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Proceedings of the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens

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Proceedings of the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens

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Proceedings of the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens

SUMMARY

The Laboratory Centre for Disease Control (LCDC) of Health Canada held a consensus conference on "Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens", on November 20-21, 1996. A wide range of opinion was sought (see Appendix 1 for a list of participants). This document represents the consensus achieved at that meeting as agreed upon by the participants at the final "consensus achieving" session.

INTRODUCTION

In December 1992, national recommendations were published in the Canada Communicable Disease Report[1] (CCDR) from a national Consensus Conference and a series of meetings organized by LCDC on issues relating to the transmission of certain bloodborne pathogens (hepatitis B virus [HBV] and human immunodeficiency virus [HIV]) from health care workers (HCWs) to patients in the health care setting. In 1995 and 1996 these recommendations were extended to hepatitis C virus (HCV). The recommendations included the following key points:

- Mandatory testing of HCWs was not justified; routine disclosure of an infected HCW's serologic status was not justified.
- HCWs with occupational or personal risk factors were encouraged to seek voluntary testing for HBV and HIV (and HCV).
- HCWs have a moral and ethical obligation to be tested following a significant exposure (see Definitions) of a patient to the HCW's blood or high-risk body fluid.
- The collaborative establishment of programs for hepatitis B vaccination of HCWs needed to be developed within provinces by government, professional associations, institutions for training in health care disciplines and health care facilities.
- Seeking medical evaluation is a fundamental ethical principle for HCWs infected with HIV or HBV (or HCV).
- Any HCW with an infectious disease that could put a patient at risk was encouraged to seek medical evaluation by the primary care physician; this physician was encouraged to seek advice on assessment of risk for transmission of infection in the health care setting through an established consultation mechanism. This mechanism was to be established, ideally, in each province. It should ensure confidentiality. It is not necessary to know the HCW's identity.
- Criteria for the evaluation of risk for transmission of a bloodborne pathogen by the HCW include medical evaluation, application of infection control practices, and risk of injury from sharp objects.
- Supportive, nonthreatening programs were to be developed through licensing and/or professional organizations.
- Invasive procedures were defined not as procedure-specific, but according to the surgical technique, environment, competence of the practitioner, exposure and patient cooperation.

Since publication of these recommendations LCDC has continued to receive enquiries from provincial and territorial departments of health, medical officers of health, HCWs and the public about whether and to what extent the practice of HCWs infected with a bloodborne pathogen should be limited. This and other repeated requests for further definition of the consultative mechanism recommended in 1992 led to the 1996 Consensus Conference.

Although it is recognized that the transmission of bloodborne pathogens from patients to HCWs is important, this was not discussed at the meeting. (For an in-depth analysis and recommendations see *Infection control guidelines: preventing the transmission of bloodborne pathogens in health care and public service settings*. CCDR 1997; Vol 23S3. For the postexposure protocol see *An integrated protocol to manage health care workers exposed to bloodborne pathogens*. CCDR 1997; Vol 23S2.)

GOALS, OBJECTIVES AND WORKING GROUPS

The goals of the Consensus Conference were as follows:

a) to understand the epidemiology of the transmission of bloodborne pathogens from infected HCWs to patients, and

b) to revise the recommendations to prevent and manage the transmission of bloodborne pathogens from HCWs to patients.

The specific objectives of the Conference were

a) to present up-to-date information on the current risk assessment and management of the transmission of bloodborne pathogens inside and outside Canada;

b) to discuss contextual factors and their relationship to the risk of transmission of bloodborne pathogens;

c) to revise, as appropriate, existing guidelines/models for risk assessment and risk management from the point of view of HWCs, consumers and responsible bodies (e.g. licensing bodies, professional associates, employers).

A number of working groups were formed to discuss the following issues:

a) risk analysis
b) immunization and screening
c) trace-back and look-back activities
d) practice modifications
e) disclosure
f) retraining and support of HCWs.

THE CONSENSUS CONFERENCE PROCESS

Participants at the Consensus Conference were invited following their identification by stakeholder groups, professional organizations and governmental agencies. However, at the conference it was recognized that participants may have presented their personal views on an issue and not necessarily those of the organizations that selected them.

For this meeting, consensus was broadly defined as agreement that the recommendation under discussion, though not perfect, was acceptable to participants. Consensus was further clarified as being more than a simple majority; however, unanimity was not required. During the final "consensus achieving" session of the meeting, the chair declared consensus if 70% to 80% of the participants indicated, by raised hand, that they supported the recommendation under discussion and no participant expressed unyielding disagreement with the recommendation.

There were more than 70 recommendations accepted at the meeting. Although consensus was achieved for these recommendations, support for some was stronger than for others, and some disagreement existed. For example, the recommendation concerning mandatory hepatitis B immunization and subsequent mandatory testing for antibodies to determine effective immunization (or if there is no antibody response to the vaccine, for disease) was debated in depth and was supported by 70% to 80% of participants. After the meeting, the first draft of this report was reviewed by the Steering Committee, working group chairs and rapporteurs; the second draft was reviewed by all participants. During the second review, concerns about some of the recommendations were raised by the Canadian Dental Association (CDA) and the Canadian Medical Association (CMA), and these organizations requested that the report not be published. In response to their request, LCDC consulted with all the conference participants, asking their opinion about whether to publish the results of the meeting, given the concerns expressed by the CDA and CMA*. On the basis of this

* 49 of 75 participants (65%) responded: 63% wanted LCDC to publish (22% wanted the recommendations published, 33% wanted the document published with an acknowledgement of CDA/CMA concerns, 8% wanted the recommendations published and gave direction to seek added input from CDA/CMA); and 37% did not want the recommendations published until CDA/CMA concerns had been addressed.

consultation, Health Canada decided to publish the Consensus Conference recommendations and to provide CDA/CMA with an opportunity to respond (see pages 19 and 21).

The recommendations reflect current knowledge presented at the conference and held by participants, corroborated by a systematic review of the literature (1987 to 1997). The recommendations are subject to change in the light of future developments. They provide details on how to prevent transmission of infection from health care workers to patients as well as detailing a specific framework within which HCWs, employers, regulatory bodies, local public health agencies or occupational health services can assess and manage the risk that infected HCWs pose to patients.

Because of the complex nature of some of the recommendations it is recognized that many will require phase-in time to allow efficient, effective implementation. In addition, in order for these recommendations to be effective, HCWs must be assured that the confidentiality of the infected HCW's infection status will be protected. HCWs must also be assured that although these recommendations are designed to protect patients, decisions regarding the infected HCW's practice will not be taken without due consideration of all the factors. Finally, HCWs must be assured that, when required, a solid support system will be available to advise on the medical, psychologic, financial and professional options.

EXPOSURE-PRONE PROCEDURES

Attempts have been made by at least two other countries to proactively manage infected HCWs. In 1991 the Centers for Disease Control and Prevention (CDC) in the United States published recommendations for preventing the transmission of HIV and HBV to patients[2]. States were required by law to show that they had implemented the CDC recommendations or recommendations equivalent to them. Whether HCWs who test positive for HIV, or hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg) should continue to perform exposure-prone procedures[†] was left to the discretion of an expert panel. If the decision was made that they could continue with such procedures, then they were responsible for notifying their patients of their seropositivity before the procedure.

In the United Kingdom, HCWs who test positive for HIV, HBeAg and hepatitis C virus (HCV) infection[3, 4], are required to stop performing invasive procedures[‡].

The **new Canadian definition for the term "exposure-prone procedures"**[¶] is used for the purpose of managing the risk of bloodborne pathogens transmitted in Canada. They are procedures during which transmission of HBV, HCV or HIV from a HCW to patients is most likely to occur and includes the following:

a) digital palpation of a needle tip in a body cavity (a hollow space within the body or one of its organs[5]) or the simultaneous presence of the HCW's fingers and a needle or other sharp instrument or object in a blind or highly confined anatomic site, e.g. during major abdominal, cardiothoracic, vaginal and/or orthopedic operations, or

b) repair of major traumatic injuries, or

c) major cutting or removal of any oral or perioral tissue, including tooth structures,[§]

during which there is a potential for the patient's open tissues to be exposed to the blood of an injured HCW.

