

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

Potentially harmful organisms can be passed from person to person through direct contact or by indirect contact, that is, by touching contaminated objects or surfaces. In order to reduce the risk of cross contamination, audiologists must follow protocols for decontaminating sources of contamination. This decontamination takes the form of cleaning, disinfecting and sterilizing.

Infection Control

Task Force:

John Greer Clark

Robert J. Kemp

A.U. Bankaitis

THE IMPORTANCE OF INFECTION CONTROL

In the delivery of any health related service, it is the health professional's responsibility to ensure the safety of all patients served. Toward this end, it is imperative that audiologists provide patients with diagnostic and treatment environments that are designed to minimize or eliminate the potential transmission of disease. Audiologists must be diligent in their efforts for controlling the spread of infectious disease within the context of the entire clinical setting for several main reasons.

Diagnostic and rehabilitative services provided by audiologists are sought by a wide range of patients varying in age, underlying disease, socioeconomic status, history of pharmacological interventions, and other factors that directly influence the integrity of the immune system's ability to defend and protect the human body from a variety of potentially infectious microorganisms (Bankaitis & Kemp, 2002; Kemp & Bankaitis, 2000). These patients maintain a heightened susceptibility to those microorganisms commonly residing in many healthy persons or on various surfaces. While these microbes do not pose a threat to healthy individuals with intact immune systems, even mildly immuno-compromised patients maintain an increased risk of developing opportunistic infections. By definition, opportunistic infections originate from commonplace microbes that take the opportunity to infect a body with a weakened immune system (Bankaitis, 1996). These microorganisms may lead to a level of infection that ultimately results in serious, life-threatening complications.

Since the practice of audiology involves and requires a notable degree of patient contact, patients and clinicians are exposed to an environment in which a variety of contaminated objects may come into direct or indirect contact with multiple patients

(e.g.: headphones, immittance or otoacoustic emissions probe tips, electrodes, otoscope specula, oto-lights, earmold impression syringes, probe tubes for real-ear measurement, earmolds and/or hearing aids).

Contact transmission remains the most common means of cross-contamination and possible disease transmission (Kemp & Bankaitis, 2000). Contact transmission may occur when a clinician or the patient touches another individual or object. Removing a hearing aid from a patient's ear or accepting a hearing aid from a patient with bare hands are practices that may encourage inadvertent cross-infection via contact transmission. In the event transmission occurs, microbes naturally seek entry into the body by traditional routes including natural orifices (nose, eyes, and ears) or via the epithelial layer of the skin (Kemp, Roeser, Pearson, & Ballachanda, 1996).

The scope of practice in audiology has changed significantly over the last 20 years, and infection control has become a more important issue. Beyond advancements in hearing aid technology, immittance procedures, or discovery of otoacoustic emissions which often necessitate the use of probe tubes or tips in multiple patients, many audiologists are involved with procedures that may potentially result in exposure to body fluids. For example, monitoring of cranial nerves or somatosensory evoked potentials not only requires the presence of the audiologist in the operating room, but the handling, insertion, and removal of several pairs of needle electrodes. Many clinicians may be involved in the administration of a battery of vestibular procedures that, on occasion, cause patients to vomit. Cerumen management and the dispensing of hearing aids potentially expose clinicians to infectious agents. While cerumen is not considered an infectious agent unless it is contaminated with blood or mucus, due to its color and viscosity, visual detection of blood or ear drainage contaminants may be difficult. Therefore, it should be treated as if it is a potentially infectious agent (Kemp et al., 1996). As more and more of these types of procedures are performed by audiologists, the incidence of exposure to blood and other bodily fluids and subsequent risk of exposure to blood-borne pathogens such as HIV or hepatitis substantially increases.

