



HHS Public Access

Author manuscript

Compend Contin Educ Dent. Author manuscript; available in PMC 2018 February 02.

Published in final edited form as:

Compend Contin Educ Dent. 2016 June ; 38(6): 398–407.

Use of Bloodborne Pathogens Exposure Control Plans in Private Dental Practices: Results and Clinical Implications of a National Survey

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Abstract

Dental healthcare workers (DHWs) are at risk for occupational exposure to bloodborne pathogens (BBPs). The Occupational Safety and Health Administration Bloodborne Pathogens Standard requires employers to have a written exposure control plan (ECP) detailing methods and means to reduce and manage occupational BBP exposures. Because little information is available on whether ECPs are created and used, the National Institute for Occupational Safety and Health and the Organization for Safety, Asepsis and Prevention conducted an online survey to determine if dental practices had an ECP, whether present ECPs had the necessary components, and if impediments existed to prevent having an ECP in place. Respondents were primarily from nonfranchised practices (69%) and dentists who owned the practice (63%). Seventy-two percent of survey participants had an ECP and 20% were unaware of any federal requirements for an ECP prior to the survey. Engineering controls were used by many practices, although the type varied. Fifteen percent of practices did not offer the hepatitis B vaccine for employees. The survey revealed many dental practices were unaware of or were lacking required elements of the ECP. Findings from this survey indicate DHWs would benefit from increased education regarding methods to prevent occupational exposures to BBPs.

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Dental healthcare workers (DHWs) are at risk for occupational exposure to bloodborne pathogens (BBPs). Occupational exposures are an urgent healthcare concern due to the potential risk for transmission of infectious diseases from patient to worker. Although more than 25 diseases may be transmitted via blood or other bodily fluids, most attention has been focused on human immunodeficiency virus, hepatitis B virus (HBV), and hepatitis C virus (HCV). The risk for transmission from a positive-source patient is 0.3%, 3% to 30%, and 1.8%, respectively.¹⁻⁵

In 1991, the Occupational Safety and Health Administration (OSHA) issued the Bloodborne Pathogens Standard (BBPS) to help protect workers from occupational exposures.⁶ Adherence to the BBPS is required for any workplace that has a reasonably anticipated exposure to blood or other potentially infectious materials. In response to both continued concern over exposures and technological developments that protect healthcare workers, the US Congress passed the Needlestick Safety and Prevention Act in 2000, directing OSHA to revise the BBPS.⁷ The revision, effective in 2001, clarified existing requirements regarding the use of safer medical devices. It also added requirements regarding identification and selection of devices and maintenance of a sharps injury log. Required of all dental practices, the exposure control plan (ECP) is a written document detailing an employer's methods for reducing and managing occupational BBP risks. The elements of an ECP include exposure determination, exposure-incident investigation and follow-up procedures, work practice and engineering controls, and training. The ECP must be specific to each work setting, reviewed and updated annually or when any changes occur in policies, practices, or procedures, and communicated to staff. Also, the OSHA BBPS requires the HBV vaccination to be offered free of charge to employees who are at risk for exposure.

Results from the 1995 to 2007 National Surveillance System for Healthcare Workers (NaSH) indicated 55% of percutaneous injuries among DHWs occurred outside the patient's mouth (eg, while cleaning instruments).⁸ Although the NaSH data were collected from hospitals and, therefore, not generalizable to dental offices, other studies corroborate the occurrence of sharps injuries among dentists, dental hygienists, dental assistants, and dental students.⁹⁻¹¹ Data on exposure incidents should be viewed with caution, as underreporting of occupational injuries, particularly BBP exposures, is common.¹¹

Purpose

The objectives of the present survey were to determine if private dental practices: (1) were aware of the need for an ECP; (2) had an ECP; (3) had the necessary components in the ECP; (4) used the ECP and other resources to prevent occupational exposure; and (5) could identify facilitators and barriers to the use of the ECP.

