MEDICAL ERRORS

The infection control has become a fact of the life, not only for those in medical fields, but also for many health-care workers especially in cosmetology and electrology fields.

Whether you are an independent contractor, a practitioner working alone, or a salon owner, your knowledge and understanding of state regulation, OSHA, CDC guidelines and infection-control principles can help you protect yourself and your clients. The practitioner is bound both by law and moral obligation to take all steps to develop a knowledge base on infection control and client safety and promote awareness for sanitary rules.

Infection control and health care epidemiology is the discipline concerned with preventing the spread of infections within the health-care setting, hand hygiene/hand washing, cleaning/disinfection/sterilization, vaccination, and surveillance. It is an essential part of the infrastructure of health care. On this basis, the common title being adopted within health care, is "Infection Prevention & Control." Regulatory agencies, both federal and state, issue rules for keeping the workplace safe.

OSHA

Occupational Safety and Health Administration or The United States Occupational Safety and Health Administration (OSHA) is an agency of the United States Department of Labor. It was created by Congress under the Occupational Safety and Health Act, signed by President Richard M. Nixon, on December 29, 1970.

OSHA regulations are enforceable under the law and were developed to protect your health and your client. It guards against bloodborne pathogens and, as a result, prevent work-related injuries, illnesses, and deaths by issuing and enforcing rules (called standards) for workplace safety and health.

The Centers for Disease Control and Prevention (or CDC) is an agency of the United States developing and applying disease prevention and control (especially infectious diseases), environmental health, occupational safety and health, health promotion, prevention and education activities designed to improve the health of the people of the United States.

Universal Precautions are recommendations issued by the CDC for minimizing the risk of transition of blood pathogens by health care and public safety workers.

It refers to the practice, in medicine of avoiding contact with patient's bodily fluids, by means of the wearing of nonporous articles such as medical gloves, goggles, and face shield. Also universal precautions are good hygiene habits, such as hand washing and the use of gloves and other barriers, correct sharps handling, and aseptic technique. The Ideas of Universal Precautions:

- Consider all clients as potentially infectious;
- Adhere infection control to minimize the risk of blood or body fluids from all clients and practitioners; and
- Reduce the risk of transition of infections and disease from clients to clients, from clients to practitioners and vice versa.

The Food and Drug Administration (FDA or USFDA) is an agency of the United States Department of Health and Human Services and is responsible for regulating and supervising the safety of foods, dietary supplements, drugs, vaccines, biological medical products, blood products, medical devices, radiation-emitting devices, veterinary products, and cosmetics.

The U.S. Environmental Protection Agency (EPA or sometimes USEPA) is an agency of the federal government of the United States charged to regulate chemicals and protect human health by safeguarding the natural environment: air, water, and land. The EPA was proposed by President Richard Nixon and began operation on December 2, 1970.\

Infection control standards

1. Hand and body hygiene
2. Cleaning, disinfection and sterilization
3. Environmental control and housekeeping
4. Personal protective equipment
5. Vaccination of health care workers
6. Potential hazards

Hand and body hygiene

In the United States, hand washing is mandatory in most health care settings and required by many different state and local regulations. OSHA standards require that employers must provide readily-accessible hand washing facilities and must ensure that employees wash hands and any other skin with soap and water or flush mucous membranes with water as soon as feasible after contact with blood or other potentially-infectious materials (OPIM). According to the CDC, hand washing is the single most important means of preventing the spread of infection." Hand washing should be performed:

- Upon arriving at work
- Before and after gloving
- After contact with any potentially-contaminated surface or item
- Between direct contact with different clients
- Before and after eating, drinking and after handling food
- After use toilet facilities
- After sneezing, coughing or blowing the nose
- Before leaving work

Hand washing technique

- Wet hand with warm (not hot) running water
- Apply soap (antimicrobial or plain)
- Vigorously rub together all surfaces of your hand for 20 seconds
- Rinse
- Dry with paper towel only (After washing and drying hands with a paper towel, the total number of bacteria was reduced on average on the finger pads by up to 76%; and on the palms by up to 77 %)
- Avoid recontamination. Use dry paper towel to close the faucets and open the door

Body Hygiene is an extension of hand washing. Keeping clean and maintaining professional appearance aids in the practice of infection control. Following is a list of good habits of personal hygiene.

