Health care workers’ experience with postexposure management of bloodborne pathogen exposures: A pilot study

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Purpose: This descriptive study of health care workers enrolled in a postexposure bloodborne pathogen management program had 3 goals: (1) to characterize their exposure incidents, (2) to assess health care workers’ experience with the program, and (3) to identify strategies to improve the management of exposure incidents.

Methods: A confidential, self-administered, 5-page survey was mailed to 150 hospital employees who were recently evaluated in the employee health clinic for a blood/body fluid exposure.

Results: Sixty-five usable surveys were returned to the study office, representing a 43% response rate. Although the majority of the employees enrolled in the postexposure management program were generally satisfied with the overall quality of care they received, many respondents perceived a lack of social support during the lengthy follow-up period. Long-term distress related to the exposure was not uncommon. The respondents’ suggestions for improvement focused on the need for department managers to become more personally involved when their staff members have an exposure incident.

Conclusion: These qualitative data suggest that additional studies are needed to assess both the short-term and long-term impact of exposure incidents on the health and well being of affected health care workers. In addition, because of a paucity of information in this area, studies are needed to assess both the effectiveness of the United States Public Health Service recommendations for postexposure management and the degree to which they have been implemented by health care facilities. (AJIC Am J Infect Control 2000;28:421-8)

Occupationally acquired HIV infection was first reported in 1984; since then, implementation of a wide range of risk-management strategies has helped reduce the risk of exposure incidents (including needlesticks) and subsequent infection in health care workers (HCWs). These strategies include regulatory controls, best exemplified by the Occupational Health and Safety Administration’s Bloodborne Pathogen Standard; administrative controls, such as targeted training and feedback programs; and, more recently, engineering controls, such as the redesign of needle-bearing devices. All of these strategies have effectively led to documented reductions in exposures and needlestick injuries in hospitals. Unfortunately, however, contaminated needlestick injuries and other types of exposures continue to occur. Conservative estimates of percutaneous blood exposure incidents in the United States are in excess of 500,000 per year, with roughly 1 in 100 involving known HIV-infected blood. Recent hospital rates of exposure incidents have ranged from 43 to 93 per 1000 worked full-time equivalent employees.
Therefore, it is not surprising that there has been a great deal of interest in preventing infection after an exposure incident occurs. This interest increased in 1996 when the Centers for Disease Control and Prevention published a widely cited review in the Morbidity and Mortality Weekly Report on the effectiveness of zidovudine in reducing HIV infection in exposed HCWs. Later that year, the Centers for Disease Control and Prevention and the National Foundation for Infectious Diseases held a workshop to review the available data on postexposure prophylaxis and postexposure management. Based on recommendations from that workshop, the United States Public Health Service (PHS) updated its postexposure management recommendations. These recommendations are periodically revised, with the most recent version published on May 15, 1998.

The PHS guidelines, although technically “recommendations,” are nonetheless “required” for compliance under the Bloodborne Pathogen Standard. Thus employers are required to provide a management plan that allows for the prompt reporting, evaluation, counseling, treatment, and follow-up of all occupational exposure incidents potentially involving bloodborne pathogens. The guidelines also recommend that exposure incident management care be provided at all hours and that this care include prompt administration of prophylaxis drugs (within 1 to 2 hours), if indicated. Importantly, the guidelines require that HCWs be educated about the need for prompt reporting of incidents and for enrolling in an exposure incident prophylaxis management plan.

The PHS guidelines provide a sound approach to the medical and administrative management of exposure incidents and represent the input of the United States’ leading experts in the field. However, even though compliance with these guidelines is legally required under the Occupational Safety and Health Administration standard, health care facilities’ compliance with key elements of the guidelines has not been evaluated. A 1993 report by Fahrner and Gerberding, which predates the PHS recommendations, indicated that up to 80% of major medical centers at least offered postexposure zidovudine treatment.

Yet there is concern about how well and how thoroughly the PHS recommendations are being applied. Anecdotal reports from frontline HCWs indicate that administrative compliance with all of the different plan elements appears to range from very good to nearly nonexistent, especially in nonhospital health care settings. There also appears to be a particularly wide range of compliance with respect to the counseling and educational components of the PHS guidelines.

