

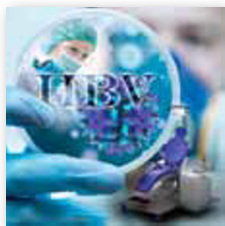
Hepatitis B virus transmissions associated with a portable dental clinic, West Virginia, 2009

Rachel A. Radcliffe, DVM, MPH; Danae Bixler, MD, MPH; Anne Moorman, BSN, MPH; Vicki A. Hogan, MPH; Vickie S. Greenfield, RN, BSN; Diana M. Gaviria, MD; Priti R. Patel, MD, MPH; Melissa K. Schaefer, MD; Amy S. Collins, BS, BSN, MPH; Yury E. Khudyakov, PhD; Jan Drobeniuc, MD, PhD; Barbara F. Gooch, DMD, MPH; Jennifer L. Cleveland, DDS, MPH

Hepatitis B virus (HBV) is a highly infectious and environmentally stable blood-borne pathogen¹ that can lead to serious long-term liver disease in people who develop chronic infection. Improving the early identification and management of the care of people with HBV infection can help prevent morbidity and mortality and can complement immunization strategies to eliminate HBV transmission in the United States.²

During periods of high viral replication activity, an infected person's blood can contain

10^6 to 10^{10} international units per milliliter of HBV DNA, and thus parenteral or mucosal exposure to even a small amount of blood or body fluid may result in infection in susceptible (not immune) people.^{2,3} Because the virus can be transmitted by means of contaminated dental equipment, instruments and environmental surfaces, meticulous compliance with dental infection control recommendations is crucial.⁴ However, HBV transmission in a dental health care setting has been rare, particularly since universal precautions and routine HBV vaccination of dental workers were recommended (1985 and 1987, respectively).⁴⁻⁶ Since 1987, the only reported transmission in a dental



ABSTRACT



Background. Although hepatitis B virus (HBV) transmission in dental settings is rare, in 2009 a cluster of acute HBV infections was reported among attendees of a two-day portable dental clinic in West Virginia.

Methods. The authors conducted a retrospective investigation by using treatment records and volunteer logs, interviews of patients and volunteers with acute HBV infection as well as of other clinic volunteers, and molecular sequencing of the virus from those acutely infected.

Results. The clinic was held under the auspices of a charitable organization in a gymnasium staffed by 750 volunteers, including dental care providers who treated 1,137 adults. Five acute HBV infections—involving three patients and two volunteers—were identified by the local and state health departments. Of four viral isolates available for testing, all were genotype D. Three case patients underwent extractions; one received restorations and one a dental prophylaxis. None shared a treatment provider with any of the others. One case volunteer worked in maintenance; the other directed patients from triage to the treatment waiting area. Case patients reported no behavioral risk factors for HBV infection. The investigation revealed numerous infection control breaches.

Conclusions. Transmission of HBV to three patients and two volunteers is likely to have occurred at a portable dental clinic. Specific breaches in infection control could not be linked to these HBV transmissions.

Practical Implications. All dental settings should adhere to recommended infection control practices, including oversight; training in prevention of bloodborne pathogens transmission; receipt of HBV vaccination for staff who may come into contact with blood or body fluids; use of appropriate personal protective equipment, sterilization and disinfection procedures; and use of measures, such as high-volume suction, to minimize the spread of blood.

Key Words. Dentistry; hepatitis B virus; outbreak; infection control; portable dental equipment.

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setting was a single episode, from one patient to another.⁷

METHODS

Setting. During a two-day period—June 26 and 27, 2009—a temporary dental clinic involving portable equipment was set up in a high school gymnasium in West Virginia, held under the auspices of a charitable organization. More than 750 staff volunteers from surrounding communities, consisting of licensed dental health care providers, dental students and nonprofessional volunteer staff, provided dental services to an estimated 1,137 adult patients in West Virginia. Patients received, at no charge, dental examinations, radiographs when indicated and treatment services limited to dental cleanings, extractions and restorations. Most dental equipment—such as portable dental units, radiographic units, steam autoclaves, dental handpieces, hand instruments and supplies—were provided by a state dental association and one individual supplier. Some practitioners used their own equipment and supplies. Alcohol-based hand sanitizers, examination gloves and environmental surface disinfectants were available.

Operational section supervisors included a nurse responsible for central sterilization and licensed dental professionals responsible for providing local anesthetic at a “numbing station,” as well as care providers responsible for surgical dental services and restorative dental services. Supervisors provided dental treatment in addition to performing their supervisory duties. A safety officer oversaw waste management and follow-up of any reported needlestick injuries. No one was designated to oversee infection control practices.

In November 2009, approximately four months after the dental clinic, a local health department notified the West Virginia Department of Health and Human Resources (DHHR) of several cases of acute HBV infection among people who had visited the dental clinic. The initial report to the local health department originated from a concerned patient who reportedly had been told by his physician that several cases of acute HBV infection among dental clinic participants had been seen in the physician’s practice. Owing to concern about possible health care-associated HBV transmission, staff of the West Virginia DHHR initiated an epidemiologic investigation. During the course of the investigation, DHHR personnel notified the state dental director and the Centers for Disease Control and Prevention (CDC) and provided a final

report to the West Virginia state dental board. Because our report is purely a description of the outbreak investigation, and all data collection was conducted during the routine course of investigation, an institutional review board approval was not required.

Case finding and investigation. Confirmed epidemiologic outbreak cases of HBV were defined by West Virginia DHHR and CDC investigators as patients or staff volunteers who attended the dental clinic, had an acute illness with a discrete onset of symptoms between Aug. 1 and Dec. 31, 2009, and had jaundice or elevated serum aminotransferase levels with laboratory evidence of HBV infection. Laboratory evidence of acute infection is defined by CDC and the Council of State and Territorial Epidemiologists (CSTE) as a positive immunoglobulin M antibody to hepatitis B core antigen (IgM anti-HBc) and a positive hepatitis B surface antigen (HBsAg).⁸ West Virginia DHHR and CDC investigators selected the period on the basis of the incubation period of hepatitis B, which is six weeks to six months between exposure and the onset of symptoms.^{2,3,9}

In follow-up to the initial outbreak report, personnel in the local health department contacted the health care provider in whose office these cases reportedly had been seen to obtain information on all recent HBV cases. After identification of the initial cases, local health department staff reviewed information for patients with acute HBV reported to the health department since the dental clinic occurred. During routine case ascertainment for surveillance, West Virginia DHHR staff had interviewed these patients about HBV transmission risks by using questions from a standardized West Virginia DHHR viral hepatitis case report form. West Virginia DHHR staff reviewed information regarding receipt of dental care during the expected exposure period to look for additional patients with confirmed HBV who might have attended the dental clinic. Review of reported cases continued through at least six months after the date of the clinic.

Other active surveillance efforts included

ABBREVIATION KEY. **ALT:** Alanine aminotransferase. **CDC:** Centers for Disease Control and Prevention. **CSTE:** Council of State and Territorial Epidemiologists. **DHHR:** Department of Health and Human Resources. **HBc:** Hepatitis B core antigen. **HBsAg:** Hepatitis B surface antigen. **HBV:** Hepatitis B virus. **HCV:** Hepatitis C virus. **IgM:** Immunoglobulin M. **NA:** Not applicable. **PPE:** Personal protective equipment. **W.Va.:** West Virginia.

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