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# *Medical Procedures and HCV Transmission*

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## ***Transmission of Hepatitis B and C Viruses in Outpatient Settings***

New York, Oklahoma, and Nebraska, 2000 - 2002

MMWR (Mortality & Morbidity Weekly)

CDC, September 26, 2003 / 52(38);901-906

Transmission of hepatitis B virus (HBV) and hepatitis C virus (HCV) can occur in health-care settings from percutaneous or mucosal exposures to blood or other body fluids from an infected patient or health-care worker. This report summarizes the investigation of four outbreaks of HBV and HCV infections that occurred in outpatient health-care settings. The investigation of each outbreak suggested that unsafe injection practices, primarily reuse of syringes and needles or contamination of multiple-dose medication vials, led to patient-to-patient transmission. To prevent transmission of bloodborne pathogens, all health-care workers should adhere to recommended standard precautions and fundamental infection-control principles, including safe injection practices and appropriate aseptic techniques.

In the four investigations, a case of acute HBV infection was defined on the basis of a positive test for IgM antibody to hepatitis B core antigen. A case of past or current HCV infection was defined on the basis of a confirmed positive test for HCV RNA or for antibody to HCV; patients known to have been infected before visiting the health-care facility were excluded. Patients with chronic or acute infection were considered to be potential sources for transmission to susceptible patients. Patients were categorized as having clinic-acquired infection on the basis of evidence that included epidemiologic findings, temporal associations between patients and procedures, documented seroconversion, signs and symptoms of acute viral hepatitis, traditional risk factors for HBV or HCV infection, or genetic relatedness among viral isolates.

### **HCV Transmission in a Private Physician's Office --- New York City**

In May 2001, a physician notified the New York City Department of Health (NYCDOH) of seven patients who had acute HCV infections after undergoing endoscopic procedures at the same office in March 2001. The office voluntarily ceased performing such procedures in late April 2001.

During the 9-day period encompassing the procedure dates of these seven patients, 68 patients underwent procedures in this practice. Among 61 (90%) patients who were tested, five additional acute HCV infections were identified, and a chronic infection in a patient whose procedure preceded the 12 acute HCV cases was identified. All 12 patients had a procedure performed within 3 days after the chronically infected patient. This chronically infected patient and six of the acutely infected patients had HCV genotype information available; all were genotype 2c, which is rare in the United States. On the basis of these results, patients who underwent endoscopic procedures since the office opened in January 2000 were notified and offered testing for HCV, HBV, and human immunodeficiency virus (HIV). Results were available for 1,315 (60%) of 2,192 eligible patients; seven additional patients were identified as having HCV infections that probably were acquired in the office. No evidence of HIV transmission was observed; HBV infection was noted among some patients, but epidemiologic links among such office patients could not be established.

A retrospective case-control study indicated that clinic-acquired HCV infection was not associated with type of endoscopic procedure, specific endoscope used, whether a biopsy was performed, type of biopsy, or anesthesia type or dose. However, the investigation revealed inappropriate infection-control and injection practices, which indicated that the probable route of transmission was contamination of multiple-dose anesthesia medication vials. In April 2002, after corrections to infection-control practices were made by the office, the New York State Department of Health allowed the office to resume gastrointestinal procedures.

HBV Transmission in a Private Physician's Office --- New York City

In December 2001, NYCDOH was informed of two elderly patients (aged 75 years) who had acute HBV infection diagnosed and who had visited the office of the same physician (physician A) during their incubation periods. A preliminary investigation by NYCDOH identified 19 additional cases of acute HBV infection.

On the basis of these results, NYCDOH offered testing for HBV, HCV, and HIV infection to 1,042 patients of physician A; 38 patients, including the 19 previously identified, had acute HBV infection during February 2000--February 2002. HBV DNA genetic sequences of 24 patients with acute infection and four patients with chronic infection were identical in the 1,500--base-pair region examined. No evidence of HCV or HIV transmission was observed.

A retrospective cohort study was conducted among the 275 patients attending physician A's office during the 10 months preceding outbreak detection. Of 91 patients with serologic results and available medical records that were included in the cohort study, 18 were infected. Among 67 patients who received at least one injection, 18 (27%) had acute HBV infection, compared with none who received no injections (relative risk [RR] = 13.6; 95% confidence interval [CI] = 2.4--undefined). Patients with HBV infection received a median of 14 injections (range: 2--25), compared with susceptible patients, who received a median of two injections (range: 0--17) ( $p < 0.001$ ). Typically, injections included doses of atropine, dexamethasone, and vitamin B12 drawn from multiple-dose vials into one syringe. The same workspace was used to prepare, dismantle, and dispose of injection equipment.

