Nail Health (8 hours)

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Module 1:Anatomy and Art

Module Outline

- Parts of the Nail
- Nail Disorders, Conditions and Diseases
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Learning objectives:

After completing this lesson you will be able to:

- List and define the parts of the nail
- Identify nail disorders
- Explain infections
- Identify conditions and their effects on the nails
- Identify methods of infection prevention
- Describe terms relating to disorders
- Describe color as it applies to nail art
- Identify foiling and gold leafing
- Identify painting and other art techniques
- Describe nail art brushes

Introduction

The purpose of this study module is to review principles and theories of nail anatomy and other related topics that effect the nail. It is important for the professional manicurist to be aware of all factors relating to the nail and it's surrounding tissues in order to perform nail services in a safe and healthy manor.

The Nail

The nail in it's created form has several functions of the human body. It protects and supports the surrounding tissues of the fingers and toes. Fingernails help us to have more dexterity in our interactions. If we did not have fingernails we would have trouble picking up objects or doing other daily tasks.

Another important function that the nail possesses is that it shows our body's level of health. **The appearance of the nail changes when there are negative health issues going on in our bodies**. This helps physicians to identify certain health issues in their patients.

Another function of the nail is an acquired function. It is cosmetic appearance. As a nation, Americans spend a lot of money on the cosmetic appearance of their nails. Both men and women in modern societies often put significant time and effort into maintaining the appearance and health of their nails.

Nails are created by living skin cells in the fingers and toes. Nails are primarily keratin. Keratin is a type of human protein.

Growth

The nail is created from the matrix area. There is a pattern of nail growth in that new cells are created and followed by more new cells. The nail area, as it progresses toward the free edge contain older and older cells. The cells at the free edge are the oldest cells. Toenails do not grow as fast as the nails of the fingers. Nails also grow according to seasons, for example in the winter, nail growth slows down.

Parts of the Nail:

Cuticle	**the non-living skin that adheres to the nail plate**
Distal Phalanges	the fingertip bones that gives shape to the nail unit and supports the dermis
Eponychium	the skin that covers the newly developing nail plate
Hyponychium	the epidermis under the free edge of the nail plate that forms the water tight seal
Keratin	the hard protein that the matrix produces
Lateral Nail Folds	the sidewall seals along each side of the nail plate
Lunula	the blueish white half-moon shape at the base of the nail, usually most pronounced on the thumb

Matrix	the area under the eponychium, the hidden part of the nail where growth takes place
Nail Bed	the skin beneath the nail plate
Nail Folds	the folds of skin that frame and support the nail on three sides
Nail Plate	the visible part of the nail on fingers and toes made of up of hard keratin
Onychodermal Band	the area between the bed epithelium and the solehorn that bunches together to form a band of delicate tissue - it borders the white free edge under the nail plate.
Proximal Nail fold	the fold nearest the point where the nail attaches.
Solehorn Cuticle	a thin layer of epithelium that attaches to the underside of the nail plate at the free edge and naturally sloughs away as the nail grows

Common Nail Disorders
Medical science places nail disorders into the skin conditions category. Nail disorders make up about 10 % of all skin conditions. Because people are very active with their hands and feet, the nail is highly susceptible to injury and in some cases infection.
The nail will show signs of problems if injured or diseased. It can change shapes as it grows, it can turn different colors and it can also develop dents or ridges.
Change in appearance may indicate a minor health problem. Some changes could indicate a more serious health issue.

White Spots
When the base of the nail is injured, white spots can develop within the nail. The white spots are not harmful and will eventually grow out. This is a very common condition and it reoccurs frequently once they develop. They are most often in the shape of circles or semi-circles.

Splinter Hemorrhages
When blood vessels burst inside the nail bed it can cause what is called splinter hemorrhages. The bleeding or hemorrhaging area runs vertical within the nail and they take on the look of splinters, thus called splinter hemorrhages. This condition is most often caused by trauma to the nail however certain medications and diseases can also cause this condition.

Ingrown Nails
Ingrown nails form at the corner of the nail. The nail most often begins to grow downward and curve into the skin due to repeated pushing or pressure. It happens most often to the large toenail. This condition can be brought about by improperly trimming the nails as well. Tight shoes or improper stance can bring about this condition.

Ingrown nails can be painful and sometimes become infected.

Fungal Infections
Fungal infections can occur to nails of the feet or hands. Fungal infections often cause the end of the nail plate to separate from the nail bed. The nail can become discolored. The top of the nail and the skin at the base of the nail can also become infected and become very painful. **Toenails are more susceptible to fungal infections than fingernails** because of the moist, warm environment. Fungi thrive where moisture and warmth are present. **Fifty percent of all nail disorders are fungal infections.**

Other types of infections can occur in the nail. Some examples of common infections are candida and yeast. Persons whose job keeps their hands wet are more susceptible to this type of infection on their fingernails. Other bodily health issues also raise the level of susceptibility for these infections to occur.

Discoloration and change in nail shape can also occur with this type of infection. Fungal infection of the nail, or onychomycosis, is often ignored because the infection can be present for years without causing any pain. Onychomycosis can also be accompanied by a secondary bacterial or yeast infection in or around the nail plate. Because it is difficult to avoid contact with microscopic organisms like fungi, the toenails are especially vulnerable around damp areas where people are likely to be walking barefoot, such as swimming pools, locker rooms, and showers.

Prevention
- Keep feet and toes clean and inspect them often.
- Keep the feet dry.
- After washing the feet and toes with soap and water, dry thoroughly.
- Wear shower shoes when in public areas such as water parks, pools, spas .
- Change your hosiery more than once daily.
- Trim toenails properly .
- Wear shoes that fit well and are made of materials that allow air exchange.
- Disinfect instruments used to cut nails.
- Don't apply polish to nails suspected of infection

Bacterial Infections
Bacterial infections are recognizable due to the redness and swelling that they cause. The bacteria begins to grow and can cause great pain in the nail skin folds. Bacteria sets up quickly if there is an injury in the nail area or to the skin surrounding the nail. Bacterial infections can cause the nail to turn green.

Germ Science
Bacteriology is the scientific study of bacteria. Bacteria is responsible for some of the most deadly diseases known to man. Diseases such as tuberculosis, typhus, plague, diphtheria, typhoid fever, cholera, dysentery, and pneumonia are all caused by bacterial infections. **Bacteria can live on the hands and nails and can be spread through contact with others or inanimate objects.**

An essential part of preventing the spread of infection in the salon is proper hygiene and sanitation. This includes hand-washing and properly disinfecting implements and surfaces.

Non Pathogenic Bacteria
Non pathogenic means that the bacteria is incapable of causing disease.
Non pathogenic bacteria are harmless.

Pathogenic Bacteria
Pathogenic means that the bacteria does cause disease. Bacteria is capable of causing diseases in humans, in animals, and also in plants.

Viruses
Most infections are caused by either bacteria or viruses.
Influenza is an example of a viral infection. It infects the lungs and is accompanied by fever, cough, and severe muscle aches.

