HETA 99-0265-2830
Venus & Mars
Orlando, Florida
and
HETA 2000-0013-2830
Body Piercing by Bink
Tallahassee, Florida

Angela M. Weber, MS

PREFACE

The Hazard Evaluations and Technical Assistance Branch (HETAB) of the National Institute for Occupational Safety and Health (NIOSH) conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health (OSHA) Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

HETAB also provides, upon request, technical and consultative assistance to Federal, State, and local agencies; labor; industry; and other groups or individuals to control occupational health hazards and to prevent related trauma and disease. Mention of company names or products does not constitute endorsement by NIOSH.

ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Angela Weber of the HETAB, Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS). Field assistance was provided by Teresa Seitz at Venus & Mars and Sally Brown at Body Piercing by Bink. Desktop publishing was performed by Patricia Lovell. Review and preparation for printing were performed by Penny Arthur.

Copies of this report have been sent to employee and management representatives at Venus & Mars, Body Piercing by Bink, and the OSHA Regional Office. This report is not copyrighted and may be freely reproduced. Single copies will be available for a period of three years from the date of this report. To expedite your request, include a self-addressed mailing label along with your written request to:

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Highlights of the NIOSH Health Hazard Evaluation

Evaluation of Potential Bloodborne Pathogen Exposures Among Body Piercers

In response to requests from Venus and Mars and Body Piercing by Bink, NIOSH evaluated potential occupational exposures to bloodborne pathogens during body piercing.

What NIOSH Did

- We observed piercing activities and decontamination procedures.
- We talked to piercers about their health and safety concerns.
- We evaluated compliance with the Occupational Safety and Health Administration's (OSHA) Bloodborne Pathogen Standard.
- We asked about training received by piercers.

What NIOSH Found

- Body piercers are at risk for infection with bloodborne pathogens through needlesticks and contact with contaminated surfaces.
- Bloodborne pathogen training had been completed by the piercers.
- The wrong type of gloves was worn while handling decontaminants.
- Studios did not have OSHA exposure control programs in place.
- Ventilation systems did not provide adequate filtration and directional airflow.

What Studio Owners Can Do

- Provide separate areas for piercings, cleaning instruments, and sterilization.
- Provide adequate ventilation and filtered air to piercing areas.
- Provide foot-operated sinks and waste receptacles.
- Provide easily accessible sharps containers.
- Develop exposure control and spill response programs.
- Offer HBV vaccinations to piercers at no cost.
- Provide appropriate gloves.

What Body Piercers Can Do

- Get HBV vaccination if not immune.
- Report needlesticks and spills immediately.
- Immediately discard used needles in sharps containers.
- Limit the number of customers in piercing area.
- Wear industrial-grade gloves while using decontaminants.
- Wear reduced protein, powder-free latex gloves to reduce the risk of latex allergy.
- Avoid performing piercings when fatigued.

What To Do For More Information:
We encourage you to read the full report. If you would like a copy, either ask your health and safety representative to make you a copy or call 1-513/841-4252 and ask for HETA Report # 99-0256-2830 and 2000-0013-2830

Health Hazard Evaluation Report 99-0265-2830
Venus & Mars
Orlando, Florida

and

Health Hazard Evaluation Report 2000-0013-2830
Body Piercing by Bink
Tallahassee, Florida

February 2001

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SUMMARY

In June 1999 and October 1999, the National Institute for Occupational Safety and Health (NIOSH) received health hazard evaluation (HHE) requests from Venus and Mars in Orlando, Florida, and Body Piercing by Bink in Tallahassee, Florida, respectively. The management requests concerned potential occupational exposures to bloodborne pathogens during body piercing procedures. Both requests were prompted by the passage of a new rule (Chapter 64E-19 of the Florida Administrative Code) which requires the Florida Department of Health (DOH) to regulate body piercing salons. In response to the HHE requests, NIOSH investigators conducted a site visit at Venus and Mars on August 10-11, 1999, and at Body Piercing by Bink on January 7-8, 2000.

NIOSH investigators observed the assembly of instruments, jewelry, and supplies used during the piercing procedure, the preparation of the piercing area, the piercing itself, the disposal of the piercing needle in a sharps container, the disinfection of contaminated surfaces, and the sterilization of reusable instruments. The use of personal protective equipment (PPE) was observed for the activities noted above, as well as general housekeeping procedures. Written policies and programs were evaluated when present, and informal interviews were conducted with the HHE requesters and their employees.

The observed practices in both piercing studios were compared to the requirements outlined in the new Florida ruling to identify any potential inconsistencies or areas in need of improvement. This evaluation was limited to areas relating to occupational health. To gain a better understanding of the factors which prompted the regulating of body piercing studios in the State of Florida, NIOSH investigators met with the authors of the ruling in Tallahassee, Florida, on January 7, 2000. Additionally, implementation strategies for the new rule were discussed including the training of the DOH inspectors.

The primary hazard noted during the piercing process was the potential for needlesticks to occur. According to anecdotal information, the most likely time for occurrence of needlesticks among piercers is when the unprotected needle is exiting the piercing site. It is unclear whether a cork provides protection against a needlestick, since piercers reported the cork may crack as the needle is pushing through it. The use of a cork during piercings was not required at either studio and appeared to be solely dependent on the preference and training of the piercer.

In both facilities, the sharps containers were located behind the piercing chair. Because the sharps container was not within reach of the piercer, used needles were placed back on the tray. Picking up contaminated needles from the tray to discard them in the sharps container posed an unnecessary risk to the piercer. In addition, an inconvenient location forced the piercer to make unnecessary movements while holding the needle.