In December 2001, NYCDOH ordered physician A to stop administering injections. In April 2002, physician A retired and closed his office permanently. In response to this outbreak and the outbreak described above, NYCDOH sent a letter (available at <http://home.nyc.gov/html/doh/pdf/chi/ltr22002.pdf>) to all city clinicians outlining the need for all staff to adhere to infection-control and bloodborne pathogen precautions, including single use of needles and syringes and appropriate use of multiple-dose vials to prevent cross contamination.

#### HBV and HCV Transmission in a Pain Remediation Clinic --- Oklahoma

In August 2002, the Oklahoma State Department of Health (OSDH) was informed of six patients with suspected acute HCV infection who had received treatment from the same pain remediation clinic. A preliminary investigation by OSDH found that a certified registered nurse anesthetist (CRNA) reused needles and syringes routinely during clinic sessions. A single needle and syringe was used to administer each of three sedation medications (Versed® [midazolam HCl], fentanyl, and propofol) to up to 24 sequentially treated patients at each clinic session. These medications were administered through heparin locks that were connected directly to intravenous cannulas.

On the basis of these findings, the clinic was closed, and an investigation was initiated. Serologic testing for HCV, HBV, and HIV infection was completed for 793 (87%) of the 908 patients attending the clinic. A total of 69 HCV and 31 HBV infections were identified that probably were acquired in the clinic; no HIV infections were identified. Receiving treatment during a clinic session after a patient who was anti-HCV--positive was a statistically significant risk factor for acquiring HCV infection (RR = 9.2; 95% CI = 3.7--22.5). Receiving treatment after a patient who was hepatitis B surface antigen--positive was a significant risk factor for acquiring HBV infection (RR = 8.5; 95% CI = 4.2--17.0). In June 2002, before this investigation, the CRNA ceased reuse of needles after a complaint was filed by staff nurses. After June 2002, no evidence of HBV or HCV transmission associated with receiving treatment at the clinic was found.

The state board of nursing revoked the CRNA's license and imposed a \$99,000 fine. In response to this outbreak, the American Association of Nurse Anesthetists (AANA) sent mailings to all AANA members and students, nurse anesthesia school program directors, and hospital administrators reminding them that needles and syringes are single-use items and should not be reused.

#### HCV Transmission in a Hematology/Oncology Clinic --- Nebraska

In September 2002, a gastroenterologist reported four patients with recently diagnosed HCV infection to the Nebraska Health and Human Services System (NHHSS). All of these patients had received chemotherapy at the same hematology/oncology clinic. A preliminary investigation identified 10 cases of

recently diagnosed HCV infection among clinic patients. Of the six patients for whom HCV genotype was available, all were genotype 3a, which is rare in the United States (1). A patient with a previous diagnosis of chronic HCV genotype 3a infection began attending the clinic in March 2000. The investigation revealed that the health-care worker responsible for medication infusions routinely used the same syringe to draw blood from patients' central venous catheters and to draw catheter-flushing solution from 500-cc saline bags that were used for multiple patients. The clinic staff reported that by July 2001, this practice was corrected through changes in personnel and infection-control practices. NHHSS conducted an investigation among all living patients examined at the clinic during March 2000--December 2001. Of 613 eligible patients, 486 (79%) underwent HCV testing; 99 patients with clinic-acquired HCV infection were identified. HCV genotype information was available for 95 patients; all isolates were genotype 3a. During March 2000--June 2001, 85 (61%) of 139 patients with an implanted central venous catheter became infected with HCV, compared with 14 (6%) of 228 patients without an implanted catheter (RR = 10.0; 95% CI = 5.9--16.8). No evidence of HBV or HIV transmission or of HCV transmission after June 2001 was found. The clinic closed in October 2002.