REGULATORY AGENCIES

In the early 1980s HIV-1 was identified as the cause of AIDS and the concern over potential cross infection of health care professionals and patients became a catalyst for change across the health care field. This concern resulted in regulatory bodies, particularly the Occupational Safety and Health Administration (OSHA), enacting regulations that would provide health care employers and workers with guidelines for risk reduction by reducing exposure to potentially harmful infectious agents. It should be noted that while AIDS served as the catalyst of change, the concept of infection control is more comprehensive. Infection control deals with reducing the transmission and exposure of all infectious diseases (Table 1) from the common

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

TABLE 1: INFECTIOUS DISEASES IMPORTANT TO AUDIOLOGY

DISEASE	AGENT	POTENTIAL TRANSMISSION DANGER	INCUBATION PERIOD	POTENTIAL OUTCOME
Acquired Immune Deficiency Syndrome (AIDS)	Virus	Blood to Blood contact. Blood enters via something as simple as chapped hands.	Average 8 years	Death
Chicken pox	Virus	Blood, saliva or mucous (ear drainage); provide therapy for infected, sub-clinical child.	10-21 days	conjunctivitis, shingles, encephalitis
Common cold	Virus	Blood, saliva, mucous; infected patient sneezes on counter. Receptionist touches counter, touches nose, then breathes on others in the office.	48-72 hours	temporary disability
Cytomegalovirus	Virus	Blood, saliva, mucous; handling toys that infected child put in mouth.	2-8 weeks	Birth defects, death
Hepatitis A	Virus	Oral, fecal; failure to wash hands after seeing infected patient.	2-7 weeks	Disability, liver damage
Hepatitis B	Virus	Blood, saliva, mucous; handling cerumen containing dried blood or providing therapy to "carrier."	6 weeks -6 months	chronic carrier, chronic disability, death
Herpes simplex-1	Virus	Blood, saliva, mucous, exudate from sores; Touch canker sore while providing therapy.	2-12 days	temporary discomfort, herpetic conjunctivitis, herpetic whitlow
Herpes zoster (Shingles)	Virus	Blood, saliva, mucous; Make contact with vesicle (blister).	6-10 weeks	disability
Infectious mononucleosis	Virus	Blood, saliva, mucous; contact with infected saliva during therapy.	4-7 weeks	temporary disability
Infectious meningitis	Virus or bacteria	Blood, saliva, mucous; contact with infected saliva during therapy, contact with infected mucous(ear drainage).	2-10 days	temporary disability
Influenza	Virus	Saliva, mucous, respiratory droplets (moisture particles from the lungs); provide service for infected patient.	1-3 days	temporary disability, death
Legionellosis	Bacteria	Respiratory droplets; therapy or otoscopic examination requires that practitioner's face come close to patient's face.	2-10 days	temporary disability, death
Measles (German) Measles (rubeola)	Virus	Saliva, mucous; saliva of infected individual touches tongue depressor which is then handled by the practitioner who fails to wash hands prior to touching nose.	9-11 days	congenital defects, temporary disability, encephalitis
Mumps	Virus	Respiratory droplets.	14-25 days	temporary disability, sterility (men)
Otitis externa	Bacteria fungus	Saliva, mucous, blood, contact with microbes; handles ITEs with bare hands, transferring fungus from one to the next.		itching, pain, swelling
Pediculosis (head lice)	Lice	Lice transported from scalp via combs and hats; head phones could potentially transfer lice from child to child.	eggs hatch in 7-10 days	temporary discomfort, itching and scratching
Pneumonia	Virus Bacteria	Blood, respiratory droplets.	varies with organism	temporary disability, death
Staphylococcus infection	Bacteria	Saliva, mucous, contact with staph colony; Audiologist handles ear mold or speculum prior to disinfecting.	4-10 days	skin lesions, death
Streptococcus Infection	Bacteria	Saliva, blood, mucous, respiratory droplets; practitioner touches instrument that enters mouth of infected patient.	1-3 days	heart and kidney problems, death
Tuberculosis	Bacteria	Respiratory droplets, saliva.	up to 6 months	disability, death

Reprinted with Permission from Infection Control for the Professions of Audiology & Speech-Language Pathology (Kemp et al, 1996).