Methods

The National Institute for Occupational Safety and Health (NIOSH) created a contract with the Organization for Safety, Asepsis and Prevention (OSAP) to design and implement an online survey. The sampling frame included more than 49,000 private-practice general dentists and specialists (nearly 30% of all private-practice dentists in the United States) who

were on an email distribution list maintained by OSAP publishing partner AEGIS Communications.

A work group with expertise in infection-control science, survey design, public health, dental education, and clinical practice in oral health settings developed the survey questions. Nine private dental practices of different types were recruited to pilot test the survey. Survey questions were then formatted in SurveyMonkey[®], and a usability test of the web-survey instrument was subsequently conducted. AEGIS electronically sent pre-survey notifications, invitations, and reminders with a link to the survey to the sample group. To maximize participation, the authors of this study asked several national organizations to post notices on their websites encouraging practitioners to complete the survey. Respondents from dental schools, private or public hospitals, government facilities, or non-private practices did not meet eligibility requirements and were excluded from the sample. In addition, the survey was designed to conclude if respondents were from dental specialties with relatively low risk for BBP exposure, and thus excluded endodontists, oral pathologists, orthodontists, and public health dentists.

The online survey was active from January 28, 2014 to April 8, 2014. Participation was voluntary, anonymous, and not incentivized. Participants were asked to have one primary person in the dental practice, preferably the staff member responsible for OSHA compliance, complete the survey. That person could consult with other staff as necessary.

Institutional Review Board

The NIOSH Institutional Review Board determined that the activities of the project did not involve human subjects and did not require review because the information collected characterized facility management practices and not personal practices.

Data Analysis

Data were analyzed using SPSS 22.0 (IBM Corp., ibm.com). Descriptive analyses including frequencies and prevalence, as well as cross tabs, are presented. Results are not generalizable due to the low response rate and self-reported data that cannot be validated. The number of respondents for each question varied. Therefore, results are presented as the proportion of respondents answering each question.

Results

Dental Practice Demographics and Person Responsible for OSHA Compliance

Of the 1362 respondents, 1059 met eligibility criteria to complete the survey. Respondents, defined as dental practices, were evenly distributed throughout the country (20% West, 29% South, 20% Midwest, 30% Northeast). Respondents' practice location varied by population density with 76% in cities (34.9% in large, 20.5% in medium, and 20.2% in small cities), 14.5% in suburbs, and 10% in rural areas.

Respondents were primarily from private, nonfranchised practices (69.1%), and were dentists who owned the practice (62.9%), a nonowner dentist in the practice (12.0%), dental

hygienists (11.5%), or other team members (13.5%). There were no specialists in 71.1% of the practices. While most practices had a staff member responsible for OSHA compliance, 11.6% of practices either did not have a staff member responsible for OSHA compliance or did not know if the practice had one (Figure 1).

Exposure Control Plan Awareness, Use, and Training

Seventy-one percent of dental practices had an ECP, while 10.7% did not have or didn't know if they had an ECP. Half of those without an ECP had no plans to implement an ECP in the next 12 months (Figure 2).

Of those who indicated their familiarity with the OSHA BBPS regarding an ECP, 20% were unaware of any OSHA requirements for an ECP prior to the survey, 11.9% didn't know if staff members in the practice were aware of the requirements, while 67.8% were aware. Awareness of OSHA BBPS requirements varied by practice type and location; 76.9% of general dentistry practices were aware of the requirements while only 58.8% of specialty practices were aware. Eighty-nine percent of practices in rural areas were aware of the requirement compared with only 59% in suburbs. These differences were not statistically significant.

Of the 99 respondent-offices that did not have or didn't know if they had an ECP, 50.5% noted they have a person responsible for OSHA compliance, and 51.6% were aware of the requirement for an ECP but 47.5% did not offer the HBV vaccine to staff, as required by the OSHA BBPS. Sixty percent did not offer staff informational materials about the OSHA BBPS in the dental setting.