There are three types of influenza
Influenza A - Responsible for regular outbreaks. Influenza A viruses also infect domestic animals like pigs, horses, chickens, ducks and birds.
Influenza B - Often causes sporadic outbreaks of illness, especially in residential communities like nursing homes.
Influenza C - Common but seldom causes disease symptoms.

Viral Infections
Warts are the results of a viral infection. Warts can be found in any portion of the nail area. The nail plate could change shape or be destroyed due to interference of a growing wart. Warts can be painful.

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 are microscopic, one-celled organisms that can be free-living or parasitic in nature. They are able to multiply in humans and can cause serious infections to develop from just a single organism.

Helminths are large, multi-cellular organisms that are generally visible to the naked eye in their adult stages. Like protozoa, helminths can be either free-living or parasitic in nature.

Ectoparasites
Although the term ectoparasites can include a broad range of blood-sucking arthropods such as mosquitoes, this term is generally used to refer to ticks, fleas, lice, and mites that attach or burrow into the skin.

Blood-borne Parasites
Some parasites can be blood-borne. This means two things:

1.The parasite sometimes can be found in the blood stream of infected people; and
2.The parasite might be spread to other people through exposure to an infected person's blood, for example, by blood transfusion or by sharing needles or syringes contaminated with blood.

Appearance of the Nail
The most common health conditions that change the appearance of the nail:

Condition	Nail Appearance
Anemia	Pale nail beds
Diabetes	Yellowish nails, with a slight blush at the base
Heart Conditions	Nail bed is red
Kidney Disease	Half of nail is pink, half is white
Liver Disease	**White Nails**
Lung Diseases	Yellowing and thickening of the nail, slowed growth rate

The appearance of nails can show the initial sign of the presence or onset of systemic diseases. For example, the pitting of nails and increased nail thickness can be manifestations of psoriasis.

Concavity
Nails that are growing in a concave shape (rounded inward) can be because of an iron deficiency in the person.

Contagious Disorders

Athlete's Foot	**Ringworm of the foot.**
Tinea	Ringworm caused by fungus, a vegetable parasite, that includes symptoms of scaling of the skin.
Tinea Unguium	Ringworm of the nails.

Nail Diseases/Disorders

Agnail	The hangnail.
Beau's Lines	Ridges, corrugations and furrows of the nail.
Eggshell Nail	Very thin nail.
Hematoma Nail	A bruised nail.
Leuconychia	The disorder where there are white spots under the nail plate**.**
Onychatrophia	The atrophy or wasting away of the nail.
Onychauxis	The overgrowth of the nail plate.
Onychia	**Inflammation of the nail.**
Onychocryptosis	An ingrown nail.
Onychocyanosis	When the nail is blue due to poor circulation.
Onychogryposis	When the nail is extremely curved like a claw.
Onychophagy	Nail biting.
Onychophosis	The accumulation of horny layers of epidermis under the nail.
Onychosis	Refers to any nail disease.
Paronychia	The inflammation of tissue due to bacteria around the nail.
Tinea Corporis	Ringworm of the hand.
Tinea Pedia	Ringworm of the foot.
Tinea Unguium	Ringworm of the nail, also known as onychomycosis.

Protecting the Manicurist and Pedicurist

Nail Technicians provide a very important and popular service to clients. There are tens of thousands of licensed professionals across America who perform manicures and pedicures daily in hundreds of salons.

Services include nail care, hand care, foot care, manicures, pedicures, nail polishing and the application of artificial nails.

Technical services require the use of many formulations of key products. These products include dynamic active ingredients and can be hazardous to the health of the professional and to their client if not handled properly and professionally.
The minimization to exposure to these ingredients, especially inhalation, must be the highest level of concern for the salon professional.
Overall, product manufacturers have formulated products to help minimize exposure and have tried to lessen negative health effects for the user and client. When products are used in smaller amounts it can minimize exposure.

Even though manufacturers consider exposure when developing their products, it is the responsibility of the product user to do what is necessary to protect themselves and their clients as much as possible during their use.
Injury can happen if improperly handled. Injury can occur to the eyes, nose and lungs. There can also be allergic reactions and sensitivities to certain products or ingredients that only until after this reaction happens that you are aware that you have an allergy.

The Environmental Protection Agency protects the salon professional and their clients by setting regulations.

Decreasing the Inhalation of Salon Products
An exhaust ventilation system must be in place near all working tables of the manicurist. This is in addition to any air conditioning system or heating system that is a standard modern part of the salon.
We must capture and expel vapors, nail filings and chemical powders and dust away from the clients and manicurists.

Tips for Decreasing Inhalation:
- The use of ceiling exhaust systems
- The use of table exhaust systems that are vented to the outside of the building
- The use of air conditioning systems
- The regular replacement of air filters in your air conditioning and heating systems
- The use of electronic air cleaners
- Not using excessive amounts of products when performing services
- Keeping products in small containers at the work table
- Keeping the work table clear of obstructions so your table exhaust system works optimally
- Keeping containers closed tightly containers when not in use
- Not using bulk product containers while performing a service
- Keeping lids on trash cans, emptying trash cans frequently and replacing liners often
- Wearing a dust mask while transferring products from one container to another

Decreasing Skin Exposure to Salon Products

- Wash hands before and after touching a patron or performing a service
- Wash hands before eating or going to the bathroom
- Wash hands after handling products or product containers
- Wear disposable nitrile gloves
- Replace gloves as soon as they are damaged or compromised in any way
- Keep containers tightly closed
- Do not wear clothing that is too loose and could cause accidents with sleeves or other areas getting caught on equipment
- Not using excessive amounts of products when performing services
- Keeping products in small containers at the work table
- Wearing eye protection and gloves while transferring products from one container to another

Prevention of Accidental Swallowing of Salon Products

- Wash hands every time before eating or drinking.
- Never eat or drink in service areas.
- Do not have food or drinks in service areas.
- Do not have salon products in food areas.
- Keep clear and separate areas for eating and working.

A Clean Environment

- Sanitize the salon.
- Dispose of gloves after each customer.
- Use clean unused towels for each customer.
- Clean implements before disinfecting them.
- Disinfect implements after each customer.
- Never give services to unhealthy nails, broken skin or any other signs of unsafe health.
- Before giving the service wash your patrons hands and/or feet.
- Do not use implements brought by customers
- Do not use razor-type shavers to remove calluses.
- Follow your State Cosmetology Board's rules for proper cleaning and disinfection techniques

Safe Practices for the Manicurist

- Label all containers
- Only dispose of waste in accordance to manufacturers' directions or with State regulations
- Do not use outdated MSDS
- Keep copies of MSDS in a binder for each product in your salon that requires it
- Keep copies of state board rules and regulations
- Be trained concerning OSHA rules.
- No smoking by you or patrons inside the salon building.