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

cold to Tuberculosis, Hepatitis B and the like. In other words, infection control policies do not encompass an isolated virus or a single disease; rather, infection control is an all-encompassing concept designed to minimize the transmission of and/or exposure to all potentially infectious diseases (Kemp & Bankaitis, 2000).

Several federal and state agencies are responsible for developing guidelines for the purpose of saving lives and preventing injury or illness in the work place. The mission of reducing disease transmission in the health care setting also falls within the scope of these agencies which base their guidelines on regulations set forth by OSHA (i.e., OSHA, 1991). As each state can require infection control practices that exceed OSHA's minimum requirements, audiologists must become familiar with the guidelines of the state(s) in which they practice. It should be noted, however, that not all states have plans. In those states where a plan does not exist, federal OSHA guidelines should be followed.

In response to the concerns regarding potential exposure of HIV in the workplace, in August of 1987 OSHA announced the intent to develop guidelines for protecting health care workers from cross-infection of blood-borne diseases. In addition, OSHA proposed to extend the scope of their mission by monitoring worker safety of health care treatment personnel. In the past, monitoring of cross-infection pertained to many groups of workers; however, such precautions were not specifically developed with health care personnel in mind. Based on the recommended Universal Precautions issued by the Centers for Disease Control and Prevention (CDC), OSHA submitted a program that was outlined in the Federal Register on May 30, 1989, and published as a final standard in 1991 (see www.osha.gov). Universal precautions, as defined by CDC, represent a set of precautions designed to prevent

transmission of HIV, Hepatitis B virus (HBV), and/or other blood-borne pathogens when providing first aid or health care. Under universal precautions blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other blood-borne pathogens. With regard to the audiology clinic, this statement indicates that infection control procedures apply to every patient and not only selectively to those who may be identified or suspected as having a potentially infectious disease.

To fully comply with OSHA regulations employees must be trained on OSHA blood-borne and safety standards prior to employment with subsequent refresher training once a year. Through the power of federal law (or state law, where a federally approved state law exists) OSHA mandates, oversees, and enforces infection control programs. Field inspectors randomly visit and inspect health care settings to ensure that such settings are in compliance with current regulations. Failure of an institution to comply with regulations results in citations and fines.

In addition to OSHA, four other groups actively set guidelines that impact the audiologist's implementation of infection control practices (Table 2) The Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) sets general guidelines for infection control based on OSHA standards that may vary, depending on the facility. The facility then creates specific protocols for each department. It is important that audiologists affiliated with hospitals with JCAHO accreditation learn how the Joint Commission guidelines affect the audiology department. Many institutions now have an infection control coordinator that can be of great assistance.

The Commission on Accreditation of Rehabilitation Facilities

TABLE 2: REGULATORY AGENCIES CONCERNED WITH INFECTION CONTROL

OSHA	Occupational Safety and Health Administration.	Regulates workplace to ensure safe conditions, including establishing infection control regulations.
JCAHO	Joint Commission for the Accreditation of Healthcare Organizations	Establishes standards and conducts voluntary accreditation programs for health care organizations; sets infection control standards based on OSHA standards.
CARF	Commission on Accreditation of Rehabilitative Facilities	Establishes standards for organizations providing services to persons with disabilities based on OSHA standards.
EPA	Environmental Protection Agency	Protects public and environment from risks posed by pesticides, promotes safer means of pest control, and registers chemical disinfectants and sterilants.
FDA	Food and Drug Administration	Ensures safety of foods, cosmetics, medicines, medical devices; collaborates with EPA to research and document biological effects of chemicals, including disinfectants and sterilants.

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

(CARF) sets standards for organizations providing services to persons with disabilities. Like JCAHO, CARF issues general standards based on universal precautions which are then customized by each department in a facility.