We decided to explore this issue after similar concerns were raised by a quality improvement team at an acute care hospital. The team was responsible for the continuous quality improvement of the hospital’s bloodborne pathogens management program. Several members suggested that a review of the effectiveness of the hospital’s postexposure management program would be beneficial and might reveal opportunities for improvement. The team also wanted to learn more about exposure incidents in the hope that this might lead to new exposure prevention strategies. Although the hospital had a comprehensive exposure data management system in place, information about the exposed workers’ actual experiences was lacking. To determine employees’ attitudes about both their exposure and the hospital’s exposure management program, the team organized a small, confidential survey that contained a large number of open-ended questions to encourage exposed employees to write about their experience in their own words. The results of our survey led to several changes in the hospital’s exposure management program, and we describe this study and our findings in the hope that they will be useful to other hospitals with a similar interest in improving their exposure management program.

METHODS

A confidential, self-administered, 5-page survey was developed to collect information from HCWs who had recently reported a blood/body fluid exposure incident to the hospital’s employee health department. The 115-item survey contained items on demographics (eg, sex, age, department, occupation, and length of tenure), the type and risk factors for exposure (eg, type of sharps device in use, type of personal protective equipment in use, and type of activity during the exposure incident), and exposure incident management procedures (including counseling, education, type and duration of chemoprophylaxis, and follow-up procedures). A second set of open-ended questions also covered the impact that the exposure incident had on the HCWs’ psychologic well being and on their families. In addition to the open-ended responses, Likert-type (eg, “all of the time,” “some of the time,” “none of the time”) responses were also included in the questionnaire.

The surveys were mailed to the HCWs’ home addresses by an employee health clinic staff member, and all procedures involving human subjects had the approval of the Johns Hopkins University, School of Public Health Committee on Human Volunteers. Of the 150 employees contacted by mail, 65 returned a completed consent form and questionnaire (representing a 43% response rate). A copy of the study questionnaire and coding information may be obtained by contacting the senior author (R. R. M. G.).
RESULTS

Demographic information

Most of the respondents were women (68%) and were nurses (29%) or house/medical staff members (39%). The mean age of the respondents was 35 years (range 23-65), and they had an average of 6 years of tenure at their present job. Six percent of the respondents were supervisors. Most of the respondents (97%) reported direct patient contact. The demographic profile of respondents is summarized in Table 1.

Exposures

The majority of the reported exposure incidents were needlesticks (56%, n = 35), followed by sharps injuries (cuts) (22%, n = 14), splashes to eyes or mouth (21%, n = 13), and exposure to open wounds (10%, n = 6). Some employees reported more than one type of exposure occurring at the same time (n = 2).

The majority of the respondents (63%) stated that this was not the first time they reported an exposure incident to the employee health clinic. HCWs with previous past exposure incidents usually experienced different types of exposure (ie, in the past they reported a splash and now they reported a needlestick).

Risk factors for exposure

Of the reported exposure incidents that occurred in the operating room, most involved sharp surgical instruments or needles (usually contaminated). Many exposure incidents, both in and out of the operating room, were caused by the actions of co-workers, particularly by improper disposal of sharps or needles. In one dramatic incident, an operating room technician incorrectly removed a dirty knife blade by directing it straight away from the body. When it was released, it flew across the operating room and landed in a nurse’s arm. As the exposed nurse commented, “The blade was like a dart and my arm was like a dartboard.” Another operating room technician described her injury by noting “I was stabbed in the buttocks by bloody surgical scissors. These should have been disposed of immediately.”

Some HCWs were exposed while trying to follow orders. One intern said, “I was told to recap a contaminated lidocaine needle by my resident; and when I did, I stuck myself. I was only doing what I was told.”

A lack of communication resulted in several exposure incidents. In one case, a suction cannister with new filters exploded and spewed large quantities of blood into the face of a HCW who had tried to empty it. She reported that “My manager knew there were new suction filters in the cannister, but she didn’t tell me about it.”

Dealing with patients who jerked or were combative (trying to bite, scratch, or spit on HCWs) resulted in several HCW exposure incidents. In most of the incidents involving unruly patients, the exposed HCW simply thought that “Nothing could have prevented it.” Other HCWs blamed themselves and said they should have been quicker to respond to the patients: “I should have been faster than the patient,” or “I should have been more alert,” and “If I had been faster, I wouldn’t have gotten bitten.”

Some HCWs reported that a lack of time or a lack of help was a contributing factor. As one HCW said, “I was putting in a nasogastric tube on an AIDS patient, and the patient threw up blood/sputum into my face. I was alone and did not have time to put on a mask.”

