

Bloodborne pathogens in the health care setting: risk for transmission

I. Introduction

Concerns about risk for transmission of hepatitis B and human immunodeficiency viruses in the health care setting led to a series of meetings, beginning in December 1991, organized by the Laboratory Centre for Disease Control, Department of National Health and Welfare. *The purpose of these forums was to define areas of consensus among interested Canadian groups on issues related to transmission of bloodborne pathogens including hepatitis B virus (HBV) and the human immunodeficiency virus (HIV) from health care workers to patients/clients in a health care setting.* It was accepted that similar recommendations would apply to the testing, disclosure and management of patients. Although data are lacking on the risks of transmission of hepatitis C and non-HIV human lymphotropic viruses in the health care setting, the approach to other bloodborne viruses is expected to be similar to that for HBV and HIV.

The subject areas discussed at these meetings were as follows:

- HBV/HIV testing of health care workers
- Infection Control Guidelines
- Compliance with infection control procedures by health care workers
- Training of health care workers in principles and practices of infection control
- HBV- and HIV-positive health care workers and the risk of transmission in the health care setting
- Clinical management of health care workers pre- and post-exposure
- Assessment of HBV- and HIV-seropositive health care workers
- Assessment of invasive procedures performed by HBV- or HIV-infected health care workers
- Disclosure of an infected health care worker's status
- Public education

Participants (Appendix 1) represented a wide range of Canadian organizations concerned about health care, ethics in medicine, and Canadian law as it applies to such issues.

Statements and recommendations emerging from these discussions reflect a consensus based on current knowledge; however, a spectrum of opinion was expressed in most subject areas. These recommendations are subject to change through results of ongoing study and research. This document is intended to serve as a guide for those who employ, educate, license and legislate health care workers in Canada.

In the following recommendations, "significant exposure" is defined as an injury during which one person's blood or other high-risk body fluid† comes in contact with someone else's body cavity; subcutaneous tissue; or nonintact, chapped or abraded skin or mucous membrane. In this context, an instrument contaminated with the health care worker's blood or the dripping of blood may be the mechanism by which a significant exposure occurs; a glove tear or perforation by itself is not regarded as a significant exposure.

II. HBV and HIV testing of health care workers

Statement

Programs for testing health care workers for HBV and HIV infection must be based on scientific principles, must consider ethical issues and legal precedents, and must be sensitive to the public needs. There is currently no legislation in Canada that specifically addresses the condition(s) under which testing of health care workers for HBV or HIV is warranted.

The participants in the meetings felt that a mandatory testing program for health care workers would not materially change the already extremely low risk for patients to acquire HBV or HIV infection in health care settings. In view of the risk, mandatory testing would be an unjustified measure that would violate the rights of individual privacy, and could result in acts of discrimination. The existence of such a testing program would likely have a major negative influence on the delivery of service and the training of health care workers in proper infection control practices because it would use scarce resources currently devoted to these high priority activities. There is also no scientific consensus on how often testing should be repeated if such a program were initiated.

Recommendations

1. Mandatory testing of health care workers is not justified on the basis of current scientific evidence.
2. Health care workers who have had a previous significant exposure or who have personal risk factors (e.g., high-risk sexual practices, IV drug use) should be encouraged to voluntarily seek HBV and HIV testing. Voluntary testing of health care workers who have no personal risk factors, based on perceived or potential occupational risk for transmitting

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† Body fluids presenting risk for bloodborne-disease transmission are: blood, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, amniotic fluid, peritoneal fluid and other body fluids containing visible blood.

HBV or HIV (e.g., persons performing invasive procedures), is *not* recommended.

3. Following a significant exposure to a patient's blood or other high-risk body fluid, voluntary testing of health care workers is recommended if:
 - (a) the source patient is known to be infected with HBV or HIV;
 - (b) epidemiological evidence suggests possible infection (e.g., high-risk sexual practices, IV drug use);
 - (c) the source patient is unknown or is unable to consent to or refuses testing.
4. Health care workers have a moral and ethical obligation to be tested following a significant exposure by a patient to a health care worker's blood or high-risk body fluid if the health care worker's serological status is unknown. (See section X, Recommendation 2).

