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CHAPTER 1
HIV / AIDS
(2 CE Hours)
(Satisfies HIV/AIDS Requirement)

Learning objectives
- Define HIV and AIDS.
- List the risk factors for HIV.
- Describe how research helps solve other medical conditions.
- Describe how you should deal with HIV infected employees.

Introduction
AIDS (acquired immunodeficiency syndrome) was first reported in the United States in 1981 and has since become a major worldwide epidemic. AIDS is caused by HIV (human immunodeficiency virus). By killing or damaging cells of the body's immune system, HIV progressively destroys the body's ability to fight infections and certain cancers. People diagnosed with AIDS may get life-threatening diseases called opportunistic infections, which are caused by microbes such as viruses or bacteria that usually do not make healthy people sick.

More than 900,000 cases of AIDS have been reported in the United States since 1981. As many as 950,000 Americans may be infected with HIV, one-quarter of whom are unaware of their infection. The epidemic is growing most rapidly among minority populations and is a leading killer of African-American males ages 25 to 44. According to the Centers for Disease Control and Prevention (CDC), AIDS affects nearly seven times more African Americans and three times more Hispanics than whites. In recent years, an increasing number of African-American women and children are being affected by HIV/AIDS. In 2003, two-thirds of U.S. AIDS cases in both women and children were among African-Americans.

Transmission
HIV is spread most commonly by having unprotected sex with an infected partner.

Risky behavior
HIV can infect anyone who practices risky behaviors such as:
- Sharing drug needles or syringes.
- Having sexual contact.
- Having sexual contact with someone whose HIV status is unknown.

Infected blood
HIV also is spread through contact with infected blood. Before donated blood was screened for evidence of HIV infection and before heat-treating techniques to destroy HIV in blood products were introduced, HIV was transmitted through transfusions of contaminated blood or blood components. Today, because of blood screening and heat treatments, the risk of getting HIV from such transfusions is extremely small.

Contaminated needles
HIV is frequently spread among injection drug users by the sharing of needles or syringes contaminated with very small quantities of blood from someone infected with the virus.

It is rare, however, for a patient to give HIV to a health care worker or vice-versa by accidental sticks with contaminated needles or other medical instruments.

Mother to child
Women can transmit HIV to their babies during pregnancy or birth. Approximately one-quarter to one-third of all untreated pregnant women infected with HIV will pass the infection to their babies. HIV also can be spread to babies through the breast milk of mothers infected with the virus. If the mother takes certain drugs during pregnancy, she can significantly reduce the chances that her baby will get infected with HIV. If health care providers treat HIV-infected pregnant women and deliver their babies by cesarean section, the chances of the baby being infected can be reduced to a rate of 1 percent. HIV infection of newborns has been almost eradicated in the United States due to appropriate treatment. A study sponsored by the National Institute of Allergy and Infectious Diseases (NIAID) in Uganda found a highly effective and safe drug for preventing transmission of HIV from an infected mother to her newborn. Independent studies have also confirmed this finding. This regimen is more affordable and practical than any other examined to date. Results from the study show that a single oral dose of the antiretroviral drug nevirapine (NVP) given to an HIV-infected woman in labor and another to her baby within 3 days of birth reduces the transmission rate of HIV by half compared with a similar short course of AZT (Azidothymidine).

For more information on preventing transmission from mother to child, go to http://aidsinfo.nih.gov/guidelines.

Saliva
Although researchers have found HIV in the saliva of infected people, there is no evidence that the virus is spread by contact with saliva. Laboratory studies reveal that saliva has natural properties that limit the power of HIV to infect, and the amount of virus in saliva appears to be very low. Research studies of people infected with HIV have found no evidence that the virus is spread to others through saliva by kissing. The lining of the mouth, however, can be infected by HIV, and instances of HIV transmission through oral intercourse have been reported.

Scientists have found no evidence that HIV is spread through sweat, tears, urine, or feces.

Casual contact
Studies of families of HIV-infected people have shown clearly that HIV is not spread through casual contact such as the sharing of food utensils, towels and bedding, swimming pools, telephones, or toilet seats.

HIV is not spread by biting insects such as mosquitoes or bedbugs.

