



Kentucky 6 Hour Esthetician CE Course

**Presented by
ContinuingCosmetology.com**

**Licensed by the Kentucky State Board of Hairdressers and Cosmetologists
License # 137**

**T. D. Costner
Cosmetology Instructor
Program Director**

PO BOX 691296 / Orlando, Florida 32869 / Phone: 407.435.9837

Kentucky 6 Hour Esthetician CE Course

TABLE OF CONTENTS

Lesson	Subject	Page
1	Sanitation and Sterilization	1
2	Diseases and Disorders of the Skin	22
i	Open Book Test	38
ii	Course Evaluation Form	40
iii	Registration Form	41

Lesson 1

Sanitation and Sterilization

Lesson Outline

- (a) Universal Sanitation and Sterilization Precautions
- (b) How to distinguish between disinfectants and antiseptics
- (c) How to sanitize hands and disinfect tools

(a) Universal Sanitation and Sterilization Precautions

Learning objectives:

After completing this lesson you will be able to:

- List precautionary elements that will protect the client
- Describe the proper progression of client services when using Foot Spas
- Explain proper cleaning and disinfection procedures for equipment

The United States Environmental Protection Agency has set universal sanitation and sterilization rules.

One Universal Sanitation and Sterilization Precaution is the recommended cleaning and disinfection procedures for foot spa basins in salons

Preventing Pedicure Foot Spa Infections

Guidance from the EPA and the Centers for Disease Control and Prevention

Outbreaks of skin infections on the legs and feet of patrons following spa pedicures have caused concern about spa safety. Information for customers of salon pedicure foot spas can help reduce the potential for infections associated with pedicure foot spa use.

Recommended Cleaning and Disinfection Procedures for Foot Spa Basins in Salons

Customer precautions - protecting the client

Check the condition of the client's feet and legs: If open sores or skin wounds are present (including insect bites, scratches, scabbed-over wounds, or any condition that weakens the skin barrier), explain to the client why they should not use the foot bath.

Complete pedicure or wax after the foot bath soak: Any procedure that risks damage to a client's skin should not be done before soaking feet in the foot spa basin.

Step by step instructions for disinfecting pedicure foot spa equipment

After Each Client: (this can take place any time after the client's feet are out of the footbath, while feet are massaged, toes are painted, or other opportunities)

Drain the water from the foot spa basin or bowl and remove any visible debris.

Clean the surfaces of the foot spa with soap or detergent, rinse with clean water, and drain.

After cleaning, disinfect the surfaces with an **EPA-registered hospital disinfectant** - according to the manufacturer's directions on the label. Surfaces must remain wet with the disinfectant for **10 minutes or the time stated on the label**, which may be shorter.

For whirlpool foot spas, air-jet basins, "pipe-less" foot spas, and other circulating spas: It is best to disinfect by filling the basin with clean water, adding the appropriate amount of liquid disinfectant, and turning the unit on to **circulate** the disinfectant for the entire contact time. After disinfection, **drain and rinse** with clean water.

Nightly:

For whirlpool foot spas, air-jet basins, "pipe-less" foot spas, and other circulating spas:

- ✓ **Remove** the filter screen, inlet jets, and all other removable parts from the basin and clean out any debris trapped behind or in them. Using a brush, **scrub** these parts with soap or disinfectant (following cleaning directions).
- ✓ **Rinse** the removed parts with clean water and place them back into the basin apparatus.
- ✓ **Fill** the basin with clean water and add an **EPA-registered hospital disinfectant**, following label directions. Turn the unit on and **circulate** the system with the liquid for 10 minutes, or the label-indicated time if different. (The whirlpool mechanism of the tub must be operating for the entire disinfection period so the piping and internal components that contain hidden bacteria are disinfected.)
- ✓ **After disinfection, drain, rinse, and air dry.**

For simple basins (no circulation):

Drain the basin and remove any visible debris.

Scrub the bowl with a clean brush and soap or disinfectant (following cleaning directions).

Rinse and drain.

Disinfect basin surfaces with and **EPA-registered hospital disinfectant**, following manufacturer's instructions. Surfaces must remain wet with the disinfectant for 10 minutes or the contact time stated on the label.

Drain the basin, **rinse** with clean water, and let air-dry.

Label information on disinfectant products

The label should clearly state that the product is a hospital or medical disinfectant. It may also list the following organisms:

Staphylococcus aureus

Salmonella enterica (formerly *S. choleraesuis*)

Pseudomonas aeruginosa

The product label should clearly identify an EPA Registration Number.

The label will also specify use sites that are health care related.

Important

Follow your state guidelines and regulations: Some states require a weekly flush of the whirlpool mechanism with bleach and that the bleach remain in contact for over eight hours. Salons should consult state cosmetology regulations to make sure they are in compliance.

Read all labels and instruction manuals: Always follow label directions for disinfectant products, and consult operating manuals for foot spa basins. Care should be taken to use appropriate doses of products to prevent damage to foot spas.

Know the condition of your equipment: If your whirlpool foot spa has not been regularly cleaned and disinfected, you may need to do more than just the maintenance steps listed above to remove bacterial buildup from the system. Consult the foot spa manufacturer for further information. A higher level EPA-registered disinfectant, such as those labeled "Tuberculocides," may be used initially (refer to the listing of these products on the List. Once the system has been adequately disinfected, regular maintenance with cleaning and use of a hospital disinfectant, as described in this document, may be used.

Guideline for Cleaning and Disinfecting Manicuring and Enhancement Equipment

These guidelines outline procedures cleaning (sanitizing) and disinfecting all types of equipment used during manicuring and enhancement services including items such as manicuring bowls, pushers, nippers, clippers, abrasive files and buffers.

In the salon, all tools, implements, devices or other pieces of equipment must be properly cleaned and disinfected before it comes into direct contact with a client, as required by the licensing rules and regulations of your region, state or country.

Proper Cleaning and Disinfection

Just about everything in the salon has a hard or soft surface of some type. Some examples are manicuring tabletops and arm cushions, finger bowls, towels, files/buffers, implements, etc. Any of these surfaces coming into direct contact with a client's skin is considered "contaminated".

All contaminated surfaces must be thoroughly and properly:

1) cleaned and then 2) disinfected.

To be considered properly clean, a surface must first be thoroughly scrubbed free of all visible signs of debris or residue (contamination). Proper cleaning is the total removal of all visible residue from every surface of tables, tools and equipment, followed by a complete and thorough rinsing with clean water.

Proper cleaning (also called sanitizing) must be performed before continuing with the disinfection step. Proper disinfection is the destruction of potentially harmful or infection-causing microorganisms (pathogens) on a pre-cleaned surface.

Disposable (Single Use) items

Items that the manufacturer designs to be disposed of after one use are called “disposable” or “single-use”. These items must be properly disposed of after one use on a single client. Reusing these items is considered an unsanitary, improper and unprofessional practice.

Some examples of disposable items are: cotton balls, gauze pads, wooden implements, disposable towels, toe separators, tissues, wooden sticks, arbor bands/ sleeves for electric files and certain abrasive files and buffers. Items damaged during the cleaning and disinfecting process are considered single-use and must be discarded after every client.

Proper Product Application

Some types of products can become contaminated if improperly used. Some examples are: creams, lotions, scrubs, paraffin wax, masks, and oils. These products must always be used in a sanitary manner that prevents contamination. For example, paraffin and nail oils should not be applied with a brush (or spatula) that has touched the skin. These practices may introduce bacteria into the product and cause contamination that can render products unsafe for use.

To avoid product contamination always:

- (a) Dispose of used or remaining product between clients.
- (b) Use single-use disposable implements** to remove products from containers for application or remove product with a clean and disinfected spatula and put product to be used into a disposable or disinfect-able service cup.
- (c) Use an applicator bottle or dropper to apply the product.

Proper Disinfection of Multi-Use Tools and Equipment

Some items are designed to be used more than once and are considered to be “multi-use”. Multi-use items are sometimes referred to as “disinfect-able”, which means that the implement can be properly cleaned and disinfected while retaining its usefulness and quality. Multi-use items are designed for use on more than one client, but require proper cleaning and disinfection between each use. Examples of multi-use items include cloth towels, manicure bowls, nippers, pushers and certain abrasive files and buffers.