III. Infection Control Guidelines

Statement

Universal Precautions were first introduced in Canada in 1987¹ in response to concern about occupational/nosocomial transmission of HBV/HIV from percutaneous exposures. Universal Precautions are specifically intended to prevent transmission of bloodborne pathogens from patients to health care workers; however, *they must be used in conjunction with traditional infection control systems for confirmed or suspected infections.*² Another established system, Body Substance Isolation,³ replaces traditional isolation systems, with the exception of airborne infections. Neither Universal Precautions nor Body Substance Isolation recommends extra labelling of specimens or patients to identify them as requiring special care because of their potential risk for transmitting infection.

The blurring of distinctions between Universal Precautions and Body Substance Isolation has led to an inconsistent application of terms and principles. Consistent use of both terms associated with promotion of a standard definition of practice would enhance understanding of the basic differences and improve the consistent application of appropriate terms and principles.

Recommendations

1. Universal Precautions should be regarded as the *minimum* standard of practice for preventing transmission of bloodborne pathogens in all health care settings. Universal Precautions must be clearly and consistently defined wherever they are described.
2. Current LCDC guidelines for Universal Precautions should be compiled in one document, revised and expanded in

content. They should be based on current results of risk-benefit studies and research findings and be organized in such a way as to facilitate adaptation to the specific needs of users. LCDC should assume a leadership role in the promotion of these guidelines to users, including professional associations, health organizations, health care facilities, and educators.

3. Health care settings (including institutions, private offices and clinics, and first-line responders) and mortuaries should have written documents that describe infection control strategies in their specific areas and outline procedures for situations where the risk of significant exposure to blood or other high-risk body fluids. Such policies and procedures should be developed in consultation with appropriate experts.
4. Strategies for preventing transmission of bloodborne pathogens should be reviewed as new information becomes available and re-evaluated as to their effectiveness.

IV. Compliance with infection control procedures by health care workers

Statement

Currently available information indicates that the risk of transmitting disease with contaminated blood from an infected worker to a patient is very small when health care workers adhere to recommended infection control procedures. Mechanisms for assessing and improving compliance can be developed by implementation of standards against which compliance is measured. However, enforcement of compliance with these infection control procedures, including Universal Precautions, is difficult.

In health care facilities, internal quality assurance/risk management programs can be used to evaluate compliance with recommended infection control procedures. External accreditation councils can assist in this process. Although assessment of compliance is more difficult in independent settings, internal studies, clinical appraisals and on-site inspections exemplify methods that could be employed.

Recommendations

1. Standards for infection control practices in health care settings and mechanisms to implement and evaluate these standards should be developed through collaborative efforts by provincial health ministries, related professional associations and licensing bodies, and health care facilities.
2. The Department of National Health and Welfare should contribute to this process by providing consistent and current national recommendations.

3. Suitable new technologies and methodologies should be promoted that enhance compliance with specific interventions such as disposal of non-recapped needles through use of devices designed to reduce needlestick injuries.

V. Training of health care workers in principles and practices of infection control

Statement

The practice of infection control is integral to the delivery of safe health care. Teaching health care workers the principles of infection control is a necessary prerequisite to their understanding of, and compliance with, infection control practices.

Structured infection control training incorporated into the curricula of schools that provide education to prospective health care workers would facilitate the acquisition of knowledge and enhance understanding of basic principles at the entry-to-practice level. Instruction is also an essential component of orienting staff to a new workplace and in-service education should continue during employment. While the value of formal training programs is recognized, the influence of role models on the practices of health care workers cannot be underestimated. Therefore, employees and medical staff in senior positions should be included in training programs. Further exploration is required to determine if a core curriculum can be developed that can be adapted and modified to the training needs of a particular practice setting.