Important Facts for the Manicurist

- Wearing gloves keeps manicurists from damaging their nails and skin
- Wearing gloves keeps the skin from absorbing ingredients that could cause harm or irritation or allergic reactions to their hands.
- Solvents can be absorbed very quickly by the hands which can be extremely harmful.
- When solvents damage the skin it causes the damaged area to be more susceptible to further absorption and damage by other harmful products.
- Only nitrile gloves provide sufficient protection due to the fact that many product ingredients can penetrate them.
- Look at the MSDS for instructions on what kind of gloves to wear or contact the distributor of the product.
- Wear dust masks to keep from inhaling dust particles
- Wear dust masks when shaping artificial nails or filing natural nails
- Dust masks are approved by the National Institute for Occupational Safety and Health
- There are specific instructions on how to use themselves
- MSDS will advise on which type of mask is best

Product Ingredients	**Symptoms of Overexposure**
Acetone nail polish remover and fingernail glue remover	Headache, dizziness, irritation to skin, eyes, and throat
Benzoyl peroxide powder additive for artificial nails	Irritation to eyes, mouth, throat, nose, and lungs, and skin rash
Butyl acetate nail polish	Irritation to skin, eyes, mouth, nose and throat; skin rash, headache, drowsiness and confusion
Butyl methacrylate artificial nails	Irritation to skin, eyes, skin, mouth, nose, and throat, skin rash, and shortness of breath
Camphor nail polish	Irritation to skin, eyes, mouth, nose and throat, nausea, vomiting, diarrhea, headache, dizziness, and in extreme cases of overexposure, uncontrollable muscle contractions
Dibutyl phthalate nail polish, nail hardener	Irritation to eyes, stomach, and upper respiratory system
Ethyl acetate nail polish, fingernail glue	Irritation to skin, eyes, mouth, nose and throat, skin rash and confusion
Ethyl cyanoacrylate fingernail glue	Irritation to skin, eyes, mucous membranes and skin sensitization
Ethyl methacrylate artificial nails	Irritation to skin, eyes, respiratory track and skin sensitization
Formalin nail hardener	Irritation to skin, eyes, nose, throat and respiratory system, and wheezing.

We have touched on various points regarding the salon environment, product ingredients, and the anatomy and health of the nail. In combination, all points are relevant to the safe performance of salon services for the client as well as for the Manicurist.

Let's turn our attention now to Nail Art.
As you read the following material, think of how you would apply the previous information to the these services. Ask yourself how each of the following services can be performed safely and in a healthy manner as you review their procedures. Consider how you would evaluate the health of the patron's nails, feet and hands in order to perform the following services.

Color schemes
Color schemes are logical combinations of colors of the color wheel. Color schemes are used to create style and appeal. Colors that create a pleasing appearance commonly appear together in color schemes.

A basic color scheme uses two colors that look appealing together. More advanced color schemes involve several colors in combination, usually based around a single color.

For example: fingernails with such colors as **red**, **yellow**, **orange** and light **blue** arranged together on a black background.

Color schemes can also contain different shades of a single color; for example, a color scheme that mixes **different shades of green,** ranging from very light to very dark.

Polish
Traditional colors for nail polish are **red, pink and brown,** but nail polish is manufactured in many colors.

French Manicure
The French manicure is traditionally patterned after the color of natural nails, using a clear, beige or soft pink polish on most of the nail with a white finish at the tips. Reverse French manicures are worn as well but not as often as the traditional French manicure.

Warm and Cool Colors
Warm colors always contain golden undertones.
Cool colors always contain blue undertones.

Nail technicians often use color pallets that stay within the same category. Either all of the colors in the pallet will be cool, or all of the colors in the pallet will be warm.

Most professionals agree that staying within one category creates a more esthetically appealing look. Using colors from opposing categories tends to create a more contrasting look with less cohesiveness in appearance.

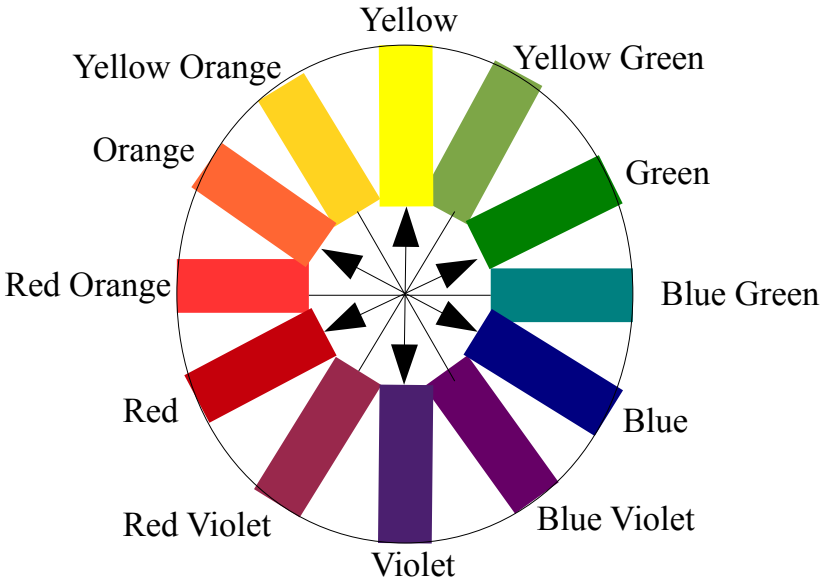
Pallets of color can be created by applying the theory that certain color combinations work well together and appear harmonious.

The word pallet has several definitions. **Pallet is a term for color combinations used by an artist** and it is a term for the actual device that holds the paint while the artist is creating.

The color wheel is an irreplaceable tool in developing color pallets for the most beautiful nail artistry.

The Color Wheel

Figure 1



One method of developing a triad color scheme is to choose three colors equidistant around the hue circle.

The color wheel is one of the best tools in color pallet determination.
Choosing colors of equal depth, in other words, equal levels of pigment, can be a favorable choice when a balanced appearance is desired.

Using contrasting color choices for your pallet can create an appearance of multiple dimensions within the artwork.

Pre-planned color pallets can be presented to the customer.
The choices can range from vibrant colors to muted soft colors.
Choosing the overall background color should be the first step in developing a color pallet.
Then choosing a secondary dominate color is usually the next step, then third, fourth, and so on.
Occasionally, the customer might want to match a dominate color in her wardrobe for her background nail color.

On the other hand, neutral and natural nail colorings are popular choices making it completely unnecessary to match any wardrobe colors. In fact, the number one choice in nail color is neutral, natural and beige or light pink tones.

Gems
Tiny gems are manufactured specifically for nail art. They come in various shapes and sizes. They are specifically designed with one side cut flat for attaching to the nail surface.
Apply the gem to the nail with top coat or nail art sealer. **Place sealer on the flat part of the gem so it will adhere to the nail.**
You may also apply the gem with a wooden pusher. First dampen the end of the pusher with the sealer.
Pick up the gem by touching the dampened stick to the colorful side of the gem and place it in the prepared spot on the nail. You can use tweezers as well to do this task.
Press the gem onto the nail and apply a generous amount of sealer to coat it.
Gems can be removed with acetone and can be reused if the gem is in good condition.