Seventy-six percent of all respondents had reviewed the ECP within the past year. The ECP was used by 194 practices in the past year for either training (76.3%), guidance on reducing exposures (53.1%), or to record and respond to an exposure incident (27.3%). Eighty percent of practices provide training on the ECP to staff at potential risk for exposure to blood or body fluids. Of all respondents providing training 79.7% do so before staff members work with patients and 84.2% provide it annually. Training was provided in various ways: attending an OSHA presentation (58.9%), using in-house resources (41.8%), using outside consultants (28.0%), and using electronic materials (38.3%).

Elements of ECP

Table 1 lists responses to questions about specific elements in the ECP. More than 80% of practices responded that their ECP included each of the required elements. For 11 of the 15 required elements, more than 90% of the practices included them.

Reasons for Not Having an ECP

Practices were asked why they either did not have an ECP or why elements were missing from the ECP, and could select all applicable statements. Of the 220 practices that did not have all of the elements in the ECP, the reasons included: they didn't know they needed it (50.0%), lack of expertise (47.2%), lack of time (35.9%), too complex (24.5%), or cost

(20.4%). Additional reasons were: not clearly written (19.5%), does not apply to our practice (14.5%), not required by law (14.1%), and not specific enough (14.5%).

Use of Exposure Controls

Engineering controls were used by many practices, although the type varied. While 97.3% of practices used sharps disposal containers, only 34.5% used a safety aspirating syringe or retractable needles, 32.5% employed safety scalpels, and 18.8% utilized self-sheathing needles. All applicable reasons for not using engineering controls included: not safer than existing method (35.3%), no need for device (33.2%), financial cost (17.7%), did not realize that safety devices were required (16.1%), no standards to compare its safety to other devices (15.5%), difficult to use (14.4%), and devices were not reliable (10.1%). Sixteen percent used all the engineering controls listed.

Ninety-six percent of practices provided personal protective equipment (PPE). Seventy-seven percent offered the HBV vaccination to new staff with potential exposure, while 15.6% reported they do not and 7.9% said they didn't know. Of significance is that more than 90.0% of practices in rural and small city locations offered the HBV vaccine, in contrast with practices in large and medium cities, and suburbs (74.6%, 7.4%, and 74.2%, respectively). Eighty-three percent of practices with one dentist or specialist offered the HBV vaccine to employees, while only 69% of practices with more than one dentist or specialist offered the immunization.

Exposure Incidents

One or more exposure incidents occurred in 15% of practices within the past 12 months, in which 65.4% of the staff experienced an exposure incident involving a contaminated sharp and 29% had a non-sharps exposure. As noted in Figure 3, postexposure management practices varied.

Sources of Information on ECPs for Dental Practices

Respondents were asked to select from a list the organizations they would use to obtain current information about prevention of BBP exposure. Forty-seven percent of respondents indicated they would use the American Dental Association, OSAP, American Dental Hygienists' Association, or American Dental Assistants Association, 44% would use state or federal government agencies, 27% would use a dental school or area health education center, and 41% would use other sources such as dental supply company representatives or the internet.

Discussion and Limitations

Findings demonstrate both the lack of knowledge of the OSHA BBPS and the required ECP, and failure to implement required policies and protocols necessary to comply with the OSHA BBPS to prevent BBP exposure even when the practice was aware of such requirements. This is of concern, as it has been more than 20 years since the enactment of the OSHA BBPS.

Previous studies have found reasons for lack of adherence to infection-control protocols to prevent exposures include: the belief that barrier precautions make it more difficult to do the task, attitudes of supervisors, habit, and failing to remember to use precaution measures.¹²

Limitations of this study need to be considered when interpreting the survey findings. Because the survey was not a probability sample, the findings and conclusions are not generalizable to all eligible private dental practices but are limited to the those that participated. Also, the responses to the survey were conducted electronically, limiting respondents to those who had internet access. The survey data were self-reported, and responses were not confirmed via observation, records, or other means.