Some concerns have been raised about the looseness of the definition. It is recognized that to determine every situation in which there is a significant risk of transmission of a bloodborne pathogen would be difficult, and therefore this definition is meant to provide a framework for the practitioner and/or expert panel in making an informed decision about the factors in a specific case.

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† **exposure-prone procedures** (US): procedures implicated in the transmission of HIV and HBV from HCWs to patients or "that include digital palpation of a needle tip in a body cavity or the simultaneous presence of the HCW's fingers and a needle or other sharp instrument or object in a poorly visualized or highly confined anatomic site . . . [and further] that present a recognized risk of percutaneous injury to the HCW, and — if such injury occurs — the HCW's blood is likely to contact the patient's body cavity, subcutaneous tissues, and/or mucous membranes". It was later decided that whether a procedure was exposure-prone had to be decided on a case-by-case basis.

‡ **invasive procedures** (UK): defined as "those that include surgical entry into tissues, cavities, or organs; repair of major traumatic injuries; cardiac catheterisation and angiography; vaginal or Caesarean deliveries or other obstetric procedures during which bleeding may occur; manipulation, cutting, or removal of any oral or perioral tissue, including tooth structures, during which bleeding may occur"

¶ The term "invasive procedures" was used during the Consensus Conference. It was changed following review by a subgroup, which stated that "exposure-prone procedures" are invasive procedures that also present the opportunity for the patient to be exposed to the blood of the HCW.

§ It is not the intent to include all invasive dental procedures as exposure-prone, although this is theoretically possible; rather, the goal is to identify those procedures involving a major opening in the oral or perioral tissue.

RISK ASSESSMENT

Estimated risk of transmission from a HCW infected with HBV, HCV or HIV to a patient following a significant exposure

Assessing the risk of transmission of a bloodborne pathogen by an infected HCW to a patient is the first step in planning measures to control the exposure and to decrease the incidence of transmission.

Mathematical models of risk suggest that per 1,000,000 procedures by an infected health care worker the following may occur:

1. 240-2,400 transmissions of HBV;
2. 50-500 transmissions of HCV[6];
3. 2.4 to 24 transmissions of HIV (average sporadic risk)[7]; however, this risk would be higher for a HCW known to have transmitted the infection at least once[6].

Documented reports indicate a total of 42 HCWs in the U.S. and other developed countries who had transmitted HBV to approximately 375 patients from the 1970s to the end of 1994[8]. These 42 HCWs included one HBeAg positive orthopedic surgeon in Nova Scotia, who requested that his surgical privileges be withdrawn after he was linked to two cases of hepatitis B among his surgical patients[9]. Two other patients were subsequently linked with transmission from surgery by the same surgeon[10].

In a hepatitis B outbreak in the Toronto area which occurred from 1992 to 1996, at least 75 people developed hepatitis B following electroencephalography with subdermal needle electrodes. The most serious complication was the death of one person who was classified as a possible case. The cause of the outbreak was attributed to poor infection control practices and an EEG technologist who was positive for HBeAg[11]. Viral DNA sequencing confirmed that the HBV from the EEG technologist was identical to that of four outbreak cases for whom testing was feasible. EEG technologists are unregulated HCWs, and little information is available regarding risks in this and other unregulated service industries such as tattooing, skin piercing and electrolysis.

Recently in the U.K., 20 patients developed hepatitis B following cardiovascular surgery performed by a surgeon who was HBeAg positive[12]. HBV DNA sequencing was identical in 14 of the 16 cases, and in two situations differed by only one nucleotide. In addition, one HBeAg positive surgeon transmitted HBV to two patients who, in turn, transmitted the infection to their sexual partners, as confirmed by HBV DNA sequencing[13]. In England, four surgeons who were HBeAg negative but had pre-core stop codon mutations (genetically unable to make e antigen)[8] were shown by DNA sequencing to have each transmitted the infection to one patient[14, 15]. Subsequent testing identified two more transmissions from one of the surgeons. CDC does not have any reports of HBV transmission from dentists to patients since 1987, when universal precautions were implemented[8, 16]. However, studies have not demonstrated a reduction in transmission of HBV from surgeons to patients since the introduction of universal precautions[8].

There have been two recent reports of probable HCV transmission from HCWs to patients, which occurred during cardiothoracic surgery. In the U.K. one patient is known to have been infected by the surgeon[4]; in Spain five patients were infected, and the implicated source was their surgeon[17].

HIV transmission from a HCW to patients was first documented in 1990, and involved a Florida dentist who transmitted HIV to six patients[18, 19]. One patient, who was seen from 1987 to 1989, did not have dental extractions or root canal therapy and seroconverted in the absence of other risk factors. More recently, in France, HIV transmission occurred in one patient following prolonged orthopedic surgery[20].

Retrospective studies carried out for CDC as of January 1, 1995, for patients of HIV infected HCWs indicate that of the 22,171 patients treated by 51 infected HCWs (29 dentists and dental students, 8 physicians and medical students, 13 surgeons or obstetricians, and 1 podiatrist) 113 had an HIV infection, but in none of these cases was transmission documented from the infected HCW to the patient. Three investigations are still ongoing[21]. However, the people tested represented only 17% of the patients seen by the infected HCWs. The recently reported transmission in France[20] confirms that the risk is not hypothetical.

Three parameters of risk influencing transmission of infection from HCW to patient[7, 22]

a) the risk of percutaneous exposure

The types of surgery that carry the greatest risk of transmission of bloodborne pathogens from an injured HCW to the patient include major surgical procedures, i.e. emergency, trauma, cardiac, intravascular, gynecologic, intra-abdominal and orthopedic

procedures[23]. In these examples, injuries to the HCW may occur while he or she is working with needles, sharp instruments or wire closures.

The scientific evidence available shows that HBV can be transmitted from HCWs to the patient even with full compliance with universal precautions and correct infection control procedures[24]. The outbreak cited here involved a thoracic surgery resident who had had acute hepatitis B 6 months earlier. Following transmission, this same HBeAg positive surgeon participated in a laboratory study in which he tied sutures with gloved hands for 1 hour. Small paper-cuts on the fingers were observed and a saline rinse of space between gloves and hands was HBsAg positive[8]. Estimates of the rates of percutaneous injuries to surgeons during surgery varies from 1.3 to 15.4%[8].

b) the risk of recontact with the patient

Once the infected HCW is injured, it is possible to change the gloves or surgical instrument if the injury is noticed. If changes in equipment or gloves are not made, then recontact with the patient by the instrument could expose the patient to a bloodborne pathogen. In one study, the recontact rate was 2% of observed procedures in four hospitals. The rate increased to 4.2% on the gynecologic service, with a high recontact rate of 8.5% for vaginal hysterectomies in which "blind" suturing is often performed and direct contact between the surgeon's and the patient's blood is possible. In another study it was found that after an injury in the operating room, the rate of recontact of the sharp object with the patient's wound was 32%[25].

c) the risk of seroconversion

This depends on the prevalence of infection in surgeons and dentists and the risk of seroconversion from a specific bloodborne pathogen.

i) the prevalence of infection in surgeons and dentists

Few data are available regarding the prevalence of bloodborne pathogens in Canadian surgeons and dentists. U.S. data are presented in Table 1.