1. Bathe or shower daily
2. Keep your hair clean
3. Cover or pull back long hair at work
4. Keep nails trimmed and clean
5. Wear clean clothes every day
6. Keep jewelry and cologne at a minimum
7. Wash your uniform

Cleaning, disinfection and sterilization

Disinfection is a general term for any process that disinfects or decontaminates the object or an area of the body.

Also this term indicates effectiveness as well as the terms cleaning and sterilization.

There are three levels of disinfection process: the first high level of disinfection is **Sterilization**; the second intermediate level of disinfection is **Disinfection** itself; and the third low level of disinfection is **Sanitation.**

High level of disinfection

Sterilization is a process intended to kill all microorganisms including most endospores (but not all spores). It is the highest level of microbial destruction that is possible to achieve. The best devices for sterilization are sterilizers.

Instrument preparation for high and intermediate level of disinfection

1. Put on gloves -- Gather instruments -- Rinse
2. Immerse instruments with visible protein debris and blood into enzymatic solution (cold soaking for a period of at least 2 hours or thoroughly scrub equipment under water to remove any visible debris).
3. Rinse
4. Fully immerse instruments into EPA-registered disinfectants for 10min All hinged instrument (scissors, tweezers, nippers) should be open
5. The longer the items have contact the better level of disinfection is achieved. Some solutions are more effective when heated (pay attention to manufacturer's recommendations)
6. Rinse and dry
7. Store in enclosed cabinet. Important: eliminate moisture, other liquid/fluid contamination, dirt and dust

Continue preparation for sterilizers

1. Label equipment packages (name, date and your initials)
2. Put only one instrument in package
3. Add water to autoclave until proper level is reached
4. Loud prepackage instruments in autoclave (do not overloud or overlap)
5. Place chemical indicator on the shelf
   a. Set up autoclave and follow manufacturer's instructions
   b. At end of sterilization time, allow sterilizer to cool completely before removing packages
6. Double-check that packages are not wet
7. Store in a designated clean and dry storage area

Sterilizers: Dry heat, steam (autoclave), or liquid chemical.

The setting for steam sterilizer (autoclave) is 250 F, 15-20 minutes, 15 psi (pounds per square inch) for unpackaged instruments 250 F, 30 min, 15 psi for packaged instruments.

Setting for dry heat sterilizer is 340F for 1 hour, 320F for 2 hours

There are three ways to sterilize: mechanical, chemical and biological monitoring (regulated by the FDA)

1. Mechanical indicator is a device that provides an assessment of cycle conditions (time, pressure and temperature). They must be checked with each load.
2. Chemical indicators and integrators are the heat-sensitive indicators or tapes that can check the actual conditions inside the autoclave via color change.
3. The sterilizers should be checked monthly and should be checked every sterilization load.
4. The biological indicator (spore test) is a high heat and chemical-resistant microorganism (Bacillus stearothermophilus or M. tuberculosis var. bovis).
5. If the sterilization process kills the microorganism, the sterilizer is considered to be effective. The biological monitoring is only the true method of determine the success of the sterilization.

Cold Sterilization is a high-level of disinfection where sterilization is not possible and is performed using glutaraldehyde, chlorine dioxide, hydrogen peroxide disinfectants.

Disinfection refers to the use of liquid chemicals on surfaces and at room temperature to kill all microorganisms causing disease. Disinfection is a less effective process than sterilization because it does not kill bacterial endospores. The effectiveness of disinfection depends on the following factors: time of immersion (contact time), dilution rate, water conditions, product use life, temperature and positions of items in disinfectant.

Examples of intermediate level disinfectants include alcohol (70% or 90% ethanol), chlorine compounds derived from sodium and calcium hydrochloride. (Regulated by FDA)

Low level of disinfection is Sanitation, and is the foundation of Aseptic technique.