Additional risks were observed regarding exposures through the potential cross-contamination of instruments and surfaces. At the time of the site visit at Venus and Mars, genital piercings were being performed in the same room where contaminated instruments were being cleaned in a sonicator. Reportedly, this practice has since been discontinued. At Body Piercing by Bink, all piercings were done within six feet of the sonicator.

A great number of disinfectants can be used for cleaning surfaces and instruments used during the piercing procedures, including alcohol, chlorine and chlorine compounds, formaldehyde, glutaraldehyde, hydrogen peroxide, iodophors, phenolics, and quaternary ammonium compounds. Latex gloves were used while handling these chemicals at both facilities.

Neither of the body piercers at Venus & Mars had been vaccinated against Hepatitis B virus (HBV), and an exposure control program, as required by the Occupational Safety and Health Administration (OSHA), had not been prepared for either of the facilities.

NIOSH investigators concluded that the body piercers at both facilities were at risk for exposure to bloodborne pathogens due to the potential for needlestick injuries. Also, although certain practices can reduce the number of viable organisms potentially aerosolized from a sonicator, there is the potential for the deposition of infectious droplets onto surfaces, equipment and personnel located in the near vicinity. Recommendations for minimizing exposures and complying with OSHA's Bloodborne Pathogen Standard are provided in this report.

Keywords: SIC 7299 (Miscellaneous Personal Services, Not Elsewhere Classified), body piercing, bloodborne pathogens, human immunodeficiency virus, HIV, hepatitis B, HBV, hepatitis C, HCV, needlestick injuries, sharps.

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INTRODUCTION

In June 1999 and October 1999, the National Institute for Occupational Safety and Health (NIOSH) received health hazard evaluation (HHE) requests from Venus and Mars in Orlando, Florida, and Body Piercing by Bink in Tallahassee, Florida, respectively. The owners' requests concerned potential occupational exposures to bloodborne pathogens during body piercing procedures. Both requests were prompted by the passage of a new rule (Chapter 64E-19 of the Florida Administrative Code) which requires the Florida Department of Health (DOH) to regulate body piercing salons. In response to the HHE requests, NIOSH investigators conducted a site visit at Venus and Mars on August 10-11, 1999, and at Body Piercing by Bink on January 7-8, 2000.

BACKGROUND

History of Body Piercing

Until recently, body piercing sites other than the earlobe have been relatively rare in Western culture. Body piercing is gaining widespread popularity among both teens and adults from a variety of occupations and social classes. Although it may seem like a new fad, body piercing has been popular in some cultures for many years. Piercings have been done as a rite of passage, to indicate social standing, and as a mark of royalty.[1,2] Roman centurions were said to have pierced their nipples to hold their capes in place, Mayans pierced their tongues for spiritual purposes, and the Pharaohs of Egypt ceremoniously had their navels pierced. Genital piercings were, and still are, seen in areas around the Indian Ocean and among peoples of the South Pacific. Both sexes of English Royalty in the Victorian Era had nipple and genital piercings. One particular type of genital piercing was supposedly worn by and named after Queen Victoria's husband, Prince Albert.

Piercing Procedure

Body piercing is a quick procedure which is done without local anesthesia. The type of piercing and the location on the body determine the gauge of the jewelry and the diameter of the rings or length of the "barbell" to be placed through the skin or mucosa. Piercing locations include the ears, nose, lips, chin, tongue, eyebrows, nipples, navel, and genitals. The types of jewelry range from small to wide hoops to ear or barbell-type studs. Once the jewelry is chosen, it is autoclaved for sterilization. Most jewelry is made of surgical-grade stainless steel, solid 14 or 18-karat gold, niobium, titanium, platinum, low-porosity plastic, or silver.

A single-use setup is used to perform the piercing. The piercer cleanses the piercing area with a topical antiseptic. Entrance and exit sites are marked with a pen to provide a guide for the needle, the skin is held taut by forceps, while the piercing is made with a large-gauge (12-16-gauge) hollow-bore needle. Some piercers prefer to place a cork at the exiting site to catch the needle. Jewelry is then attached to the needle and quickly guided through the hole in a needle-and-thread type fashion. A bead, metal ball, or disk is then screwed on to the exiting side of the jewelry. Since a small amount of bleeding usually occurs, manual pressure is applied to the pierced area with sterile gauze. The amount of blood depends on the piercing location; the nose and genital areas generally produce the most blood.

Variations of this procedure may occur. In piercing the tongue, a longer "barbell" is initially used to allow for edema of the tongue. In the Prince Albert penile piercing, the needle passes through the urethra, where a receiving tube is used to guide the needle. Receiving tubes are also used for nose piercings, where they are placed in the clients nostril. To stretch existing piercing site openings so larger-diameter jewelry can be worn, tapers are slowly passed through them.

Training Level of Piercers

Body piercing is currently performed by unlicenced personnel who have learned their trade from colleagues, magazines, or videos.[2] In the absence of local or federal regulations, piercers

may not have received training in anatomy, infection control, or universal precautions. The Association of Professional Piercers (APP) recommends that an apprenticeship consisting of at least one year be completed.[3] Some of the requirements listed for an apprenticeship include attending an Occupational Safety and Health Administration (OSHA) bloodborne pathogen course; spending a minimum of three months full-time as a trainee, learning sterilization and disinfection and cross-contamination avoidance; spending a minimum of six months to one year in full-time supervised training before achieving the title of piercer; and observing all procedures before performing them. The APP has four different piercing titles: apprentice/trainee, piercer, senior or training piercer, and master piercer. The designated title depends on the time the person has been piercing. For example, an apprentice is someone who has worked as a piercer for less than a year, while a master piercer is an individual with not less than five years of full-time piercing experience.