Table 1: Non-representative Antibody Prevalence Data in US by CDC[26]

Sample Group	HB Infection	Anti-HCV	Anti-HIV
Surgeons	10-18%	NY City oral dental surgeons 9.3% NY City other dentists 1% Other US surgeons 0.8%	0%-0.1%
Anesthesiologists	13-49%		

ii) known risk of seroconversion if one is exposed to a source person with HCV, HBV or HIV

The level of the viral titre, the length of time the source person is infectious and the seroconversion rate influence the rate of transmissibility (Table 2).

Perception of risk by the public

Along with the actual risks of transmission of HBV, HCV or HIV the risk perceived by the public has to be considered in determining an acceptable risk. A lay person's perception of risk can lead him or her to believe that

Table 2: Factors Influencing the Risk of Seroconversion

	Virus		
	HCV	**HBV**	**HIV**
Plasma/serum in viral particles/mL	10-1,000,000[27]	HBeAg +ve 100-1,000,000,000[27]	10-1,000[27]
When is the source person most infectious?	Lifetime risk once infected	6-12 wk after onset of disease Chronic carriers = lifetime risk	Seroconversion and AIDS clinical stage result in the highest titres
Seroconversion rate if exposed to the virus	2.7-6.0%[27]	If no hepatitis B immunization has been given to the person exposed HBeAg +ve: 19-30% HBeAg -ve : 5%[27]	0.31%[27]

If the source person is positive for HBeAg, then the viral load is very high and HBV is approximately 100 times more transmissible than HIV after a significant percutaneous blood exposure. However, if the source person is negative for HBeAg but is HBsAg positive, then the risk is less: HBV is about 20 times more infectious than HIV[28]. The risk of transmission of HCV after a significant exposure is approximately 10 times less than that of HBV[27].

The rate of seroconversion from a mucous exposure (0.09% for HIV) is less than from a percutaneous exposure (0.3% for HIV). Although mucous membrane and skin exposures may account for about 50% of exposures from patient to surgeon in the surgical setting[29], it is likely that the rate of mucous cutaneous exposure that occurs from the infected HCW to the patient is lower, as the patient's surgical site is fully draped. In an occupational setting, blood is the only fluid to which the patient would likely be exposed.

a) even if only one life is saved, an action is worth taking, and

b) any identifiable risk of transmission is unacceptable[30].

When zero risk is not attainable, recommendations must strike a balance between the rights and reasonable expectations of the public and the rights and responsibilities of individual HCWs, health care facilities, professional organizations, licensing bodies and governmental health departments. The public has rights that must be protected, but the public also has responsibilities. In this situation the public's responsibilities include the following:

a) basing perceptions on reliable information and sound scientific principles, and

b) giving due consideration to the rights of the infected HCW.

METHODS TO REDUCE THE TRANSMISSION OF HBV, HCV OR HIV FROM AN INFECTED HCW TO THE PATIENT

Preamble

It is important to decrease the number of opportunities by which surgeons can expose a patient to their infected blood. Once a task analysis has been performed, then the appropriate interventions can be focused and control measures can be put in place for those procedures that pose a risk to the patient.

Participants at the Consensus Conference discussed the industrial hygiene model of control measures, including engineering controls, administrative actions, work practices and personal protective equipment, to decrease exposures to bloodborne pathogens[31]. Items higher on the control list, i.e. engineering controls, are more effective, as the decision is less likely to be in the hands of the practitioner at the time of intervention with the patient.

Engineering controls may consist of design modifications to sharp instruments in order to make them safer — for instance, the use of blunt rather than sharp needles[32].

Administrative measures include the adoption of appropriate policies, e.g. hepatitis B immunization of HCWs, hepatitis B immunization as a condition of employment, and direction about how infected HCWs are to be treated in the workplace.

Work practice controls include changes in standard operating room procedures intended to reduce the handling of sharp instruments. Examples include the announcement of the intention to pass sharp instruments, the use of transfer basins or the "hands-free" (see Definitions) technique[33].

HCWs initiated universal precautions in the operating room in 1987 to protect the operating team from exposure to the patient's blood; these should also protect the patient by reducing exposure to blood from an infected HCW[34]. Universal precautions are now considered the minimum standard of practice and are an example of how work practices can be changed. Studies indicate that compliance with universal precautions varies and is generally low. Kelen has reported compliance in the emergency department of 55% in situations of profuse bleeding and during major procedures[35]. In 1991, Courington reported compliance of HCWs in the operating room to be 25%[36]. A Canadian study of HCWs in emergency departments, dental clinics and plastic surgery clinics noted that 31.3% of HCWs were compliant[37]; however, this study was not limited to exposure-prone procedures. In a study of active surgical staff and residents in secondary and tertiary care teaching hospitals affiliated with the University of Toronto, it was found that only in less than 5% of the time did surgeons use work practice controls to prevent sharps injuries, such as the "no touch" technique (see Definitions), not handling sharps and increased use of less dangerous equipment[38]. Low compliance with universal precautions means a loss of protection for the patient and the HCW, and it interrupts a barrier designed to prevent injury and thus exposure to potentially contaminated blood.

Personal protective equipment is the last choice of control methods to be used in the industrial hygiene model because compliance by modifying the behaviour of the worker is necessary for each situation[38]. Personal protective equipment, e.g. gloves, should be used whenever there is a likelihood of exposure to blood from the patient to the HCW and from the HCW to the patient. Double gloves have been recommended for many surgical procedures, since they decrease the amount of blood the patient is exposed to[39].

Participants at the Consensus Conference were strongly in favour of increasing support for measures to increase compliance in infection control.

Recommendations

1. *Compliance with current infection control methodologies should be promoted and strongly supported to reduce the risk of injury and potential transmission of bloodborne pathogens from the patient to the HCW and also from the HCW to the patient.*

2. *Compliance with universal precautions should be monitored, e.g. in the employee performance appraisal or in a manner consistent with the status of HCWs who have hospital privileges or are unregulated workers.*

3. *Universal precautions should be expanded, on the basis of a risk analysis of the procedure, to include engineering, administrative, work practice, and personal protective equipment controls to prevent the transmission of a bloodborne pathogen from HCWs to patients.*

4. *Engineering controls should be pursued with vigour to reduce potential exposures to blood.*

5. *Administrative measures should include a mechanism for reporting exposure incidents in each organization or jurisdiction.*

6. *Exposure incident reports should be reviewed on a regular basis to determine factors that contribute to their occurrence, with the goal of decreasing the incidence.*

7. *Work place practices should be modified to reduce the potential for transmission of bloodborne pathogens, e.g. the "no touch" technique.*

8. *Personal protective equipment, e.g. gloves, should be worn if there is a likelihood of exposure to blood[1]. Double gloving should be considered if the HCW is performing exposure-prone procedures.*

9. *The education of HCWs on the transmission of bloodborne infections and the principles and benefits of universal precautions and other infection control measures should be initiated during their early training as students and continue throughout their careers to support compliance. Education should also include information on the risk assessment of procedures and control measures to prevent the exposure of bloodborne pathogens to another person.*

10. *Proficiency testing for infection control measures should be performed on both students and HCWs.*

11. *Education standards for infection control measures should be in place for unregulated HCWs, e.g. midwives.*

IMMUNIZATION AND SCREENING

Preamble

As one of the main medical principles is to "do no harm", it is essential that HCWs who perform exposure-prone procedures take measures to prevent transmission of infection. It is possible that there are also HCWs infected with a bloodborne pathogen who perform exposure-prone procedures and are not aware of their infectious status.

Hepatitis B

In 1992, participants at the Consensus Conference on Bloodborne Pathogens agreed that all HCWs exposed to blood or blood products or at risk for occupational exposure to sharps injuries should be immunized with hepatitis B vaccine[1]. U.S. data indicate that HCWs have not complied[40], but we do not have Canadian data.

