood donor screening test results to public health surveillance is insufficient in these cases because it does not include documentation of the recent past negative test results, nor does it provide the epidemiologic context which raises the likelihood that the result represents a HAI transmission sentinel event. Investigation of acute infections may yield important information for state and/or local public health departments in order to facilitate public health measures such as contact tracing, and may enhance understanding of local hepatitis transmission patterns, regardless of transmission source.

The acute hepatitis B and C surveillance case definitions (1,2) were revised in 2012 to include any asymptomatic acute laboratory-confirmed infection within six months or less of a negative test result. Prior to 2012, the acute case definitions relied on presence of symptoms for reporting. For the four examples presented in the Table, the period between the last hepatitis negative and positive donations ranged from 70 to 287 days. Incident infections identified with up to twelve months between negative and confirmed-positive test results may likely represent a sentinel event, given the low risk for infection for repeat blood donors, so the threshold for reporting of these events by transfusion centers should be expanded from six to twelve months to take this into account.

The American Red Cross (ARC) recently conducted a retrospective review of cases of incident HBV and HCV infections identified among repeat blood donors. During January 2012 through June 2014, a total of 21 recent HBV infections were identified among nearly 12 million donations (4.3 million donors) to ARC from repeat donors, for a rate of 1 incident

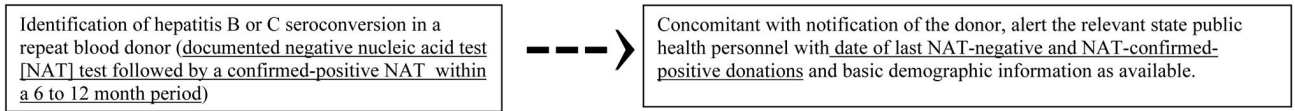
infection per 571,000 donations. These 21 donors were all seronegative for anti-HBc but HBV DNA positive (with [n=9], or without [n=12] detectable HBsAg) within one year after a negative donation screening test. During the same time period, ARC identified 25 recent HCV infections (limited to those who were anti-HCV seronegative but HCV RNA positive within one year after a negative donation screening test), yielding a rate of 1 per 480,000 donations (unpublished data, ARC). Future analysis may be undertaken to retrospectively identify the additional NAT-confirmed recent infections among donors with sufficient time from infection to screening for the development of hepatitis C antibody. All of these cases were detected during routine blood donation screening and none of their blood products were transfused, underscoring the benefit of NAT blood screening. Notification of the positive test results for these cases to state public health officials without other information has occurred as required by routine blood center procedures, but notification to the states for these cases has now been repeated, adding information regarding recency of infection (based on prior negative tests) and other available epidemiologic data.

We offer one centralized approach used by the ARC, which currently supplies more than 40% of the blood and blood products in the US, for blood collection center reporting of incident or recent (within a year) infections of viral hepatitis to state or local public health departments (Figure). Notification alerts to public health departments (9) should include the dates of the donor's last known negative NAT result and first confirmed-positive NAT result, along with donor's state of residence and contact information. The public health department may request further demographic information as available following CSTE guidelines through completion of acute hepatitis case report forms (10,11). In 2012, the Centers for Disease Control (CDC) in consultation with state and local health departments released a guide to best practices in the investigation of suspected healthcare associated hepatitis infections (12). The Division of Viral Hepatitis at CDC may be contacted at [dvhw@cdc.gov](mailto:dvhw@cdc.gov) if assistance is needed in identifying the appropriate state health department contacts for reporting/notification.

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**Figure.**

Flow chart for reporting documented hepatitis B or C seroconversions from blood collection centers to public health based on an approach used by American Red Cross Biomedical Services\*

\* The Centers for Disease Control and Prevention Division of Viral Hepatitis may be contacted at [dvhw@cdc.gov](mailto:dvhw@cdc.gov) for assistance in identifying the appropriate state health department contacts for reporting.

**Table**

Healthcare-associated hepatitis transmissions detected via investigation of asymptomatic hepatitis B virus (HBV) or hepatitis C virus (HCV) seroconversion in a repeat blood donor, 2008–2013

Year investigated or reported	Setting where Transmission Occurred	Healthcare-Associated Infections Detected*	Persons Notified for Screening**	Known or suspected mode of transmission
2008	Outpatient cardiology clinic <sup>†</sup>	5 incident HCV infections	1,200	Syringe reuse contaminating multi-dose vials of saline solution used for >1 patient
2012	Hospital <sup>‡</sup>	1 incident HCV infection	Patient notification not performed	Specific lapses in infection control not identified at the time of the investigation
2013	Pain management clinic <sup>§</sup>	9 incident HBV infections	534	Procedure and infection control breaches related to injection safety were identified during the investigation, however, there was insufficient evidence to implicate a specific breach as the source of transmission
2013	Oral surgery clinic <sup>//</sup>	1 incident HCV infection	5810	Suspected inappropriate handling of medication vials (single-dose and multiple-dose), and improper reprocessing of dental instruments

\* In each investigation one or more previously infected patients whose chronic viral hepatitis was closely genetically related to that of the incident cases and served as a likely source for transmission was identified, but not included in the table. Outbreak-associated HBV and HCV infections are defined as those with epidemiologic evidence supporting healthcare related transmission.

\*\* The number of persons notified for screening is dependent upon information and resources available at the time of investigation and may underestimate the total number of individuals at risk. More information on multi-case healthcare-associated outbreaks of hepatitis B and C may be found at <http://www.cdc.gov/hepatitis/Outbreaks/HealthcareHepOutbreakTable.htm>

<sup>†</sup> Moore ZS, Schaefer MK, Hoffmann KK, Thompson SC, Guo-Liang X, Lin Y, et al. Transmission of hepatitis C virus during myocardial perfusion imaging in an outpatient clinic. *Am J Cardiol.* 2011;108:126–132.

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