METHODS

At both of the body piercing studios, NIOSH investigators observed the assembly of instruments, jewelry, and supplies used during the piercing procedure, the preparation of the piercing area, the piercing itself, the disposal of the piercing needle in a sharps container, the disinfection of contaminated surfaces, and the sterilization of reusable instruments. The use of personal protective equipment (PPE) was observed for the activities noted above, as well as general housekeeping procedures. Written policies and programs were evaluated when present, and informal interviews were conducted with the HHE requesters and their employees.

The observed practices in both piercing studios were compared to the requirements outlined in the new Florida ruling (discussed in the Background section of this report) to identify any potential inconsistencies or areas in need of improvement. This evaluation was limited to those areas relating to occupational health. To gain a better understanding of the factors which prompted the regulating of body piercing studios in the State of Florida, NIOSH investigators met with the authors of the ruling in Tallahassee, Florida on January 7, 2000. Additionally, implementation strategies for the new rule were discussed, which included the training of the DOH inspectors.

EVALUATION CRITERIA

Bloodborne Pathogens Standard

Bloodborne pathogens include, but are not limited to, the hepatitis B virus (HBV); human immunodeficiency virus (HIV), which causes acquired immunodeficiency syndrome (AIDS); hepatitis C virus (HCV); human T-lymphotrophic virus Type 1; and pathogens causing malaria, syphilis, babesiosis, brucellosis, leptospirosis, arboviral infections, and viral hemorrhagic fever. For the purposes of this report, attention will be focused on the three most commonly transmitted bloodborne viruses: HBV, HCV, and HIV.

OSHA regulation on bloodborne pathogens, 29 CFR 1910.1030, took effect on March 6, 1992.[4] The OSHA standard covers all employees who may be reasonably anticipated to be occupationally exposed to blood and other potential infectious materials. The key requirements of the standard are the determination of occupational exposure and the implementation of appropriate control measures and work practices to minimize these exposures. The following section outlines the major requirements of the bloodborne pathogens standard.

Written Exposure Control Plan

- Identification of job classifications where there is exposure to blood or other potentially infectious materials.

- Identification of protective measures currently in effect at the facility.
- Establishment of procedures to evaluate the circumstances of an exposure incident.

Hazard Communication to Employees

- Implementation of employee training programs, which should include information on bloodborne pathogens, OSHA regulations, and the employer's exposure control program.

Preventive Measures

- Hepatitis B vaccination should be provided within 10 working days of initial job assignment at no cost to the employee.
- Application of the universal precautions approach to infection control, which assumes that the blood, body fluids, and tissues of all persons are potentially infectious.

Engineering and Work Practice Controls

- Use of puncture-resistant, leak-proof containers (color-coded red or labeled as a biohazard) to discard or transport sharps and other potentially infectious material.
- Use of work practice controls to reduce the probability of exposure by altering the manner in which the task is performed.

Personal Protective Equipment (PPE)

- Use of gloves, face shields, face masks, protective clothing and other PPE to reduce workers' risk of exposure.

Procedures after an Exposure Incident

- Medical evaluations and follow-up are at no cost to the individual.
- Employee must be immediately directed to a healthcare professional who is available during all working hours.

Recordkeeping

- A medical record must be established for each employee with potential occupational exposure. A copy of the employee's hepatitis B vaccination status should be included. The record must be confidential, separate from other personnel records, and maintained for 30 years after employment.
- Training records must be kept for three years.

Specific Bloodborne Pathogens

Although there are a number of bloodborne pathogens, as listed at the beginning of the section, only the three most common in the United States are discussed below.

Hepatitis B

One of the most infectious of all the known bloodborne pathogens is HBV. Among healthcare workers who have had needlestick injuries where the patient has had HBV infection, up to 30% have developed infection with this virus.[5,6,7,8] Persons infected with HBV are at risk for chronic liver disease (i.e., chronic active hepatitis, cirrhosis, and primary hepatocellular carcinoma) and can potentially infect others. An estimated 100-200 healthcare personnel have died annually during the past decade because of the chronic consequences of HBV infection (Centers for Disease Control and Prevention [CDC], unpublished data). A vaccine for HBV is available, and the CDC recommends that workers potentially exposed to blood or blood-contaminated body fluids receive this vaccine.[9]

Hepatitis C

HCV infection is the most common chronic bloodborne infection in the United States.[10] HCV is most efficiently transmitted by large or repeated percutaneous exposures to blood, such as through the transfusion of blood or blood products from infectious donors and sharing of contaminated needles among injection drug users. The risk factors for HCV transmission in the occupational setting are not well-defined.[11,12,13,14] During the past decade, the annual number of newly acquired HCV infections has ranged from an estimated 28,000 to 180,000.[15] Of these, an estimated 2-4 % occurred among healthcare personnel who were occupationally exposed to blood.[16]

At least 85 % of persons with HCV infection become chronically infected, while chronic liver disease with persistently elevated liver enzymes develops in about 67 % of those chronically infected.[10] These extraordinarily high rates of chronic disease and persistent viremia in humans indicate the absence of an effective neutralizing immune response.[17,18] Although the efficacy of post-exposure prophylaxis after occupational exposure to HCV has been difficult to assess, immune globulin does not appear to be effective in preventing HCV infection.[19]

Even in the absence of available post-exposure prophylaxis, individual worksites should establish policies and procedures for follow-up after percutaneous or mucosal exposure to anti-HCV positive blood to address individual worker's concerns about their risk and outcome. Employers should provide education to employees regarding the prevention of hepatitis C in the occupational setting,[10] and such information should be routinely updated to ensure accuracy.