Sexually transmitted infections
If you have a sexually transmitted infection (STI) such as syphilis, genital herpes, chlamydia infection, gonorrhea, or if bacterial vaginosis appears, you may be more susceptible to getting HIV infection during sex with infected partners.

Early symptoms of HIV infection
Many people do not have any symptoms when they first become infected with HIV. They may, however, have a flu-like illness within a month or two after exposure to the virus. This illness may include:
- Fever.
- Headache.
- Tiredness.
- Enlarged lymph nodes (glands of the immune system easily felt in the neck and groin).

These symptoms usually disappear within a week to a month and are often mistaken for those of another viral infection. During this period, people are very infectious, and HIV is present in large quantities in genital fluids.

More persistent or severe symptoms may not appear for 10 years or more after HIV first enters the body in adults, or within 2 years in children born with HIV infection. This period of "asymptomatic" infection varies greatly in each individual. Some people may begin to have symptoms within a few months, while others may be symptom-free for more than 10 years.

Even during the asymptomatic period, the virus is actively multiplying, infecting, and killing cells of the immune system. The virus can also hide within infected cells and lay dormant. The most obvious effect of HIV infection is a decline in the number of CD4 positive T (CD4+) cells found in the blood, the immune system's key infection fighters. The virus slowly disables or destroys these cells without causing symptoms.

As the immune system worsens, a variety of complications start to take place...
over. For many people, the first signs of infection are large lymph nodes or "swollen glands" that may be enlarged for more than 3 months. Other symptoms often experienced months to years before the onset of AIDS include:

- Lack of energy.
- Weight loss.
- Frequent fevers and sweats.
- Persistent or frequent yeast infections (oral or vaginal).
- Persistent skin rashes or flaky skin.
- Pelvic inflammatory disease in women that does not respond to treatment.
- Short-term memory loss.

Some people develop frequent and severe herpes infections that cause mouth, genital, or anal sores, or a painful nerve disease called shingles. Children may grow slowly or be sick a lot.

What is AIDS?
The term AIDS applies to the most advanced stages of HIV infection. CDC developed official criteria for the definition of AIDS and is responsible for tracking the spread of AIDS in the United States.

CDC's definition of AIDS includes all HIV-infected people who have fewer than 200 CD4+ T cells per cubic millimeter of blood. (Healthy adults usually have CD4+ T-cell counts of 1,000 or more.) In addition, the definition includes 26 clinical conditions that affect people with advanced HIV disease. Most of these conditions are opportunistic infections that generally do not affect healthy people. In people with AIDS, these infections are often severe and sometimes fatal because the immune system is so ravaged by HIV that the body cannot fight off certain bacteria, viruses, fungi, parasites, and other microbes.

Symptoms of opportunistic infections common in people with AIDS include:

- Coughing and shortness of breath.
- Seizures and lack of coordination.
- Difficult or painful swallowing.
- Mental symptoms such as confusion and forgetfulness.
- Severe and persistent diarrhea.
- Fever.
- Vision loss.
- Nausea, abdominal cramps, and vomiting.
- Weight loss and extreme fatigue.
- Severe headaches.
- Coma.

Children with AIDS may get the same opportunistic infections as do adults with the disease. In addition, they also have severe forms of the typically common childhood bacterial infections, such as conjunctivitis (pink eye), ear infections, and tonsillitis.

People with AIDS are also particularly prone to developing various cancers, especially those caused by viruses such as Kaposi's Sarcoma and cervical cancer, or cancers of the immune system known as lymphomas. These cancers are usually more aggressive and difficult to treat in people with AIDS. Signs of Kaposi's Sarcoma in light-skinned people are round brown, reddish, or purple spots that develop in the skin or in the mouth. In dark-skinned people, the spots are more pigmented.

During the course of HIV infection, most people experience a gradual decline in the number of CD4+ T cells, although some may have abrupt and dramatic drops in their CD4+ T-cell counts. A person with CD4+ T cells above 200 may experience some of the early symptoms of HIV disease. Others may have no symptoms even though their CD4+ T-cell count is below 200.

