

---

# Unusual Cases of Hepatitis B Virus Transmission

*One reason some parents don't vaccinate their children against the hepatitis B virus (HBV) is their belief that their child has no risk of ever coming in contact with the virus. "My child will never be sexually promiscuous or addicted to drugs! Why does he or she need to be protected against hepatitis B?" Of course, it is impossible to predict which children will grow up and engage in risky behavior. But let's assume for a moment that this hypothetical parent is right . . . does this mean that his or her child has no possibility of ever coming in contact with HBV?*

*The truth is that transmission of HBV can sometimes occur in unusual ways. Approximately 30% of those infected with HBV do not know how they contracted the virus. The following reports of some uncommon methods of HBV transmission illustrate how every susceptible person is at some (albeit limited) risk of HBV infection.*

---

1. Between April 1984 and February 1985, 24 cases of HBV infection occurred among the patients of a dentist practicing in rural Indiana. Two of these patients died of fulminant hepatitis. The dentist had never had hepatitis symptoms, but blood tests indicated he was hepatitis B surface antigen (HBsAg) positive.<sup>1</sup>
2. An investigation documented transmission from an HBV-infected elementary school student to a teacher who had no overt percutaneous or permucosal exposure to the student's blood or infectious body fluids. The student did sneeze saliva and nasal secretions onto the teacher's cracked, chapped hands. The teacher gave birth to an infant 3 weeks prior to her diagnosis, and her infant also tested HBsAg positive. The teacher and student were found to have the same HBV subtype and identical HBV DNA sequences.<sup>2</sup>
3. In Rhode Island, 35 patients of an acupuncturist became infected with HBV, the primary source for the outbreak being a patient in the practice. Investigators were not able to determine the precise mechanism of transmission, but theorized it was possibly due to inadequately sterilized needles or the transfer of infectious material from the acupuncturist's hands to sterilized needles.<sup>3</sup>
4. In Japan, 5 of 10 members of a high school sumo wrestling club developed HBV infection in a one-year period. The asymptomatic index case often bled from injuries received while wrestling, presumably transmitting HBV to his teammates through cuts and abrasions.<sup>4</sup>
5. In July 1992, a 47-year-old woman became ill with acute HBV infection after undergoing a thymectomy. The thoracic surgery physician-in-training who assisted in surgery had had acute HBV infection six months earlier and was subsequently found to be HBeAg positive. Though the hospital had used appropriate infection control procedures, further investigation identified 19 other infected patients.<sup>5</sup>
6. CDC reported a case involving a 4-year-old boy in day care who developed acute HBV infection; another child at the center who had a history of biting and scratching was found to be chronically infected with HBV.<sup>6</sup>
7. In December 2001, the New York City Department of Health (NYCDOH) was informed of two elderly patients who had been diagnosed with acute HBV infection and who had visited the same physician. A follow-up investigation by NYCDOH found an additional 38 patients in the same practice who had acute HBV infection. Further study found that infection was strongly correlated with having received an injection at this office, where doses of atropine, dexamethasone, and vitamin B12 were drawn from multiple-dose vials into one syringe.<sup>7</sup>
8. Thirty patients who received autohaemotherapy (a procedure that involves drawing the patient's blood, mixing it with saline, and reinjecting the mixture) at an alternative medicine clinic in the U.K. were infected with HBV. Five had markers of chronic HBV infection. Contaminated saline in a repeatedly used bottle was the probable method of transmission.<sup>8</sup>
9. In 1996, an outbreak of HBV infection was detected among patients attending an electroencephalogram (EEG) clinic in Toronto. A follow-up of all available patients found 75 who developed HBV infection from 1991 to 1996. All of the cases had had at least one EEG performed with reusable subdermal electrodes. The outbreak was a result of a common source of infection (a technician who was HBeAg positive) and inadequate infection control practices.<sup>9</sup>
10. In 1996, 9 residents of an Ohio nursing home were diagnosed with acute HBV infection and 2 with chronic HBV infection; all were diabetic. HBV infection was associated with fingerstick capillary sampling, specifically with the use of a lancet device with a re-used end cap. That same year, acute hepatitis B illness was diagnosed in 3 diabetic patients in a New York hospital. A review of serologic records of previous patients identified another 11 possible cases of nosocomially [hospital] acquired HBV infection. Transmission seems to have occurred through contamination of a fingerstick blood sampling device.<sup>10</sup>
11. The University of Sydney used molecular fingerprinting to provide evidence that a child chronically infected with HBV who had an exudative skin lesion and a history of biting had infected another child in the same day care center.<sup>11</sup>
12. Outbreaks of HBV infection occurred in 5 chronic hemodialysis centers in California, Nebraska, and Texas from April through August 1994. Transmission of HBV from hemodialysis patients with chronic HBV infection to susceptible patients was believed to have resulted from failure to identify and isolate HBV-infected patients during dialysis; sharing of staff, equipment, and supplies among patients; and failure to vaccinate susceptible patients against the hepatitis B virus.<sup>12</sup>