Participants at the 1996 Conference discussed post-immunization testing for HCWs as a method of identifying nonresponders[41]. They also discussed an assessment for infection status for those who perform exposure-prone procedures and who do not have detectable antibodies against hepatitis B surface antigen (anti-HBs). Up to 50% of HCWs would not have adequate levels of this antibody within 7 years after immunization[42], either because of waning antibodies in those who still have immunologic memory or because of primary vaccine failure. For HCWs and student HCWs whose antibody levels were not tested within 4 to 8 weeks after the last hepatitis B vaccination and who perform or will perform exposure-prone procedures, occupational health departments may proceed in one of several ways; there was no consensus among Conference participants on a preferred method. They may boost those HCWs whose antibody status is unknown and then test for anti-HBs, or do anti-HBs testing on those without post-immunization serology, boost (if required) with a dose of vaccine, and then carry out post-booster serology.

There was general agreement that mandatory immunization against hepatitis B with follow-up testing and screening for non-responders and people with hepatitis B infection is necessary. However, some concerns were raised by participants about mandatory versus voluntary immunization. This practice may cause some practitioners to refuse to come forward, whether or not they are infected. Some felt that practitioners may want to have patients tested before surgery and might refuse to perform procedures on those who have bloodborne pathogens.

Hepatitis C and HIV

Participants discussed the current knowledge related to the screening of HCWs for antibodies to HCV and antibodies to HIV, the value of HCWs knowing their serologic status and the value of informing the expert panel (see next section) if one performs exposure-prone procedures.

It was acknowledged at the Conference that legislative changes may be needed to allow HCWs' test results to be sent to either regulatory bodies (for the regulated HCW) or to local public health agencies (for the non-regulated HCW). Confidentiality should be maintained throughout the whole process of testing through notification and assessment.

Recommendations

1. *All HCWs who are exposed to blood or [manufactured] blood products or at risk for occupational exposure to sharps injuries should be immunized with hepatitis B vaccine[1] for their own protection.*

2. *Immunization for hepatitis B should be mandatory for HCWs who perform or who will perform exposure-prone procedures. Mandatory hepatitis B immunization applies also to student HCWs who perform or will perform exposure-prone procedures.*

3. *HCWs and student HCWs who perform or who will perform exposure-prone procedures should have mandatory testing for antibody protection 4-8 weeks after immunization against hepatitis B (anti-HBs $\geq$ 10 international units per litre [IU/L]).*

4. *HCWs and student HCWs who perform or will perform exposure-prone procedures and who are found on post-HB immunization testing to be nonresponders, as well as HCWs and student HCWs who refuse or have a valid medical contraindication to immunization, should be screened for infection regularly (HBsAg, antibody to hepatitis B core antigen [anti-HB core]), e.g. annually (see recommendation 9).*

5. *Informed pre-test and post-test counselling is an essential component in all screening programs.*

6. *HCWs and student HCWs who perform or will perform exposure-prone procedures and who test positive for HBsAg should be tested for HBeAg. If they are **HBeAg positive**, they should be referred to an expert panel (see next section) for assessment and **cease practice** pending the panel's recommendations.*

7. *HCWs and student HCWs who perform or will perform exposure-prone procedures and who test **HBeAg negative** should also be referred to the expert panel but **do not need to cease practice** while they are waiting for the panel's recommendations.*

8. *HCWs and student HCWs who perform or will perform exposure-prone procedures and **refuse screening** will be presumed to be HBeAg positive, **will cease practice**, and will be referred to the expert panel.*

9. *HBsAg and HBeAg testing, as specified in recommendations 4 and 6, should be done after employment but before job placement or before hospital privileges are granted and on renewal of privileges, e.g. annually.*

10. *The work institution for HCWs or the education facility for student HCWs should keep records that document immunization and testing.*

REFERRAL TO THE EXPERT PANEL TO ASSESS THE RISK OF TRANSMISSION OF HBV, HCV OR HIV BY THE INFECTED HCW

Preamble

When a HCW is infected with a bloodborne pathogen and performs exposure-prone procedures, additional measures need to be taken to assess the risk of transmission in the tasks performed and the method of practice. The appropriate measures can then be put in place to limit any added risk of transmitting infections that this individual poses.

Participants at the Consensus Conference agreed that the consultation mechanism should include referral to an expert panel for any HCW or student who is infected with a bloodborne pathogen and who performs or will perform exposure-prone procedures. The panel's mandate would be to assess the transmission risk to patients posed by the infected HCW during exposure-prone procedures and make recommendations on the HCW's practice.

There was agreement on the need for the expert panel to have experience in local public health, occupational health, infection control and infectious diseases, and to include a professional from the same specialty as the infected HCW. A microbiologist or virologist on the panel was also considered important by some participants, and some believed that a lay person with expertise in the field of risk analysis, ethics or policy making might make an important contribution. Others felt that the inclusion of an additional member to present the perception of risk from a non-health care provider's point of view was inappropriate. It was noted that the situation may arise in which one person may have expertise in more than one area. Many participants thought that the same members would need to be called upon each time the panel is required, although some felt that this would not be practical.

Most participants thought that the expert panel should meet within 7 days of a request, but some felt that this was unrealistic in today's setting. It will be important that the panel's review be completed before the HCW's short-term disability insurance expires.

Many participants felt that the infected HCW should be present at the expert panel hearing, if that individual wishes; however, some participants disagreed.

Recommendations

1. *All HCWs who perform exposure-prone procedures have an ethical obligation to know their serologic status with reference to the bloodborne pathogens of HBV, HCV and HIV.*

2. *HCWs who perform exposure-prone procedures and who learn that they are infected with a bloodborne pathogen are ethically obligated to report the fact to their profession's regulatory body, e.g. the College of Physicians and Surgeons of Canada or the College of Nurses in accordance with provincial regulations, or to the local public health agency or occupational health service if their profession does not have a regulatory body.*

3. *Regulatory bodies should take an active role in overseeing the infected HCW's practice as part of their obligation to regulate their members for the protection of the public.*

4. *Expert panels should be established by the provincial and territorial regulatory bodies* in consultation with provincial and territorial bodies and other professional organizations. Expert panels would work at a regional or provincial and territorial level, depending on the needs and size of the population.*

5. *The expert panel should be activated when a HCW who performs exposure-prone procedures is found to be infected with HBV, HCV or HIV.*

6. *The expert panel should minimally include a local public health specialist, an occupational health specialist, an expert from the same specialty as the infected HCW, an infection control expert, an infectious diseases specialist, and an expert in risk assessment, ethics or policy.*

7. *The expert panel may be contacted by the infected HCW or his/her primary care physician, the HCW's regulatory body, a public health official, the occupational health service, the employer (if the occupational health service does not exist) or a HCW representative, depending on the situation.*

8. *The expert panel must convene within 7 days if the HCW's practice has been affected by the pending decision and complete its review as soon as possible, including notification of the decision to the affected HCW.*

9. *The expert panel should review the current literature on the bloodborne pathogen in question. When addressing the issue of whether the HCW is safe to continue practising exposure-prone procedures the panel should consider the following:*

   a) *the specific infection and viral load, e.g. HBeAg positive*

   b) *risk analysis of work activities with special reference to exposure-prone procedures*

   c) *procedural techniques*

   d) *the skill and experience of the HCW*

   e) *evidence of prior transmission by the HCW*

   f) *compliance with universal precautions and other infection control practices*

   g) *the likelihood of compliance with the practice recommendations*

   h) *relevant ethical principles*

10. *Infected HCWs may attend the meeting of the panel to present their case and may be accompanied by a medical, legal or ethical advisor(s).*

11. *There should be a timely appeal process available.*

12. *The primary care physician is responsible for the medical management of the infected HCW.*

* Discussions at the Consensus Conference indicated that the Ministry of Health should ensure that the expert panel is established in conjunction with the professional organizations or regulatory bodies and also that the expert panel report to the regulatory body. Comments from participants indicate that it is more appropriate for the regulatory body to be responsible for establishing the expert panel, and that it is not possible, at the present time, for the Minister of Health to be responsible for how the regulatory body sets up the expert panels.