Foiling
Foiling is easy and lends opportunity for endless creativity. **Foil comes in rolls and pre-cut pieces in many colors and designs.** Some of the most popular are silver, gold and snake skin. Pre-cut pieces are easy to handle and convenient.

Before applying foil, polish the nail and allow to completely dry. Select the polish color as part of the color scheme.

Apply foil adhesive to the dry nail. Apply the adhesive thinly and evenly. **The adhesive is slightly tinted when wet and becomes clear and tacky when dry**. This tackiness is similar to double sided tape and is developed for easy adhesion to foil.

Foil comes attached to a cellophane base, so when the foil is touched to the tacky nail, it pulls off of the cellophane and adheres to the nail. Wait until the adhesive becomes clear, but do not wait too long or the adhesive will become overly dry and lose it's stickiness.

The timing of the tacky phase is imperative to the success of the service.
There is a shiny side and a matte side to the foil. **The shiny side is always to be facing up and the matte side is to be against the adhesive.**

Foil Methods
Method one is a type of free hand designing. The nail technician pats the cellophane, foil side down, onto the nail. The cellophane is clear after the foil is removed from it, so the technician watches for coverage areas.
The nail technician is careful not to touch the clear portions of the cellophane to the nail. If the nail is touched with the clear portion of the cellophane instead of the foil area, it is possible that the cellophane would stick to the adhesive which could in turn remove the adhesive along with the nail polish.

Method two involves complete coverage. The foil is gently laid on the surface of the nail and a wooden pusher is used to lightly burnish or lightly rub over the cellophane backing, applying the foil to the nail. This is the method used for pre-manufactured foil patterns.

All nail art applications require that you use a final coat of nail art sealer. To apply you must "float the bead". In other words, drop a "bead" or drop of sealant onto the nail and pull the liquid gently to cover the entire nail. Do not brush using pressure as you would polish, but touch the "top" of the bead of dropped sealant and disperse it gently in that manner.

Striping Tape
Striping tape can be applied as the first design application after the nail polish is dry or it can be applied as the last design application when all other design features are in place and are dry.
Striping tape is manufactured in rolls and pages with many colors and sizes. The most used colors are gold, sliver, and black. **Striping tape has a tacky backing.**

Gold Leafing
Leafing material is very thin and fragile. It has a foil-like consistency and is manufactured both in sheets and in loose pieces. Loose gold leafing is also referred to as nuggets and the gold leaf sheets are referred to as nugget sheets.

Leafing sheets are very delicate and must be handled with tweezers or the tissue paper that comes between the sheets in the packaging, otherwise they can crumble or blow away. Usually sheets of leafing come in quantities of 10 to 100 sheets per package. Keep the package closed or the slightest air movement can blow away the product.

The Application Method
Apply nail adhesive to the dry polished nail and allow to become tacky.
Apply the leafing in small amounts using tweezers or a dampened wooden pusher.
When applying a sheet, use the same method as foiling.
When leafing is applied in pieces it appears more like nuggets, and when applied in sheets you get a thin even coverage.
Complete the application with nail art sealer.

Free Hand Painting
Freehand painting is also referred to as flat nail art.
It is when you use nail polish and brushes to create art design on the nail surface.

Brushes
To the artist, the proper choice and quality of brushes and nail color play a crucial part in creating precision designs. Brushes come in many shapes and sizes and many varieties of bristle types. There are firm bristles and soft bristles, slender shapes and thicker shapes. **A complete knowledge of color theory is required to create the most desirable works of art.**

Parts of a Brush
The tip of the brush is the end of the bristles farthest away from the handle. It is also called the edge of the brush.
The mid section of the bristles is called **the belly.** This is where the brush holds the most paint.
The ferrule is the metal band around the brush that helps to hold the bristles in place.
The heel of the brush is the area where the bristles meet the ferrule.

Knowing the parts of the brush is the beginning of understanding why certain brush choices are made to achieve the desired result.

Round brushes have pointed tapered tips and a large belly.
Round brushes vary in their tips making some better for detail work than others.
Softness of the bristles or hairs of the brush determine the amount of control in detail work as well.

Liner brushes are thin and pointed.
They are great for lettering or other fine work requiring detail.
They are best, for example, drawing thin lines and outlining other art applications.

Flat brushes are flexible with long bristles and a square tip.
Another name for a flat brush is shader brush.
It has a flat tip or chiseled edge.
It is used for multi-purposes.

Using the flat of the brush creates smooth strokes.
Each side of the brush can be loaded with different colors to create fade effects. This is called double loading.
The best way to understand it's versatility is to practice designs on art paper to see the limitless creations from this one brush.

Bright brushes are short and flat with very firm bristles.
They are great for creating texture.

Fan brushes are flat brushes in which the bristles are spread out like a fan.
It's a great special effects tool and also can be used for blending. I
t's great for special effects.
When used dry with just a dab of paint on the bristle ends, it can be floated across the top of a design and look similar to air brushing.

Spotter brushes are also called a detailer.
It is short and round with a small belly and a very fine point tip.
It is excellent for the most intricate of detail work.

Striper brushes are very long flat brushes with few bristles.
It's great for creating designs that need long lines or stripes.

The stripette brush also known as the short striper brush is simply a shorter version of the striper brush and it creates the same effects.

The marbleizer brush also known as a stylus comes with wooden handles, a rounded tip and a metal extension. They have rounded ball tips that come in different sizes. They are used for dotting small circles of color such as polka dots or bubbles. A marbleized effect can be created by using different colored paints in a swirl motion similar to the look of marble.

Air Brushing
Airbrushing has become a phenomenally popular salon service.
The technique of color fading can easily be achieved with the airbrush.
Airbrushing is used for the French manicure to achieve the perfect white edge.
A stencil is used to define the shape for the desired end results of the white nail tip.
By using airbrushes and stencils you can easily apply images onto the nail. Pre-cut stencils are readily available at all professional supply stores. **Stencils are made of either plastic, paper or fabric.** You can create your own stencils.

Airbrush Equipment
Airbrushes are usually classified by three characteristics.
The first characteristic is the action performed by the user to trigger the nail color flow.

The second is the mechanism for feeding the nail color into the airbrush.
The third is the point at which the nail color and air mix.

Trigger
The simplest airbrushes work with a single action mechanism where the depression of a single trigger results in nail color and air flowing into the airbrush body and the atomized paint being expelled onto the target surface.

Dual action or double action airbrushes separate the function for air and nail color flow so that the user can control the volume of airflow and the concentration of nail color flow through two independent mechanisms.

Technique
Airbrush technique is the freehand manipulation of the airbrush, nail color, air pressure and distance from the surface being sprayed in order to produce a certain predictable result on a consistent basis with or without shields or stencils. Airbrush technique will differ with the type of airbrush being used.