Multi-use items come in three varieties;

- 1) Hard and non-absorbent items constructed of hard materials that do not absorb liquid, i.e. metal, glass, fiberglass or plastic. These should be cleaned and disinfected as described below.
- 2) Porous and/or absorbent items constructed of materials such as cloth or wood with surfaces that may absorb or are penetrated by liquids, i.e. scrub brushes for nails, cushioned abrasive buffers, cloth towels and chamois. They should be cleaned and disinfected as described below.
- 3) Self-disinfecting items that will not support the growth of bacteria, viruses or fungi. Examples are application brushes used for nail polish, primers along with artificial enhancement application brushes. Due to the nature of these products, the brushes do not require disinfection and should be cleaned, used and stored only as recommended by the product manufacturer.

Individual Client Packs

Tools/instruments kept in individual packs must be properly cleaned and disinfected after each use. If a client provides their own implements/tools, they must be properly cleaned and disinfected before use. State rules require all tools and equipment to be disinfected before being reused, even if used by the same client! Improperly cleaned and disinfected implements may grow infection/disease-causing organisms before the client returns for their next visit, thereby increasing the risk of infection. Never use air-tight bags or containers for storage as these can promote bacterial growth.

Methods of Proper Cleaning

Proper cleaning requires liquid soap/detergent, water and the use of a clean and disinfected scrub brush to *remove all visible* debris and residue. All items should be scrubbed with a clean and disinfected scrub brush under running water. Cleaning is not disinfection; disinfection is an entirely separate step. Different items are cleaned in different ways. This often depends on what the item is made of and how it was used.

NOTE: the cleaning step must be properly performed before an item can be disinfected. All items must be thoroughly rinsed and dried with clean cloth or paper towels prior to putting them into a disinfectant.

Cleaning (sanitation) Method Examples

- Scrub Brush - Abrasive files, buffers, paddles
- Ultrasonic Cleaner - Metal pushers & nippers
- Acetone Soak -Metal electric file bits used on enhancements
- Washing machine -Cloth towels, linens, chamois
- Towelette/Wipe -Electrical equipment, table tops

Methods of Proper Disinfecting

After proper cleaning, all reusable implements/tools must be disinfected by complete immersion in an appropriate disinfecting solution.

The item must be completely immersed so that all surfaces, including handles, are soaked for the time required on the disinfectant manufacturer's label. In general, U.S. Environmental Protection Agency (EPA) registered disinfectants require 10 minute immersion.

Remove items after the required time, using clean and disinfected tongs or gloves to avoid skin contact with the disinfectant solution. If required by the instruction label, rinse thoroughly in running water.

Allow items to air dry completely by placing them on top of a clean towel and covering them with another clean towel. Thick foam cushioned buffers should have the moisture pressed out while in between clean towels to ensure the buffer is dry before storing in a sanitary manner.

Methods for Proper Storage of Tools and Equipment.

All properly cleaned, disinfected and dried implements/ tools must be stored in a sanitary manner. A lined drawer is usually adequate, provided it is clean, contains only clean items and is properly labeled.

Store soiled or used items in a properly labeled, covered container separate from clean items. Never use airtight containers or zipper bags – these may promote bacterial growth!

Abrasive Files, Buffers and Electric File Bits

After each use abrasive files, buffers, blocks or bits must be thoroughly cleaned by manually brushing with a clean and disinfected brush or by other adequate methods to remove all visible debris. The sides of foam cushioned buffers, blocks or other abrasives should also be brushed after each use.

Once electric bits have been thoroughly cleaned, they must be disinfected by complete immersion in an appropriate EPA registered disinfectant, as described in the next section. Any porous (absorbent) abrasive file, buffer, block, band, etc. that comes in contact with broken, damaged, infected or unhealthy skin or nails must be properly disposed of immediately, as described below.

Appropriate Disinfectants

How do you know if a disinfectant product is suitable for professional salon use? Standards and requirements vary from country to country, but in the United States, the EPA registered Hospital disinfectants with bactericidal, fungicidal and virucidal claims on the label are best for use in salons. Some disinfectants are designed for use on hard- surfaces while others are best used on porous or absorbent items. EPA-registered Hospital disinfectants are good examples of a type that is suitable for hard surfaces.

Disinfectant products are designed to destroy disease-causing microorganisms (pathogens) on non-living surfaces, such as those described in this document. They are not appropriate for use on living skin and contact with skin should be avoided.

Appropriate salon disinfectants include the following:

- (a) EPA-registered Hospital disinfectants with bactericidal, fungicidal and virucidal claims on the label.
- (b) 10% bleach solution (1 part bleach to 9 parts water)

Contact with Blood, Body Fluid or Unhealthy Conditions

If blood or body fluid comes in contact with any salon surface, the nail professional should put on a pair of clean protective, disposable gloves and use an EPA-registered Hospital liquid disinfectant or a 10% bleach solution to clean up all visible blood or body fluid. In case of an accidental cut, clean with an antiseptic and bandage the cut.

Disposable items, such as a cotton-tipped wood stick must be immediately double-bagged and discarded after use, as described at the end of this section. Any non-porous instrument or implement that comes in contact with an unhealthy condition of the nail or skin, blood or body fluid, must be immediately and properly cleaned, then disinfected using an EPA-registered Hospital disinfectant as directed or a 10% bleach solution for 5 minutes.

Any porous/absorbent instrument that comes in contact with an unhealthy condition of the nail or skin, blood or body fluid must be immediately double-bagged and discarded in a closed trash container or bio-hazard box.

Some EPA disinfectants are registered for hospital use, but may not say "Hospital" on their label. In these cases, the product label MUST claim effectiveness against Salmonella choleraesuis, Staphylococcus aureus, and Pseudomonas aeruginosa.

Additional Information about Disinfectants and Cleaners

- 1) Disinfectants must be mixed, used, stored and disposed of according to manufacturer's label instructions (proper mixing ratio is of the utmost importance to be an effective disinfectant). Some are ready to use and do not require mixing.
- 2) U.S. Federal Law prohibits the use of EPA-registered disinfectants in a manner that is contrary to its label.
- 3) Disinfectants must be prepared fresh every day (including spray bottles). Further, they must be replaced immediately if the solution becomes visibly contaminated. Disinfectant solutions will lose their strength upon standing and become ineffective within 24 hours. Use a logbook to record when fresh disinfectant is made.
- 4) Disinfectants are ineffective if implement/tools are not properly cleaned prior to use.
- 5) Just spraying disinfectants on tools and equipment is inadequate. Pre-cleaning is required before spraying the disinfectant and most types require ten minute contact to be effective.
- 6) Disinfectants can damage or rust some metal tools if improperly used.
- 7) All disinfectant containers must be properly labeled. Disinfectant solutions prepared in the salon must list on the container: the contents and percentage solution (concentration), and use a logbook to record the date and time of mixing. Check the label for the product's expiration date.
- 8) All brushes used for cleaning purposes, i.e., nail brushes and electric-file bit cleaning brushes, must be properly cleaned and disinfected between each use.
- 9) Ultra-violet light cabinets are not suitable replacements for liquid disinfectant solutions. These can be used for storage after properly cleaning and disinfecting implements/tools with a liquid solution.
- 10) Read all warning labels and precisely follow manufacturer's instructions.

These guidelines are believed to be highly effective and are designed to help avoid unforeseen pitfalls, problems and complications.

These guidelines are not a replacement for local government standards, rules or regulations.

Always consult federal, state and local laws and regulations, which may vary somewhat from these recommendations.

Protect Your Skin

- Microorganisms in foot spas can enter through the skin; so broken skin (e.g., cuts and abrasions) should not come into contact with foot spa water.
- Do not shave, use hair removal creams, or wax your legs during the 24 hours before receiving treatment in a foot spa.
- Do not use a foot spa if your skin has any open wounds such as bug bites, bruises, scratches, cuts, scabs, poison ivy, etc.

Identifying an Infection

Open wounds appear on the skin of feet and legs. Initially they may look like insect bites, but they increase in size and severity over time, and sometimes result in pus and scarring.

Cause of Infections

Some incidents of foot spa infections have been caused by *Mycobacterium fortuitum*. This organism can occur naturally in water and soil. Other organisms have also been found in footbath systems. The screens and tubes of foot spas are particularly good places for the bacteria to collect and grow, often forming dense layers of cells and proteins called biofilms, which can be very hard to remove.

Know how the salon cleans and disinfects foot spas.

1. Ask salon workers how the foot spas are maintained and how often.
2. A foot spa should be disinfected between each customer, and nightly. The disinfectant needs to work for the full time listed on its label, typically 10 minutes, depending on the type of disinfectant.
3. Proper cleaning and disinfection can greatly reduce the risk of getting an infection by reducing the bacteria that can build up in the foot spa system.

Disinfectants used in the foot spa should indicate on the label that they're approved for hospital use.

A disinfectant label should clearly show its uses and that it is EPA-approved.