Many people are so debilitated by the symptoms of AIDS that they cannot hold a steady job or do household chores. Other people with AIDS may experience phases of intense life-threatening illness followed by phases in which they function normally.

A small number of people first infected with HIV 10 or more years ago have not developed symptoms of AIDS. Scientists are trying to determine what factors may account for their lack of progression to AIDS, such as:

- Whether their immune systems have particular characteristics.
- Whether they were infected with a less aggressive strain of the virus.
- If their genes may protect them from the effects of HIV.

Scientists hope that understanding the body's natural method of controlling infection may lead to ideas for protective HIV vaccines and use of vaccines to prevent the disease from progressing.

Diagnosis
Because early HIV infection often causes no symptoms, your health care provider usually can diagnose it by testing your blood for the presence of antibodies (disease-fighting proteins) to HIV. HIV antibodies generally do not reach noticeable levels in the blood for 1 to 3 months following infection. It may take the antibodies as long as 6 months to be produced in quantities large enough to show up in standard blood tests. Hence, to determine whether you have been recently infected (acute infection), your health care provider can screen you for the presence of HIV genetic material. Direct screening of HIV is extremely critical in order to prevent transmission of HIV from recently infected individuals.

If you have been exposed to the virus, you should get an HIV test as soon as you are likely to develop antibodies to the virus – within 6 weeks to 12 months after possible exposure to the virus. By getting tested early, if infected, you can discuss with your health care provider when you should start treatment to help your immune system combat HIV and help prevent the emergence of certain opportunistic infections (see section on treatment below). Early testing also alerts you to avoid high-risk behaviors that could spread the virus to others.

Most health care providers can do HIV testing and will usually offer you counseling at the same time. Of course, you can be tested anonymously at many sites if you are concerned about confidentiality.

Health care providers diagnose HIV infection by using two different types of antibody tests: ELISA and Western Blot. If you are highly likely to be infected with HIV but have been tested negative for both tests, your health care provider may request additional tests. You also may be told to repeat antibody testing at a later date, when antibodies to HIV are more likely to have developed.

Babies born to mothers infected with HIV may or may not be infected with the virus, but all carry their mothers' antibodies to HIV for several months. If these babies lack symptoms, a doctor cannot make a definitive diagnosis of HIV infection using standard antibody. Health care providers are using new technologies to detect HIV to more accurately determine HIV infection in infants between ages 3 months and 15 months. They are evaluating a number of blood tests to determine which ones are best for diagnosing HIV infection in babies younger than 3 months.

Treatment
When AIDS first surfaced in the United States, there were no medicines to combat the underlying immune deficiency and few treatments existed for the opportunistic diseases that resulted. Researchers, however, have developed drugs to fight both HIV infection and its associated infections and cancers.

HIV infection
The Food and Drug Administration (FDA) has approved a number of drugs for treating HIV infection. The first group of drugs used to treat HIV infection, called nucleoside reverse transcriptase (RT) inhibitors, interrupts an early stage of the virus making copies of itself. These drugs may slow the spread of HIV in the body and delay the start of opportunistic infections. This class of drugs, called nucleoside analogs, includes:

- AZT (azidothymidine).
nd C (zalcitabine).
ddI (dideoxyinosine).
d4T (stavudine).
3TC (lamivudine).
Abacavir (zidovudin).
Tenofovir (viread).
Emtriva (emtricitabine).

Healthcare providers can prescribe non-nucleoside reverse transcriptase inhibitors (NNRTIs), such as:
- Delavirdine (rescriptor).
- Nevirapine (viramune).
- Efavirenz (sustiva) (in combination with other antiretroviral drugs).

FDA also has approved a second class of drugs for treating HIV infection. These drugs, called protease inhibitors, interrupt the virus from making copies of itself at a later step in its life cycle. They include:
- Ritonavir (norvir).
- Saquinavir (invirase).
- Indinavir (crixivan).
- Amprenavir (agenerase).
- Nelfinavir (viracept).
- Lopinavir (kaletra).
- Atazanavir (reyataz).
- fosamprenavir (lexiva).