Read the manufacturers instructions for operating your airbrush. Practice on paper to become accomplished in technique. See what works and what does not.

There are specific practices to master in developing beautiful work. Practice proper aim. Practice on nail tips mounted on wooden sticks. It's a great way to become accustomed to the exact thing of what you are trying to perfect, the nail.
Practice painting straight lines, dots and with stencils.

Review The Following Terminology

Nail Art

belly	midsection of the brush bristles; the area that holds the most nail color
color wheel	color guide that illustrates and identifies the primary, secondary, tertiary and complementary colors
double loading	placing two different colors of paint on either side of the brush
floating the bead	technique used to seal nail art where a bead of sealer is dropped onto the nail surface, and the brush floats across the surface and completely covers it with sealer
foil adhesive	special adhesive just for foiling that is generally tinted white or pink and appears cloudy when it is wet
freehand painting	using no stencils or pre-formed patterns, creating art on nails also known as flat nail art
French	airbrushing technique that creates a natural looking nail with a smooth

manicure	white tip at the free edge
gem	tiny jewel added to a nail design, attached to the nail with adhesive
heel	the part of the brush where the bristles of the brush meet the ferrule
gold leafing	also known as nuggets or nugget sheets, foil like material used to create nail art
marbleizer	also known as stylus, tool with a rounded ball tip and wooden handle use for making dots or small circles
stencil	precut design made of plastic, paper or fabric used to create nail art
striping tape	tacky-backed tape available in various colors; applied over nail polish or other nail art to create bolder designs

This concludes our study of Anatomy and Art.

The following module discusses Health and Sanitation.

Module 2:Health and Sanitation

Module Outline

Universal Sanitation / Proper Cleaning and Disinfection
The Study of MRSA
OSHA Regulations

Learning objectives:

After completing this lesson you will be able to:

identify general salon requirements
identify general sanitation rules and regulations
describe rules and regulations of proper care of salon products
define proper disinfection procedures
describe facts about MRSA
identify OSHA standards that pertain to matters of safety, health and sanitation

Let's review the practices, principles and theories from the United States Environmental Protection Agency.

The EPA has set Universal Sanitation and Sterilization Rules.

Universal Sanitation

Proper Cleaning and Disinfection
Everything in the salon has either a hard or soft surface. Any surface 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. 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 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, and wooden sticks. 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, and manicure bowls. Hard and non-absorbent items constructed of hard materials that do not absorb liquid, like metal, glass, fiberglass or plastic should be cleaned and disinfected as described below.

Individual Client Packs
Tools/instruments kept in individual packs must be properly cleaned and disinfected after each 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.

Methods of Proper Disinfecting
After proper cleaning, all reusable implements and 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.

Methods for Proper Storage
All properly cleaned, disinfected and dried implements must be stored in a sanitary manner.

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.
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.

Disposable items, 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.
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.**

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 must be properly cleaned and disinfected between each use.

9) Ultra-violet light cabinets are not suitable replacements for liquid disinfectant solutions.

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. Disinfectants used 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.

Disinfectants and Antiseptics

Antiseptic is defined as**:** a substance that inhibits the growth and reproduction of disease-causing microorganisms. Antiseptics are topical agents for application to skin and mucous membranes.

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.

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

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?
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 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.

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.

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 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:
1. studies focusing on products to remove transient flora and
2. 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. 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.

Alcohol-based Hand Cleansers
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.
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.
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.

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 all Salon Professionals.
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 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.

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

In health news reports, awareness of one particular type of invasive staph infection has come to the forefront. It is called MRSA . It is also known as “the flesh eating disease”. The results of having this disease is often bodily disfigurement. Bodily damage occurs in varying degrees of severity.

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 epidemiological 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.

To fully comply with safety, health and sanitation standards in the salon, we must also observe federal regulations set by the the United States Department of Labor's Occupational Safety and Health Administration regarding the use, handling and storage of chemicals.

OSHA

How Must Chemicals Be Labeled?

Chemical manufacturers and importers must communicate hazard information to employers by properly labeling containers and material safety data sheets (MSDS).

Chemical manufacturers, importers, and distributors must mark containers of hazardous chemicals with labels, tags, or marked with the identity of the chemical, appropriate hazard warnings, and the name and address of the manufacturer or other responsible party.

Each container must be labeled, tagged, or marked with the identity of hazardous chemicals contained therein, and must show hazard warnings appropriate for employee protection.

The hazard warning can be any type of message, words, pictures, or symbols that provide at least general information regarding the hazards of the chemical(s) in the container and the targeted organs affected, if applicable.
Labels must be legible, in English (plus other languages, if desired), and prominently displayed.

What Are Material Safety Data Sheets, And Why Are They Needed?

The MSDS is a detailed information bulletin prepared by the manufacturer or importer of a chemical that describes

- the physical and chemical properties
- physical and health hazards
- routes of exposure
- precautions for safe handling and use
- emergency and first-aid procedures and control measures

Chemical manufacturers and importers must develop an MSDS for each hazardous chemical they produce or import, and must provide the MSDS automatically at the time of the initial shipment of a hazardous chemical to a downstream distributor or user.

Distributors also must ensure that downstream employers are similarly provided an MSDS. Each MSDS must be in English and include information regarding the specific chemical identity of the hazardous chemical(s) involved and the common names.

In addition, information must be provided on the

physical and chemical characteristics of the hazardous chemical
known acute and chronic health effects and related health information
exposure limits whether the chemical is considered to be a carcinogen
precautionary measures
emergency and first-aid procedures
and the identification (name, address, and telephone number) of the organization responsible for preparing the sheet.

Copies of the MSDS for hazardous chemicals in a given work site are to be readily accessible to employees in that area. As a source of detailed information on hazards, they must be readily available to workers during each work shift. MSDS have no prescribed format.

Any Material Safety Data Sheet Preparation format may be used.
The non-mandatory MSDS form (OSHA 174) also may be used as a guide and a copy can be obtained from OSHA field offices.

Employers must prepare a list of all hazardous chemicals in the workplace. When the list is complete, it should be checked against the collected MSDS that the employer has been sent.
If there are hazardous chemicals used for which no MSDS has been received, the employer must contact the supplier, manufacturer, or importer to obtain the missing MSDS. A record of the contact must be maintained.

What are temporary agency employers required to do to meet HAZCOM requirements?
In meeting the requirements of OSHA's Hazard Communication Standard, the temporary agency employer would, for example, be expected to provide generic hazard training and information concerning categories of chemicals employees may potentially encounter. Host employers would then be responsible for providing site-specific hazard training.

Can MSDS be stored on a computer to meet the accessibility requirements of HAZCOM?
If the employee's work area includes the area where the MSDS can be obtained, then **maintaining MSDS on a computer would be in compliance.** If the MSDS can be accessed only out of the employee's work area, then the employer would be out of compliance.