Human Immunodeficiency Virus (HIV)

Exposures to HIV can occur through needlesticks or cuts from other sharp instruments contaminated with an infected person's blood or through contact of the eye, nose, mouth, or skin with contaminated blood. All exposures of this type should be immediately evaluated by a healthcare provider.

Most occupational exposures to HIV do not result in infection. The risk of infection varies with the type of exposure and factors such as the amount of blood involved in the exposure, the amount of virus in the blood, and whether treatment was given after the exposure. Between 1985 and June 1999, cumulative totals of 55 documented cases and 136 possible cases of occupational HIV transmission to U.S. healthcare workers were reported to the CDC.[20] Needlesticks were associated with 89% (49 out of 55) of the documented transmissions. Of these, 44 involved hollow-bore needles. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin. The risk may be higher if the skin is damaged or if the contact involves a large area of skin or is prolonged.

Treatment is available after an occupational exposure to HIV. Results from a small number of studies suggest that the use of zidovudine (ZDV) and other antiviral drugs after certain occupational exposures may reduce the chance of HIV infection after exposure.[21] However, a healthcare provider familiar with the risks of HIV infection and the side effects of the drugs should be consulted to determine whether post-exposure treatment is appropriate.

Regulation of Body Piercing Studios

Most body piercing studios in the United States are not regulated. In 1998, Texas, Oregon, and Wisconsin were the only states that specifically regulated body piercing. According to the website of APP, approximately 18 states are currently in the process of enacting legislation to regulate body piercing.[22]

The APP is a nonprofit organization which was formed in an attempt to initiate self-regulatory policies for the body piercing industry.[23] The association publishes a procedural manual which provides safety suggestions, as well as a monthly newsletter called "The Point." In addition, the APP holds an annual conference where safety and health issues are discussed. To become a

member of the APP, applicants must prove that they have been piercing full-time for at least one full year, that they are certified in First Aid/CPR, and they use an autoclave for sterilization of reusable instruments. Spore testing for the autoclave must be submitted on a monthly basis. There are currently over 100 members belonging to the APP. At the time of the HHE requests, the only two APP members from Florida, out of an estimated 300 piercers in the state, were the owners of the two piercing studios which submitted the NIOSH HHE requests. The total number of piercing studios in the United States is unknown; therefore, an estimate of at-risk piercing employees cannot be calculated. Since this occupation is not closely monitored, the potential for disease transmission among workers is unknown.

Chapter 64E-19, Florida Administrative Code

The Florida ruling prescribes minimum sanitary and safety requirements regarding the design, operation, and maintenance of body piercing studios and temporary establishments. The primary focus of the standard is the prevention of infections in those receiving the piercings, not occupational risks to those performing the piercings. Potential risks to recipients of piercings include localized bacterial infections, tetanus, non-menstrual toxic shock syndrome, viral hepatitis, and HIV.[24,25,26,27,28,29,30,31,32] These infections have been attributed to the use of contaminated equipment and improper after-care by the client.

The sections of the standard which specifically address occupational concerns of the piercers are summarized below:

Requirements for Premises (64E-19.004): This section contains requirements for handwashing facilities within each body piercing area, appropriate disposal of biohazardous waste; cleaning and sterilization of instruments; and prohibiting smoking, eating, and drinking in piercing areas.

Requirements for Sterilizing Jewelry and Instruments (64E-19.005): This section recommends the use of sanitizers which are tuberculocidal for surface cleaning.

Piercing Procedures (64E-19.006): This section requires piercers to wear "disposable sterile medical gloves" during procedures and to wear protective eyewear if splashing is expected. This section also states that the skin area to be pierced must be "free of rash, infection or any other visible disease condition."

Other Operations (64E-19.007): This section requires the completion of training covering the areas of safety, sanitation, and sterilization for the prevention of infectious diseases.

Although the ruling requires that injuries to a customer's body structure or function be reported to the local health department, there is no discussion for the need of reporting an occupational exposure to bloodborne pathogens as required by OSHA.[4] The Florida standard does not cover ear piercings performed in beauty salons or jewelry stores.

RESULTS

Venus & Mars

Venus & Mars serves as a piercing studio, as well as a clothing, shoe and music store. Approximately 15 employees work at the establishment, but only 2 employees actually perform piercings. Approximately 100 piercings are completed per week, depending on the time of the year. The most common piercing sites are the tongue and naval. Jewelry was displayed near the entrance of the store in an enclosed case and was kept separate from the stock jewelry.

There were two areas in the facility which were designated for piercing activities: a piercing room and a decontamination/sterilization room. All surfaces of the piercing room, including the walls, floors, and procedure surfaces, were constructed of smooth, non-absorbent and washable materials. There was approximately 64 square feet of floor

space which contained one piercing station. A viewing window with blinds had been installed in one of the walls so customers could observe the piercings. This limited the number of people going into the room, which may introduce additional contaminants to the surrounding environment. The room was in good physical condition and was well lit. Smoking, eating, and drinking were not allowed in the piercing areas.