MANAGING THE RISK AFTER AN INFECTED HCW HAS PRACTICE MODIFICATIONS IMPOSED

Preamble

Participants discussed the HCW who has practice modifications imposed by the expert panel and is unable to perform exposure-prone procedures because there is a real risk that he or she will expose the patient to a bloodborne pathogen. Enforcement and public protection are the responsibilities of the regulatory bodies for regulated HCWs and of the public health agency or occupational health service for unregulated HCWs.

Techniques for ensuring privacy and confidentiality were discussed at the Consensus Conference, as confidentiality is a vital principle. As far as possible, confidentiality must be maintained throughout the whole process of the expert panel consultation. If the infected HCW chooses not to attend the panel meeting, and if the panel decides not to modify the HCW's practice, his or her identity need be known only by the referring body or person. If practice modifications are imposed, however, the identity of the HCW will need to be communicated to whichever body will be responsible for monitoring or enforcing the modifications. Concerns were raised about personal health information; this information should be given strictly on a "need to know" basis.

Other approaches were mentioned, such as the possibility of immunizing all surgical patients with hepatitis B vaccine on admission to hospital or early treatment for patients in the operating room who may have been exposed to bloodborne pathogens because of an injury by the HCW. There was no consensus on these approaches.

Recommendations

1. *The mechanisms of contacting the expert panel and of disseminating its findings must ensure confidentiality; the expert panel need not know the identity of the infected HCW unless practice modifications are recommended (or unless the HCW chooses to attend the meeting).*

2. *When practice modifications are recommended, the identity of the infected HCWs must be revealed by the referring body to the expert panel and to the regulatory body, if the HCW is regulated, or to the local public health agency or occupational health service, if the HCW is unregulated.*

3. *These bodies will have the responsibility for establishing a continuous and comprehensive monitoring program to ensure that the expert panel's recommendations are followed by the infected HCW.*

4. *The regulatory body in the case of regulated HCWs, and the public health agency or occupational health service in the case of unregulated HCWs should review the HCW's modified and non-modified practices and their applicability as the health status of the HCW changes.*

5. *The person monitoring the HCW's compliance must inform the regulatory body or the local public health or occupational health service (for the unregulated HCW) if a HCW does not comply with the expert panel's decision to modify his or her practice. Failure to follow the recommendations would necessitate referral to the regulatory body or local public health for action to revoke/restrict the licence.*

6. *Personal health information should be given strictly on a "need to know" basis.*

7. *The individual (e.g. the employer) responsible for monitoring the practice modifications does not need to know the HCW's exact diagnosis, i.e. which bloodborne pathogen the worker has. This individual need know only what the practice modifications/work restrictions are.*

8. *Provincial and territorial expert panels may choose, if they wish, to work together to standardize their assessment and management approaches.*

9. *LCDC should be a resource for the expert panels, the regulatory, public health or occupational health service in providing the latest scientific information on the transmissibility of bloodborne pathogens.*

TRACE-BACK AND LOOK-BACK ACTIVITIES

Preamble

Look-back notification programs for patients of an infected HCW can be undertaken not only to identify and treat those patients and prevent further transmission but also to supplement research findings, clarify legal or ethical issues, evaluate risk or reassure the public. Infected HCWs may be identified in any of the following ways:

a) disclosure by the HCW,

b) identification through a voluntary or mandatory screening program, or

c) identification during the follow-up of another infected patient(s).

Well-designed investigations always need to be carried out to describe accurately the transmission level or transmission parameters when an infected HCW may have transmitted a bloodborne pathogen to a patient. Participants discussed whether it is necessary to initiate a trace-back if only a single patient met the criteria; the extent of the trace-back or look-back (i.e. how far back in time); the type of surveillance required to maximize identification; and the person responsible for initiating the look-back. Other necessary parts of the notification process include assembling the names of the people to be notified, making sure the response team is in place and ready, notifying all the patients at the same time, and being prepared to answer the public's questions, possibly by means of a telephone hot line. Some participants felt that it is not always feasible to notify all the patients at once. Instead, the most recent patients should be notified first, followed by the other patients as soon as possible. Some participants thought the accumulated results of testing should be centralized.

Since there is a dearth of published evaluations of notification programs in Canada, the recommendations made here are based solely on expert opinion. There was no agreement on the time period for the length of look-back if the date of the infection is not known; it will need to be based on the analysis of the specific case. Health care funding sources should appreciate the new additional cost to facilities or agencies to protect the public, because notification programs are new in Canada and could entail considerable investment of resources.

Recommendations

1. *A trace-back should be done if a single patient infected within the previous 12 months is found to have no identifiable personal risks of infection but has undergone an exposure-prone procedure within the appropriate infection risk time frame.*

2. *A trace-back should be done if two or more patients are infected with a particular bloodborne pathogen in a time period of more than 12 months and have been found to have no identifiable personal risks of infection but have undergone an exposure-prone procedure within the appropriate incubation period at the same hospital or by the same person. In addition, a trace-back is necessary when a clinician performing exposure-prone procedures finds a bloodborne infection in his or her patient(s) within 12 months after the procedure.*

3. *During a trace-back, the infected HCW should be identified through a quick, focused discussion with those HCWs most likely to be the source of infection, and serologic testing of these HCWs should be done. Advanced virologic methods should be used to establish the link more firmly.*

4. *The public health laboratory should be involved, whenever possible, to ensure appropriate testing, reporting and accountability.*

5. *If a HCW is implicated during a trace-back but refuses to be tested, he/she should be treated as though test results were positive for the virus under examination and referred to the expert panel.*

6. *To maximize identification by trace-back the local public health surveillance for these newly acquired infections should be of high quality:*

   a) *infections from these bloodborne pathogens (including HIV) should be reportable to the local public health agency;*

   b) *interviews should identify risk factors for all newly found persons infected, including a history of an exposure-prone procedure;*

   c) *data should be constantly reviewed, i.e. cases from one HCW or institution; and*

   d) *good communication should be maintained between clinicians and the public health agency.*

7. *A look-back and a notification program should be done when the professional practice of an infected HCW is modified or restricted because of the risk posed by his or her infection. Such a modification acknowledges that transmission may have occurred since the time of infection of the HCW.*

8. *No look-back or notification program need take place if the expert panel assessing the HCW does not recommend practice modification or restrictions.*

9. *The retrospective period covered by the notification program should take into account the time of acquisition of the HCW's infection, if known, and the times when exposure-prone procedures were performed.*

10. *The infected HCW's employing facility or facility where the HCW practises should be the primary agent in a notification program, with appropriate collaboration with the local public health agency.*

11. *If the HCW is unregulated, the primary agency responsible in a notification program is the local public health agency.*

12. *Notification may be multijurisdictional if the HCW has practised in more than one location during the look-back period.*

13. *Physicians and the medical officer of public health or equivalent should be encouraged to allow their information systems to be used in look-back programs. Current addresses are often difficult to obtain, and their databases could greatly assist the studies.*

14. *Notification programs should take all reasonable steps to encourage patients to be tested, for their own benefit and that of their families. Such steps may include the use of the media, clearly worded notification letters, information to local practitioners, and specific recommendations regarding testing, all respecting confidentiality.*

15. *Other necessary parts of the notification process should include assembling the names of the people to be notified, making sure the response team is in place and ready, notifying all the patients at once, and being ready to answer the public's questions, possibly by means of a telephone hot line.*

DISCLOSURE TO PATIENTS

Preamble

Participants discussed whether the identity of the HCW should be divulged after a significant exposure of the patient has taken place and whether the HCW who is infected with a bloodborne pathogen should inform the patient before performing a procedure that could result in a significant exposure.