Recommendations

1. Professional associations should be responsible for developing and promoting to their members continuing education programs in infection control.
2. Training in infection control should become a compulsory component of a health care worker's preparatory (prelicensure) education and continuing education.
3. Training programs should be developed by associations, faculties or facilities and evaluated regularly to ensure that information is current and meets the changing needs of the health care worker. Continuing education programs should be based on a needs assessment.

VI. HBV- and HIV-positive health care workers and the risk of transmission in the health care setting

Statement

The risk of infection following exposure to blood contaminated with hepatitis B "e" antigen (HBeAg+) is estimated to be 100 times greater than the risk of infection following exposure to blood contaminated with HIV. However, the risk for death

is estimated to be similar following a single exposure to a sharp instrument contaminated with blood from an HBeAg+ or HIV-infected person.

A number of issues were discussed that could have a bearing on strategies aimed at reducing the risk of transmission of HBV and HIV in the health care setting. These included the following:

- A subpopulation of individuals infected with HBV can be defined who appear to be more likely to transmit infection (e.g., persons who are HBeAg+).
- HBV infection can be prevented by vaccination and/or hepatitis B immune globulin.
- Psychosocial stigmata associated with HIV infection are several times greater than for HBV infection.
- The willingness of persons infected with HIV to participate in and comply with primary and secondary preventive strategies may be different from the willingness of those infected with HBV. For example, it is more likely that health care workers would agree to HBV testing following a significant exposure than they would to HIV testing. Similarly, it is possible that they may be more willing to participate in pre-exposure HBV testing than pre-exposure HIV testing.
- The clinical course of HIV infection, with respect to mental and physical deterioration, could increase the risk of occupational transmission of this virus. While this is potentially true for HBV infection, it is not the usual experience in clinical practice.

Recommendations

When evaluating risk for transmission in the health care setting, and when planning strategies aimed at reducing the risk for transmission, similar considerations should apply to persons infected with HBV or HIV. However, the nature of specific preventive measures may differ (e.g., between HBeAg+ and HBeAg- individuals).

VII. Clinical management of health care workers pre- and post-exposure

Statement

The effectiveness of hepatitis B vaccine in preventing HBV infection has been proven. Protecting health care workers from acute and chronic infection with this virus will further decrease the likelihood of health care worker to patient transmission in the future. Hepatitis B vaccination programs may be made more effective through the application of measures such as:

- offering vaccine to current staff;
- making vaccination a condition of employment;
- establishing a declination record for persons who refuse vaccination;

- making vaccination mandatory before clinical training at schools providing education in health care services.

Surveillance for significant blood exposures of health care workers and patients would permit identification of persons infected as a result of the blood exposure and would permit counselling and the early management of their infection. Information collected by such a surveillance system, would also be of value in better defining the risk for infection after a defined exposure.

A protocol for postexposure management and follow-up of persons exposed to bloodborne pathogens should be generally applicable to all bloodborne pathogens and be adaptable to a variety of health care settings. Designated persons who are readily available should manage and follow-up exposed health care workers and patients according to current established protocols.⁴

Recommendations

1. All health care workers exposed to blood or blood products or at risk for occupational exposure to sharps injuries should be vaccinated against HBV. Within provinces government, professional associations, institutions for training in health care disciplines and health care facilities need to collaboratively establish programs for hepatitis B vaccination of these health care workers based on the demonstrated cost-effectiveness of these programs.
2. Campaigns aimed at promoting health and the personal benefits of reporting significant exposures should be developed to enhance participation in all health care settings and facilitate timely application of protocols. Professional associations, provincial governments, employees and educators should collaborate in the development of these campaigns.
3. All significant exposures should be reported through a proactive mechanism that:
 - (a) is easy to access and is user-friendly;
 - (b) assures confidentiality;
 - (c) clearly and succinctly outlines information required from health care workers;
 - (d) provides for referral to appropriate experts;
 - (e) activates a protocol for follow-up that instills confidence in the exposed worker.