A large industrial-sized toolbox, located in the piercing room, was used for storing individually-packaged jewelry which had been sterilized. The sharps container was bolted to the wall behind the piercing chair. A handsink was located along the same wall as a counter-top cabinet where supplies were stored and instruments assembled in preparation for piercings. Paper towels were dispensed from a wall-mounted unit located above the preparation area. A stainless steel rolling cart with a tray holder was used for positioning the forceps, jewelry, gloves, needle, and gauze used during the piercings. The tray was wiped down with a disinfectant before and after each use.

During the site visit, NIOSH investigators observed a labret piercing (through the skin beneath the lip). After the client chose the type of jewelry (a barbell with a flat disk for the interior of the mouth and a ball on the other), the piercer selected the same type from stock which had already been sterilized. Pre-packaged, sterilized jewelry has a shelf-life of 30 days; after this time, it needs to be re-autoclaved. A pair of packaged, sterilized latex gloves were worn by the piercer during setup, which involved opening another package of gloves. The packaging was opened to cover the entire tray, with the inner portion (sterilized side) facing up (Figure 1). Other materials needed for the piercing included gauze; a 14-gauge, hollow-bore disposable needle about one and a half inches in length; marking dye and applicator; and sterilized, packaged forceps, which were unwrapped and placed on the tray. The piercer cleaned the area of the face with a topical antiseptic applied to gauze, while the client was asked to use mouthwash antiseptic to cleanse the inside of her mouth. Using a toothpick, the piercer marked the location of the piercing with the dye both inside the mouth and on the face.

The additional pair of gloves on the tray were then placed over the gloves already being worn. The forceps were used to align the entrance and exit markings of the piercing and tightened. The tips of the forceps are looped, therefore, they provide guidance for the needle, which passes through the looped area (Figure 2). The needle (with the attached barbell) was inserted from the outer skin below the lip through the skin to the inside of the mouth (Figure 3). The needle was removed and a ball was screwed on to the end of the exterior portion of the barbell.

Pressure was applied to the pierced area with sterile gauze to slow the bleeding (Figure 4), followed by the application of an antiseptic. The entire process took less than five minutes, with the majority of time spent marking the piercing site. Throughout the process, all materials and instruments, including the needle, were placed back on the tray. The amount of blood produced by the piercing could be cleaned with two gauze pads. According to the piercer, this amount of blood is similar for all piercings except for the nose and genital areas, which bleed more. After the procedure was completed, the contaminated needle was picked off the tray by hand and disposed of in the sharps container. The blood-contaminated gauze and gloves were discarded as biohazardous waste, the forceps were taken to the sterilization room, and all other materials were thrown away as regular trash. Between clients, the tray, chair, and countertop are sanitized with a germicidal agent. The floor is mopped with a diluted sodium hypochlorite (bleach) solution at least once per day.

In addition to the piercing, NIOSH investigators observed the stretching of an existing piercing. Stretching is accomplished with the use of tapers (Figure 5). Tapers are made of solid, surgical-grade stainless steel and are reusable after they have been autoclaved. A lubricant is used to insert the taper slowly through the pierced area. This was a much less invasive procedure compared to a piercing. No visible blood was seen, which is reportedly the case for most circumstances. The same type of skin preparation and clean-up was used for the stretching as was

for the piercing; latex gloves were used throughout the procedure.

The decontamination/sterilization room was off limits to clients, except for the performance of genital piercings, which are rare. At the time of the survey, genital piercings were performed in this room because it offered more privacy than the piercing room. Contaminated instruments were brought to this room and soaked in an open tray in either Cidex® or Wavicide.® The active ingredient in both agents is glutaraldehyde. A single pair of latex gloves is worn during the handling of contaminated instruments. Once the instruments have soaked in the decontaminant, they are rinsed in the sink, and put in the sonicator for 30 minutes. A lid is placed on the sonicator while it is in use. The instruments are removed from the sonicator and allowed to dry. After drying, instruments are bagged and placed in the autoclave. Both the clean-up of contaminated equipment and the sterilization of equipment are done in this room. A comprehensive set of material safety data sheets (MSDSs) for the chemicals used in the store and studio were kept in a binder located in this room.

The heating, ventilating, and air conditioning (HVAC) system serving the store consisted of a typical central forced-air residential unit. A low-efficiency filter was used in the unit, and a half inch gap was found at the top of the filter frame; this allows for the passage of unfiltered air through the system. The system is serviced by an outside contractor. The piercing room was under negative pressure (air flowed from the hallway into the room).

Neither of the body piercers had been vaccinated against HBV, and an exposure control program, as required by OSHA, had not been prepared for the facility at the time of the site visit. A bloodborne pathogens training course had been completed by both piercers.

Body Piercing by Bink

The Body Piercing by Bink piercing studio shared space with a tattoo parlor. At the time of the site visit, there were two piercers in the studio; one piercer was the owner, and the other piercer was completing her apprenticeship. Approximately 100 piercings are completed per week, with the most common piercing site being the naval. Jewelry is displayed in an enclosed, counter-top viewing case. Display jewelry is kept separate from the stock jewelry.

The piercing area is located near the entrance of the tattooing room. There is approximately 45 square feet of floor space in this area, which contained one piercing station. The piercing area is blocked off from the main reception area by a curtain. All other surfaces of the piercing room, including the floor and procedure surfaces, were constructed of smooth, non-absorbent and washable materials. The room was in good physical condition and was well lit. Additional light was provided by an adjustable lamp. Smoking, eating, and drinking were not allowed in the piercing area.