In the United States, the CDC's recommendation is that "HCWs who are infected with HIV or HBV [and are HBeAg positive] should not perform exposure-prone procedures unless . . . [he/she] notifies patients of the HCW's seropositivity before they undergo exposure-prone procedures "[2]. Few states, however, have put this recommendation into practice.

If HCWs see disclosure as a threat to their livelihood they are less likely to want to know their serologic status or to seek testing voluntarily. If the expert panels make fully informed and valid decisions about the extent of the risk posed by infected HCWs who perform exposure-prone procedures and institute practice modifications or restrictions that the HCW follows, participants felt that disclosure would be unnecessary.

It is recognized that in some provinces and territories across Canada, regulatory bodies or local public health agencies do not have the authority to monitor practice modifications or restrictions for regulated or unregulated HCWs at the present time. Legislative changes may be necessary.

Recommendations

1. *Provided that the infected HCW's health status and the exposure-prone procedures have been assessed by the expert panel and all the panel's recommendations are followed, disclosure of a HCW's infected status to patients before an exposure-prone procedure is carried out is not required as a way of protecting patients from bloodborne pathogens.*

2. *After a significant exposure from any HCW has occurred, the patient must be notified that he/she was exposed to the blood of a member of the HCW team (the HCW does not need to be identified by name).*

3. *The HCW has an obligation to be tested following a significant exposure to the patient. If the HCW tests positive for HBV, HCV or HIV the patient has the right to know to which pathogen he/she was exposed in order to access the appropriate post-exposure protocol*[41].

RETRAINING AND SUPPORTING INFECTED HCWs

Preamble

HCWs who suspect or know that they are infected with a bloodborne pathogen should feel confident that by seeking testing or by reporting the infection they will receive appropriate advice and treatment as well as the support and encouragement to continue in practice in ways judged to be safe for their patients. Policies that support HCWs are more likely to be effective than those that exclude or punish them.

The elements of a support system were discussed as well as the responsibilities of the employing facility and the regulatory body of the infected HCW. Recommendations of the expert panel that modify or restrict the

HCW's practice may have a serious impact on the HCW's financial and professional life. Some participants felt that provincial and territorial governments should encourage retraining where needed.

Recommendations

1. *A support system should be established for HCWs infected with a bloodborne pathogen. Provincial or territorial regulatory bodies should ensure that the following key elements are available:*

   a) *a well-defined point of entry, preferably within a professional association, regulatory body or other group independent of the employer that can act in the best interests of the HCW;*

   b) *provision for safeguarding the confidentiality of the HCW's identity;*

   c) *a contact person at the point of entry who will ensure that support is available on an immediate and continuing basis and who will facilitate the HCW's access to*

      i) *appropriate medical care and counselling,*

      ii) *social and psychologic support,*

      iii) *professional advice on maintenance of registration,*

      iv) *options for income security and retraining.*

2. *Each provincial and territorial health department should work with the relevant professional associations and regulatory bodies to establish a support system and a policy regarding its use. The professional associations have a responsibility to inform their full membership of this option, including those working in private practice or in a setting with few employees.*

3. *After HCWs have been identified as being infected with a bloodborne pathogen and await the recommendations from the expert panel, their professional association membership as well as salary and benefits, if applicable, should be retained.*

4. *As far as possible, infected HCWs should be accommodated in the workplace with meaningful work if their practices have been restricted during the waiting period.*

5. *Regulatory bodies, professional associations and health care facilities should encourage members to consider disability insurance for infection with a bloodborne pathogen. Such coverage may be available through group or private disability insurance. If the infection is occupationally acquired, compensation may be sought through the Workers' Compensation Board.*

6. *Professional associations should inform members about the types of coverage available.*

7. *Regulatory bodies, professional associations and health care facilities should inform members about the requirements for eligibility for such insurance (such as accident reports for injuries with an instrument, baseline testing, etc.).*

8. *Insurance companies should be encouraged to make disability insurance for occupational infection with bloodborne pathogens available to HCWs.*

9. *Insurance coverage should also be available to those who cannot identify the source of their infection or were infected under non-occupational circumstances.*

10. *Student HCWs should be made aware that if they acquire a bloodborne infection, their work practices could be modified.*

11. *Unregulated workers should seek guidance through their public health agency.*

DEFINITIONS

Exposure-prone procedures* (Canadian definition)

The term is used for the purpose of managing the risk of bloodborne pathogens transmitted in Canada. They are procedures during which transmission of HBV, HCV or HIV from a HCW to patients is most likely to occur and includes the following:

a) digital palpation of a needle tip in a body cavity (a hollow space within the body or one of its organs[5]) or the simultaneous presence of the HCW's fingers and a needle or other sharp instrument or object in a blind or highly confined anatomic site, e.g. during major abdominal, cardiothoracic, vaginal and/or orthopedic operations, or

b) repair of major traumatic injuries, or

c) major cutting, or removal of any oral or perioral tissue, including tooth structures†

during which blood from an injured HCW may be exposed to the patient's open tissues.

It is recognized that it is difficult to determine every situation in which there is a significant risk of transmission of a bloodborne pathogen, and therefore this definition is meant to guide the practitioner and/or expert panel in making an informed decision about the factors in a specific case.

Significant injury

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 non-intact, chapped or abraded skin or mucous membrane[1]. In the context of an infected HCW, an instrument contaminated with the HCW's blood or the dripping of blood from the HCW to a patient's body cavity may be the mechanism by which a significant exposure occurs.

"Hands free" technique

A procedure that ensures that "the surgeon and surgical nurse do not touch the same instrument at the same time. This is achieved by placing the sharp instrument in a so-called neutral zone that is cleared of other instruments"[33].

Look-back

If a HCW has been identified as infected with HBV, HCV or HIV and has performed exposure-prone procedures that could have put patients at risk of exposure to an infection, then the agency employing the HCW or the local public health agency contacts patients at risk to give advice about testing and potential treatment and to discuss methods of preventing further transmission with those found to be infected.

"No touch" technique

The use of an extension such as a sponge forcep, rather than hands, to handle or touch contaminated items or to handle or touch sterile items[43].

Non-responder

A HCW who has had two complete series (three doses) of hepatitis B vaccine and has tested anti-HBs negative (< 10 IU/L) 4-8 weeks after each hepatitis B immunization series[41].

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* The term "invasive procedures" was used during the Consensus Conference. It was changed following review by a subgroup who stated that "exposure prone procedures" is a more encompassing term.

† It is not the intent to include all invasive dental procedures as exposure-prone although this is theoretically possible; rather, the goal is to identify those procedures involving a major opening in the oral or perioral tissue.

Trace-back

If a patient has been identified as infected with HBV, HCV or HIV and has no identifiable risk of infection from that pathogen, as assessed by the physician or local public health agency, but has undergone an exposure-prone procedure within the appropriate incubation period, then the local public health agency seeks to identify the HCW who has performed exposure-prone procedures and other infected or potentially infected patients in order to provide treatment and counselling on preventing further transmission.

REFERENCES

1. Health Canada, LCDC. *Bloodborne pathogens in the health care setting: risk for transmission.* CCDR 1992;18:177-84.

2. CDC. *Recommendations for preventing transmission of human immunodeficiency virus and hepatitis B virus to patients during exposure-prone procedures.* MMWR 1991;40:1-9.

3. Joint Working Party of the Hospital Infection Society and the Surgical Infection Study Group. *Risks to surgeons and patients from HIV and hepatitis: guidelines on precautions and management of exposure to blood or body fluids.* BMJ 1992;305:1337-43.

4. PHLS. *Hepatitis C virus transmission from HCW to patient.* CDR Review 1995;5(26):R121.

5. *Dorland's illustrated medical dictionary.* 27th edition. Philadelphia: W.B. Saunders Co., 1988.