The mission of the United States Environmental Protection Agency (EPA) is to protect human health and to safeguard the natural environment. Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), first promulgated in 1947, the EPA registers all chemical disinfectants and sterilants intended for use on inanimate objects and/or environmental surfaces. The registration procedures are exacting and, particularly in the case of sterilants, extremely demanding. While a product may meet the criteria of a sterilant, the EPA also has the responsibility of reviewing toxicology and hazards data, product literature, and other company information to determine the benefit versus risk ratio of a qualified product. The Food and Drug Administration (FDA), in addition to its other consumer protection duties, also ensures that product labels are accurate and specific enough so that the contents may be used properly. This agency has been authorized by Congress to enforce several public health laws, including the Federal Food, Drug, and Cosmetic Act, and monitors the manufacturing, importation, transportation, storage, and sale of over one trillion dollars worth of goods annually (FDA, 1998).

INFECTION CONTROL RATIONALE

Infection control in any setting revolves around controlling exposure among people as well as among people and the environment in which they work. The regimen required to comply with needed infection control measures may range from a simple cleaning to disinfecting to sterilizing depending on the nature of the contact. It is each clinician's responsibility to employ preventive measures to ensure a healthy and safe work environment for themselves, their colleagues and their patients.

Research has shown that ordinary objects touched by patients are often contaminated with potentially infectious organisms. For example, in a study assessing bacterial growth on physicians' stethoscopes, Breathnach, Jenkins, and Pedler (1992) found that 26 of 29 stethoscopes were significantly contaminated with staphylococci, a bacterium that can cause serious infections in immuno-compromised individuals. More recently, Bankaitis (2002) assessed the microbial composition found on the surface of hearing aids that were swabbed from 10 patients. Light to moderate amounts of ten different bacteria and three fungi were isolated from the group of hearing aids with the predominant organism the staphylococcus bacterium. The general finding of light to heavy amounts of microbial growth on hearing aid surfaces is not necessarily an unusual finding. Because cerumen is physiologically designed to inhibit bacterial or fungal reproduction, the residual presence of the very microorganisms it is designed to combat is to be expected.

The recovered bacteria and fungi are ubiquitous or widely distributed throughout the environment, with staphylococcal flora

typically thriving on skin surfaces such as the external auditory canal. Although the recovered microbes from hearing aid surfaces are ubiquitous in nature, the hallmark of immuno-suppression is characterized by susceptibility of disease-prone individuals to these very same organisms (Schountz & Bankaitis, 1998; Bankaitis, 1996). For instance, coagulase negative staphylococcus is a universal microbe of normal skin and nasopharyngeal flora. Because of its universal nature, shedding of this bacterium is very common; however, it also accounts for a high percentage of hospital-acquired infections by susceptible patients exhibiting varying degrees of immuno-suppression (Murray et al., 1994).

As further discussed by Bankaitis (2002), in addition to the presence of staphylococcus on most of the hearing aids, unique microbial compositions were observed for each of the hearing aids studied, creating a more compelling concern for cross-infection. For instance, the clinician handling one hearing aid with unwashed, bare hands who subsequently handles another hearing aid with the same unwashed, bare hands could cross-contaminate the latter hearing aid with the microbial content of the former hearing aid. Reinserting a contaminated hearing aid into a patient's ear will expose the patient to a foreign microbial composition. If that patient is immuno-compromised, the otherwise innocuous microbes from one hearing aid can cause an opportunistic infection with potentially serious complications.

While Bankaitis (2002) indicates that this study was not designed to establish a cause and effect relationship, it provides a compelling rationale for the need to integrate infection control procedures in the audiology clinic. Protection against inadvertent transmission of disease from patient to patient, clinician to patient, and patient to clinician must be approached from a preventive standpoint. Infection control begins with a written plan that should be available in every practice. While there is no single correct infection control plan, the procedures presented here may serve as guidelines for audiologists to develop their own plans while keeping in mind the local and federal regulations for infection control (OSHA, 1991).

GENERAL HOUSEKEEPING PRACTICES AND ENVIRONMENTAL INFECTION CONTROL

Environmental infection control requires cleaning, disinfecting and sometimes sterilizing items or surfaces that are reused. These terms are not arbitrarily selected to describe products or procedures. Each has a very specific legal meaning as defined by the Environmental Protection Agency (EPA). For example, a product that only cleans cannot be called a disinfectant, and a disinfectant cannot be called a sterilant unless it has been demonstrated to meet the requirements of a sterilant. It is important to understand the differences between these terms.