Individually-packaged, sterilized jewelry was stored in a credenza located in the piercing area. The sharps container was located behind the piercing chair. A handsink was located along the same wall as the jewelry credenza, while paper towels were dispensed from a wall-mounted unit located above the sink. Additional piercing supplies and instruments were assembled in the credenza. A stainless steel rolling cart with a tray holder was used for positioning the forceps, jewelry, gloves, needle, and gauze used during the piercings. The tray was wiped down with a disinfectant before and after each use. The sonicator and autoclave were also located in the piercing area along the same wall as the credenza.

NIOSH investigators were able to observe numerous piercings during the site visit, including piercings in the eyebrow, nostril, naval, tongue, and a female genital piercing. The same procedures were followed as described for Venus & Mars, except that corks were used during the piercings. Corks can be used to support the tissue and forceps during the piercing, and they potentially offer protection against needlesticks. In addition, a receiving tube was used during the nostril piercing; forceps cannot be used for this body

area. Prior to the piercing, the receiving tube was placed inside the client's nostril. The needle (with the attached jewelry) was inserted from the outer part of the nose through the skin to the inside of the nose where it was pushed through the receiving tube and out through the nostril. Nasal jewelry has no further attachments inside the nose. Instead, the portion of the jewelry inside the nose is bent by the piercer to conform to the inside of the nostril. There was significantly more blood associated with this piercing compared to all others that were observed on the day of the site visit.

Contaminated instruments were soaked in MadaCide,® which has an alcohol-based active ingredient. A single pair of latex gloves is worn during the handling of contaminated instruments. Once the instruments have soaked in the decontaminant, they are rinsed in the sink, and put in the sonicator for 30 minutes. A lid is placed on the sonicator while it is in use. The instruments are removed from the sonicator and allowed to dry. After drying, instruments are bagged and placed in the autoclave. A comprehensive set of MSDSs for the chemicals used in the studio was available.

The HVAC unit was not accessed during the NIOSH site visit. The same unit serviced both the piercing studio and the tattoo parlor. Since the piercing area did not have floor to ceiling walls, there was no consistent directional airflow.

Both of the body piercers had been vaccinated against HBV. While a bloodborne pathogen training course was completed by both of them, an exposure control program, as required by OSHA, had not been prepared for the facility at the time of the site visit.

DISCUSSION AND CONCLUSIONS

The primary hazard noted during the piercing process was the potential for needlesticks to occur. NIOSH investigators concluded that the body piercers at both facilities were at risk for exposure to bloodborne pathogens due to the potential for needlestick injuries. While there are numerous publications on the risk of infections in those receiving body piercings, there is relatively little information available on the occupational risks posed to body piercers. For instance, the number of body piercers in the United States has never been documented. Additionally, there is no published data available regarding the number of body piercers who have received needlesticks, or how many of that group may have contracted an infection with a bloodborne pathogen. The fact that most, if not all, piercers have received numerous piercings themselves, makes determining the number of occupational transmissions in this group of employees even more difficult, since an infection could have occurred while they were receiving a piercing.

The risk of infection after a needlestick depends on the pathogen, the immune status of the piercer, the severity of the needlestick injury, and the availability of appropriate post-exposure prophylaxis.[33] Healthcare workers (HCWs) are the only group of employees where the risk of infection due to needlesticks has been evaluated. Among HCWs , the average transmission rate for HIV, when the source is HIV-positive, is 0.3% per injury.[34] The rate of HBV transmission to susceptible HCWs, when the source is infectious, ranges from 6% to 30%;[9] while the average transmission of HCV is 1.8% (range of 0% to 7%) per injury when the source is infectious.[10] While HBV poses a high risk for infection, the hepatitis B vaccine has been shown to be 90% effective in preventing HBV infection.[34] There is no vaccine available for HIV and HCV, therefore, the only protection against these agents, is to prevent the needlestick from ever occurring.

It is unknown whether these rates of transmission are similar among body piercers. The severity of the needlesticks may be different among the two groups. In body piercing, a relatively large needle (14-gauge) is used; in the healthcare industry, smaller needles tend to be used for the most common procedures. Additionally, the force applied to the needle during piercing is much different (greater) than the force that is applied when collecting blood or injecting a drug into a

patient. The risk of transmission will also be greatly influenced by the population served. It is unknown, however, whether individuals seeking body piercings have a higher rate of bloodborne infections than the persons receiving healthcare.

Another potential route of transmission of bloodborne pathogens is from an infected piercer to a customer. Within the healthcare industry, there have been reports of 20 clusters of HBV transmission in which a total of 300 patients were infected with HBV during an invasive procedure conducted by an HBV-infected HCW.[35] According to data collected by CDC, certain invasive surgical and dental procedures have been linked to HBV transmission, and have been identified as exposure-prone. The question is whether or not body piercing would fall into an exposure-prone category. Since the procedures identified by CDC include manipulations which are much more invasive than body piercing (i.e., digital palpation of a needle tip in a body cavity, simultaneous presence of the HCW's fingers and a needle in a poorly visualized anatomical site), it can be concluded that body piercing would not be considered exposure-prone. Therefore, there would be no reason to restrict the practice of piercers infected with a bloodborne pathogen provided that the piercer complies with universal precautions and appropriate procedures for disinfection/sterilization.[36]

The implementation of engineering controls is one of the primary methods used to eliminate an occupational hazard. In the healthcare industry, this has led to a drastic reduction in the number of needlesticks by the introduction of better designed needles.[37] These devices, however, may not be usable in the piercing industry, since the needles must entirely pass through a body part. According to anecdotal information, needlesticks among piercers typically happen when the unprotected needle is exiting the piercing site. It is unclear whether or not a cork provides protection against a needlestick, since the cork may reportedly crack as the needle is pushing through it. The use of a cork during piercings appears to be solely dependent on the preference and training of the piercer. Since this aspect of piercing has not been widely studied, it is impossible at this time to make a recommendation regarding the use of corks.