Salons should use an EPA-registered hospital disinfectant

The label (at right) should list relevant product information, including:

The terms "Disinfectant" and also "Hospital" or "Medical" or "Health Care". This indicates the product can be used as a disinfectant on surfaces in these environments.

The EPA registration number.

Some products may have instructions for both sanitizing and disinfecting footbaths. Pedicurists should follow disinfecting directions.

Do not use the foot spa if you are not sure it is disinfected and safe to use. Do not risk your health. You should report any problems to your state cosmetological board.

(b) How to distinguish between disinfectants and antiseptics

Learning objectives:

After completing this lesson you will be able to:

- Define the terms disinfectant and antiseptic
- Identify precautions with these chemicals
- List their purposes

Disinfectants and Antiseptics

Antiseptic: A substance that inhibits the growth and reproduction of disease-causing microorganisms. For practical purposes, antiseptics are routinely thought of as topical agents, for application to skin, and mucous membranes.

Disinfectant: Any chemical agent used chiefly on inanimate objects to destroy or inhibit the growth of harmful organisms.

Purpose

Antiseptics are a diverse class of drugs which are applied to skin surfaces or mucous membranes for their anti-infective effects. Their uses include cleansing of skin and wound surfaces after injury, preparation of skin surfaces prior to injections or surgical procedures, and routine disinfection of the oral cavity as part of a program oral hygiene.

Commonly used **antiseptics for skin** cleaning include benzalkonium chloride, chlorhexidine, hexachlorophine, iodine compounds, **alcohol and hydrogen peroxide**. Other agents which have been used for this purpose, but have largely been supplanted by more effective or safer agents, include boric acid and volatile oils such as methyl salicylate.

Chlorhexidine shows a high margin of safety when applied to mucous membranes, and has been used in oral rinses and preoperative total body washes.

Benzalkonium chloride and hexachlorophine are used primarily as hand scrubs or face washes. Benzalkonium may also find application as a disinfecting agent for instruments, and in low concentration as a preservative for drugs including ophthalmic solutions.

Benzalkonium chloride is inactivated by organic compounds, including soap, and must not be applied to areas which have not been fully rinsed.

Iodine compounds include tincture of iodine and povidone iodine compounds. Iodine compounds have the broadest spectrum of all topical anti-infectives, with action against bacteria, fungi, viruses, spores, protozoa, and yeasts.

Iodine tincture is highly effective, but its alcoholic component is drying and extremely irritating when applied to abraded (scraped or rubbed) skin. Povidone iodine, an organic compound, is less irritating and less toxic, but not as effective.

Povidone iodine has been used for hand scrubs and disinfection of surgical sites. Aqueous solutions of iodine have also been used as antiseptic agents, but are less effective than alcoholic solutions and less convenient to use than the povidone iodine compounds.

Hydrogen peroxide acts through the liberation of oxygen gas. Although the antibacterial activity of hydrogen peroxide is relatively weak, the liberation of oxygen bubbles produces an effervescent action, which may be useful for wound cleansing through removal of tissue debris.

The activity of hydrogen peroxide may be reduced by the presence of blood and pus. The appropriate concentration of hydrogen peroxide for antiseptic use is 3%, although higher concentrations are available.

Precautions

Precautions vary with individual product and use. Consult individualized references.

Hypersensitivity reactions should be considered with organic compounds such as chlorhexidine, benzalkonium and hexachlorophine.

Skin dryness and irritation should be considered with all products, but particularly with those containing alcohol.

Systemic toxicity may result from ingestion of iodine containing compounds or mercury compounds.

Iodine compounds should be used sparingly during pregnancy and lactation due to risk of infant absorption of iodine with alterations in thyroid function.

Alcohols

Alcohols have been appreciated for centuries for their antiseptic qualities. As a chemical group, alcohols possess many features that are desirable for an antiseptic. They have a bactericidal action against vegetative cells. They are relatively inexpensive, usually easily obtainable, and relatively nontoxic with topical application.

Alcohols have a cleansing action, evaporate readily, and are colorless. Their destructive action against spores is much less effective than that against vegetative cells. The greatest amount of work has been done with ethanol.

Phenols

Crude mixtures of cresols (krē'sôl', -sôl', -sôl') solubilized by soap or alkali were originally introduced as **Lysol** and are still used as rough disinfectants. They need to be applied at high concentrations, are irritant, and toxic, but they kill bacteria, fungi, and some viruses.

For **more refined applications as antiseptics**, chlorinated cresols or xylenols are commonly used in practice. These compounds are less active than cationic antiseptics against Staphylococci and Pseudomonas.

Hexachlorophene is a different kind of phenolic antiseptic that acts slowly, but binds strongly to the skin. It was used widely in surgical soaps and antiperspirant preparations. However, absorption through the skin can cause damage to the central nervous system, particularly in infants, and the use of **hexachlorophene is now severely restricted**.

Phenol no longer plays a significant role as an antibacterial agent, although its use has not been abandoned entirely. Phenols are still used today in drug formulations such as **cold-sore creams and liquids, throat lozenges**, and washes. **Phenol derivatives are also used as preservatives and antimicrobial agents in germicidal soaps and lotions**.

Quaternary Ammonium Compounds

Initially, Quaternary Ammonium Compounds were used as an adjunct to surgery, such as in preoperative patient skin treatment, de-germing the hands of the surgical team pre-operatively, and **disinfection of surgical instruments**.

(c) How to sanitize hands and disinfect tools

Learning objectives:

After completing this lesson you will be able to:

- Describe disease prevention
- Describe the recommended hand washing technique
- List ways to transmit pathogens
- List adverse effects of using hand sanitizers

Hand Washing

Hand washing, when done correctly, is the single most effective way to prevent the spread of communicable diseases. Good hand washing technique is easy to learn and can significantly reduce the spread of infectious diseases among both children and adults.

What types of disease can good hand washing prevent?

- Diseases spread through fecal-oral transmission. Infections which may be transmitted through this route include salmonellosis, shigellosis, hepatitis A, giardiasis, enterovirus, amebiasis, and campylobacteriosis. Because these diseases are spread through the ingestion of even the tiniest particles of fecal material, hand washing after using the toilet cannot be over-emphasized.
- Diseases spread through indirect contact with respiratory secretions. Microorganisms which may be transmitted through this route include influenza, Streptococcus, respiratory syncytial virus (RSV) and the common cold. Because these diseases may be spread indirectly by hands contaminated by respiratory discharges of infected people, illness may be avoided by washing hands after coughing or sneezing and after shaking hands with an individual who has been coughing and sneezing.
- Diseases may also be spread when hands are contaminated with urine, saliva or other moist body substances. Microorganisms which may be transmitted by one or more of these body

substances include cytomegalovirus, typhoid, staphylococcal organisms, and Epstein-barr virus. These germs may be transmitted from person to person or indirectly by contamination of food or inanimate objects such as toys.

What is good hand washing technique?

There is more to hand washing than you think! By rubbing your hands vigorously with soapy water, you pull the dirt and the oily soils free from your skin. The soap lather suspends both the dirt and germs trapped inside and are then quickly washed away.

Follow these four simple steps to keeping hands clean:

- 1) Wet your hands with warm running water.
- 2) Add soap, then rub your hands together, making a soapy lather. Do this away from the running water for at least 15 seconds, being careful not to wash the lather away. Wash the front and back of your hands, as well as between your fingers and under your nails.
- 3) Rinse your hands well under warm running water. Let the water run back into the sink, not down to your elbows.
- 4) Dry hands thoroughly with a clean towel. Then turn off the water with a clean paper towel and dispose in a proper receptacle.

What type of soap should be used?

Any type of soap may be used. However, bar soap should be kept in a self draining holder that is cleaned thoroughly before new bars are put out and liquid soap containers (which must be used in day care centers) should be used until empty and cleaned before refilling. To prevent chapping use a mild soap with warm water; pat rather than rub hands dry; and apply lotion liberally and frequently.

May I use the over-the-counter alcohol gels for washing my hands instead of using soap and water?

These products, which can be found wherever soap is sold, are very effective at killing germs on the hands as long as your hands are not visibly dirty. They should be used when soap and water are not readily available.

To use correctly, apply about a teaspoonful of the alcohol gel on the palm of one hand. Then rub all over both hands, making sure you rub the front, back, and fingernail areas of both hands. Let the alcohol dry, which should take about 30 seconds.

If your hands look dirty but you have no other way to wash your hands, use the gel but wash with soap and water as soon as you can.

The History of Hand Washing

The history of hand washing began in the Health Care Sector and has had a profound effect on the Personal Service and Beauty Industry.