CLEANING

To clean means to remove the gross contamination from an object or surface without regard to killing germs. Cleaning is an

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

important precursor to disinfecting and sterilizing as gross contamination must first be removed before these procedures will be effective. Cleaning can be accomplished with a brush, a wipe, or an ultrasonic machine.

DISINFECTING

To disinfect means to kill a specific number of germs, the number of which is determined by the level of disinfectant used. Health care facilities, such as audiology practice settings, should use a hospital grade disinfectant (Rutala, 1990). Effective disinfectants may be in the form of a towelette, a spray or a soak used for a static soaking tray or ultrasonic machine. Disinfectant products are commercially available for audiologists' use that will not chemically denature plastic, silicone, rubber and acrylic. Rubbing alcohol, although considered a disinfectant, is not recommended in the audiology clinic as its chemical composition denatures those materials and/or devices typically handled in the clinical setting. Before disinfecting, all items should be first cleaned of gross contamination.

Disinfection is acceptable on "non-critical" items, those items that do not touch blood or other potentially infectious substances or are not likely to break the skin. Non-critical items in an audiology setting might include earmolds, hearing aids worn in the ear or canal, supra-aural headphones, otoscope specula, probe tips and tubes, ABR and ENG electrodes or any object or surface that is not contaminated with blood, ear drainage or cerumen that contains such bodily fluids. All of these items should be disinfected before handling or re-use, but sterilization is not required. Hearing aid cleaning tools and listening stethoscope couplers should be cleaned and disinfected before re-use. After use, these tools and couplers should be either soaked in disinfectant or wiped thoroughly with a disinfectant towelette. Hearing aids should be disinfected prior to attaching to the hearing aid analyzer's 2cc coupler, or fun tac should be replaced after each use.

All patients, particularly those who have recurring fungus or external ear infections, should be advised to disinfect their hearing aids daily as part of their routine cleaning. The ear canal is populated by bacteria and fungus. While the immune system usually keeps organisms in the ear under control, contamination of the hearing aid goes unchecked. This contamination can lead to odor, discoloration of the hearing aid or earmold and possible itching.

Surfaces in work areas should be disinfected regularly. Repair benches where earmolds and hearing aids are cleaned should be routinely disinfected, as should patient "touch" surfaces such as examination chair arm rests, and reception counters.

Toys and motivation devices used for audiological assessment should be cleaned and disinfected after each use. Toys should be nonporous and easily disinfected. Plastic materials are easier to maintain than painted wood, metal surfaces or fuzzy, furry toys. Because children invariably place toys in their mouths, great care should be taken when handling objects covered with saliva.

Waiting room toys should be cleaned and disinfected daily. Always thoroughly wash hands after contacting a potentially infectious item or wear gloves while cleaning up.

STERILIZATION

To sterilize means to kill 100 percent of the vegetative microorganisms and their endospores 100 percent of the time. Many microbes, when challenged, will return in a spore form that is much more resistant than the vegetative form. If the spore is not killed it may become vegetative again and cause disease. Sterilization is indicated when an object is contaminated with a potentially infectious material such as blood, mucous or other bodily fluid or substance. Objects that are capable of breaking the skin (i.e. cures, wax loops) must be sterilized prior to re-use regardless of contamination. As the preferred sterilization technique, heat under pressure in an autoclave, can melt many of the implements used by audiologists, "cold sterilization" with chemicals is the recommended procedure.

Cold sterilization is accomplished by soaking instruments in 2% glutaraldehyde for ten hours or in 7.5% hydrogen peroxide. Currently these are the only chemicals approved for sterilization. Due to its ease of use (no mixing) Wavicide™ is often the favored glutaraldehyde solution. This solution is only to be used for sterilizing and must be stored in a tightly covered soaking tray to control fumes. Glutaraldehyde must not touch skin so gloves should be worn when accessing the tray and objects sterilized should be rinsed thoroughly prior to re-use. Porous items must not be soaked in glutaraldehyde. Glutaraldehyde solutions are effective for use and re-use for 14 or 28 days, depending on the brand. Controversy exists on the potential biohazard of glutaraldehyde upon disposal with many believing that it can be safely disposed of by pouring down the drain with flowing tap water to ensure dilution.