In both facilities, the sharps containers were located behind the piercing chair. Because the sharps container was not within reach of the piercer, used needles were placed back on the tray. Picking up contaminated needles from the tray to discard them in the sharps container is an unnecessary handling step thus posing an unnecessary risk to the piercer. In addition, an inconvenient location of the sharps container forces the piercer to make unnecessary movements while holding the needle.

Additional infection risks were observed regarding exposures from the potential cross-contamination of instruments and surfaces. It is important to stress that the typical body piercing procedure should not be considered a sterile procedure. Even the instruments which are autoclaved can become contaminated once their packaging is open, since the surrounding environment is not sterile. At the time of the site visit at Venus and Mars, genital piercings were being performed in the same room where contaminated instruments were being cleaned in a sonicator. This practice has since been discontinued. At Body Piercing by Bink, all piercings were done within six feet of the sonicator. Although certain practices can reduce the number of viable organisms potentially aerosolized from a sonicator (see Recommendations section), there is the potential for the deposition of infectious droplets onto surfaces, equipment, and personnel located in the near vicinity.

A great number of disinfectants can be used for cleaning surfaces and instruments used during the piercing procedures, including alcohol, chlorine and chlorine compounds, formaldehyde, glutaraldehyde, hydrogen peroxide, iodophors, phenolics, and quaternary ammonium compounds. Occupational skin diseases among cleaning personnel have been associated with the use of several disinfectants such as formaldehyde, glutaraldehyde, chlorine, and phenol.[36,37] The use of latex gloves while handling these chemicals, which was done at both facilities, does not offer adequate protection to any of these compounds.

RECOMMENDATIONS

The following recommendations apply to both facilities, and are offered to reduce employees' exposures to potentially infectious agents during body piercing activities and chemicals during disinfection procedures.

1. Develop and implement all components included in the OSHA Bloodborne Pathogen Standard.[4] The major components of the standard include: following universal precautions, appropriate use of PPE, housekeeping, use of sharps containers, offering hepatis B vaccinations to all employees, post-exposure management including an exposure evaluation and follow-up, bloodborne pathogen training, and record keeping.

2. Procedures should be modified to allow the piercer to dispose of the needle as soon as possible after use without needing to put the needle down and pick it up again.[38] This may require that the sharps disposal container be mounted on wheels to accommodate its movement to the piercing station. Some manufactures provide trays or holders to stabilize the sharps container during this type of application. Pushing the needle into a cork located on the tray is not considered a safe alternative to immediate disposal of needles.

3. All piercers should be required to be up-to-date on relevant immunizations according to recommendations by the CDC Advisory Committee on Immunization Practices.[9] Currently, vaccination against tuberculosis is not recommended in the United States (tuberculosis [TB] vaccination is recommended by the APP[3]). All non-immune piercers should be offered the hepatitis B vaccination prior to performing any piercings. One to two months after completion of the 3-dose hepatitis B vaccination series, employees should be tested for antibody to hepatitis B surface antigen (anti-HBs).[35]

4. Consideration should be given to the use of improved needle designs (such as solid needles instead of the currently used hollow-bore needles) as they become available. This type of needle is currently not available, and would have to be designed to work in combination with the insertion of jewelry. This would potentially reduce the amount of blood a piercer is exposed to if they were stuck, since the needle would not be full of blood. Prior to using any new device, training must be performed.

5. Immediately following an exposure to blood or body fluids, or to objects potentially contaminated with blood or body fluids, the following should occur: areas of skin exposed to needlesticks and cuts should be washed with soap and water; after splashes to the nose, mouth, or skin, the area should be flushed with water; and after splashes to the eyes, the eyes should be irrigated with clean water, saline, or sterile irrigants. There is no evidence that the use of antiseptics for wound care or the squeezing of the wound site further reduces the risk for disease transmission.[39] The application of caustic agents such as bleach is not recommended. All employee needlesticks, cuts from other sharp objects, or splashes onto the skin, eyes, nose, or mouth should be immediately reported and evaluated by an appropriate healthcare professional.

6. If permissible by law, an attempt should be made to determine the infection status of the customer if a needlestick or exposure to blood or other body fluids occur. If their infectious status is unknown, contact information should be acquired including the customers name, address, and telephone number. This information could be passed on to the healthcare professional or the health department providing follow-up.

7. Since environmental contamination is a potential method of disease transmission, appropriate cleaning and disinfecting of work surfaces is necessary. "Appropriate disinfectants" include a diluted bleach solution and "EPA-registered tuberculocides" (list B). A list of EPA-registered products are available from the National Antimicrobial Information Network at 800-447-6349 or its website at http://ace.orst.edu/info/nain/lists.htm. The recommended manufacturer's contact time should be closely followed. At no time should a surface

be prepared for another piercing prior to appropriate decontamination contact time.

8. Appropriate gloves should be worn and changed as needed. If latex gloves are used, reduced protein, powder-free gloves should be worn to protect workers from developing latex allergy.[40] These gloves reduce exposures to latex protein, although some symptoms may still occur. "Hypoallergenic" latex gloves do not necessarily reduce the risk of latex allergy; they are designed to reduce reactions to chemical additives in the latex which can cause allergic contact dermatitis.