13. A study of 920 employees in a large residential institution for the developmentally disabled in Oregon found an overall prevalence of 10% for anti-HBc, a marker of present or past HBV infection. Antigen positivity was significantly associated with a history of working directly with clients.<sup>13</sup>
14. From June 1989 through March 1990, 26 patients in a California hospital contracted acute HBV infection. A retrospective cohort study indicated that transmission of the virus occurred percutaneously through contamination of the stabilizing platform on a spring-loaded fingerstick device.<sup>14</sup>
15. A general surgeon in the Netherlands infected a number of patients with HBV over four years of practice (transmission from the surgeon was confirmed in 8 patients, probable in 2, and possible in 18). Two patients were chronically infected, and one case of secondary transmission to a spouse was identified.<sup>15</sup>
16. Eleven cases of HBV infection were detected among 65 members of the Okayama University's football team during a period of 19 months. All players with acute hepatitis B virus infection belonged to the same training group as an HBeAg carrier on the team, with transmission presumably occurring through contact with open wounds during training.<sup>16</sup>
17. In Israel, a butcher who was chronically infected with HBV infected 3 of his co-workers, who in turn infected their spouses. The workers shared knives. If the index case cut or punctured himself, his HBV-contaminated blood could have tainted a knife that other butchers later used, making it possible for the infection to be transmitted from the knife to them through a break in their skin.<sup>17</sup>
18. Hepatitis B virus infection was transmitted by a cardiothoracic surgeon to 2 patients during coronary artery bypass surgery. Both patients presented with serious clinical illness 12 weeks after surgery. The surgeon was HBsAg positive.<sup>18</sup>
19. In 1986, 4 cases of HBV infection were linked to an oral surgeon practicing in New Hampshire. One of the patients developed severe complications; another became chronically infected with HBV. CDC reported 8 other outbreaks of HBV infection traceable to general dentists or oral surgeons from 1974 to 1986, with the number of

clinically infected patients in each outbreak ranging from 3-55.<sup>19</sup>

20. In August 2002, the Oklahoma State Department of Health investigated a pain remediation clinic where they discovered a certified registered nurse anesthetist routinely reused needles and syringes. They tested 793 patients for hepatitis C virus (HCV), HBV, and HIV infection. A total of 69 HCV and 31 HBV infections were identified that probably were acquired in the clinic.<sup>20</sup>
21. Twenty-two cases of acute hepatitis B disease were linked to a Florida dermatologist's practice during 1985-1991. Since the dermatologist was not HBsAg positive, the outbreak is believed to have resulted from the dermatologist's failure to apply either universal precautions or sterile surgical technique.<sup>21</sup>

These examples are not presented to scare. Such modes of transmission are relatively rare, and sexual activity is still the predominant source of HBV infection among U.S. adults. However, these reports demonstrate that one can acquire HBV infection without engaging in so-called "risky" behavior. On the average, any baby born in the United States has a 5 percent chance of acquiring HBV infection during his or her lifetime. By avoiding obvious means of exposure, people can reduce the odds of becoming infected. But in reality, as the U.S. Public Health Service so succinctly stated, "Anyone can get HBV infection."<sup>22</sup> Fortunately, the availability of hepatitis B vaccine means no one has to get infected.

### Sources

1. Lethal outbreak of hepatitis B in a dental practice. *JAMA*.255(23):3260-4, 1986.
2. Hepatitis B virus transmission in an elementary school setting. *JAMA* Vol. 278(24):2167-9, 1997.
3. A large outbreak of acupuncture-associated hepatitis B. *Am J Epidemiol* 127(3): 591-8, 1988
4. An outbreak of hepatitis B in members of a high school sumo wrestling club. *JAMA* 248(2):213-4, 1982.
5. Transmission of hepatitis B virus to multiple patients from a surgeon without evidence of inadequate infection control. *N Engl J Med* 334(9):549-54, 1996.
6. Hepatitis B virus transmission between children in day care. *Pediatr Infect Dis J* 8(12):870-5, 1989.
7. Transmission of hepatitis B and C viruses in outpatient settings—New York, Oklahoma, and Nebraska, 2000-2002. *MMWR* 52(38):901-6, 2003.
8. Molecular epidemiology of a large outbreak of hepatitis B linked to autohaemotherapy. *Lancet* 356(9227):379-84, 2000.

9. An outbreak of hepatitis B associated with reusable subdermal electroencephalogram electrodes. *CMAJ* 162(8):1127-31, 2000.
10. Nosocomial hepatitis B virus infection associated with reusable fingerstick blood sampling devices—Ohio and New York City, 1996. *MMWR* 46(10):217-21, 1997.
11. Horizontal transmission of hepatitis B in a children's day-care centre: a preventable event. *Aust N Z J Public Health* 21(7):791-2, 1997.
12. Outbreaks of hepatitis B virus infection among hemodialysis patients—California, Nebraska, and Texas, 1994. *MMWR* Vol. 45(14):285-9, 1996.
13. Hepatitis B and workers in institutions for the mentally retarded: risk of infection for staff in patient care. *Am J Prev Med* 5(3):170-4, 1989.
14. Nosocomial transmission of hepatitis B virus associated with the use of a spring-loaded fingerstick device. *N Engl J Med* 326(11):721-5, 1992.
15. Transmission of hepatitis B virus from a surgeon to his patients during high-risk and low-risk surgical procedures during 4 Years. *Infect Control Hosp Epidemiol* 23(6):306•12, 2002.
16. Horizontal transmission of hepatitis B virus among players of an American football team. *Arch Intern Med* 160(16):2541-5, 2000.
17. Hepatitis B—an occupational risk for butchers? *Ann Intern Med* 116(5):428, 1992.
18. Acute hepatitis B in two patients transmitted from an e antigen negative cardiothoracic surgeon. *Commun Dis Public Health* 3(4):250-2, 2000.
19. Epidemiologic notes and reports: outbreak of hepatitis B associated with an oral surgeon—New Hampshire. *MMWR* 36(9):132-3, 1987.
20. Transmission of hepatitis B and C viruses in outpatient settings—New York, Oklahoma, and Nebraska, 2000-2002. *MMWR* 52(38):901-6, 2003.
21. Patient-to-patient transmission of hepatitis B in a dermatology practice. *Am J Public Health* 83(12):1689-93, 1993.
22. Important information about hepatitis B, hepatitis B vaccine, and hepatitis B immune globulin. U.S. Dept. of Health and Human Services, May 1992.