VIII. Assessment of HBV- and HIV-seropositive health care workers

Statement

Evaluation of health care workers who are infected with HBV or HIV will be enhanced if uniform criteria are used in a consistent manner maintaining confidentiality, and participation of appropriate organizations, licensing bodies and public health officials

is ensured, when necessary. The development of supportive review bodies within licensing and/or professional organizations with which infected health care workers are willing to cooperate will assist in allaying public concern.

In developing the following recommendations, a greater spectrum of opinions was recognized compared with other subject areas discussed. The recommendations provide a framework for further discussions within provinces on the development of a uniform and consistent approach to the evaluation of seropositive health care workers.

Recommendations

1. Any health care worker with an infectious disease that could put a patient at risk is encouraged to voluntarily seek medical evaluation with respect to the potential for transmission of the infection to patients. Seeking medical evaluation is a fundamental ethical principle for health care workers infected with HBV or HIV.
2. Current guidelines and legislation dealing with confidentiality should be reinforced and followed. Reporting of seropositive health care workers must only be done within the requirements of current legislation.
3. Medical evaluation of an infected health care worker should be the responsibility of the health care worker's primary care physician. Primary care physicians who care for HBV- or HIV-infected health care workers are encouraged to seek advice on assessment of risk for transmission of infection in the health care setting through an established consultation mechanism.
4. A consultation mechanism that can be easily accessed by a primary care physician should be established, ideally in each province. This mechanism should ensure confidentiality and allow for input from public health, licensing bodies and/or professional associations, experts in infectious diseases and infection control, and others as judged appropriate to the situation. Participants in this process need not know the health care worker's identity. An existing provincial reporting/consultation system may be adapted to serve as the consultation mechanism.
5. Criteria used to assess seropositive health care workers should include the medical evaluation (including mental condition), knowledge, application of infection control practices, and risk for injuries from sharp objects in the context of the individual's occupation.
6. Supportive nonthreatening programs through licensing and/or professional organizations should be developed to assist seropositive health care workers whose practices are modified because of their infection status. Career counselling and, if necessary, job retraining should be encouraged to promote the utilization of the health care worker's skills and knowledge.

IX. Assessment of invasive procedures performed by HBV- or HIV-infected health care workers

Statement

Transmission of bloodborne pathogens from health care workers to patients has occurred during some invasive surgical and dental procedures. However, specific surgical procedures ("exposure-prone") that are associated with transmission of infection independent of the operator's technique, skill and medical status have not yet been well defined. In the absence of procedure-specific risk data, the concept of "exposure-prone" procedures is not useful for the development of strategies aimed at reducing transmission of bloodborne pathogens in health care settings.

Recommendations

High-risk practices and behaviours associated with invasive procedures need to be defined in specific health care settings, so that safer alternatives can be proposed to the health care worker and their implementation monitored. The identification of these practices and behaviours should consider the following:

- surgical techniques (e.g., manipulation of sharp objects without being able to see them clearly, digital palpation of sharp objects);
- environment (e.g., quality of equipment, level of assistance, physical setting);
- competency (e.g., fatigue, stress, level of training, experience and skill in relation to specific task, risk perception);
- exposure (e.g., potential for bleeding into a cavity, inadequate containment of bleeding);
- patient (e.g., uncooperative patient, adverse physical factors).

X. Disclosure of an infected health care worker's status

Statement

Most contact between health care workers and patients does not involve the possibility of blood-to-blood contact and carries no risk for transmission of bloodborne pathogens. Current evidence suggests that risk of transmission of HBV and HIV from a serologically positive health care worker to a patient during an invasive procedure is extremely low.