Conclusions and Clinical Implications

The findings contain important, clear clinical implications. Notably, 20% of dental offices were completely unaware of the need for an ECP, 15% did not offer the HBV vaccine to employees, and only 35% used needles with sharps-injury prevention features. We may surmise that if practitioners are unaware of the basic elements of the ECP, they may not have detailed working knowledge of the OSHA BBPS itself for postexposure protocols. The availability of dental devices with engineered sharps-injury prevention features was limited. This presents an opportunity for manufacturers to fill this gap.

This survey focused on the ECP because it is a critical component of the OSHA BBPS and a driving force behind a private dental practice's policies, practices, and procedures to eliminate or minimize potential exposure to BBPs. These findings should encourage dental practices to evaluate if they have an appropriate ECP containing all of the key elements and to develop and implement an ECP if they do not.

Study results indicate DHWs would benefit from increased continuing education regarding methods to prevent occupational exposures to BBPs. Providing training prior to clinical assignment sets the foundation for proper worksite practices. Professional practice organizations and regulatory agencies are urged to broadly disseminate information regarding the OSHA BBPS and the requirements for the ECP. Dental, dental hygiene, and dental assisting schools should include information on the OSHA BBPS in their curricula. Incorporating requirements for worker health and safety training for initial licensing and renewal may be one way to ensure that practitioners maintain their knowledge of the subject. DHWs who may have limited access to structured educational seminars may benefit from webinars or online courses developed for them. Practices should encourage staff attending educational seminars to share information or train coworkers. For training to meet the requirements of the OSHA BBPS, it must be specific to the individual worksite and provide for direct access to a qualified trainer during training to receive accurate and timely answers.

Dental practices are urged to fully comply with the OSHA BBPS, including development and implementation of an ECP. In addition to guidance from OSHA, information provided by the Centers for Disease Control and Prevention regarding infection control in dental settings can aid practices with compliance.¹³⁻¹⁵ Practices are required by law to ensure that the dental team is appropriately trained on these measures, particularly preventing and

managing occupational exposures to BBPs. Knowledge and implementation of workplace health and safety measures, as well as adherence to the elements of an ECP, is essential for protecting both workers and patients from exposure to BBPs.

Acknowledgments

The authors thank Therese Long for her exceptional wisdom and steady guidance of this project. We also thank Stacey Culp for analyzing the data. The authors are grateful to the dental practices who participated in the survey. This manuscript was developed under a project supported in part by the National Institute for Occupational Safety and Health under contract no. 254-2011-M-38912.

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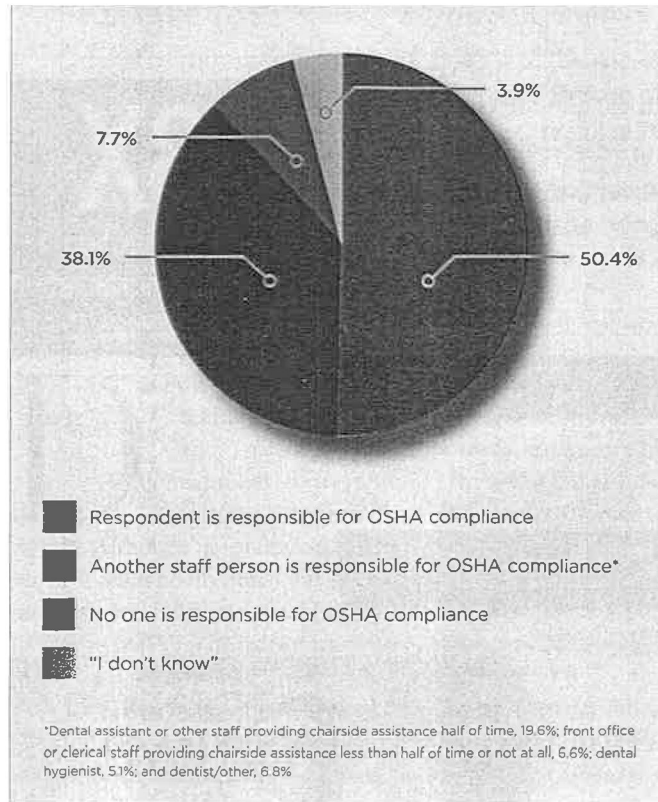


Fig. 1. Practices with staff persons responsible for OSHA compliance, N=1005.