Reported by: S Balter, M Layton, K Bornschlegel, New York City Dept of Health and Mental Hygiene; PF Smith, New York State Dept of Health. M Crutcher, S Mallonee, J Fox, P Scott, Oklahoma State Dept of Health. T Safraneck, D Leschinsky, K White, Nebraska Health and Human Svcs System. JF Perz, IT Williams, BP Bell, Div of Viral Hepatitis; L Chiarello, AL Panlilio, Div of Healthcare Quality Promotion, National Center for Infectious Diseases; M Phillips, M Marx, A Macedo de Oliveira, D Comstock, N Malakmadze, T Samandari, TM Vogt, EIS officers, CDC.

#### Editorial Note:

These four outbreaks are among the largest health-care--related viral hepatitis outbreaks reported in the United States and share several common characteristics. All occurred in outpatient settings and were reported to public health authorities by clinicians who suspected these infections might have been health-care--related. The investigations were resource-intensive and involved notification, testing, and counseling of hundreds of patients. Transmission probably occurred indirectly from patient to patient after exposure to injection equipment that was contaminated with the blood of one or more source patients. All of these outbreaks could have been prevented by adherence to basic principles of aseptic technique for the preparation and administration of parenteral medications.

Health-care--related exposures are a well-recognized but uncommon source of viral hepatitis transmission in the United States. The majority of outbreaks identified previously have been associated with unsafe injection practices, primarily reuse of syringes and needles or contamination of multiple-dose medication vials. However, because the majority of patients with acute HBV or HCV infection are asymptomatic, clusters of patients infected in the health-care setting might be unrecognized. Health-care--related transmission should be suspected when cases are detected among persons without traditional risk factors for infection. State and local health authorities should consider strategies to improve case identification, such as targeting intensive follow-up for persons who typically are at low risk for infection (e.g., persons aged 60 years).

In the outbreaks described in this report, health-care workers did not adhere to fundamental principles related to safe injection practices, suggesting that they failed to understand the potential of their actions to lead to disease transmission. In addition, deficiencies related to oversight of personnel and failures to follow up on reported breaches in infection-control practices resulted in delays in correcting the implicated practices. To prevent health-care--related transmission of bloodborne viruses, certification and training programs need to reinforce infection-control principles and practices, including aseptic techniques and safe injection practices. These principles should be reviewed with frequent in-service education for health-care staff, including those who work in outpatient settings, and practices should be monitored as part of the institutional oversight process. Finally, written policies and procedures to prevent patient-to-patient transmission of bloodborne pathogens should be established and implemented among all staff involved in direct patient care. CDC is working with professional organizations, advisory groups, and state and local health officials to address these issues.

## ***Nosocomial transmission of bloodborne viruses from infected health care workers to patients***

1991 CDC published recommendations for preventing HIV and HBV transmission to patients, which included the recommendation that HCWs who are infected with HIV or HBV (and HBeAg positive, a marker of higher infectivity) should not perform exposure-prone procedures unless they have sought counsel from an expert review panel (5). In 1998, Health Canada published guidelines for the management of HCWs infected with HBV, HCV, and/or HIV (6). Both these documents generated controversy at the time of their publication. Since that time, however, several provincial regulatory bodies have formed committees to advise physicians infected with these bloodborne pathogens (BBPs) regarding their practice. This article reviews what we know about the transmission of HBV, HCV and HIV from infected HCWs to patients in medical and dental settings.

Click on the link to read more [Nosocomial transmission of bloodborne viruses from infected health care workers to patients](#)

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***Transmission of hepatitis C virus from a patient to an anesthesiology assistant to five patients.*** *New England Journal of Medicine.* 343:1851-1854. Ross, R. S., Viazov, S., Gross, T., Hofmann, F., Seipp, H.-M., and Roggendorf, M. 2000.

Transmission of the hepatitis C virus (HCV) from medical personnel, mostly surgeons, to patients is rare but has been reported (for an example see the paper by Esteban et al. *New England Journal of Medicine.* 1996;550-560; reviewed in April, 1996 *Current Papers in Liver Disease*). In this paper, Ross et al. report on an outbreak of hepatitis C in a municipal hospital in Germany. Their analysis strongly suggests that HCV was transmitted from a patient with chronic hepatitis C undergoing surgery to an anesthesiology technician who cared for her in the operating room. The anesthesiology technician in turn infected five other patients over the next several weeks. Sequencing of the genetic material of the HCV isolates from the infected subjects strongly suggested that they all arose from the initial patient. This report provides evidence that HCV can be transmitted from medical personnel other than surgeons to patients. The authors note that the anesthesiology technician did not use gloves while starting intravenous lines in patients and emphasize that these infections could have been prevented if so-called "universal precautions for infection control" practices in most hospitals had been taken.