What are the container labeling requirements under HAZCOM?
Under HCS, the manufacturer, importer, or **distributor is required to labe**l each container of hazardous chemicals. If the hazardous chemicals are transferred into unmarked containers, these containers must be labeled with the required information, unless the container into which the chemical is transferred is intended for the immediate use of the employee who performed the transfer.

When is the chemical manufacturer required to distribute MSDS?
Hazard information must be transmitted on **Material Safety Data Sheets (MSDS)** that must be distributed to the customer at the time of first shipment of the product. **The Hazard Communication Standard** also requires that MSDS be updated by the chemical manufacturer or importer within three months of learning of "new or significant information" regarding the chemical's hazard potential.

What is considered proper training under the HAZCOM standard?
Employees are to be trained at the time they are assigned to work with a hazardous chemical. The intent of this provision is to have information prior to exposure to prevent the occurrence of adverse health effects. This purpose cannot be met if training is delayed until a later date.

The training provisions of the **HCS** are not satisfied solely by giving employee the data sheets to read. An employer's training program is to be a forum for explaining to employees not only the hazards of the chemicals in their work area, but also how to use the information generated in the hazard communication program.

This can be accomplished in many ways (audiovisuals, classroom instruction, interactive video), and should include an opportunity for employees to ask questions to ensure that they understand the information presented to them.

Training need not be conducted on each specific chemical found in the workplace, but may be conducted by categories of hazard (i/e: carcinogens, sensitizers, acutely toxic agents) that may be encountered by an employee during the course of his duties.

Furthermore, the training must be comprehensible. If the employees receive job instructions in a language other than English, then the training and information to be conveyed under the HCS will also need to be conducted in a foreign language.

Do you need to keep MSDS for commercial products such as Windex and White-Out?
OSHA does not require that MSDS be provided to purchasers of household consumer products when the products are used in the workplace in the same manner that a consumer would use them: when the duration and frequency of use (and therefore exposure) is not greater than what the typical consumer would experience.

This exemption in OSHA regulation is based, however, not upon the chemical manufacturer's intended use of his product, but upon how it actually is used in the workplace.
Employees who are required to work with hazardous chemicals in a manner that results in a duration and frequency of exposure greater than what a normal consumer would experience have a right to know about the properties of those hazardous chemicals.

Is a material safety data sheet (MSDS) required for a non-hazardous chemical?
MSDS that represent non-hazardous chemicals are not covered by the HCS.
OSHA does not require nor encourage employers to maintain MSDS for non-hazardous chemicals. Consequently, an employer is free to discard MSDS for non-hazardous chemicals.

On December 6, 1991, the Occupational Safety and Health Administration (OSHA) promulgated the **Occupational Exposure to Blood Borne Pathogens Standard.**
This standard is designed to protect approximately 5.6 million workers in the health care and related occupations from the risk of exposure to blood borne pathogens, such as the Human Immunodeficiency Virus (HIV) and the Hepatitis B Virus (HBV).

What Is Hazard Communication, And Why Is a Standard Necessary?
Under the provisions of the Hazard Communication Standard, employers are responsible for informing employees of the hazards and the identities of workplace chemicals to which they are exposed.
About 32 million workers work with and are potentially exposed to one or more chemical hazards. There are an estimated 650,000 existing chemical products, and hundreds of new ones being introduced annually. This poses a serious problem for exposed workers and their employers.

Chemical exposure may cause or contribute to many serious health effects such as heart ailments, central nervous system, kidney and lung damage, sterility, cancer, burns, and rashes. Some chemicals may also be safety hazards and have the potential to cause fires and explosions and other serious accidents.
Because of the seriousness of these safety and health problems, and because many employers and employees know little or nothing about them, the Occupational Safety and Health Administration issued the Hazard Communication Standard.

The basic goal of the standard is to be sure employers and employees know about work hazards and how to protect themselves; this should help to reduce the incidence of chemical source illness and injuries.

The Hazard Communication Standard establishes uniform requirements to make sure that the hazards of all chemicals imported into, produced, or used in U.S. workplaces are evaluated, and that this hazard information is transmitted to affected employers and exposed employees.
Employers and employees covered by an OSHA-approved state safety and health plan should check with their state agency, which may be enforcing standards and other procedures at least as effective as, but not always identical to, federal requirements.

Why Is a Written Hazard Communication Program Necessary?
A written hazard communication program ensures that all employers receive the information they need to inform and train their employees properly and to design and put in place employee protection programs. It also provides necessary hazard information to employees, so they can participate in, and support, the protective measures in place at their workplaces.
Employers therefore must develop, implement, and maintain at the workplace a written, comprehensive hazard communication program that includes provisions for **container labeling, collection and availability of material safety data sheets, and an employee training program.**

If the workplace has multiple employers on site (for example, a construction site), the rule requires these employers to ensure that information regarding hazards and protective measures be made available to the other employers on site, where appropriate.

In addition, all covered employers must have a written hazard communication program to get hazard information to their employees through labels on containers, MSDS, and training.

The written program does not have to be lengthy or complicated, and some employers may be able to rely on existing hazard communication programs to comply with the above requirements.

The written program must be available to employees, their designated representatives, the Assistant Secretary of Labor for Occupational Safety and Health, and the Director of the National Institute for Occupational Safety and Health.

Material Safety Data Sheets / Identifying Document Content

SECTION I: MANUFACTURER'S NAME AND CONTACT INFORMATION SECTION
Manufacturer's name and address Emergency phone number

II: HAZARDOUS INGREDIENTS/IDENTITY INFORMATION SECTION
Lists hazardous components and safe exposure limits

III: PHYSICAL/CHEMICAL CHARACTERISTICS SECTION
Physical state (gas, liquid, or solid), boiling point, freezing point, vapor pressure, specific gravity

IV: FIRE AND EXPLOSION HAZARD DATA SECTION
Flash point, extinguishing media, special fire fighting procedures, unusual fire and explosion hazards, if any

V: REACTIVITY DATA SECTION
Stability, incompatibility, hazardous decomposition or by-products, if any

VI: HEALTH HAZARD DATA SECTION
Routes of entry/exposure Health hazards Carcinogenicity Signs and symptoms of exposure Medical conditions generally aggravated by exposure

VII: PRECAUTIONS FOR SAFE HANDLING AND USE SECTION
Emergency and First Aid procedures Steps to be taken in case material is released or spilled Waste disposal methodsPrecautions to be taken in handling and storing

VIII: CONTROL MEASURES
Respiratory protection Ventilation requirements Personal Protective Equipment

The following is a sample of an MSDS.