Many current procedures and practices are inherently unsafe. For example, several exposed workers talked about the need to recap or uncap contaminated injection needles used for pain medications. Another example was the transfer of blood from a needle and syringe to a bottle or other secondary container.

Exposure incidents related to the exposed HCWs’ own unsafe disposal practices were also reported. For example, 3 HCWs tried to dispose of contaminated needles in an overfilled sharps containers and were stuck when they failed to see another needle sticking out of the container. In another instance, a HCW tried to dispose of 3 liver biopsy needles at once and was stuck.

A lack of compliance with standard safety practices was frequently reported by respondents. For instance, HCWs who tried to reuse blood collection tubes, in conflict with stated hospital policy, reported recapping,
uncapping, and unscrewing needles from blood collection tubes (in one instance, even using a Kelly clamp to unscrew the needles).

Misunderstandings, including misperceptions about the risk of certain procedures, were also reported by the exposed HCWs. One nurse was stuck when she tried to remove a 25-gauge anesthesia needle from a syringe; her reason was “I wanted to save room in the sharps container.”

Some HCWs thought that they could have prevented even these inherently dangerous types of exposure incidents simply by being “more careful.” This may be the case with the use of effective engineering controls or personal protective equipment or with proper handling and disposal; however, being more cautious when recapping contaminated needles will not make a risky procedure safer.

Equipment failure was responsible for several exposure incidents; for instance, two laboratory accidents were reported: one involved a splash from a broken centrifuge tube and the other a damaged knife blade. Sharps container failure led to other exposures. In two separate instances, needlesticks occurred when contaminated needles poked through the sides of the container.

The lack of personal protective clothing or inadequate protection led to several exposure incidents. For example, gloves that were too short permitted the seepage of blood onto hands, and inadequate face shields allowed splatter to reach the face or eyes. Splashes, sprays, and splatters often resulted when the HCW was not wearing eye protection (ie, a shield or goggles) as recommended. Exposed HCWs reported that they did not wear proper protection during procedures that clearly could result in splatter (eg, intubation), with the most frequent reason given as “lack of time.”

Treatment

With regard to quality of care, the survey team was particularly interested in determining how long the HCWs had to wait before they received treatment. Sixty-three percent of the exposed HCWs were seen within 15 minutes of arrival at the employee health clinic, 31% within 45 minutes, 2% within 2 hours, and 4% had to wait more than 2 hours. Some HCWs reported problems with the hospital’s exposure hot line, a 24-hour operator-assisted service that links HCWs to the employee health clinic or, during off-hours, puts them in contact with the hospital’s infectious disease fellow who is on call. In several instances, the operator did not know how to respond or who to call when the employee called the hot line during off-hours. Although most exposed HCWs arrived promptly at the employee health clinic, nearly 5% waited a day or longer before reporting the incident. Postponed visits generally occurred because the employee “did not have time to go.” Most HCWs first reported their exposure incident to their supervisor (54%) or to the hot line (29%).

Several HCWs described an exposure incident that should have resulted in the administration of at least 1 postexposure prophylaxis (PEP) drug; yet they stated that they never received PEP. For example, one nurse said that because the source patient had tested negative for HIV 3 months earlier during a prenatal visit, “I didn’t have to have PEP.” Another said, “I was safe, thank goodness, as I had been stuck with a bloody needle from a small child.”

Twenty-two respondents were told that PEP was indicated for their exposure, two thirds (n = 14) were given zidovudine and lamivudine combinations, and one third (n = 7) were given all 3 of the currently recommended PEP drugs (zidovudine, lamivudine, and indinavir). Of the 21 who received PEP, 7 stopped their treatment when the source patient’s test came back negative, and 7 stopped because of severe side effects. Only 7 HCWs stayed on the PEP for the full recommended 28 days. One respondent refused to start PEP even though it was recommended because of concern about the potential side effects.

Making the decision about what to do regarding PEP was difficult for some HCWs. One noted that “The material they gave me to read in the clinic was overwhelming.” Another said, “I wish I could have reviewed the information on PEP before I ever needed it.”

More than half (60%) of exposed HCWs recommended for follow-up testing returned on schedule. The reason most often given by those who did not return on time was that they “had not been reminded by the clinic.” Almost all HCWs said that reminders were essential.

Treatment side effects

Eighty-three percent of the HCws taking the PEP had adverse side-effects, most commonly nausea, stomachache, fatigue, headache, and diarrhea. Many HCWs needed additional medications to combat these side effects. Most HCWs with side effects lost work time, including one HCW who lost 14 work days.