<http://cpmcnet.columbia.edu/dept/gi/references.html>

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## ***Hepatitis C a Greater Threat to Healthcare Workers Than HIV***

Thursday, July 20 12:05 PM ET

ATLANTA (Reuters Health) - The risk that healthcare workers will become infected with hepatitis C virus (HCV) following an accidental needlestick is 20 to 40 times greater than their risk of HIV infection, according to data presented here at the International Conference on Emerging Infectious Disease. The meeting was sponsored by the US Centers for Disease Control and Prevention and the American Society for Microbiology.

HIV has driven healthcare safety initiatives for years," Dr. Robert T. Ball pointed out in an interview with Reuters Health during the meeting. "We need to change our educational focus" to address the risk of exposure to HCV, he said.

Ball, an epidemiologist from the South Carolina Department of Health, polled 66 healthcare facilities in South Carolina, gathering data on HCV and HIV in cases where healthcare workers were exposed to blood or body fluids.

Responses from 53 hospitals (80%) revealed that 1,668 healthcare workers had been exposed to either HCV



or HIV in 1998. Of the patients involved, 1,451 had been tested for HCV and 1,508 had been tested for HIV. Overall, 5.2% were infected with HCV and 2.3% were infected with HIV.

These rates are "significantly higher than the general population at 1.5% and 0.3%, respectively," the researchers note. Because HCV is more prevalent in the general population than HIV, Bell said that it is logical that it is a greater threat to healthcare workers who experience needlesticks, yet the data suggest that HCV is less often tested for after accidental needlesticks than HIV. "We have started a healthcare worker safety unit, as well as a statewide registry and coalition to raise awareness," Bell said. "It is important that both private and public health providers be made aware of the risk, and above all that all source patient providers be tested for hepatitis C."

[http://dailynews.yahoo.com/h/nm/20000720/hl/hiv\\_hepatitis\\_1.html](http://dailynews.yahoo.com/h/nm/20000720/hl/hiv_hepatitis_1.html)

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### ***Possible infectious causes in 651 patients with acute viral hepatitis during a 10-year period (1976-1985).***

Liver 1987 Jun 7;3 163-8 Kiyosawa K, Gibo Y, Sodeyama T, Furuta K, Imai H, Yoda H, Koike Y, Yoshizawa K, Furuta S

#### **Abstract**

Six hundred and fifty-one patients with acute viral hepatitis were identified serologically between January 1976 and December 1985. Of these, 109 (17%) had hepatitis A, 135 (21%) had hepatitis B, and 407 (62%) had hepatitis non-A, non-B. The possible infectious causes for acquisition of viral hepatitis occurring within 6 months before the onset of hepatitis were analysed. Approximately 80% of cases of hepatitis A and 70% of hepatitis B had no known risk factor, while in 67% of cases of hepatitis non-A, non-B possible risk factors for infection were documented. Infectious causes for hepatitis A were ingestion of raw shellfish (11%) and previous familial contact with patients with hepatitis A (10%). For hepatitis B, risk factors included medicare (24%), such as transfusion, surgical operation, accidental needle stick and acupuncture, and sexual contact (6%). For hepatitis non-A, non-B, the most important infectious cause was medical procedures (65%). The numbers of hospital employees were 2 (2%) with hepatitis A, 15 (11%) with hepatitis B and 14 (3%) with hepatitis non-A, non-B. These data suggest that hepatitis non-A, non-B can be a kind of nosocomial disease.

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### ***Hand Contamination with Hepatitis C Virus in Staff Looking after Hepatitis C-Positive Hemodialysis Patients.***

Am J Nephrol 2000 Mar;20(2):103-106 Alfurayh O, Sabeel A, Al Ahdal MN, Almeshari K, Kessie G, Hamid M, Dela Cruz DM Department of Medicine, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.

**Background:** Hepatitis C virus (HCV) is a major cause of hepatitis in hemodialysis (HD) patients. Routes other than blood transfusion play a role in the spread of HCV in HD patients. Molecular studies of HCV implicate nosocomial transmission of the virus in HD units. We conducted a clinicovirological study in our HD unit to investigate if the hands of dialysis personnel could represent a mode of transmission of HCV among HD patients.