SAMPLE MSDS

XYZ Company		**Material Safety Data Sheet**
I. Product Claudia's Quick Clean and Shine		
Description Orange liquid, a phenolic odor		
Other Designations	**Distributor**	**Emergency Telephone Nos**
Non-Porous Surface Sanitizer	XYZ Company 123 Drive City, State, Zip	For Medical Emergencies call (000) 111-2222 Transportation Emergencies call (000) 222-1111

II. Health Hazard Data	**III. Hazardous Ingredients**
Corrosive... First Aid For: Eye Contact... Skin Contact... Inhalation... Ingestion... HMIS Hazard Scale...	Ingredient Concentration Worker Exposure Limit …... …..... …..... …... …..... ….....
IV. Special Protection and Precautions	**V. Transportation and Regulatory Data**
Hygienic practices Personal Protection Equipment	Not restricted
VI. Spill Procedures / Waist Disposal	**VII. Reactivity Data**
Spill Procedures Waist Disposal	Stable under normal use
VIII. Fire and Explosion Data	**IX. Physical Data**
Not flammable or explosive	Boiling point Soluble in water

The following is a copy of an OSHA News Release posted by the Administration.

OSHA News Release
When new information regarding a hazardous chemical is discovered, OSHA releases the information to the public.

HAZARD ALERT April 11th, 2011

Hair Smoothing Products That Could Release Formaldehyde
The Occupational Safety and Health Administration (OSHA) and several State OSHA programs are investigating questions and complaints from hair salon owners and workers about possible formaldehyde exposure from using Brazilian Blowout and other hair smoothing products. Some of these products have been labeled as "formaldehyde-free."Oregon's Occupational Safety and Health Administration, California's Occupational Safety and Health Administration, the Connecticut's Dept of Public Health and several other state agencies have already issued warnings about these products to salon owners, stylists, other salon workers, and clients. This Hazard Alert provides information about OSHA's investigations, the health hazards of formaldehyde, and how to protect workers using hair smoothing products that contain or release formaldehyde.

Recent reports from Oregon OSHA, California OSHA, and now Federal OSHA should alert salon owners and stylists to look closely at the hair smoothing products they are using to see if they contain methylene glycol, formalin, methylene oxide, paraform, formic aldehyde, methanal, oxomethane, oxymethylene, or CAS Number 50-00-0. All of these are names for or treated as formaldehyde under OSHA's Formaldehyde standard. Products containing them can expose workers to formaldehyde; employers who manufacture, import, distribute, or use the products must follow OSHA's formaldehyde standard.

What have OSHA's investigations found?
Federal OSHA and State OSHA programs are investigating complaints from stylists and hair salon owners about exposure to formaldehyde while using GIB LLC dba (doing business as) Brazilian Blowout products and other hair smoothing products. OSHA has found formaldehyde in the air when stylists use hair smoothing products. Some had "formaldehyde-free" on the label or did not list formaldehyde on the product label or in the Material Safety Data Sheet (MSDS).

During one investigation, Federal OSHA's air tests showed formaldehyde at levels greater than OSHA's limits in a salon using Brazilian Blowout Acai Professional Smoothing Solution, even though the product was labeled "formaldehyde-free." In most cases, OSHA found that hair salon owners did not know that a hair smoothing product contained or could expose workers to formaldehyde because manufacturers, importers, and distributors did not include the correct warnings on product information.

California OSHA recently found violations at one importer and distributor, GIB LLC dba Brazilian Blowout, that failed to list formaldehyde as a hazardous ingredient on the MSDS provided to downstream users (e.g., salon owners, stylists) for two products: Brazilian Blowout Acai Professional Smoothing Solution and Brazilian Blowout Professional Brazilian Blowout Solution. The MSDS also did not list the health effects from formaldehyde exposure. The MSDS is required to provide users information about the chemicals in a product, the hazards to workers, and how to use a product safely.

The first reports about formaldehyde in hair smoothing products surfaced when Oregon OSHA investigated a complaint from a hair stylist who had nosebleeds, eye irritation, and trouble breathing while using a Brazilian Blowout product labeled "formaldehyde-free." After testing the product, Oregon OSHA found that the product contained formaldehyde, a chemical that can cause the health problems reported by the stylist. Oregon OSHA tested more than 100 samples of keratin-based hair smoothing products and found formaldehyde levels in some products well above what could legally be labeled as "formaldehyde-free." In addition to the Brazilian Blowout products, Oregon OSHA found that other manufacturers, importers, and distributors of hair smoothing products also had not listed formaldehyde or included hazard information on the label or in the MSDS. Based on these findings, Oregon OSHA published a Hazard Alert and a full report in October 2010. Oregon OSHA also alerted Federal OSHA and State OSHA programs where the products were manufactured, imported, or distributed because the hazard information for the product was not correct and did not meet the requirements of OSHA's Hazard Communication standard or State equivalent).

OSHA continues to work with other agencies (e.g., Food and Drug Administration, National Institute for Occupational Safety and Health) to look at formaldehyde exposures in other salons and to make sure that workers and the public have correct information about these products.

What is formaldehyde and how can it affect my health?
Formaldehyde is a colorless, strong-smelling gas that presents a health hazard if workers are exposed.

You can be exposed to formaldehyde if you breathe it into your lungs, if it gets into your eyes, or if it is contained in a product that gets onto your skin. You can also be exposed accidentally if you touch your face, eat food, or drink after using a product containing formaldehyde without first washing your hands. It can irritate the eyes and nose, and cause coughing and wheezing. Formaldehyde is a "sensitizer," which means that it can cause allergic reactions of the skin, eyes, and lungs such as asthma-like breathing problems and skin rashes and itching. When formaldehyde is in a product that gets sprayed into the eyes, it can damage the eyes and cause blindness. It is also a cancer hazard that is linked to nose and lung cancer.

Formaldehyde is a health hazard, whether in a product or in the air. OSHA's Formaldehyde standard covers employers who use formaldehyde, and products that contain or release formaldehyde. (OSHA has also published a formaldehyde fact sheet

Why do some hair smoothing products expose me to formaldehyde?
Many keratin-based hair smoothing products contain formaldehyde dissolved (and chemically reacted) in water and other ingredients in the product. Because of the way the formaldehyde reacts in these products, some manufacturers, importers, or distributors might list other names for formaldehyde on product information or might claim that the product is "formaldehyde-free." Formaldehyde might be listed as methylene glycol, formalin, methylene oxide, paraform, formic aldehyde, methanal, oxomethane, oxymethylene, or CAS Number 50-00-0. All of these are names for formaldehyde under OSHA's Formaldehyde standard. The bottom line is that formaldehyde can be released from hair smoothing products that list any of these names on the label and workers can breathe it in or absorb it through their skin. Workers can be exposed to formaldehyde during the entire hair straightening process, especially when heat is applied (e.g. blow-drying, flat ironing).

How would I know if the product I'm using could expose me to formaldehyde?
Read the product label and MSDS to determine if they list methylene glycol or any of the other names for formaldehyde listed above. If they do, the product can expose you to formaldehyde. Under OSHA's Hazard Communication standard, salon owners and other employers must have an MSDS for each product used in the salon that contains a hazardous chemical. Employers need to review the MSDSs they receive and make sure they understand the hazards of the products they use in their salon(s). They must also make the MSDSs available to their workers (e.g., stylists) and train all workers using the product about the hazards and how to use it safely. If employers do not receive an MSDS automatically, they should request one. If the MSDS does not look complete (e.g., blank spaces that are not completed) then the employer should request a new one from the manufacturer. If the request does not produce the information needed, then the employer should contact the local OSHA Area Office for assistance in obtaining the MSDS.