Latex gloves do not, however, provide adequate protection against disinfection agents, since the chemicals may cause deterioration of the glove material. Consideration should be given to using vinyl or nitrile rubber gloves instead of latex. Nitrile, for example, could safely be used with most disinfectants including ethyl alcohol, hydrogen peroxide, glutaraldehyde, and sodium hypochlorite.[41] If this were done, only one type of glove would need to be purchased for both piercing and decontamination activities.

9. A spill response plan should be developed and implemented. The response plan should be included as an employee training requirement. All spills of blood and blood-contaminated fluids should be promptly cleaned using an EPA-approved germicide or a 1:100 solution of household bleach while wearing appropriate gloves. If visible materials are present, they should be removed first with disposable towels. If there are sharps present, they should be picked up using forceps or other means which do not require direct contact with the sharp or needle. The area should then be decontaminated with the appropriate germicide, and hands should be washed immediately following the removal of gloves. A biohazard waste container should be available for the removal of contaminated items from the site of the spill.

10. Procedures or equipment, such as the sonicator, which have a high potential for generating droplets should be operated within an enclosed environment which passes its exhaust air through a high-efficiency particulate air (HEPA) filter.[42] Additional ways to minimize the aerosolization of infectious droplets includes operating the sonicator only when a manufacturer-provided lid is in place. The lid should be left on for several minutes after the sonicator has finished its cycle in order for the aerosols to settle. Soaking the instruments for the recommended contact time prior to the operation of the sonicator may also reduce the number of viable organisms in solution. While aerosolized bloodborne pathogens do not typically pose an inhalation hazard, cross-contamination could be an issue when aerosols settle out on surfaces in the piercing areas.

11. Piercings should not be performed in the same room where contaminated instruments are cleaned by sonication. In addition, sterilized materials should not be kept in the same room where contaminated materials are cleaned.

12. The use of recirculating, portable HEPA filtration units may be used in any of the piercing areas, including the piercing room, the cleaning room, or the sterilization room, where additional air filtration could aid in lowering the airborne bacterial and fungal loads. The placement and its airflow capacity of the unit determines its ability to effectively recirculate and filter the room air.

13. Since the body piercing procedure is similar to the activities which are conducted in a hospital patient room, ventilation rates should comply with those recommended by the American Society for Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). In Standard 62-1999, "Ventilation for Acceptable Indoor Air Quality," ASHRAE recommends an effective outside air exchange rate of 25 cubic feet per minute (cfm) per person for patient rooms in hospitals.[43] Additionally, the piercing room should be kept under positive pressure to prevent the migration of air from an adjacent "dirtier" environment into the piercing room. Rooms with floor to ceiling solid walls are necessary to achieve controlled directional air flow and air exchange rates.

14. The current filtration is not adequate to prevent dust accumulation in the ventilation

systems. Filters with an ASHRAE dust spot efficiency rating of 35 to 60 percent should be used instead of the current filters, which are less than 10 percent efficient. The most efficient filters whose pressure drop the system can handle should be used. A mechanical firm should be consulted to determine the maximum filter efficiency. At Venus & Mars, the filter should be seated correctly in the filter frame of the HVAC system to remove the gap which was present during the site visit.

15. Chemical indicator strips should be used on every load which is autoclaved to ensure that the appropriate temperature is reached during the cycle.

16. Ideally, wrist-action or foot pedal-operated sinks should be used in the piercing areas to reduce the potential for cross-contamination of hands. Towel dispensers should not be located over work areas where dripping water from wet hands could contaminate clean instruments.

17. Foot traffic in the piercing areas should be kept to a minimum to reduce the amount of contaminants tracked into the room. Piercing areas should never be carpeted, since it cannot be appropriately cleaned. Customers' personal belongings (i.e., purses, bags, etc.) should remain outside of the piercing room.

18. Markers, which are re-used between customers for the marking of piercing sites, should be discarded or cleaned between uses with an appropriate disinfectant.

19. Body piercing should be discouraged when piercers are fatigued, since this could lead to accidental needlesticks.

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Figure 1. Tray Preparation

Figure 2. Area held with forceps.

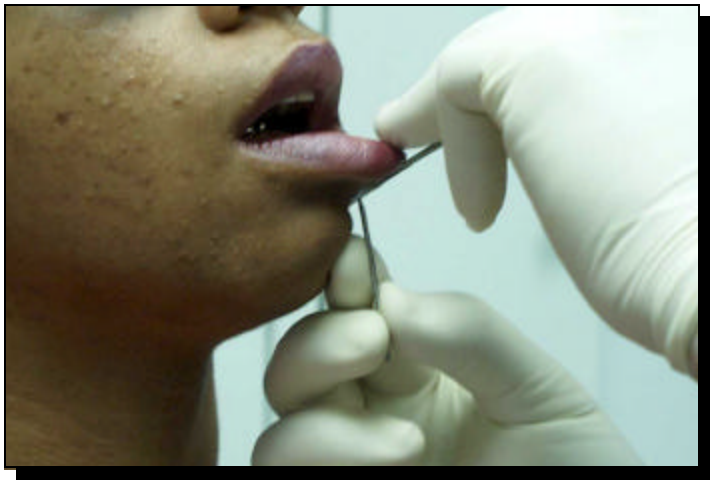

Figure 3. Insertion of jewelry.

Figure 4. Applying pressure.

Figure 5. Insertion of taper.