It is hoped that hydrogen peroxide solutions such as Sporox will supplant the use of glutaraldehyde as it is significantly less hazardous to use clinically and is free of the controversy surrounding appropriate disposal. Sporox is good for use and re-use for 21 days and may be disposed of in a similar manner to that often recommended for glutaraldehyde. Hydrogen peroxide is only a sterilant in a concentration of 7.5% or greater. Because it is safer to use and dispose of than the glutaraldehyde products, it is the recommended cold sterilant for audiology practices.

"Critical items," those that may contact blood or mucus, or those items that are likely to break the skin, require sterilization. Cerumen is not an infectious substance per se, but often contains dried blood or mucus. If there is visible blood in or on cerumen, then that cerumen specimen is a potentially infectious substance and the instruments contacting it must be pre-cleaned and then sterilized. One difficulty is that the nature of cerumen, its color and viscosity, make it very difficult for the clinician to determine whether blood, particularly dried blood, is present. For this reason, instruments like cures used in cerumen removal, immittance and

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

otoacoustic emissions probe tips, and otoscopic specula should be sterilized after use when visibly contaminated with cerumen, ear drainage or blood.

DISPOSABLES

Many items that have the potential for serving as cross-contaminants may be purchased as disposables including otoscope specula, immittance and OAE probe tips, earmold impression syringe tips, insert receivers, infection control earphone covers, and probe-microphone tubes. The increased hygiene provided by the use of insert earphone receivers is one more advantage to the preferred use of these receivers over the continued use of supra-aural earphones. From an infection control standpoint, the use of products or items marked as disposable or one-time-use should be used as directed.

CONTROLLING THE HUMAN SOURCE OF INFECTION

MEDICAL CASE HISTORY

If feasible, a full medical history of a patient can assist in reducing potential exposure. For example, identifying a case of shingles (Herpes zoster) while taking a medical history would alert the clinician to question an unusual looking sore. Identifying a patient taking an anticoagulant (e.g. Coumadin [the generic name is warfarin]) would warn the practitioner of a greater potential for excessive bleeding. It may be impractical to ascertain case histories in group settings like schools or industry. When possible, however, a medical case history should be taken.

HAND HYGIENE

As previously mentioned, proper hand hygiene is critical to any infection control program. The Centers for Disease Control and Prevention (2002) has recommended that the use of fast-drying rub-on alcohol gels replace the traditional soap and water hand washing that is recommended to be done routinely before and after each patient. The alcohol-based gels are readily available, kill more microbes than traditional hand washing and are more convenient.

GLOVES

All audiometric procedures, including hearing and immittance screenings performed by audiologists, should begin with a thorough inspection of the ear, surrounding facial area, and scalp. An otoscopic inspection of the circumaural region and ear canal should be conducted, confirming that the skin is intact and that there is no blood or ear drainage present. After completing this inspection, reviewing the medical history and considering the procedure to be performed, a determination of the necessity of gloves can be made. Gloves should be worn prophylactically when the risk of encountering infectious substances is high. It is recommended that gloves be worn during cerumen management procedures including irrigation of the ear. In addition, gloves should be worn whenever the patient has a draining ear, when blood is present, when sores or lesions are evident on the ear or

scalp or when a medical history indicates an infectious disease. At a minimum, gloves should be worn when cleaning up spills of infectious waste and while disinfecting a contaminated area. Professionals are responsible for applying their discretion in the extent for which protective measures must be taken when cleaning spills. Additional protective measures may include a disposable cover for clothing and the use of safety glasses, the use of which would be dependent on the extent of the spill, the context of the situation, and the clinical environment.