FDA also has introduced a third new class of drugs, known as fusion inhibitors, to treat HIV infection. Fuzeon (enfuvirtide or T-20), the first approved fusion inhibitor, works by interfering with HIV-1's ability to enter into cells by blocking the merging of the virus with the cell membranes. This inhibition blocks HIV's ability to enter and infect the human immune cells. Fuzeon is designed for use in combination with other anti-HIV treatment. It reduces the level of HIV infection in the blood and may be active against HIV that has become resistant to current antiviral treatment schedules.

Because HIV can become resistant to any of these drugs, healthcare providers must use a combination treatment to effectively suppress the virus. When multiple drugs (three or more) are used in combination, it is referred to as highly active antiretroviral therapy, or HAART, and can be used by people who are newly infected with HIV as well as people with AIDS.

Researchers have credited HAART as being a major factor in significantly reducing the number of deaths from AIDS in this country. While HAART is not a cure for AIDS, it has greatly improved the health of many people with AIDS and it reduces the amount of virus circulating in the blood to nearly undetectable levels. Researchers, however, have shown that HIV remains present in hiding places, such as the lymph nodes, brain, testes, and retina of the eye, even in people who have been treated.

Side effects
Despite the beneficial effects of HAART, there are side effects associated with the use of antiviral drugs that can be severe. Some of the nucleoside RT inhibitors may cause a decrease of red or white blood cells, especially when taken in the later stages of the disease. Some may also cause inflammation of the pancreas and painful nerve damage. There have been reports of complications and other severe reactions, including death, to some of the antiretroviral nucleoside analogs when used alone or in combination. Therefore, healthcare experts recommend that you be routinely seen and followed by your health care provider if you are on antiretroviral therapy.

The most common side effects associated with protease inhibitors include nausea, diarrhea, and other gastrointestinal symptoms. In addition, protease inhibitors can interact with other drugs resulting in serious side effects. Fuzeon may also cause severe allergic reactions such as pneumonia, trouble breathing, chills and fever, skin rash, blood in urine, vomiting, and low blood pressure. Local skin reactions are also possible since it is given as an injection underneath the skin.

If you are taking HIV drugs, you should contact your healthcare provider immediately if you have any of these symptoms.

Opportunistic infections
A number of available drugs help treat opportunistic infections. These drugs include:
- Foscarnet and ganciclovir to treat CMV (cytomegalovirus) eye infections.
- Fluconazole to treat yeast and other fungal infections.
- TMP/SMX (trimethoprim/sulfamethoxazole) or pentamidine to treat PCP (Pneumocystis carinii pneumonia).

Cancers
Healthcare providers use radiation, chemotherapy, or injections of alpha interferon—a genetically engineered protein that occurs naturally in the human body—to treat Kaposi's Sarcoma or other cancers associated with HIV infection.

Prevention
Because no vaccine for HIV is available, the only way to prevent infection by the virus is to avoid behaviors that put you at risk of infection, such as sharing needles and having unprotected sex.

Many people infected with HIV have no symptoms. Therefore, there is no way of knowing with certainty whether your sexual partner is infected unless he or she has repeatedly tested negative for the virus and has not engaged in any risky behavior.

Although some laboratory evidence shows that spermicides can kill HIV, researchers have not found that these products can prevent you from getting HIV.

Twenty-seven years of HIV/AIDS: Snapshots of an epidemic
This snapshot gives you an idea of how quickly HIV/AIDS became an epidemic.

1981 – Unexplained cases of enlarged lymph nodes among men are observed and studied by physicians and researchers in New York City.
U.S. Total Cases reported: 159

1982 – In addition to cases in men, cases of AIDS are reported in hemophiliacs and in a few women, infants and recipients of blood transfusions. Transmission of an infectious agent through blood and sexual contact is strongly suspected.
The Centers for Disease Control and Prevention establishes the term acquired immunodeficiency syndrome (AIDS) and identifies four “risk factors”: Unprotected sex, intravenous drug use, Haitian origin, and hemophilia A.
U.S. Total Cases reported: 771 618 deaths

1983 – A major outbreak of AIDS is reported among men and women in central Africa.
The CDC warns bloodbanks of a possible problem with the U.S. blood supply. AIDS cases have now been reported in 33 countries.
U.S. Total Cases reported: 2,807 2,118 deaths