**Methods:** One liter of sterile water was used for each handwashing of dialysis personnel. The washing was collected in a sterile container and tested for HCV-RNA by polymerase chain reaction (PCR) within 3 h of collection. Eighty handwashings from nurses dialyzing HCV-positive patient (group A) and 100 handwashing from nurses dialyzing HCV-negative patients (group B) were tested for HCV-RNA. As a control, 60 handwashings were collected from the dialysis personnel before entering the dialysis unit (group C) and tested for HCV-RNA. **Results:** HCV-RNA was positive in 19 (23.75%) of samples of group A, in 8 (8%) of samples of group B ( $p < 0.003$ ) and in 2 (3.3%) of samples of group C ( $p < 0.35$ ). These two positive samples of group C were from nurses who had dialyzed HCV-negative patients. **Conclusion:**

These results indicate the presence of HCV-RNA on the hands of some dialysis personnel in our HD unit, in spite of adherence to the standard precautions.

The hands of dialysis personnel are therefore a potential mode for facilitating transmission of HCV between HD patients. Copyright 2000 S. Karger AG, Basel

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***Contamination of doctors' and nurses' pens with nosocomial pathogens.***

Lancet. 1998 Jan 17;351(9097):213. No abstract available.

PMID: 9449890; UI: 98111543.

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***Failure of gloves and other protective devices to prevent transmission of hepatitis B virus to oral surgeons.***

JAMA 1988 May 6;259(17):2558-60 Reingold AL, Kane MA, Hightower AW Department of Biomedical and Environmental Health Sciences, School of Public Health, University of California, Berkeley.

A survey of 434 oral surgeons was conducted to examine risk factors for hepatitis B virus (HBV) infection. Overall, 112 (26%) of the participants demonstrated serologic evidence of past or current infection with HBV. Seropositivity was significantly associated with age, number of years in practice, and year of graduation from dental school but not with other variables examined, such as the number of patients seen annually or the number of patients seen who were at high risk of HBV infection. The strong correlation between years in practice and seropositivity was unaffected by reported use of gloves, face masks, or eye shields. The use of gloves and other protective devices does not appear to offer substantial protection against HBV exposure in oral surgeons, and all oral surgeons should receive HBV vaccine.

More on "Failure to where Gloves"

**Breaches in safe-injection practices** CDC recommendations. How many were not practiced on you?

...Fourteen patients reported breaches in safe-injection practices by the practitioner, including **1) failure to practice hand hygiene, 2) failure to prepare the skin with an antiseptic, 3) failure to wipe vials with alcohol before injection, and 4) failure to wear gloves.** Of 11 patients who could recall, all reported use of a new needle; however, **nine patients reported use of a multidose vial.**

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***Recommendations for preventing transmission of human immunodeficiency virus and hepatitis B virus to patients during exposure-prone invasive procedures.***  
**Centers for Disease Control.**

Bull Am Coll Surg 1991 Sep;76(9):29-37

The Governor's Subcommittee on AIDS has prompted the periodic publication of articles in the Bulletin in an effort to broaden surgeons' understanding of this significant health problem. The availability of information related to this disease has expanded significantly in recent years, and those in the health care profession have been able to assimilate this information and deal realistically with the problem as it begins to fall into proper perspective. We recognize that much information is not yet available and that, therefore, rational decision making is limited by lack of data. Unfortunately, the disease continues to stimulate undue sociopolitical interest as witnessed by the recent action taken by our national Senate, by media attention, and by public reaction to this attention. Thoughtful insights and decision making have not been hallmarks of the current scene. Following are the long-awaited "Recommendations for Preventing Transmission of HIV and Hepatitis B Virus to Patients During Exposure-Prone Invasive Procedures," which were released recently by the Centers for Disease Control, Atlanta, GA. The recommendations are being criticized by some individuals as being either too limited or too excessive. They bear heavily on surgeons, and on the medicolegal climate in which we practice. No matter how you regard the CDC recommendations, we all recognize the universal precautions must be emphasized and followed. The ACS Subcommittee on AIDS is formulating recommendations to be made to the Board of Regents at our 1991 meeting in October. Your comments would be welcomed.

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