For generations, hand washing with soap and water has been considered a measure of personal hygiene. The concept of cleansing hands with an **antiseptic agent** probably emerged in the early 19th century. As early as **1822**, a French pharmacist demonstrated that solutions containing chlorides of lime or soda could eradicate the foul odors associated with human corpses and that such solutions could be used as disinfectants and antiseptics.

In **1846**, Ignaz Semmelweis observed that women whose babies were delivered by students and physicians in the First Clinic at the General Hospital of Vienna consistently had a higher mortality rate than those whose babies were delivered by midwives in the Second Clinic.

He noted that physicians who went directly from the autopsy suite to the obstetrics ward had a disagreeable odor on their hands despite washing their hands with soap and water upon entering the obstetrics clinic. He proposed that the puerperal fever that affected so many of these women was caused by "cadaverous particles" transmitted from the autopsy suite to the obstetrics ward via the hands of students and physicians.

Perhaps because of the known deodorizing effect of chlorine compounds, as of May **1847**, he insisted that students and physicians clean their hands with a chlorine solution between each patient in the clinic.

The maternal mortality rate in the First Clinic subsequently dropped dramatically and remained low for years. This intervention by Semmelweis represents the first evidence indicating that cleansing heavily contaminated hands with an **antiseptic** agent between patient contacts may reduce health-care--associated **transmission of contagious diseases** more effectively than hand washing with plain soap and water.

In **1961**, the U. S. **Public Health Service** produced a training film that demonstrated hand washing techniques recommended for use by health-care workers. At the time, recommendations directed that personnel wash their hands with soap and water for 1--2 minutes before and after patient contact.

Rinsing hands with an antiseptic agent was believed to be less effective than hand washing and was recommended only in emergencies or in areas where sinks were unavailable.

Center for Disease Control.

In **1975 and 1985**, formal written guidelines on hand washing practices were published by the **Center for Disease Control**. These guidelines recommended hand washing with non-antimicrobial soap between services to patrons. Use of waterless antiseptic agents (alcohol-based solutions) was recommended only in situations where sinks were not available.

In **1988 and 1995**, guidelines for hand washing and hand antisepsis were published by the **Association for Professionals in Infection Control**. Recommended indications for hand washing were similar to those listed in the CDC guidelines.

The **1995** APIC guideline included more detailed discussion of alcohol-based hand rubs and supported their use in more public settings than had been recommended in earlier guidelines.

In **1995 and 1996**, the **Healthcare Infection Control Practices Advisory Committee** recommended that either antimicrobial soap or a waterless antiseptic agent be used. These guidelines also provided recommendations for **hand washing and hand antisepsis** in other public settings.

Transmission of Pathogens on Hands

Transmission of pathogens from one person to another happens when:

- Organisms present on the patron's skin transfers to the hands of the Salon Professional
- Hand washing or hand antisepsis by the Salon Professional are inadequate or omitted entirely, or the agent used for hand hygiene is inappropriate.
- The contaminated hands of the Salon Professional comes in direct contact with another person, or with an inanimate object that will come into direct contact with a person

Pathogens can be transported from one person to another. The number of organisms present on the skin varies.

Persons with diabetes, patients undergoing dialysis for chronic renal failure, and those with chronic dermatitis are more likely to have colonized organisms. We shed microorganisms daily from normal skin onto nightgowns, bed linen, bedside furniture, and other objects in our environment.

Scientific Study of Hand Washing

Investigators use different methods to study hand washing, antiseptic hand wash, and surgical hand antisepsis protocols.

Differences among the various studies include:

- whether hands are purposely contaminated with bacteria before use of test agents,
- the method used to contaminate fingers or hands,
- the volume of hand-hygiene product applied to the hands,
- the time the product is in contact with the skin,
- the method used to recover bacteria from the skin after the test solution has been used, and
- the method of expressing the effectiveness of the product

Despite these differences, the majority of studies can be placed into one of two major categories:

- studies focusing on products to remove transient flora and
- studies involving products that are used to remove resident flora from the hands

The majority of studies of products for removing transient flora from the hands involve artificial contamination of the volunteer's skin with a defined test organism before the volunteer uses a plain soap, an antimicrobial soap, or a waterless antiseptic agent.

In the United States, antiseptic hand wash products are regulated by FDA's Division of Over-the-Counter Drug Products (OTC).

Products are evaluated by using a standardized method. Tests are performed in accordance with use directions for the test material.

Plain (Non-Antimicrobial) Soap

Soaps are detergent-based products that contain esterified fatty acids and sodium or potassium hydroxide. They are available in various forms including bar soap, tissue, leaflet, and liquid preparations. Their cleaning activity can be attributed to their detergent properties, which result in removal of dirt, soil, and various organic substances from the hands.

Plain soaps have minimal, if any, antimicrobial activity. However, hand washing with plain soap can remove loosely adherent transient flora. For example, hand washing with plain soap and water for 15 seconds reduces bacterial counts on the skin by 0.6--1.1, whereas washing for 30 seconds reduces counts by 1.8--2.8.

Alcohols

The majority of alcohol-based hand antiseptics contain either isopropanol, ethanol, n-propanol, or a combination of two of these products.

The majority of studies of alcohols have evaluated individual alcohols in varying concentrations. Other studies have focused on combinations of two alcohols or alcohol solutions containing limited amounts of hexachlorophene, quaternary ammonium compounds, povidone-iodine, triclosan, or chlorhexidine gluconate.

Alcohols, when used in concentrations present in alcohol-based hand rubs, also have activity against several viruses.

For example, 70% isopropanol and 70% ethanol are more effective than medicated soap or nonmedicated soap in reducing viruses on fingers. Products containing 60% ethanol were also found to reduce the presence of viruses.

Other viruses such as hepatitis A and the polio virus may require 70%--80% alcohol to be reliably inactivated. However, both 70% ethanol and a 62% ethanol foam product with emollients reduced hepatitis A virus on whole hands or fingertips more than nonmedicated soap.

Both were equally as effective as antimicrobial soap containing 4% chlorhexidine gluconate in reducing reduced viral counts on hands. In the same study, both 70% ethanol and the 62% ethanol foam product demonstrated greater virucidal activity against polio virus than either non-antimicrobial soap or a 4% chlorhexidine gluconate-containing soap.

However, depending on the alcohol concentration, the amount of time that hands are exposed to the alcohol, and viral variant, alcohol may not be effective against hepatitis A and other viruses. Alcohol can prevent the transfer some pathogens.

Alcohol-based products are more effective for standard hand washing than soap or antimicrobial soaps.

The effectiveness of alcohol-based hand-hygiene products is affected by several factors, including:

- the type of alcohol used,
- concentration of alcohol,
- contact time,
- volume of alcohol used, and
- whether the hands are wet when the alcohol is applied.

Frequent use of alcohol-based formulations for hand antisepsis can cause drying of the skin unless emollients, humectants, or other skin-conditioning agents are added to the formulations. The drying effect of alcohol can be reduced or eliminated by adding 1%--3% glycerol or other skin-conditioning agents.

Moreover, in several recent prospective trials, alcohol-based rinses or gels containing emollients caused substantially less skin irritation and dryness than the soaps or antimicrobial detergents tested. These studies, which were conducted in clinical settings, used various subjective and objective methods for assessing skin irritation and dryness. Further studies are warranted to establish whether products with different formulations yield similar results.

Alcohols are flammable. As a result, alcohol-based hand rubs should be stored away from high temperatures or flames in accordance with National Fire Protection Agency recommendations.

Chlorhexidine

Chlorhexidine was developed in England in the early 1950s and was introduced into the United States in the 1970s.

It has antimicrobial activity. Chlorhexidine's immediate antimicrobial activity occurs more slowly than that of alcohols. Chlorhexidine has good activity against some bacteria, somewhat less activity against other bacteria and fungi. It has activity against some viruses such as herpes simplex virus, HIV, and influenza.

Chloroxylenol

Chloroxylenol is a phenolic compound that has been used as a preservative in cosmetics and other products and as an active agent in antimicrobial soaps. It was developed in Europe in the late 1920s and has been used in the United States since the 1950s.

The antimicrobial activity of PCMX is attributable to inactivation of bacterial enzymes and alteration of cell walls. It has good activity against certain organisms and fair activity against some bacteria, and certain viruses.

Hexachlorophene

In the 1950s and early 1960s, emulsions containing 3% hexachlorophene were widely used for hygienic hand washing, as surgical scrubs, and for routine bathing of infants in hospital nurseries. The antimicrobial activity of hexachlorophene results from its ability to inactivate essential enzyme systems in microorganisms.