1984 – Dr. Robert Gallo of the U.S. National Cancer Institute announces that his lab has isolated the virus believed to cause AIDS. He calls it human T-cell lymphatic virus type III (HTLV-III).
U.S. Total Cases reported: 7,239 5,596 deaths

1985 – The federal government licenses an HIV antibody test, and screening of the U.S. blood supply begins.
Ryan White, a 13-year-old hemophiliac with AIDS, is barred from school in Indiana.
U.S. Total Cases reported: 15,527 12,529 deaths
1986 – In the first comprehensive report on AIDS, the Institute of Medicine states that $2 billion is needed annually for AIDS research and care.
U.S. Total Cases reported: 28,712 24,559 deaths

1987 – Researchers realize that virtually all cases of HIV infection ultimately lead to full-blown AIDS, but only after a long incubation period.
U.S. Total Cases reported: 50,378 40,849 deaths

U.S. Total Cases reported: 82,362 61,816 deaths

1989 – The NIH funds 17 community-based AIDS clinical research units as part of a federally sponsored research program.
U.S. Total Cases reported: 117,508 89,343 deaths

1990 – Surveillance data indicate that while Black and Latina women constitute just 19 percent of all U.S. women, they represent 72 percent of U.S. women diagnosed with AIDS. Nearly twice as many Americans have now died from AIDS in the Vietnam War.
Ryan White dies of AIDS.
U.S. Total Cases reported: 160,969 120,453 deaths

1991 – The CDC reports that 1 million Americans are infected with HIV.
Ervin “Magic” Johnson announces that he is infected with HIV.
U.S. Total Cases reported: 206,563 156,143 deaths

U.S. Total Cases reported: 254,147 194,476 deaths

1993 – AIDS patients start to show signs of resistance to AZT.
Arthur Ashe dies of AIDS.
U.S. Total Cases reported: 360,909 234,225 deaths

1994 – Dr. David Ho and George Shaw show that following initial infection, HIV replicates in the body continuously, producing billions of copies each day.
U.S. Total Cases reported: 441,528 270,870 deaths

1995 – AIDS deaths reach an all-time high.
The New York Times reports that AIDS has become the leading cause of death among all Americans ages 25 to 44.
U.S. Total Cases reported: 513,486 319,849 deaths

1996 – For the first time in the U.S., a larger proportion of AIDS cases occur among African Americans (41 percent) than among whites (38 percent).
The first home HIV test is approved by the FDA.
U.S. Total Cases reported: 581,427 362,004 deaths

1997 – AIDS patients continue to live longer thanks to the new anti-HIV therapies, dubbed drug “cocktails,” and AIDS deaths in the U.S. decline by 42 percent.
U.S. Total Cases reported: 641,086 390,692 deaths

1998 – Early hope that combination therapy might affect a clinical cure for AIDS fades.
U.S. Total Cases reported: 688,200 410,800 deaths

1999 – Experts estimate that at least half of all new HIV infections in the U.S. (and worldwide) occur among young people under the age of 25.

U.S. Total Cases reported: 733,374 429,825 deaths

2000 – UNAIDS reports that 3.1 million people are now living with HIV/AIDS, over 13 million children have lost one or both parents to AIDS and nearly 22 million people have died of AIDS-related causes since the epidemic began.
U.S. Total Cases reported: 774,467 448,060 deaths

2001 – New study shows that 14 percent of individuals newly infected with HIV in the U.S. already exhibit resistance to at least one antiviral drug.
U.S. Secretary of State Colin Powell reaffirms the position that HIV/AIDS constitutes a national security threat.

2001-2006 – Many believe that HIV/AIDS is a thing of the past because you do not hear much about it in the news media anymore. Nothing could be further from the truth. Below is a chart that shows that while the number of deaths has leveled off, the sheer number of people living with AIDS is growing.

How does HIV research help with the cure of other diseases?
Many ask “How does HIV/AIDS affect me and why is research so important?” The fact is, HIV/AIDS research is helping solve many other medical mysteries.