Be aware that an MSDS may not contain all of the hazard information required, as initially found in the case of Brazilian Blowout products. In the Oregon case, it was only after a stylist reported health problems while using the products that the investigation began. Workers need to report any health problems they think are from the products they use in the workplace to their employer and employers need to follow up on reports of health problems from workers.

When are manufacturers, importers, and distributors of hair smoothing products required to list formaldehyde as an ingredient in their products?
OSHA requires manufactures of products that contain or release formaldehyde to include information about formaldehyde and its hazards on the label and in the MSDS.

Formaldehyde must be listed if it is in the product at 0.1% or more (as a gas or in solution) or if the product releases formaldehyde above 0.1 parts of formaldehyde per million parts of air. Salons and other employers that directly import hair smoothing products from other countries have the same responsibilities as a manufacturer under the Hazard Communication standard - they must determine the hazards of the product and develop labels and MSDSs that communicate the hazards to users. These requirements are explained in OSHA's Hazard Communication standard (commonly referred to as the "Worker's Right-to-Know Rule") and OSHA's Formaldehyde standard.

What can I do to reduce exposure to formaldehyde when using formaldehyde releasing hair smoothing/straightening products?
Employers, stylists, and other salon workers should read the product information and MSDSs for the products they buy and use so that they know what chemicals are in them and how to use them safely in the workplace. The best way to control exposure to formaldehyde is to use products that do not list formaldehyde, formalin, methylene glycol, or any of the other names for formaldehyde listed above on the label or in the MSDS. Beauty care companies are now making and selling products that they claim do not contain formaldehyde in the solution. Choosing one of these products might eliminate the risk of formaldehyde exposure. Note that just because a product doesn't list formaldehyde, formalin, or methylene glycol does not mean that it does not contain any other hazardous ingredients.

If salon owners decide to use products that contain or release formaldehyde, then they must follow the requirements in OSHA's Formaldehyde standard. The standard requires that employers test the air to find out the level of formaldehyde present in the air when the product is being used. If the test shows that formaldehyde is present at levels above OSHA's limits (0.75 parts of formaldehyde per million parts (or ppm) of air during an 8-hour work shift or 2 ppm during any 15-minute period), then the employer must:

- Install air ventilation systems in the areas where these products are mixed and used to help keep formaldehyde levels below OSHA's limit and perform regular maintenance to make sure the systems work correctly;
- When possible, require workers to use lower heat settings on blow-dryers and flat irons used during the process;
- Give workers respirators, if needed; train them to use the respirator properly; and meet the other requirements in OSHA's Respiratory protection standard;
- Ensure workers understand the information on a product's label and MSDS;

- Post signs at entryways to any area where formaldehyde is above OSHA's limit to tell workers of the danger and stating that only authorized personnel may enter;
- Tell workers about the health effects of formaldehyde, how to use the product safely, and what personal protective equipment to wear while using the product; and
- Train workers how to safely clean up spills and properly throw products out.

In addition, where the tests show that formaldehyde is present in the air at a level of 0.5 ppm during an 8-hour work shift or 2 ppm during any 15-minute period, then the employer must:

- Get workers the right medical attention (e.g., doctor exams), and
- Test the air periodically to make sure that formaldehyde levels are below OSHA's limits.

Whether or not air tests show formaldehyde levels above OSHA's limits, employers must follow certain parts of the standard if a product contains formaldehyde:

- Give employees appropriate gloves and other personal protective equipment (e.g., face shield, chemical splash goggles, chemical-resistant aprons) and train them on how to use this equipment while mixing and applying the products;
- Explain to workers how to read and understand the information on a product's label and MSDS;
- Make sure the workplace has eye and skin washing equipment if products that contain formaldehyde could be splashed onto the workers' skin or into their eyes;
- Train workers how to safely clean up spills and properly throw products out, and;
- Get workers the right medical attention (e.g., doctor exams) if they develop signs and symptoms of an exposure to formaldehyde or are exposed to large amounts of formaldehyde during an emergency (e.g., a large spill).

Employers must also keep records of the air tests they perform, any medical attention needed by their employees, and respirator fit-testing.
For more information about how to control formaldehyde exposures in hair salons, read Oregon OSHA's hazard alert and Cal/OSHA's Advisory.

How can OSHA help you?
OSHA continues to monitor ongoing inspections that may have nationwide impact to ensure that health hazards and appropriate protections for products containing hazardous chemicals are communicated properly on the labels and MSDS. OSHA developed this webpage to give workers and employers useful, up-to-date information on formaldehyde hazards that might be present when using hair smoothing products that contain or release formaldehyde. Employers and workers should read OSHA's

Formaldehyde Fact Sheet for more information about formaldehyde hazards and how to work with it safely. Contact your local OSHA office if you have any questions about a product that you are using or its MSDS. Hair salon owners can also contact OSHA's free and confidential consultation service to help determine if there are hazards at their workplace. On-site consultations do not result in penalties or citations.

What rights do workers have?

Workers have a right to a safe workplace. The Occupational Safety and Health Act of 1970 (OSH Act) was passed to prevent workers from being killed or seriously harmed at work. The law requires employers to provide their workers with a workplace that is free of potential hazards. The OSH Act created the Occupational Safety and Health Administration (OSHA), which sets and enforces protective workplace safety and health standards. OSHA also provides information, training and assistance to workers and employers. Workers may file a complaint to have OSHA inspect their workplace if they believe that their employer is not following OSHA standards or that there are serious hazards.

- Disclaimer -

This Hazard Alert is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act’s General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

Study the following terms and definitions.
Glossary

Terms and Definitions:

agnail	The hangnail
cuticle	the non-living skin that adheres to the nail plate
eggshell nail	Very thin nail.
eponychium	the skin that covers the newly developing nail plate
hyponychium	the epidermis under the free edge of the nail plate that forms the water tight seal
keratin	the hard protein that the matrix produces
leuconychia	The disorder where there are white spots under the nail plate**.**
nail bed	the skin beneath the nail plate
onychocryptosis	An ingrown nail.
tinea corporis	Ringworm of the hand.
tinea pedia	Ringworm of the foot.

This concludes our study: Nail Health (8 hours)

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U.S Department of Labor / Occupational Safety and Health Administration
200 Constitution Ave., NW, Washington, DC 20210 * 800-321-OSHA (6742)
TTY: 877-889-5627 * www.OSHA.gov

U.S Environmental Protection Agency * Ariel Rios Building 1200 Pennsylvania Avenue, N.W.
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www.epa.gov

U.S Food and Drug Administration: www.fda.gov * 10903 New Hampshire Ave Silver Spring, MD 20993-0002 * 1-888-INFO-FDA (1-888-463-6332)

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