Studies of hexachlorophene as a hygienic hand wash and surgical scrub demonstrated only modest efficacy after a single hand wash. Hexachlorophene has residual activity for several hours after use and gradually reduces bacterial counts on hands after multiple uses. It has a cumulative effect. With repeated use of 3% hexachlorophene preparations, the drug is absorbed through the skin.

Iodine and Iodophors

Iodine has been recognized as an effective antiseptic since the 1800s. However, because iodine often causes irritation and discoloring of skin, iodophors have largely replaced iodine as the active ingredient in antiseptics. Iodine molecules rapidly penetrate the cell wall of microorganisms and inactivate cells by forming complexes with amino acids and unsaturated fatty acids, resulting in impaired protein synthesis and alteration of cell membranes.

The majority of iodophor preparations used for hand hygiene contain 7.5%--10% povidone-iodine. Formulations with lower concentrations also have good antimicrobial activity because dilution can

increase free iodine concentrations. However, as the amount of free iodine increases, the degree of skin irritation also may increase.

Quaternary Ammonium Compounds Quaternary ammonium compounds are the most widely used as antiseptics.

Quaternary ammonium compounds are primarily bacteriostatic and fungistatic, although they are microbicidal against certain organisms at high concentrations.

In the United States, these compounds have been seldom used for hand antisepsis during the last 15--20 years. However, newer hand washing products containing benzalkonium chloride or benzethonium chloride have recently been introduced for use.

A recent study of surgical intensive-care unit personnel found that cleaning hands with antimicrobial wipes containing a quaternary ammonium compound was about as effective as using plain soap and water for hand washing; both were less effective than decontaminating hands with an alcohol-based hand rub. One laboratory-based study reported that an alcohol-free hand-rub product containing a quaternary ammonium compound was effective in reducing microbial counts on the hands of volunteers.

Triclosan

Triclosan is a nonionic, colorless substance that was developed in the 1960s. It has been incorporated into soaps and into other consumer products. Concentrations of 0.2%--2% have antimicrobial activity. Triclosan has a broad range of antimicrobial activity. It is classified as safe and effective for use as an antiseptic hand wash.

Other Agents

Certain other agents are being evaluated by FDA for use in health-care-related antiseptics. However, the effectiveness of these agents has not been evaluated adequately for use in hand washing preparations.

Irritant Contact Dermatitis Resulting from Hand-Hygiene Measures

Frequency of Irritant Contact Dermatitis

Frequent and repeated use of hand-hygiene products, particularly soaps and other detergents, is a primary cause of chronic irritant contact dermatitis.

This is of great concern to Cosmetologists and all Salon Professionals in the Personal Service Industry.

The potential of detergents to cause skin irritation can vary considerably. Irritation associated with antimicrobial soaps may be caused by the antimicrobial agent or by other ingredients of the formulation. Affected persons often complain of a feeling of dryness or burning; skin that feels rough or even scaling.

Detergents can damage the skin. Irritant contact dermatitis is more commonly reported with iodophors. Other antiseptic agents that can cause irritant contact dermatitis (in order of decreasing frequency) include chlorhexidine, triclosan, and alcohol-based products.

Skin that is damaged by repeated exposure to detergents may be more susceptible to irritation by alcohol-based preparations.

Allergic Contact Dermatitis Associated with Hand-Hygiene Products

Allergic reactions to products applied to the skin may present as delayed type reactions or less commonly as immediate reactions. The most common causes of contact allergies are fragrances and preservatives; emulsifiers are less common causes. Liquid soaps, hand lotions or creams, and may contain ingredients that cause contact allergies.

Allergic reactions to antiseptic agents, including quaternary ammonium compounds, iodine or iodophors, chlorhexidine, triclosan, and alcohols have been reported. Allergic contact dermatitis associated with alcohol-based hand rubs is uncommon.

Allergic reactions to alcohol-based products may represent true allergy to alcohol, allergy to an impurity or aldehyde metabolite, or allergy to another constituent of the product.

Allergic contact dermatitis or immediate contact reactions may be caused by ethanol or isopropanol.

Allergic reactions can be caused by compounds that may be present as inactive ingredients in alcohol-based hand rubs, including fragrances, benzyl alcohol, stearyl or isostearyl alcohol, phenoxyethanol, myristyl alcohol, propylene glycol, parabens, and benzalkonium chloride.

Proposed Methods for Reducing Adverse Effects of Agents

Potential strategies for minimizing hand-hygiene--related irritant contact dermatitis include reducing the frequency of exposure to irritating agents (particularly detergents), replacing products with high irritation potential with preparations that cause less damage to the skin, and increasing education on hand care.

Hand lotions and creams often contain humectants and various fats and oils that can increase skin hydration and replace altered or depleted skin lipids that contribute to the barrier function of normal skin.

MRSA

Methicillin-Resistant Staphylococcus Aureus

An outbreak of “USA300 strain” **MRSA: methicillin-resistant Staphylococcus aureus** occurred in a Cosmetologist and 2 of her customers.

Eight other persons, who were either infected or colonized, were linked to this outbreak, including a family member, a household contact, and partners of customers.

The CA-MRSA USA300 strain is known to cause outbreaks among population groups, such as:

- native Americans,
- prison inmates,
- military personnel,
- men who have sex with men, and
- competitive sports participants,
- and accounts for 97% of MRSA isolates obtained in emergency departments across the United States from patients with soft tissue infections.

CA-MRSA is associated with invasive infections. The USA300 strain, which is also found in Europe was first isolated in the Netherlands in 2002.

Overall prevalence of MRSA in the Netherlands is low (2%). In 2006, 3.8% of all MRSA isolates sent to the National Institute for Public Health were identified as the USA300 strain.

We report an outbreak of the USA300 strain related to a Beauty Salon in the Netherlands, in a:

- Cosmetologist
- A family member
- A household contact and
- Customers and their partners.

The Study of MRSA

In September **2005**, a medical microbiologist from the regional medical microbiology laboratory **reported** to the municipal health department a **recurring MRSA infection in a Cosmetologist**. From **December 2004** onwards, the woman had recurrent infections on the:

- ✓ legs,
- ✓ buttocks, and
- ✓ groin

resulting in treatment to include incision and drainage of lesions. When an abscess developed in the genital area in **July 2005**, MRSA was cultured from a wound swab.

In **December 2005**, the Cosmetologist was declared MRSA-free after antimicrobial treatment.

Swabs were taken 3 times in 1-week intervals from:

- nose,
- throat,
- perineum, and
- wound

and used for enrichment culture of MRSA. In **March 2006**, the woman was tested again for MRSA colonization; test results showed that she had been reinfected or that therapy had failed. The Cosmetologist had eczema. Because of the "hands on" nature of her work, she was advised to temporarily stop providing services to customers.

The municipal health department conducted a risk assessment of the woman's household contacts and the Beauty Salon. **The Netherlands does not require that MRSA infections be reported**. Therefore, the municipal health department depends upon the consent and full cooperation of index patients and contacts for further investigation of outbreaks. Consequently, in this instance, household contacts for screening were identified but had not presented themselves for screening. Contacts who had complaints sought treatment at the emergency department, where the observant infection control practitioner and microbiologists related them to the MRSA outbreak.

Nurses obtained specimens by swabbing each patient's nose, throat, and wounds. A case was defined as a patient who had a culture-confirmed MRSA infection during the outbreak period July 2005–

December 2006 and a direct epidemiologic link to the index patient.

In April 2006, a **salon customer** was hospitalized with an **abscess of the breast caused by MRSA**; in July 2006, **another customer** who had had **boils** since February 2006 was found to be **MRSA positive**. **Both customers had been given wax treatments by the Cosmetologist during the period in which she had an infected hair follicle in her armpit.**

Swabs taken from this site showed that the beautician was infected with the same MRSA strain as before. Concern arose about the risk for infection to customers through:

- instruments,
- materials (wax), or
- contact with other employees.

The index patient and the other 6 employees of the salon regularly provided services to each another. A nurse and a member of the municipal health department visited the salon in June 2006 to check on hygiene protocols and to advise on preventive measures to reduce risk for further transmission. All working procedures and protocols were investigated, and the salon was advised to clean and disinfect instruments and procedure rooms. More specifically, the health department observed a total waxing procedure performed by the staff.

Ten swabs were taken from:

- used wax,
- wax implements, and
- the treatment room.

All 6 employees were screened and informed about MRSA and the current situation. Arrangements were also made to test 22 regular customers who had received wax treatments by the index patient in the previous 2 months. In the following weeks, these customers were screened at the municipal health office and informed about MRSA. Of the 22 regular customers, 21 completed a questionnaire and 19 were actually screened for MRSA by culturing samples from nose and throats.