Treatments for several types of cancer have grown directly out of AIDS research. One promising experimental therapy for advanced cancer is high dose chemotherapy followed by a bone marrow transplant. But the profound immune suppression necessary for a successful transplant often leads to devastating, even fatal, infections. New drugs to treat and prevent these infections have come directly from AIDS targeted research.

Treatments for other cancers are also emerging from AIDS research. Several natural body hormones called growth factors promote the activity of HIV. Many of these hormones also accelerate the growth and spread of cancer cells. Blocking the activity of these hormones is a strategy first used experimentally to treat Kaposi’s sarcoma, a cancer found in patients with HIV/AIDS. Now it is also being tested in bladder, vulva, and breast cancers and has shown some exciting recent success in treating colon cancer. In addition, small proteins and drugs that can block the growth of new blood vessels (which is critical to the survival of tumor cells) were originally developed to treat Kaposi’s sarcoma, but are now being tested in many other cancers as well.

Are other treatments for major diseases likely to emerge from AIDS research any time soon?
Absolutely, AIDS research is helping to improve treatments for Alzheimer’s disease and heart disease. Alzheimer’s disease is a progressive, global dementia whose cause is unknown. Profound
ordinances covering disability discrimination in employment.

covered by the Rehabilitation Act and by certain State and municipal

ADA is beyond the scope of this publication but can be found at www.

against all people with disabilities or perceived disabilities, including

1990

bulk of the U.S. workforce.

Two-thirds of large businesses and one in 10 small

HIV/AIDS is an increasingly important issue in workplaces throughout

complex medical and legal concerns, AIDS raises difficult emotional

People living with HIV infection and AIDS can be productive

HIV/AIDS therapies may be critical in the treatment of other diseases. For example, lamivudine and adefovir can help patients with hepatitis B that have no other options. In addition, protease inhibitors are being developed to combat infections, such as hepatitis C, influenza, and most recently, SARS is based on a concept similar to that of an anti-HIV entry inhibitor called enfuvirtide, or fuzeon, which was approved for use in 2003. A modified version of another AIDS drug called cidovir, used to treat CMV eye infections in AIDS, is now being developed to treat and possibly prevent smallpox infection. AIDS drugs have been used to eliminate diseases in plants. Two of them, adefovir and tenofovir, can eradicate the banana streak virus, which infects a substantial proportion of the world’s banana harvest.

Since HIV is a virus that attacks the immune system, what does AIDS research teach us about autoimmune disorders or immune-based therapies for other diseases?

HIV-positive people often develop autoimmunity problems, such as psoriasis or blood abnormalities associated with lupus. For these autoimmune diseases, treatments developed for AIDS should also apply when the same conditions occur spontaneously. Certain hormones that modify the function of immune cells are now being tested as treatments for AIDS. Some of the most recent include IL-12 and TNF (Tumor Necrosis Factor) -alpha inhibitors, which may also boost the immune systems of cancer patients.

Workplace accommodations for employees with HIV/AIDS

People living with HIV infection and AIDS can be productive workers for many years. Even in the best of circumstances, the challenges associated with HIV can be significant. In addition to complex medical and legal concerns, AIDS raises difficult emotional issues such as fear, stigma, death, and dying.

HIV/AIDS is an increasingly important issue in workplaces throughout the country. Two-thirds of large businesses and one in 10 small businesses have already encountered an employee with HIV infection or AIDS. More than 75 percent of all AIDS cases occur among people between the ages of 25 and 44 – the same group comprising the bulk of the U.S. workforce.

Employment provisions under the Americans with Disabilities Act of 1990

The Americans with Disabilities Act (ADA) prohibits discrimination against all people with disabilities or perceived disabilities, including people with HIV infection and AIDS. A detailed explanation of the ADA is beyond the scope of this publication but can be found at www.ada.gov. Similar legal requirements have been in place for employers covered by the Rehabilitation Act and by certain State and municipal ordinances covering disability discrimination in employment.