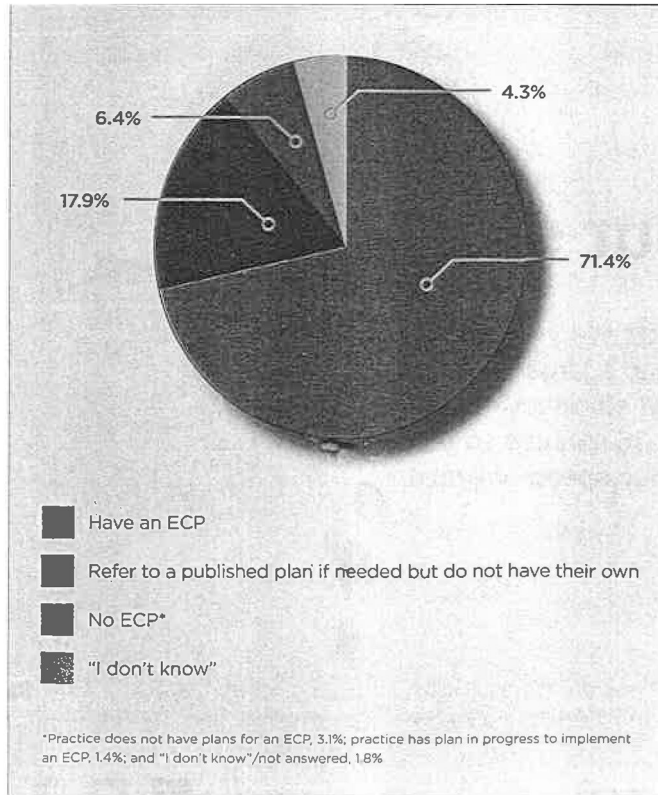


Fig. 2.
Practices with Exposure Control Plans, N=929.