1. The condition of being aseptic
2. The methods of making or keeping aseptic

Asepsis (clean technique) is the state of being free from biological contaminants (such as bacteria, viruses, fungi, and parasites). The term asepsis also often refers to those practices used to promote or induce asepsis in an operative field in surgery or medicine to prevent infection. Ideally, a field is "sterile" or free of all contaminants. However, elimination of infection is the goal of asepsis, not sterility.

Antisepsis is the process of inhibiting the growth and multiplication of the microorganism: hand washing, cleaning, decontamination, disinfection, and sterilization.

The selection of an appropriate level of disinfection based upon the intended use of instruments or tool.
Instruments used on clients are divided on three categories:

- Critical Items are instruments that have direct contact with blood.
- Comedo extractors, lancets, tweezers, microdermabrasion tips, current tips, galvanic rollers, wands and electrolysis needle (if not disposable) are the examples of critical items.
- High levels of disinfection are required.

Semi-critical items are instruments that do not penetrate the body surface but have potential to be exposed to blood and other potential infectious materials (OPIM). An intermediate level of disinfection is essential.

Noncritical items are items that come into direct contact with unbroken skin. Sanitation is normal but disinfection is preferred. Preferred disinfectants are alcohol, chloride solution or QUATS. Examples of noncritical items are needle or lancet holders, tables, towels, sheets, electrical cord of electro equipment, etc. It is enough to clean the electrical cord by soap and water only.

An additional cleaning system that helps to clean delicate items or hard to rich surfaces is an ultrasonic cleaning system. Ultrasonic (sonic sound) waves pass through a liquid, which makes this liquid vibrate very fast (20,000 - 38,000 vibrations/sec). Using the cleaning solution during this process enhances the effect of disinfection. After conclusive studies, an ultrasonic cleaning system proves to be more effective.

Environmental control and housekeeping
A proper hygienic environment should be the goal for every practitioner.
Environmental control techniques
Each treatment room:

- Is kept clean, well-lit and well ventilated.
- Contains a sink with hot and cold water and appropriate hand washing products
- Contains covered storage for supply. The disposable and reusable items such as cotton, towels, drapes, sheets and pillowcases should be stored separately in closed cabinets/container/drawers.

- Contains sharp containers, isolyser, and contain covered regular trash container.
- Treatment table surfaces made of washable materials and treated with disinfectants with fresh disposable paper drapes or sheets. Headrests are covered with disposable paper or pillowcase.
- Cream, lotions and other products must be removed from the container with sanitized spatula.
- Follow manufacturer's recommendations.
- Follow aseptic techniques for dispensing products.
- Containers for dispensing products must be cleaned and dried before being filled with fresh product.
- Reusable items such as sheets, pillowcases, towels and drapes should be placed in a covered container, labeled "soiled laundry" after use.
- Laundered with detergent and water temperature (160F) that will ensure adequate cleaning and disinfection and thoroughly rinsed. Immersion in a 10% bleach solution for 1 min after laundry (10% of bleach in 90% of water).
- Dry completely and store in a closed cabinet.

Housekeeping

All environmental surfaces in the treatment room are kept clean by:

- Cleaning with water and detergent.
- No eating or drinking in areas should be strictly enforced.
- Use a low-level, hospital-grade disinfectant to clean noncritical environmental surfaces. (Regulated by the EPA).
- Countertops should be cleaned daily.
- Sinks and toilet facilities should be cleaned daily.
- Environmental surfaces as doorknobs, phones, and treatment tables should be cleaned and disinfected daily.
- Floors, carpet and tiles should be vacuumed and cleaned daily.
- Trash should be removed daily.
- Blinds and curtains should be cleaned on a regular basis to avoid visible soiling.

Personal protective equipment

Personal protective equipment (PPE) include gloves, gowns (uniform), shoe covers, and face shields, CPR masks, goggles, surgical masks, and respirators. Typically, use only gloves, gowns (uniform), masks and sometimes goggles, determined by regulations or the infection control protocol of the facility. Many or most of these items are disposable. It helps to avoid carrying infectious materials from one patient to another patient and to avoid costly disinfection, and should be discarded after each use.