Many exposed HCWs also reported psychologic symptoms that they attributed to their exposure incident: 53% reported feelings of anxiety, 18% insomnia, 13% depression, 10% a loss of appetite, 10% sleepiness, and 10% frequently crying, especially when they thought about the incident.

Many HCWs thought that there had never been adequate closure to the incident. Others, especially physicians with access to source patient medical records, found that seeing the final test result on the source
patient said she was ashamed to tell her family, “I didn’t

supportive, because I was afraid to tell them.” Another
could not turn to her family, “They could not be sup-

ered HCWs tended not to tell their families about their
were able to tell them about the experience, but unmar-

The incident caused several HCWs to seriously
rthink their careers. One surgeon said, “I’m giving
consideration as to whether this is what I really want to
do given the risk.” A practical nurse said, “I wish I didn’t have to have any patient contact.”

Some HCWs believed the event would “never be
over,” because the exposure incident haunted their
thoughts: “It’s on my mind a lot; “I still wish it wouldn’t have happened”; “I still worry even though I’m neg-

ative at six months because the patient had both HIV
and hepatitis B virus”; “I wish I could still be tested again [12 months later]”; and “I needed more counsel-
ing then and still do.” Yet another said, “I still worry
that I might become positive later on.” (This was 12
months after the event.)

Others thought that the experience made them more
careful: “It was a learning experience I never want to
experience again,” one registered nurse said. This
sentiment was echoed by others who found that the expe-
rience “made me learn,” “made me aware,” and “made
me more cautious.” Self-blame was not infrequent, as
one nurse lamented, “I couldn’t believe how stupid I
could be in handling infectious materials.”

Some HCWs were angry about the incident; one res-
ident asserted that it was “…unfair that I have to do the
really difficult sticks; especially since I felt I did not
receive enough training to do them.”

It upset some HCWs when the source patient refused
to be tested; when this happened, they felt “aban-
doned” as though their needs and concerns were not
important to the institution. Some residents/interns
left the facility before the end of the testing period and
were upset by the lack of follow-up or coordination
with their new facility.

**Impact on workers’ spouses/families**

Most HCWs who were married or who had a partner
were able to tell them about the experience, but unmar-
ried HCWs tended not to tell their families about their
exposure incident. For instance, one nurse said she
could not turn to her family, “They could not be sup-
portive, because I was afraid to tell them.” Another
nurse said she was ashamed to tell her family, “I didn’t
tell them because I didn’t want to upset them, especially
because I might possibly get infected because of a
sloppy co-worker.” Although the majority of the
spouse/partners were supportive of the exposed HCW,
many were “worried,” “anxious,” “concerned,” or “feel-
ing stunned.” As one nurse said, “He was so upset, I
had to calm him down.” Most exposed HCWs altered
their sexual practices after the exposure and either
abstained from sexual activity or practiced “safe sex.”
One nurse reported, “I was afraid to have sex with my
spouse, but he did not understand my concerns, and
we are separated now. I feel it’s because of the prob-
lems we had when I got exposed.” One physician said,
“I refused to have sex for four months, then only ‘safe
sex’ for six months. It was hard on my wife, as we want-
ed to start a family.”

**Employee satisfaction with the management of
the exposure incident**

Most HCWs found their follow-up care to be excel-
 lent; however, several reported dissatisfaction with at
least some elements of the management plan and
offered recommendations for improvement. For ex-
ample, having a faster turnaround time for source patients’
test results would have lessened the anxiety for some
exposed workers. Others would have benefitted by hav-
ing the same person who counseled them at the initial
clinic visit also provide the 3-month and 6-month test
results (ie, they wanted continuity of care). Some
HCWs (mostly medical doctors) wanted polymerase
chain reaction testing for hepatitis C virus and HIV
because they had experienced high-risk sticks and did
not want to endure the side effects of PEP because it
might interfere with their work schedules. As one sur-
geon said, “I can’t afford to be sick. I’ll still have to
work, even if I am sick.” An intern noted that “There
won’t be any allowances made for me if I’m sick.”
These HCWs thought that the cost of specialty testing
was justified given the potential side effects of the PEP
regimen and its impact on their health and well being.

One HCW felt better informed than members of the
employee clinic staff; “I shouldn’t have to tell them
what to do.” Some HCWs reported that provision of
care was uneven, with certain members of the employ-
ees’ health staff better prepared to respond than others.