All employees and the 19 selected regular customers were negative for MRSA colonization. All environmental swabs were also negative for MRSA. It was noted that the 70% alcohol used to disinfect the skin after waxing was diluted with water because customers had complained about the stinging effect of the alcohol on treated skin. Furthermore, it became apparent that after performing waxing treatments the Cosmetologist would touch the waxed skin of customers with ungloved hands to check for remaining hairs. She did not wash her hands after removing the gloves.

During the outbreak investigation, more background information became available from those who were MRSA colonized or infected and who could be indirectly linked to the beautician or her customers. During the week that the first infected customer was identified (in April 2006), another customer was hospitalized with an abscess in the groin. Unfortunately, no culture was taken from this patient. The partner of the second infected customer was also infected with MRSA that was related to an abscess on his leg.

By the end of 2006, a MRSA-positive couple was identified as a contact of the second infected customer. In August 2006 another couple was reported to be MRSA positive; both had abscesses on the thighs. Because no further epidemiologic data could be obtained, whether the couple's infection was linked to the beauty salon is not clear.

A total of 45 persons who had been in direct or indirect contact with the beautician were screened for

MRSA:

- 3 family members
- 3 roommates
- 11 other persons (including secondary contacts)
- 6 beauty salon employees and
- 22 customers (including regular customers)

Fifteen persons had skin infections and 10 of them were colonized with MRSA

- Cosmetologist
- family member
- roommate
- ex-partner of the roommate
- customers and
- partners of customers

Although skin infections never developed in the Cosmetologist's family members, tests did show MRSA colonization in one of them. The beautician's boyfriend, a native of the United States, had already lived for 2 years in the Netherlands.

Although he had skin lesions, no MRSA was found. The girlfriend of a sport mate who regularly exercised with the partner of a customer was colonized with MRSA at the end of 2006.

She had immigrated recently from the United States to the Netherlands, but her first screening test results were negative. The mean age of the patients was 29 years (range 21–40 years).

Eleven people were found to be MRSA positive.

Of these 11:

- 3 persons with a direct link to the beauty salon (the Cosmetologist and 2 customers)
- 6 with an indirect link (family member, roommate, ex-partner of roommate, partner of a customer, sport mate of partner of a customer and his partner), and
- a couple from whom no epidemiologic data could be obtained were infected with the same MRSA strain as the Cosmetologist.

All MRSA isolates were identical and identified as the well-known CA-MRSA USA300 strain.

All MRSA isolates had identical susceptibility patterns: resistant to oxacillin (and thus to all β -lactam antimicrobial drugs) and erythromycin, and susceptible to rifampicin, ciprofloxacin, gentamicin, clindamycin, vancomycin, teicoplanin, tetracycline, cotrimoxazole, mupirocin, and fusidic acid.

Conclusions

Outbreaks of CA-MRSA strains have been reported with increased frequency. Several reports involved outbreaks among:

- competitive sports participants
- military personnel
- men who have sex with men
- prisoners
- native Americans
- and drug users

Skin treatments in a beauty salon likely led to MRSA transmission as a result of contact with an infected Cosmetologist. Unless outbreaks occur in a defined group, MRSA remains undetected in the general population because reporting is not mandatory. Although the prevalence of MRSA in the Netherlands is low, local microbiologic laboratories should report outbreaks, when detected, to the local municipal health department for further investigation. More research is necessary to better understand the risk factors involved in these outbreaks.

Lesson 2

Diseases and Disorders of the Skin

Learning objectives:

After completing this lesson you will be able to:

- List purposes of the skin
- Describe the composition of skin
- List the layers of the skin
- Explain structural attributes of the skin
- Explain skin functions
- Describe the different types of bacteria
- Identify types of infections
- List classifications of parasites
- Explain bloodborne infections
- List descriptive terms for disease
- Name conditions of the skin
- Explain pigment disorders
- Identify factors that effect skin health
- Describe terms relating to disorders

The skin can reflect the overall health of the human body. The appearance of the skin can change as well as it's level of health. Biological aspects can change the skin as well as external environmental exposures.

Conditioning the outer layer of the skin is one of the most popular applications of skin care. Some modern treatments or skin conditioners contain ingredients that can cause action of the skin itself, such as stimulating blood flow.

Purpose

Skin has different textures and qualities according to the different locations on the body.

It can vary in color even on the same person.

The skin can be delicate in places and thinner. In other locations, the skin can be thicker and not as sensitive to environmental issues.

Skin has miraculous abilities built in to it's makeup. It is self healing and renews itself.

The outer layer renews about every thirty days.

The skin is a living organ that is so intricate that it can conduct many actions simultaneously and consistently.

The skin measures as the largest organ of the body.

It's main function is to protect.

It's massive and complete coverage protects all internal organs, bones and tissues.

It protects in many complex ways. It acts as a barrier to keep out harmful bacteria and foreign objects.

A normal and healthy function of the skin is that it regulates temperature. It promotes action to cool us down when we are overheated, and it acts to heat us when we are very cold.

The skin will create "goose bumps" in an attempt to increase the thickness of the skin thus warming the body.

The skin will produce perspiration in an attempt to wet the skin thus a cooling effect.

The skin has many protect qualities. The skin is designed with many nerve endings that sense temperature, touch and pain.

It also has absorbing qualities that allows the rays of the sun to penetrate the top later.

Composition

The skin is made up of layers>

There are 3 main layers: The epidermis, the dermis and the deep connecting tissues.

There a total of 5 layers including the sub layering.

Function

Within the deeper layers of the skin, is where the body grows the renewing skin cells.

The deeper skin creates and places the skin cells outward to the outer layer.

The outer layer contains protein keratin.

It is the inner layer that feeds the outer layer.

The health of the body can be revealed by the appearance or the skin. The skin will have a healthy look to include a supple feel.

Anatomy and Biology

The dermis is the internal layer.

It is thick and it is the deepest part of the skin.

It contains nerve endings, hair follicles, blood vessels and the sebaceous glands.

It consists of collagen and elastin.

The combination of collagen and elastin is what gives the skin its ability to have the movement and density to contain the glands, follicles and nerve endings.

One of the most essential elements important to skin health is sebum. It is the skin's lubricant and is produced by the sebaceous glands.

Body oil has a protective quality. It helps protect the skin from invading bacteria.

Chemical actions within the body cause the sebaceous gland to activate thus controlling the amount of oil produced.

For faces, the skin must be cleansed of this oil before building up in the pores. The build-up of oil can cause clogged pores and outbreaks.

The outer layer of skin is called the epidermis.

The inner layer of skin is called the dermis.

The epidermis allows light to pass partially through it and is quite translucent in design.

There are no blood vessels in the epidermis but gets its nutrients from the underlying dermis.

Oxygen is passed from the dermis to the epidermis.

Underneath the epidermis is a membrane layer. This is called the basement membrane.

Underneath the dermis is a fat layer. This is called the subcutaneous fat.

The thickness of the dermis layer differs from person to person as does the amount of fat contained therein.

The subcutaneous fat directly covers our bones and muscles and is attached to them by connective tissues.

Healthy Skin

Healthy skin has good blood circulation. And in all skin tones, healthy skin will tend to have a rosy color when good blood circulation is present.

However when good blood circulation is not happening, the skin can have a bluish tonal quality.

This can happen if a person has health challenges but also can happen when you become cold.

When the body becomes overly cold, the body fights to keep its blood near the internal organs, thus leaving the skin with less blood. This causes a bluish appearance to the skin.

Differences

The skin is most thick on the palms of the hands and on the soles of the feet.

The skin is the thinnest around the eyes.

Thinner skin tends to be more sensitive to touch, temperature, pressure and environmental exposures.

Sometimes, where the skin is thinner, you can see the blood vessels in the underlying dermis.

Key Terms

Absorption	Substances can enter the body through the skin.
Excretion	Sweat glands within the skin puts out perspiration.
Heat regulation	Skin maintains our 98.6 °F body temperature.
Protection	Skin protects us from bacteria and viruses.
Secretion	Sebum is created by the sebaceous glands within the skin.
Sensation	Feeling cold, heat, pain and pressure.

All functions of the skin are necessary for life to the human body. The break-down of functions can determine our level of health and determine quality of life.

Our skin is a single organ that has many functions.

Water conservation is a key function of the skin.