Gloves are very important protection against the penetration of bloodborne pathogens. They also protect from biochemical processing materials when working on the clients or impact of daily cleaning process. It is very important carefully to exam quality of gloves for the size, water leak, thickness, tensile strength, the "halo effect." The "halo effect" is seen at glove fingertips where glove's material has solidifies and it indicates a weakened area that can fracture during use.

Unfortunately, gloves are not completely resistant to pathogens and sometimes can cause allergic reaction (Natural Rubber Latex NRL).

NRL can cause three distinct allergy reactions:

- Irritant Dermatitis is a non-allergenic response to NRL. It can occur as result of improper hand washing, poor hygiene, soap, lotions, disinfectants, user's perspiration, etc.;
- Type 1 (immediate) hypersensitivity appears everywhere within minutes; and
- Type IV (delayed) hypersensitivity localized to the skin when has place of repeated exposure of chemicals in the workplace. It appears within minutes and up to several hours after contact.

Other chemicals such as antiseptics, disinfectants, massage lubricants and adhesives can also produce allergic

reactions. The barrier protection of any glove can be compromised by everyday practices, including storage conditions, skin care, personal habits, and inability to rapidly identify type of glove base material.

A surgical mask is intended to be worn by healthcare workers preventing contamination from bacteria shed in liquid droplets and infection during the practice. They can also reduce the spread of infectious droplets (carrying bacteria or viruses) that are created when the wearer coughs or sneezes. Any masks should be discarded after each use.

Goggles or safety glasses are forms of protective eyewear that usually protect the eye area from the water or chemicals from striking the eyes and from laser radiation.

Wearing a gown (uniform) protects the skin and prevents soiling of clothing during procedures. It should be washed every day.

Vaccination of health care workers

One of the important parts of infection control is vaccination. This will provide some protection to workers. Depending on regulation and recommendation, the specific work function, or personal preference, healthcare workers should be immunized against Hepatitis B (HIB) and influenza. Vaccination against Hepatitis B works effectively during 15 years in case the practitioners received three shots.

Potential hazards

Estheticians and Electrologists may have a heightened awareness of potential hazards that can come from using sharp instruments. Sharps are any object that can penetrate the skin, including needles, razors, lancets, scissors and broken glass. It is standard practice for used disposable needles and other sharp instruments to be placed immediately into a sharps container or isolyser after a single use. The most common sharps containers (red or yellow plastic) is a container that is filled with used disposable instruments. Isolyser is a plastic bottle with liquid disinfectant. When the bottle is full with sharp used instruments, the catalyst addition transforms the entire contents to a gel-like solid. It may be disposed in regular trash.

Puncture injury

Contact practitioners with sharp items may have serious consequences, especially if the client has a communicable disease. Always assume transition and always follow these rules:

- Remove gloves.
- Allow the area to bleed.
- Wash the site vigorously.
- Cover and protect the wound.
- If practitioner has actual source contact with his open skin or mucous membrane he/she has to check with the owner/administrator and follow the office protocol.
- Clients also may report to Emergency Occupational Medicine Facility for appropriate evaluation and screening according to OSHA.
- Practitioner will be directed to the same facility for appropriate evaluation and screening after client report.

Other Hazards

While a needle/lancet stick is the most prevalent risk, other services can generate a risk factor as well.

- The practitioner always needs to inspect the skin for breaks in the stratum corneum, dermatitis reaction and chapping, check fingernails and torn cuticles.
- The client's skin needs visual inspections before any treatment begins.
- Other potential risk appears when practitioner encounters client has a known airborne illness.
- Clients with influenza, measles or tuberculosis may not know that he/she has a disease.
- Wear a mask while performing microdermabrasion, extraction, laser hair removal, or chemical peel due to vapor and other unknown airborne transition.

- Always use universal precautions.

Conclusion

The aim of this educational course is to lead the healthcare workers to pay special attention to their acknowledged importance of Infection Prevention and Control Standards.