Almost without exception, all thought that better fol-
low-up on their recommended testing was needed.
Exposed HCWs wanted to be reminded when to come
back for vaccine doses, follow-up testing, and patient
test results.

Many HCWs wanted the follow-up procedures to
move quickly. Waiting in the waiting room was very
upsetting for some of the respondents. “The room was
empty, yet I had to wait 45 minutes,” one nurse said.
The medical staff was particularly upset about waiting, both during the initial visit and the follow-ups: “I was sitting there anxious, yet the nurse had to sift through pages and pages of results to get to my [HIV] test result—it was torture”; “She should have been ready for me the moment I walked in”; and “I should not have had to wait a week, I know the lab does the HIV testing faster than that.”

A few never came back for their follow-up testing. “I could not wait that long again,” said one house staff member. In reality, most waited a very short time (although any wait seemed like an eternity to some exposed HCWs and was intolerable). Others did not want to return because they were not satisfied with the quality of care. “There was very little compassion,” said one nurse. “I felt they didn’t care about me,” an intern complained; and one physician’s assistant said, “They made me feel like an idiot for what happened, like it was a joke.”

Employees who were injured through careless co-worker actions wanted the co-worker whose actions led to the exposure incident to acknowledge what happened and apologize. Others were angry when the laboratory refused their request for polymerase chain reaction testing or when their managers failed to acknowledge what happened.

Many of the HCWs wanted patients to be screened before receiving treatment, especially psychiatric patients. If that was not possible, then they wanted access to patient’s medical history (after the incidents occurred). Several HCWs complained that when they called the hospital operator after their exposure incident, the operator did not know what to do, especially after hours. Others were upset that they had to come to the main hospital from an off-site facility to receive care.

**DISCUSSION**

Exposed HCWs want and deserve fast, compassionate, and knowledgeable postexposure care. It is important to recognize than an exposure incident may trigger an acute stress reaction in the exposed HCW. This type of reaction is typical after experiencing traumatic events, and it initially includes feelings of disbelief, fear, and anger followed by a combination of avoidance and reliving the experience. Eventually, for most persons, the event may then be resolved. For some persons, however, intrusive and painful thoughts about the event persist; and when this type of response persists for a month or more, then the person may have met the criteria for post-traumatic stress disorder. Research has shown that one factor in particular that may affect the development of post-traumatic stress disorder is the quantity and quality of available social support. This is why appropriate management of any potential bloodborne pathogen exposure incident, from either an infectious disease perspective or a psychologic perspective, is so important to prevent both infection and psychologic harm to exposed HCWs.

These results support the findings of a small pilot study conducted in France in which 30% of the 16 exposed HCWs seeking exposure incident treatment reported feelings of depression and insomnia. In that study, 87% of the exposed HCWs reported modifying their sexual habits, and one exposed HCW underwent a therapeutic abortion in the 14th week of pregnancy.

**CONCLUSION**

Generally, persons conducting research in this particular area of occupational health and safety do not have the opportunity to talk with exposed HCWs because of the necessity to maintain patient confidentiality. However, qualitative input from exposed HCWs can be incredibly valuable in developing new risk-reduction strategies. Clearly, this type of information is important to any health facility’s risk management program. By using a confidential survey, both researchers and administrators can gain valuable knowledge and at the same time provide exposed HCWs with a means to be heard. Other hospitals might similarly benefit from conducting qualitative surveys of their exposed HCWs.

Additional studies are clearly warranted. For instance, neither the implementation nor the effectiveness of the PHS postexposure management guidelines has been widely evaluated. In addition, we need to fully understand the impact of exposure incidents and their management on employees’ mental health and well-being. Finally, we also need to know how exposure affects employee turnover rates, overall job satisfaction, and the delivery of patient care.

On the basis of suggestions for improvement by the surveyed exposed HCWs, our bloodborne pathogen quality improvement team developed several simple, relatively inexpensive recommended improvements to the hospital’s exposure incident management program, and these are summarized in the appendix. Because the exposed HCWs stressed the need for their managers to get personally involved in their exposure incident, several recommendations focus on this issue. However, the exceptional burdens placed on many hospital managers in this time of re-engineering and restructuring are recognized, and hospital administrators are encouraged to develop strategies that will assist managers in meeting their responsibility to their employees.