6. Bell DM, Shapiro CN, Culver DH et al. *Risk of hepatitis B and human immunodeficiency virus transmission to a patient from an infected surgeon due to percutaneous injury during an invasive procedure: estimates based on a model.* Infect Agents Dis 1992; 263-69.

7. Bell D. *Human immunodeficiency virus transmission in health care settings: risk and risk reduction.* Am J Med 1991;3B-294S–3B-300S.

8. Bell DM, Shapiro CN, Ciesielski CA, Chamberland ME. *Preventing bloodborne pathogen transmission from health-care workers to patients.* Surg Clin North Am 1995;75:1189-1203.

9. Health Canada, LCDC. *Nosocomial hepatitis B associated with orthopedic surgery Nova Scotia.* CCDR 1992;18:89-90.

10. Johnson BL, Langille DB, LeBlanc JC et al. *Transmission of hepatitis B related to orthopedic surgery.* Infect Control Hosp Epidemiol 1994;15:352.

11. Johnson I. *Hepatitis B - EEG clinics outbreak investigation.* Toronto: Ontario Ministry of Health. 1997. Final report.

12. PHLS. *Lessons from two linked clusters of acute hepatitis B in cardiothoracic surgery patients.* CDR Rev 1996;6:R119-R125.

13. PHLS. *Response to the discovery of two practicing surgeons infected with hepatitis B.* CDR Rev 1996;6:R126-R128.

14. The Incident Investigation Team and Others. *Transmission of hepatitis B to patients from four infected surgeons without hepatitis B e antigen.* N Engl J Med 1997;336:178-84.

15. Heptonstall J. Presentation at the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens. Ottawa: November 19, 1996.

16. Mast E. Presentation at the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens. Ottawa: November 19, 1996.

17. Esteban JI, Gomez J, Martell M et al. *Transmission of hepatitis C virus by a cardiac surgeon.* N Engl J Med 1996;334:555-60.

18. CDC. *Transmission of HIV infection during an invasive dental procedure, Florida.* MMWR 1991;40:21-27,33.

19. CDC. *Update: investigations of persons treated by HIV-infected health care workers - United States.* MMWR 1993;42:329-31.

20. Dorozynski A. *French patient contracts AIDS from surgeon.* BMJ 1997;314:250.

21. Robert L, Chamberland ME, Cleveland J et al. *Investigations of patients of health care workers infected with HIV: CDC database.* Ann Intern Med 1995;122:653-57.

22. Robillard P. Presentation at the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens. Ottawa: November 19, 1996.

23. Gerberding JL. *Procedure-specific infection control for preventing intraoperative blood exposures.* Am J Infect Control 1993;21:364-7.

24. Harpaz R, Von Seidlein L, Averhoff FM et al. *Transmission of hepatitis B virus to multiple patients from a surgeon without evidence of inadequate infection control.* N Engl J Med 1996;334:549-54.

25. Tokars JI, Bell DM, Culver DH et al. *Percutaneous injuries during surgical procedures.* JAMA 1992;267:2899-904.

26. Short LJ, Bell DM. *Risk of occupational infection with blood-borne pathogens in operating and delivery room settings.* Am J Infect Control 1993;21:343-50.

27. Lanphear BP. *Trends and patterns in the transmission of bloodborne pathogens to HCW.* Epidemiol Rev 1994;6:437-50.

28. Shapiro CN. *Occupational risk of infection with hepatitis B and hepatitis C virus.* Surg Clin North Am 1995;75:1047-56.

29. Pugliese G. *Should blood exposures in the operating room be considered part of the job?* Am J Infect Control 1993;21:337-42.

30. Paltiel D. *Perception of risk.* Presentation at the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens. Ottawa: November 19, 1996.

31. National Safety Council. Plog B, ed: *Fundamentals of industrial hygiene.* 3rd edition. Chicago: National Safety Council, 1988;457-474.

32. CDC. *Evaluation of blunt suture needles in preventing percutaneous injuries among health-care workers during gynecologic surgical procedures — New York City, March 1993-June 1994.* MMWR 1997;46:25-9.

33. Raahave D. *Operative precautions in HIV and other bloodborne virus diseases.* Infect Control Hosp Epidemiol 1996;17:529-31.

34. Gerberding JL, Lewis FR, Schecter WP. *Are universal precautions realistic?* Surg Clin North Am 1995;75:1091-104.

35. Kelen GD, Green GB, Hexter DA et al. *Substantial improvement in compliance with universal precautions in an emergency department following institution of policy.* Arch Intern Med 1991;151:2015-56.

36. Courington KR, Patterson SL, Howard RJ. *Universal precautions are not universally followed.* Arch Surg 1991;126:93-6.

37. Wright JG,Young NL, Stephens D. *Reported use of strategies by surgeons to prevent transmission of bloodborne diseases.* Can Med Assoc J 1995;152:1089-95.

38. Osterman JW. *Beyond universal precautions.* Can Med Assoc J 1995;152:1051-95.

39. Schaffner W, Mishu-Allos B. *Protecting patients when their surgeon or dentist is infected with a blood-borne virus.* J Hosp Infect 1995;30S:156-62.

40. Hersey JC, Martin LS. *Use of infection control guideline by workers in healthcare facilities to prevent occupational transmission of HBV and HIV: results from a national survey.* Infect Control Hosp Epidemiol 1994;15:243-52.

41. Health Canada, LCDC. *An integrated protocol to manage health care workers exposed to bloodborne pathogens.* CCDR 1997;23S2:1-14.

42. Mast EE, Alter MJ. *Prevention of hepatitis B virus infection among HCW.* In: Ellis RW, ed. *Hepatitis B vaccines in clinical practice.* New York: Dekker, 1993:295-307.

43. AORN. *Standards, recommended practices, and guidelines.* 1997:303.

RESPONSE FROM THE CANADIAN MEDICAL ASSOCIATION

The prevention of the occupational transmission of bloodborne pathogens is a very important policy objective. The Canadian Medical Association (CMA) shares Health Canada's goal of continuing to protect the public. CMA commends Health Canada and the Laboratory Centre for Disease Control (LCDC) for being vigilant about this problem and for convening the conference from which these recommendations emerged.

However, CMA believes that the claim to consensus coming out of the conference is misleading. Although there was consultative discussion, no consensus was reached. More than one third of the participants recently polled did not support publishing these recommendations in light of the dissent of CMA and others.

The recommendations in these proceedings supersede the ones published by LCDC from a similar consensus conference in 1992 and diverge from them in important respects. CMA does not support the new recommendations. In the move from a voluntary system of immunization and screening to a mandatory one in the case of hepatitis B, and by the introduction of a new system of management for all health care workers known to be infected with hepatitis B virus (HBV), hepatitis C virus or human immunodeficiency virus, important rights of privacy, confidentiality and autonomy will be infringed upon, and new burdens and responsibilities imposed. The revised recommendations are not explicit about why it is thought that these changes are necessary or justified. CMA does not believe they are.

CMA's main concerns about the new recommendations are as follows:

- the proposed mandatory system, particularly its emphasis on the concept of "exposure-prone procedures", may afford even less protection to the public than would a carefully implemented voluntary program;
- the recommendations focus too narrowly on a particular risk group, and the narrowly targeted measures will do little to prevent transmission compared with other, more comprehensive measures, such as universal immunization;
- the evidence does not warrant measures any more intrusive on privacy and autonomy than those in the previous recommendations;
- with respect to HBV, the proposed mandatory regimen is unlikely to provide significant additional gains in risk reduction over the 1992 recommendations; such minimal gains as may be achieved under the proposed mandatory regimen do not, on balance, outweigh the costs in moral, social and financial terms;
- the rationale underlying the recommendations is not clear, particularly with regard to the principles upon which they are based;
- respect for autonomy and for privacy are not given adequate consideration;
- the approach to risk assessment and management is at best unclear, and at worst confused.