The epidermis has three main functions:

- protecting the body from the environment such as the sun
- preventing too much water loss from the body
- protecting the body from bacterial invasion

Epidermis is made up of:

- the stratum corneum
- keratinocytes
- the basal layer

Dermis:

The dermis, the middle layer, contains:

- blood vessels
- collagen bundles
- fibroblasts
- hair follicles
- lymph vessels
- nerves
- sweat glands

Subcutis:

The subcutis, the deepest layer, contains:

- collagen
- fat cells

Environmental Impact on the Skin

The first element in our environment that comes to mind is definitely the sun. The sun is key in giving life to plants, animals and humans on the earth. Nothing can live without the sun.

There are certain issues though that can effect the skin. The outer layer of the skin allows amounts of light rays to penetrate because the epidermis is quite translucent.

It is ultraviolet radiation that is the penetrating factor within the suns rays. UV rays can cause the skin to burn. When too much UV rays are absorbed, this creates damage and causes the skin to become red and tender to the touch.

The surface of the skin has a layer called the stratum corneum. It is what causes the sunlight to be absorbed but it also has reflective qualities and some scattering qualities.

Sunburn

Effects of the sun can show up in different ways.

Overexposure and sunburn can occur and cause the skin to become red and swollen.

It often causes pain and blisters can form.

The person can experience fever, chills and profound weakness in their body.

The skin where the burn has occurred will begin peeling after a few days and become itchy and dry.

This is the natural healing process that the body possesses. The stages of healing must occur in order to produce new skin and shed off the damaged.

Moisture of the Skin

The skin always contains a certain amount of water. The amount of water can vary but without moisture the skin would die.

The skin has a natural level system that occurs carefully balancing the amount needed.

The skin allows evaporation by allowing the body to perspire. The skin regulates the amount of water loss in order to contain the perfect amount for a healthy body.

Cell Regeneration

New skin cells are generated from deep within the dermis. These cells are pushed outward toward the epidermis thus renewing the skin. This is when repairs are made and healing occurs.

As we age the ability of regeneration can slow down. Collagen no longer is produced in the same amounts causing the skin to become less flexible. The skin becomes thinner during the aging process.

The ability to heal slows down so special attention should be given to aging skin that proper preventive care is taken to avoid injury or sunburn.

For example, wearing makeup with sunproof (SPF) ingredients is beneficial.

SPF ingredients help the skin to reflect UV rays preventing harmful absorption.

We know that the skin produces oil. The sebaceous glands that live within the skin creates sebum. Sebum has protective qualities and helps keep the body from invading bacteria.

With aging skin, the sebaceous glands tend to produce less oil.

It is beneficial for older skin to be moisturized with lotions and oil based products.

Sweat production can decrease in aging skin. Being aware of this fact is crucial in caring for yourself or others going through the later stages of aging. Preventing overheating of the body is necessary in the aged. Since the skin decreases in it's ability to cool the body, we must make the necessary changes that keep us cooler especially in hotter climates or warmer weather.

As for oil production, we can prevent further oil loss by choosing the proper soaps, deodorants and body care products that we use.

The aged skin can develop areas of discoloration. Some call these areas "age spots". They are a natural occurrence and should be no cause for alarm. Dermatologists can improve the appearance of age spots. They can occur anywhere on the body. Also the skin can create enlarged blood vessels that can be seen on the skin. Where there were no signs of these vessels before, they can develop over time.

Bacteriology

Germ Science

Bacteriology is the scientific study of bacteria.

There are separate types of bacteria.
There is good bacteria and bad bacteria.

Bacteria can kill and bacteria can help the body to heal.

For the bad bacteria, there is no substitution for sanitation and sterilization of your environment.
Killing or reducing bacteria is the first step in preventing body invasion and infection.

Proper cleaning of the environment is essential as well as proper cleaning of the body.
Proper hygiene of the body and hands is crucial in personal health.

To prevent the spread of scalp bacteria, you should take special care to make sure that brushes and combs are sanitary and are not shared.

Non Pathogenic Bacteria

Harmless bacteria is called non pathogenic meaning that it is incapable of causing disease.

Pathogenic Bacteria

Bacteria that cause disease are called pathogenic bacteria.

For a pathogenic bacteria to cause disease, it must first invade the body.
There are many types of pathogenic bacteria.
They can create disease within any part of the body.
Pathogens can travel through the bloodstream and manifest in different areas of the skin as well.

When pathogens spread throughout areas of cities, towns or countries it is considered to be an epidemic.

Growth

Bacteria can be parasitic or non-parasitic.
Fungi are parasitic, as they need a host in which to thrive.
Parasitic bacteria draw nutrients from a host in order to live, grow and multiply.

Viruses

Viruses are organisms that cause disease.
The virus is parasitic in nature requiring a living host in which to live, grow and multiply.

The most commonly known example of a virus is the flu virus (influenza).

Influenza is a viral infection of the lungs.
The virus causes coughing, higher than normal body temperature and body pain.
If the body's immune system is weak the infected person could die.

There are three types of influenza:

Influenza A

Influenza A is the most common type of flu in America.
It can infect humans and animals.

Influenza B

Influenza B is the second most common type of flu in America.
It infects most often the elderly because of their weakened immune systems.

Influenza C

Influenza C is common but can be undetected because of it's lack of symptoms.

Parasites

A parasite is an organism that lives on or in a host.

There are three main classes of parasites that can cause disease in humans:

Protozoa

**Helminths and
Ectoparasites**

Protozoa

Protozoa are microscopic.
They can live with or without a host.
When inside a human host, they can multiply and cause infection.

Helminths

Helminths are larger but still can not be easily seen because they are so small.
They can live with or without a host.

Ectoparasites:

Ectoparasites can be seen and include insects such as fleas, lice, mites, mosquitos and ticks.
They need a host to live and can either attach themselves to the host or burrow into the host.

Blood-borne Parasites

Some parasites are blood-borne meaning that the parasite lives and thrives in the bloodstream. It is a highly contagious condition.

Parasites can live in the human intestine as well.

Parasites can enter the body through drinking water, food or a contaminated object that comes in contact with the mouth.

Diseases and Conditions

Key Terms:

Acute	Severe symptoms.
Allergy	Physical reaction by the skin due to exposure to a substance.
Chronic	Recurring and long duration of symptoms
Contagious	Communicable
Dermatologist	Physician who specializes in the medical practice of the skin
Dermatology	The study, analysis and treatment of skin.
Diagnosis	Recognition of a disease by its symptoms
Disease	The pathological interference of the normal function of the body or it's parts
Disorder	An abnormal condition that is usually not contagious
Epidemic	Wide spread disease that affects a large number of people
Etiology	The study of the causes of diseases
Immune	When the body is totally resistant to a certain disease.
Immunity	Refers to the body's level and ability to be resistant to disease.
Infectious	The ability of a bacteria to enter the body
Inflammation	A skin disorder characterized by redness, pain, edema, and heat.
Occupational	Due to the activity of your job, possibly repetitive.
Parasitic	The type of any condition caused by animal or vegetable parasites.
Pathogenic	Any disease whose origin is bacterial
Pathology	The study of disease .
Prognosis	The predetermination, using educated insight, of the probable course of a disease.
Seasonal	Effects due to the exposure of changes in weather occurring throughout the year.
Subjective symptom	A symptom that can be felt but not seen

In the salon, you will assuredly come in contact with diseases and disorders of the skin. You are responsible for being able to recognize infectious diseases and conditions that should be referred to a physician.

Key Terms:

Albinism	Congenital condition in which there is an absence of melanin pigment.
Chloasma	Patches of increased deposits of pigment in the skin are also known as liver spots.
Leucoderma	Light patches on the skin due to congenital defective pigmentations.
Naevus	A birthmark also known as portwine or strawberry that can be small or large and that includes the malformation of skin due to pigmentation or dilated capillaries.
Lentigo	Small spots that can be yellow to brown in color.
Vitiligo	The type of condition of leucoderma that can affect skin or hair.

Vitiligo

Vitiligo is a skin disorder.

At any area of the body, the skin will develop white patches or white blotches.

The cells that make pigment become destroyed and can no longer make pigment thus resulting in white patches on the skin.

The cells that produce pigment are called melanocytes.

Vitiligo can not only effect the skin but also mucous membrane tissues such as in the eyes, nose or mouth.

Although scientists are unsure of the cause, it appears to be an action of the autoimmune system. It is unknown what causes the immune system to turn on parts of the skin in this way.

Most people who have the condition, have it by the age of 40.

It is estimated that two to five million people in the U.S. Have it.

Research shows that those who already have a known autoimmune disease have a higher tendency to get Vitiligo.

It is also thought to be an inherited trait.

The areas of the skin that is most exposed to the sun tend to have the most areas of white patches.