Latex gloves should not be worn during impression taking as a chemical interaction between the material and the gloves keeps impression material from setting up. Gloves made from nitrile can be used safely with impression material. Latex gloves can be used when impression techniques use a pad (splead) and spatula thereby avoiding touching impression material with the hands. To avoid latex allergies, non latex vinyl or nitrile gloves are preferred.

After use, gloves should be properly disposed of and hands should be washed immediately after removing gloves. Unless grossly contaminated with blood or other bodily fluids gloves should be disposed of in the regular trash (see Waste Disposal which follows).

PROTECTIVE APPAREL

Safety glasses and disposable masks are necessary when there is risk of splash or splatter of potentially infectious material, or when the audiologist or patient is at risk of airborne contamination. Cerumen removal by irrigation may require safety glasses or masks if the splash of the irrigation is significant. Also, safety glasses and a mask should be worn when working with a grinding or buffing wheel to reduce the chance of microorganisms and particles of plastic being inhaled or landing in eyes. Masks should be worn in the presence of immuno-compromised individuals who may be at risk from droplet contact. Tuberculosis patients are to be treated using OSHA TB guidelines which include a higher grade mask than the standard. In the absence of the use of insert receivers, disposable headphone covers should be considered to reduce the risk of cross contamination. These can be particularly important for mass screenings.

WASTE DISPOSAL

Glutaraldehyde is toxic and should be handled with gloves with consideration given toward eye protection. Although glutaraldehyde begins to neutralize when in contact with organic material, controversy exists toward the common practice of disposal down the drain while flushing with large quantities of water to dilute it and promote more rapid neutralization. It is because of this controversy and other health concerns with the use of glutaraldehyde that hydrogen peroxide (in a 7.5% concentration or higher) is recommended for cold sterilization in audiology practices. Certainly disposal of sterilants must be made in accordance with local or federal regulations. Disposal methods are generally stated in the manufacturer's specifications. Further information on hazards associated with disinfectant and

INFECTION CONTROL IN AUDIOLOGICAL PRACTICE

sterilization chemical product use, and corresponding poison control measures to be employed in the event a product is swallowed or comes in contact with the skin or eyes, is outlined in the manufacturer's Materials Safety and Data Sheet (MSDS) and is available from the manufacturer upon request. The MSDS for all potentially harmful substances should be readily accessible in the clinic.

In the typical audiology clinic, waste (gloves, wipes, paper towels, etc.) that is contaminated with blood, ear drainage, or cerumen containing blood or ear drainage can be placed in regular trash receptacles unless the amount of blood or mucus is significant. Materials containing significant amounts of blood should be disposed of in impermeable bags labeled with the symbol for biohazardous waste. This would include gross amounts of material; that is, there is no need for biohazard bags for a little earwax. Rather, biohazard bags should be used for large amounts of visible blood and the materials used to clean it up. This waste should be picked up by a waste hauler licensed for medical waste disposal. When placing less contaminated waste in the regular trash, it is recommended that it be separated from the regular trash by sealing it in a separate bag or wrapping it in paper to minimize the chance of maintenance or cleaning personnel making casual contact with it.

VACCINATION

One of the most effective forms of controlling infection is through vaccination. Measles, mumps, rubella, tetanus, influenza, tuberculosis, small pox, polio, pertussis (whooping cough), diphtheria, hepatitis A and hepatitis B are all preventable through vaccination. Vaccinations should be seriously considered for all health care professionals.

THE AUDIOLOGIST'S RESPONSIBILITY

The Code of Ethics of the American Academy of Audiology states that "Individuals shall exercise all reasonable precautions to avoid injury to persons in the delivery of professional services or execution of research" (Part 1, Principle 2, Rule 2B). Toward this end, the development and vigilant execution of a comprehensive program for infection control, and the reporting and follow-up of exposure to potentially hazardous materials should be an integral component of any audiological practice, regardless of setting. All necessary precautions should be taken to ensure the safety of the patients served, as well as the safety of the professionals and support personnel serving those patients. It is every audiologist's responsibility to ensure that infection control protocols are established for their work setting and that the guidelines recommended within such protocols are adhered to routinely. 

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