If health authorities are serious about protecting the public they should consider the following:

- universal hepatitis B immunization;
- enhanced voluntary testing of health professionals;
- universal precautions;
- an educational campaign directed at the public and health professionals.

CMA believes that a properly implemented voluntary system, enhanced by an educational program, would afford greater protection than would the conference recommendations, and in addition would have the merit of being less intrusive on privacy and autonomy.

In the case of HBV, immunization is certainly important in preventing transmission from health care worker to patient (and is also a prudent measure to be taken for the health care worker's own protection). It would be good to immunize as many health care workers who are capable of transmitting HBV as possible. However, CMA believes this goal could be achieved by less restrictive means, such as encouraging vaccination in the context of better education of health care workers, or more convenient access to the vaccine. Medical, nursing, and dental students in particular, and other health care professionals in training, should have access to hepatitis B vaccination through their programs.

CMA holds that a voluntary system for both immunization and testing has never been adequately attempted. If immunization for health care workers has not reached desired levels, this is not because the voluntary approach taken after the 1992 recommendations cannot work. Rather, it is because a

voluntary system was never properly implemented to begin with.

With regard to mandatory testing for HBV, it is important to note that in the 1992 recommendations post-vaccination testing was not even recommended. This being so, the abrupt decision to move to mandatory testing in the revised recommendations is unwarranted. Before consideration of a mandatory system, there should be a trial in which vaccination and post-vaccination follow-up testing is strongly recommended to health care professionals and set in the context of an educational campaign in which the risks and benefits of vaccination and knowledge of personal serologic status are clearly laid out.

There is good reason to believe that a voluntary approach, intensely pursued, could prove as effective in preventing occupational transmission of HBV as the screening and management regimen proposed in the current recommendations. CMA has recently developed a detailed policy along these lines and urges health professionals, health institutions, public health officials and governments to give serious considerations to its proposal for an effective voluntary system. Given the improvements that have been made in the treatment of HBV there is considerably more benefit in learning one's serologic status today than there was in the past. In addition, CMA considers that health care workers have a responsibility to know their serologic status if they put patients at significant risk. This responsibility is grounded in the principle of medical ethics, "do no harm". The health care system does and must rely to a considerable extent upon the moral integrity of health care workers. A voluntary approach incorporating an explicit appeal to professional responsibility would draw on the individual moral integrity of every health care worker.

Further gains in risk reduction could be made if an intensive voluntary approach were coupled with improved use of universal precautions or the use of other prophylactic measures. Programs to vaccinate patients pre-operatively where feasible would also substantially reduce the risk of occupational transmission.

Finally, CMA has serious concerns about the recommendations' narrow focus on the *occupational* transmission of HBV. The evidence clearly shows that the risks of occupational transmission are minuscule compared with other sources of infection, such as sexually transmitted disease and intravenous drug use. Targeting health care workers for mandatory vaccination and testing will do little to address the serious public health problems posed by HBV. A more intensive public health initiative to immunize the entire population, for example, would produce substantial gains in reducing the risk of transmission without singling out and stigmatizing one particular group in society.

CMA recognizes that such an initiative would be costly. However, the mandatory regime proposed in the recommendations would be costly in social and moral terms as well as economic ones. The occupational transmission of bloodborne pathogens is a small, albeit important, part of a much larger public health problem. It is questionable whether some or all of the various new measures in the revised recommendations are cost-effective (given how the money could otherwise be used to prevent transmission). CMA believes that universal immunization for HBV would probably be more cost-effective. Issues of cost aside, there can be no doubt that if we want to address the problem of HBV in a serious and comprehensive way, universal immunization would be the most effective way to proceed.

CMA is committed to the goal of protecting the public from the hazards of disease and will continue its work on behalf of its members and the public.

RESPONSE FROM THE CANADIAN DENTAL ASSOCIATION

The Canadian Dental Association (CDA) supports the general intent of the proceedings of the LCDC Consensus Conference on Infected Health Care Workers to bring about further emphasis on preventive measures and reduce the risks of transmission of bloodborne pathogens by practitioners. However, CDA notes that the recommendations for mandatory testing of practitioners and related requirements for practitioners to show proof of seroconversion are impractical because of potential legal challenges and other serious difficulties that would follow implementation. CDA believes that the overall goal of the report and the specific objectives of its recommendations can be more efficiently and effectively met by seeking further emphasis on preventive measures within a voluntary system administered by professional regulatory authorities.

CDA currently encourages dental health professionals to be immunized (voluntarily) against hepatitis B. The success of this policy is reflected in a study conducted in 1994 and 1995 by G.M. McCarthy and J.K. MacDonald which reports that 93% to 94% of Ontario dentists have been so immunized and that an additional 1% have acquired natural immunity[1]. A more recent study of dentists across Canada by the same authors, which was supported by a Health Canada grant, indicates that 94% of those dentists responding reported receiving HBV vaccination.

There are no reported cases of transmission of hepatitis B from dentist to patient since 1986. It is difficult to justify mandatory immunization of dentists when it is apparent that voluntary approaches are practical and can work.

CDA's *Code of Ethics*, which is referenced by several provincial dental licensing authorities, currently states, under Article 2, Competency:

> A practitioner should inform the dental licensing authority when a serious injury, dependency, infection or other condition has either immediately affected, or may affect over time, his or her ability to practice safely and competently.

The intent of such a provision is to encourage a voluntary process, administered by the dental regulatory authority, to work with practitioners who have identified limitations (and to determine an appropriate range of practice through a consultative process).

Mandatory approaches will introduce rather than solve problems. CDA has obtained a preliminary legal opinion suggesting that provisions for mandatory testing or proof of seroconversion could be challenged under Canada's *Charter of Individual Rights and Freedoms*. Professional regulatory authorities will accordingly be faced with the LCDC report's recommendations on the one hand, and on the other the possibility of legal challenges if they choose to follow them.

The recommendations present practical as well as legal problems. A major concern centres on the "new Canadian definition" for the term "exposure-prone procedures" as related to dentistry. With the lack of evidence of transmission of disease to dental patients, it is technically impossible to identify one dental procedure as being more "at risk" than any other. The definition, however, attempts to equate risk in dental procedures with "degree of invasiveness", although no direct evidence-based foundation for this equivalency can be provided.

A second practical concern relates to the proposed requirement for practitioners to provide evidence of seroconversion. The biology of HBV vaccination is such that, after immunization, blood levels of antibodies, as tested in serology, decline. Despite the gradual reduction in blood antibody level, there is no need — as is true for many childhood immunizations — for booster immunization. In fact, booster immunizations are not recommended. Post-immunization testing is currently not recommended because of the cost and the high number of seroconversions experienced, particularly among younger individuals. If related recommendations in the LCDC report cannot be changed, such issues will need to be addressed and clarified.

Although the publication of these recommendations is not equivalent to the introduction of new policy by the federal government, it stands as a medical legal reference that may be considered on its own merits. CDA's concerns are presented to assist evaluation of the report and its recommendations.

Despite the concerns noted, CDA views these proceedings of the LCDC Consensus Conference as an indication of a *need for re-emphasis upon voluntary approaches, directed by professional regulatory authorities, to the prevention of transmission of disease from practitioner to patient.* CDA pledges its support in this regard, to include immediate objectives such as the following:

- further encouragement of dentists to be voluntarily immunized, and special encouragement to ensure that allied dental personnel working with patients are immunized;

- encouragement of the recognition of a professional responsibility to be aware of the results of immunization;

- professional awareness initiatives to publicize the above and their relationship to Article 2, CDA *Code of Ethics* (and related provisions in the codes of individual provinces);

- professional awareness initiatives to publicize the continuing importance of universal precautions and their complete and consistent application.

Reference

1. McCarthy GM, MacDonald JK. *Improved compliance with recommended infection control practices in the dental office between 1994 and 1995*. Am J Infect Control 1998;26:24-8.

Appendix I
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