In conclusion, although much has been done during the past 2 decades to reduce the risk of occupational exposure to bloodborne pathogens, much still remains to be done. Whereas the focus should naturally be
directed toward primary prevention (ie, preventing exposures), we must also be mindful of providing the best quality of care to those workers who do have exposure incidents. Hospitals and other health care facilities can demonstrate their commitment to their employees by doing everything feasible to reduce risk and to manage all exposure incidents as effectively, efficiently, and compassionately as possible.

References


APPENDIX

Improvement strategies

1. All new employees should receive a brochure or hand-out describing the health care facility’s exposure incident management plan.
2. Department managers should receive extensive training on their facility’s exposure incident management plan and on their expected responsibilities under that plan. Managers should also receive annual updates describing any changes in the plan and should review the updated exposure incident management plan with their staff on an annual basis. Both HCWs and managers should be tested on their understanding of the basic elements of the plan, including PEP protocols.
3. The effectiveness of the hospital’s bloodborne pathogen training program should be periodically evaluated. End-point measures might include percentage of employees trained, employee knowledge (through quizzes), needs assessment surveys, etc.
4. At the time of their first employee health clinic visit, exposed HCWs should be given a 1-page fact sheet on the risks associated with the exposure incident and with the PEP regimen and a more extensive packet that can be read at a convenient time and that includes comprehensive information on the PEP drugs, dosage, potential side effects, stress effects, etc. A 24-hour or 48-hour follow-up visit should be planned so that the employee can discuss all of his or her long-term options after he or she has had a chance to review the materials.
HCWs should also receive a 1-page information sheet written in nonclinical language for their partner/spouses and families. This sheet should include the telephone number of a trained counselor who could provide immediate counseling to the family. Also at this time, reminder postcards should be prepared and filed appropriately so that exposed HCWs can be notified of all necessary follow-up visits in a timely fashion.
5. A support group or buddy system should be available to exposed HCWs.
6. All employee health staff that may be called on to counsel exposed HCWs should be trained by an
experienced mental health care professional. This training should cover measures that will provide support to exposed HCWs. It is also extremely important that employee health staff learn to recognize the symptoms of post-traumatic stress disorder or other stress disorders and refer HCWs with those symptoms to mental health caregivers. Employee health staff members must recognize that exposure incidents involving a potentially life-threatening or life-altering agent are not and should not be treated like incidents of exposure to other agents (eg, head lice, chicken pox, or hepatitis B).

7. Follow-up counseling should be available to affected HCWs and their spouses/partners and families. This counseling could be organized through the employee assistance program.

8. Employee health departments should survey all exposed HCWs after the treatment protocol has ended to obtain feedback on the exposure incident management program and identify improvement opportunities. The managers of employee health departments should periodically review the exposure incident management program and PEP protocols and adjust them in accordance with any new public health recommendations and with the recommendations and experiences of affected HCWs.

9. Department managers should be required to review and respond to each exposure incident. This response should include meeting with the affected HCW to discuss the incident and any changes in work practices or procedures that the incident warrants. Managers should be aware that the affected HCWs will require release time during the work day for the necessary treatment and follow-up. Managers should submit action plans to the appropriate committee (eg, safety or infection control) for institution of any new control measures that are needed. Managers should periodically check with affected HCWs to see how they are doing, especially because PEP side effects may necessitate work schedule adjustments. If appropriate, managers should recommend that the affected HCW take advantage of employee assistance programs or make additional clinic visits. Managers should also initiate a dialogue between affected HCWs and any co-workers whose actions led to the exposure incident.

10. Exposure incident data (at the very least in aggregate form) should be reviewed by the appropriate hospital committee. In a small hospital, this might be an infection control or safety committee or task force. In a large hospital, it might be a bloodborne pathogens safety subcommittee. This review of the data and input from managers of affected HCWs should drive the hospital's exposure incident prevention program and should result in the development of clear recommendations and action plans when indicated.

11. Quarterly summaries of data on exposure incidents should be transmitted to all pertinent committees (eg, product evaluation, risk management, and accident prevention) and persons (nursing leadership, medical leadership, nurse managers, infection control directors, safety directors, purchasing directors, etc) in an easily understandable format. Feedback from these committees and persons should direct the development of any additional recommended changes in the hospital's exposure management program.

12. Frontline HCWs (both those who have and those who have not experienced an exposure incident) should be encouraged (with time provided) to participate in the work of these pertinent committees.