The employment provisions of the ADA also require employers to provide “reasonable accommodations” for employees with disabilities. Reasonable accommodations are changes or adjustments in the job or work environment that permit individuals with disabilities to perform the essential functions of a job. The term “reasonable accommodation” is a legal term that refers to certain changes and adjustments in the workplace. An employer may choose to go beyond the ADA and provide an accommodation that would not be required under the law. For example, removing an essential function from an employee’s job description and providing HIV education for all employees are not examples of reasonable accommodations. Similarly, while allowing an employee to work part-time is a type of reasonable accommodation, continuing to pay that employee a full-time salary is not required by the law. The ADA establishes a baseline – a floor, not a ceiling.

Specific legal boundaries of reasonable accommodation

Employers and employees trying to determine appropriate accommodations should be aware of the specific legal boundaries of “reasonable accommodation.” Many of the employers profiled in these case studies provided assistance and accommodations that went above and beyond what the law would require. As a general rule of thumb, given that the ADA governs many of the actions in this area, employers should consider the ADA implications of any decisions involving an employee with HIV infection or AIDS. This includes any decisions about disclosing an employee’s HIV status.

The ADA has strict rules about maintaining confidentiality of such information, and employers should ensure that they do not violate these rules. As awareness of the ADA and its employment provisions increases, more and more employees are stepping forward to disclose their HIV status to their employers, managers, coworkers, and friends. Disclosure often takes courage and is unlikely to happen without an environment in which the disclosure will be met with cooperation and support. Because of the stigma still associated with HIV, this disclosure – especially in the workplace setting – too often does not occur until a crisis forces the issue out into the open. By this time an otherwise manageable situation can become a crisis, and everyone loses – the HIV-positive employee, the employer, the manager, coworkers, and the worksite.

Many employers believe that encouraging disclosure may not be desirable because it creates certain obligations that might not have otherwise existed. An environment that discourages or is hostile to disclosure, however, may present altogether different problems, legal and otherwise, just as a company experiences similar problems when it does not encourage employees with harassment complaints to come forward.

Most human resource professionals agree that providing an environment where complaints or situations (such as the existence of a disability and the need for an accommodation) can be discussed and remedied without the fear of retaliation is a sound policy for both overall productivity and legal reasons.

There is no simple formula for accommodation of employees with HIV Infection or AIDS

The dual goals of accommodation are to ensure that work assignments are accomplished and that the individual with HIV infection or AIDS continues working as long as possible. Accommodation is a process of ongoing problem-solving between an employee with HIV infection or AIDS and his or her supervisor. Because the manifestations of HIV infection and AIDS are different in different people, accommodation is not a one-time alteration of a job or physical structure. Just as each person with HIV infection and AIDS experiences the disease differently, each person will also require different accommodations. An accommodation that is effective for an earlier phase of HIV infection may not be effective for a later phase; an accommodation is an ongoing process requiring ongoing evaluation, in part because the manifestations of HIV infection and AIDS change over time, and in part because some attempted accommodations may not work for either the employer or the employee.
Effective accommodation does not require lowering the expectations of the employee. Rather, it requires ongoing negotiation and creative problem-solving to determine alternative means of accomplishing work assignments. This negotiation process may result in different outcomes in similar circumstances. For example, one employee might convert from a full-time job to part time.

Providing accommodation to employees with HIV infection or AIDS is a team effort with impact on a company’s workforce, managers, and policies

Because of the fear and stigma still associated with HIV/AIDS, accommodating people with HIV infection and AIDS affects virtually everyone in the workplace. A fearful work environment is not a productive work environment. In the process of providing accommodation of employees with HIV infection or AIDS, an employer might consider addressing coworker attitudes. In order to dispel unwarranted fears and to ensure cooperation in the accommodation process, managers need accurate information about HIV infection and AIDS. Confronting AIDS also involves confronting grief. Coworkers and managers in these profiles responded constructively in a supportive environment where emotional responses to HIV could be addressed. Leadership is an important part of effective accommodation. A message from the manager about how an employee with HIV infection or AIDS will be treated is critical because it sets a clear standard.