Key Terms:

Keratoma	The callus. It is the superficial, round, thickening of the epidermis caused by friction. If it grows inward it is called a corn.
Mole	A small spot on the skin that can be flat or raised. It is sometimes genetically inherited and it's colors can range from tan to brown or bluish black.
Polyp	A growth on the body that sometimes extends from the surface of the skin and others within the skin.
Skin Tag	A bead-like fibrous tissue that protrudes from the surface of the skin and is sometimes a dark color
Verruca	A wart, a viral infection of the epidermis and non cancerous.

Moles

Moles are very common and are most often not a cause for concern.

However, moles do have a risk for becoming cancerous and any changes should be noted and examined by a physician.

Warts

Warts are never cancerous.

They are a skin growth caused by the papilloma virus.

All ages of people can develop a wart.

Being a virus, warts are contagious.

They can spread to different areas of the body and they can also spread from person to person.

Key Terms:

common warts	Located around the nails and the back of the hands, rough surfaced, grayish-yellow or brown in color
foot warts	located on the soles of feet (plantar warts) with black dots (clotted blood vessels that once fed them); clusters of plantar warts are called mosaic; can be painful
flat warts	small, smooth growths that grow in groups up to 100 at a time; most often appear on children's faces
filiform warts	small, long, narrow growths that usually appear on eyelids, face, or neck

Inflammatory Conditions

Key Terms:

Eczema	Dry or moist lesions accompanied by itching and burning that usually has red-blisters and oozing.
Psoriasis	Lesions that are often round and are dry. Occurring in patches, they are covered with coarse, silvery scales. When irritated, they bleed. Although it spreads on the patient, it is not contagious.

Psoriasis

Psoriasis is a chronic skin condition.

It causes inflammation and raised areas that often develop as silvery scales.

It occurs most often on the scalp and elbows but can also occur on the knees and lower back.

Psoriasis affects millions of people all over the globe.

The cause is unknown.

Scientists conclude that it is not contagious but is thought to be an inherited condition.

Types and symptoms of Psoriasis

There are several types of Psoriasis.

Discoid Psoriasis

Also called plaque psoriasis, this type of psoriasis is the most common. Symptoms may include patches of red, raised skin on the trunk, arms, legs, knees, elbows, and scalp. Nails may also thicken, become pitted, and separate from the nail beds.

Guttate Psoriasis

This type of psoriasis affects mostly children. Symptoms may include many small patches of red, raised skin. A sore throat usually precedes the onset of this type of psoriasis.

Pustular Psoriasis

Symptoms may include small pustules (pus-containing blisters) all over the body or just on the palms, soles, and other small areas.

Key Terms:

Dermatitis Medicamentosa	Dermatitis that occurs after an medical injection.
Dermatitis Venenata	Allergy to ingredients in cosmetics.
Urticaria	Hives and inflammation caused by an allergy to specific drugs or foods.

Contact Dermatitis

Contact Dermatitis is a condition of the skin that occurs as a reaction to an allergen. When the skin comes in direct contact with the irritant it triggers the response. Sometimes the reaction is immediate and sometimes it can take several days after exposure.

Causes

The most common causes of allergic contact dermatitis:

- clothes detergent
- food
- body soap
- perfume
- shampoo

Less common causes of allergic contact dermatitis:

- cosmetic ingredients
- medications
- metals
- plants

Cosmetics

Cosmetic ingredients are often a source of allergic reaction.

That is why several cosmetic companies develop product lines that are formulated with ingredients that are not commonly known to cause allergic responses in most people.

Hair color is a very common allergen among many people which is why an allergy test is mandatory before a professional gives a color service.

Medications

Many “mycin” drugs cause allergic reactions in people. The mycin family of drugs are antibiotics that are available by prescription and over the counter. They come in pill form and topic creams.

Metals

The most common metal allergies are from chrome, mercury and nickel.

Poison Ivy

Many plants can cause contact dermatitis but the best know plant is poison ivy.

Symptoms of contact dermatitis

- blistering of the skin
- itching
- mild redness and swelling of the skin
- thickening of the skin
- scaling of the skin

Key Terms:

Bulla	A blister containing body fluids.
Crust	Scab
Excoriation	An abrasion caused by injury such as a scraped knee.
Fissure	A crack in the skin that penetrates the dermal layer.
Macule	A small, discolored spot or patch on the skin's surface. A freckle is a good example of a macule
Scale	The accumulation of flakes of the epidermal layer.
Ulcer	Open lesions on the skin or mucous membranes.
Vesicle	A blister that contains body fluid within or just beneath the epidermis, an example is poison ivy.
Wheal	An itchy, swollen lesion that is temporary, for example: a mosquito bite.

Contagious disorders of the skin

Fungal Infections

Fungi can live, grow and multiply on the top layer of the skin.

Areas that tend to hold moisture are the most common areas of the body that fungus occurs.

The scalp is an area that tends to hold moisture as well as other parts of the body such as the foot, toes and groin area.

It can cause the skin to blister, itch, scale and swell.

It is a contagious condition that can spread to other parts of the body as well as to other people.

Tinea infections: Ringworm

Ringworm refers to the circular appearance of a fungal infection of the skin.

Fungi is what causes this condition.

It is a vegetable parasite.

It can effect the skin of the scalp, face or neck.

There is an increased risk of becoming infected when a person is undernourished.

Also the increase is much higher in people that do not keep themselves clean.

Those who live in warmer parts of the world have even a greater tendency to become infected with ringworm.

You can catch ringworm from an infected person or an infected animal.

There is also a greater risk for becoming infected with ringworm if you have a weakened immune system.

Cancer

Key Terms:

Basal Cell Carcinoma	The least serious type of skin cancer, containing light or pearly nodules with visible blood vessels.
Malignant Melanoma	The most serious type of skin cancer, containing dark brown, black, or discolored patches on the skin.
Squamous Cell Carcinoma	Scaly, red papules.
Tumor	Abnormal growth of swollen tissue.

At risk

Lighter skinned people have a greater occurrence of skin cancer.

Blond haired people and red haired people with light colored eyes are those with the highest statistics of skin cancer.

Medical statistics suggest that if the trend does not change that nearly half of all Americans will have some type of skin cancer by the time they are sixty-five years old.

Scientific studies show that skin cancer occurs more frequently to those whose ancestors have had skin cancer.

There are other people at higher risk of skin cancer.

They are those who have more exposure to the sun, those who have lots of freckles or moles, and those who had been badly sunburned during their childhood.

Sebaceous Glands

Key Terms:

Acne Rosacea	The chronic inflammatory congestion of the cheeks and nose
Acne Simplex	The chronic inflammatory disorder that usually related to hormonal changes and overactive sebaceous glands
Acne Vulgaris	Acne pimples
Comedones	Blackheads, keratinized cells and hardened sebum
Cysts	Round, body fluid filled sac within the dermis caused by a ruptured follicle
Furuncle	A boil, which is a subcutaneous abscess that fills with pus
Milia	Whiteheads, which is an accumulation of dead, keratinized cells and sebaceous matter trapped beneath the skin's surface
Pimples	A follicle filled with oil, dead cells, bacteria and pus
Seborrhea	Oily Dandruff

Key Terms:

Acne Pit Scar	Sunken appearance, caused by pimples or cysts
Raised Scar	Lump of raised tissue on the surface of the skin, caused where cysts have clumped together
Ice Pick Scar	Large, open pore appearance, as if scarred with an ice pick, caused by deep pimples or cysts

The medical community considers acne to be a skin disorder. It involves hair follicles and the sebaceous glands. This disorder is identified by the presence of pimples and cysts. It is thought that the over production of sebum exacerbates the problem.

The pores where the hair follicles extend, fill with sebum and hardens. This hardening clogs the pore preventing liquid oils to travel properly thus creating the acne problem.

Bacteria sets up in the clogged area creating inflammation. It can be near the surface or deeper in the skin.

Acne can occur anywhere on the body. It occurs most often on the:

- chest
- face
- neck
- shoulders and
- upper back

Manifestations include:

- blackheads
- nodules / firm bumps
- pus-filled lesions
- whiteheads

References and Resources:

Occupational Safety and Health Administration osha.gov

U.S. Environmental Protection Agency epa.gov

Center for Disease Control cdc.gov

Milady's Standard Fundamentals For Estheticians, 9th Edition, (2004) Delmar Learning

Public Health Action Plan to Combat Antimicrobial Resistance

World Health Organization

Milady's Standard Textbook of Cosmetology (2008) Thomson Delmar Learning

Skin: A Natural History (2006) Berkeley: University of California Press

Your Skin and Hair (1986) New York, Bookwright Press

American Medical Association Complete Guide to Women's Health (1996) NY, Random House