As in the case for serological testing of patients and health care workers, disclosure of an infected person's test results involves many legal, ethical, and personal considerations. An individual's right to know should be balanced with the potential harm caused if that knowledge is not kept confidential. A health care worker is under an ethical obligation to maintain confidentiality of patients' records, but the patient is under no similar

ethical constraints. The decision to disclose or withhold the serological status of an infected health care worker is also complicated by the public's current perception of the risk of exposure. Disclosure of an infected health care worker's serological positive status could have a devastating impact on that person's ability to practise professionally, in spite of the extremely low risk of transmission of the infection from the health care worker to patient.

Recommendations

1. Routine disclosure of an infected health care worker's serological status is not justified.
2. The patient should be notified when a significant exposure to an infected health care worker has occurred. There is no need to disclose the identity of the source of the exposure.

XI. Public education

A strong, consistent, and repetitive message focusing on the factors related to transmission of bloodborne pathogens in the health care setting may enhance understanding of the relative risk and appropriate preventive measures for both the public and health care workers. Provincial health ministries, the Canadian Public Health Association, professional associations and the federal government share in the responsibility for assessing needs for information and for developing and disseminating appropriate messages.

References

1. Recommendations for prevention of HIV transmission in health-care settings. Can Dis Wkly Rep 1987; 13 (suppl 3):1-10.
2. Infection Control Guidelines for Isolation and Precaution Techniques, rev (cat H30-11-6-1E), Dept of National Health and Welfare, Ottawa, 1992.
3. Lynch P, Cummings MJ, Roberts PL et al. Implementing and evaluating a system of generic infection precautions: body substance isolation. Am J Infect Control 1990; 18:1-12.
4. National Advisory Committee on Immunization. Canadian Immunization Guide, 3rd ed (cat H49-8/1989E), Dept of National Health and Welfare, Ottawa, 1989: 55-56.

Appendix 1

Participating organizations

Alberta College of Physicians and Surgeons	Corporation professionnelle des médecins du Québec
Alberta Dental Association	Department of Health, Newfoundland and Labrador
Alberta Health	Department of Health and Community Services, New Brunswick
Association des médecins microbiologistes infectiologues du Québec	Department of Health and Social Services, Prince Edward Island
Association des professionnels pour la prévention des infections	Department of Justice (federal)
Association of Canadian Faculties of Dentistry	Department of National Health and Welfare
Association of Canadian Medical Colleges	Fédération des médecins omnipraticiens du Québec
British Columbia Medical Association	Fédération des médecins spécialistes du Québec
Canadian AIDS Society	Manitoba College of Physicians and Surgeons
Canadian Association of Emergency Physicians	Manitoba Dental Association
Canadian Association of Internes and Residents	Manitoba Health
Canadian Association of Medical Microbiologists	Ministry of Health, Province of British Columbia
Canadian Association of University Schools of Nursing	National Advisory Committee on Aging
Canadian Cancer Society	National Association of Occupational Health Nurses
Canadian Centre for Occupational Health and Safety	Nova Scotia Dental Association
Canadian Council on Health Facilities Accreditation	Occupational Health and Safety Association
Canadian Dental Association	Ontario Medical Association
Canadian Dental Hygienists Association	Ontario Ministry of Health
Canadian Hemophilia Society	Operating Room Nurses Association of Canada
Canadian Hospital Association	Ordre des dentistes du Québec
Canadian Infectious Disease Society	Patient Rights Association
Canadian Intravenous Nurses Association	Professional Association of Residents and Interns of British Columbia
Canadian Medical Association	Royal College of Dental Surgeons of Ontario
Canadian Nurses Association	Royal College of Physicians and Surgeons of Canada
Canadian Orthopaedic Association	Saskatchewan Health
Canadian Public Health Association	Society of Obstetricians and Gynaecologists of Canada
Centre d'études sur le SIDA	Toronto HIV Primary Care Physicians Group
College of Dental Surgeons of British Columbia	
College of Family Physicians of Canada	
College of Physicians and Surgeons of Ontario	
Community and Hospital Infection Control Association – Canada	