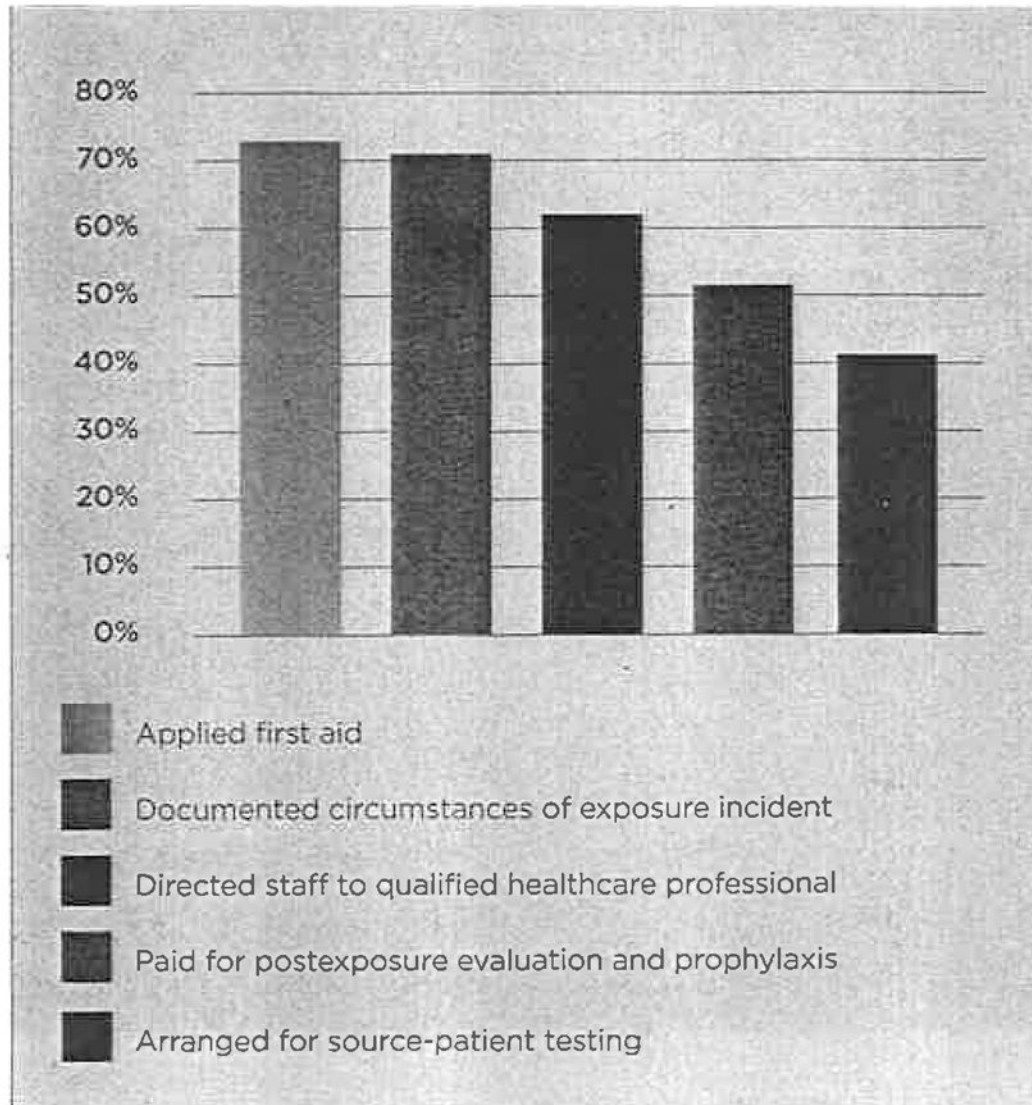


Fig 3. Postexposure management practices of respondents reporting an occupational exposure incident in the past 12 months, N=109.

Table 1

Elements Included in an Exposure Control Plan

	No. of Respondents*	Yes (%)	No (%)	Don't Know (%)
Lists				
List of all job classifications in which all or some employees have potential occupational exposure	538	489 (90.9)	18 (3.3)	31 (5.8)
List of all tasks and procedures performed by employees who have potential occupational exposure	529	457 (86.4)	30 (5.7)	42 (7.9)
Methods to reduce the likelihood of exposure				
Universal (standard) precautions	538	531 (98.7)	0	7 (1.3)
Engineering and work practice controls	532	468 (88.0)	22 (4.1)	42 (7.9)
Personal protective equipment	537	531 (97.0)	0	6 (1.1)
Housekeeping controls (cleaning, decontaminations, storage, laundry, waste handling, etc)	535	519 (96.1)	6 (1.1)	10 (1.9)
Pre/postexposure medical care				
Hepatitis B vaccination for employees with occupational exposure	539	518 (94.8)	4 (0.7)	17 (3.2)
Postexposure evaluation and follow-up for exposure staff	536	508 (94.8)	11 (2.1)	17 (3.2)
Process for testing a source patient	537	431 (80.3)	61 (11.4)	45 (8.4)
Hazard communications				
Using labels and signs to communicate hazards to staff	538	511 (95.0)	18 (3.3)	9 (1.7)
Information and training for staff with occupational exposures	533	516 (96.8)	8 (1.5)	9 (1.7)
Recordkeeping				
Personal medical records for postexposure evaluation	537	487 (90.7)	28 (5.2)	22 (4.1)
Personal medical records related to hepatitis vaccination	538	489 (90.0)	30 (5.6)	19 (3.5)
Records of training staff on the Exposure Control Plan	537	497 (92.6)	20 (3.7)	20 (3.7)
Sharps injury log	534	473 (88.6)	35 (6.6)	26 (4.9)

* Number of respondents varied for individual items (ie. number of eligible respondents less number who elected not to answer).