The benefits of accommodating employees with HIV infection and AIDS balance the costs

Companies that effectively manage HIV/AIDS grow stronger. How a company treats one employee with a chronic illness is a clear indicator and a signal of the standard it will use in managing other employees. Witnessing support, accommodation, and respect for a coworker with a terminal illness strengthens worker morale, loyalty, and productivity. Coworkers and supervisors share a deeply human connection. Employers have the satisfaction of knowing they are making a contribution to the dignity and well-being of one of their own employees. Sometimes companies directly benefit financially from accommodations as well. One employee, working on commission-based pay, wanted to reduce the pressure caused by his income depending directly on his daily sales. His accommodation included converting from commission-based pay to a fixed salary. When his sales were high, this arrangement benefited the company since it kept the commissions he would have received.

Companies benefit when employees who become ill can help train other employees to share and eventually assume some of their responsibilities. The expertise of a knowledgeable and experienced employee is thus passed on to a new employee. This may also give ill employees some peace of mind knowing their responsibilities are being taken care of in their absence.

Employees who fully disclosed their HIV status in the workplace felt relieved and strengthened

Being an employee with HIV/AIDS, as one interviewee described it, is “not for cowards.” The employee must manage the overwhelming emotions of facing a terminal and often stigmatizing illness while still continuing to be a productive worker. People with HIV infection and AIDS are challenged to manage and plan for an ever changing set of ailments, health care needs, and financial demands – all while maintaining motivation and self-esteem.

HIV-positive employees must decide whom to inform about their health status, how much information to reveal, and when to reveal it. The stigma still associated with HIV/AIDS makes such decisions all the more difficult. Fear of rejection, regrettable, is a fear based in reality.

The decision to disclose HIV status is the prerogative of the HIV-positive individual. It is illegal for an employer to ask a current or prospective employee about HIV status. Nonetheless, the HIV-positive employee may have to disclose some health information to managers or supervisors in order to seek an accommodation. Accommodations can be made without the supervisor’s knowing that the individual is HIV-positive or has AIDS; the supervisor may know only that the individual is ill.

Disclosure of one’s HIV status can take place in many settings. Some employees have chosen to disclose it in letters to colleagues or work groups, others do so in face-to-face meetings with individuals or groups. Intensive workplace AIDS education may precede or follow a disclosure. Employees may inform managers of their health condition but request that the information be kept confidential; and by law, the employer must comply with that request.

Over time, however, if coworkers unaware of these circumstances become suspicious of perceived preferential treatment, they may become resentful and spend considerable time, energy, and effort trying to figure out “what’s wrong.” Rumors may circulate. When the performance of their work groups is called into question by superiors, managers may find themselves unable to adequately explain the situation. In such circumstances, the employee may be uncomfortable as well, knowing that rumors are circulating and feeling the unwanted attention from others. At that point, it may be helpful for the manager to discuss with the employee what, if anything, he or she wants to do to address the situation. The decision to disclose rests with the employee, but the employee may be willing to risk disclosure if the manager is not forcing the individual to disclose but, instead, offers support for whatever decision is made.

Finally, many employees with HIV/AIDS believe that continuing to work is critical to their mental and physical health and survival. Work can provide a sense of purpose, financial support, productiveness, continuity, involvement, peer support, and the opportunity to focus on something other than one’s illness. In our culture and society, a person’s work and profession often hold deep ethical, economic, and personal significance. The importance of work and the workplace context for people with HIV infection and AIDS should not be underestimated. Indeed, for some, keeping a job may mean keeping the “will to live.”
Learning objectives
- Describe the basic anatomy and chemical composition of hair.
- Describe how the pH scale pertains to hair care.
- List and compare the three main types of hair color.
- Explain the significance of material safety data sheets.
- Identify ingredients in common hair care products that may be problematic to clients.
- Associate common symptoms with conditions and diseases of the hair and scalp.

Introduction
This chapter will review the chemical composition of the hair and discuss various conditions that you are likely to encounter in your clients. Understanding the composition and nature of hair is the first step in protecting your clients from possible harm that a variety of products can cause.

Structure of hair
Like other mammals, humans are covered by hair. Human body hair, however, is much finer than that of our nonhuman brothers and sisters, and is concentrated primarily on our heads, underarms, and genital regions. Most men, and some women, also have hair on their faces. Each hair grows from an individual follicle that is adjacent to a sebaceous gland. Sebaceous glands produce sebum, which moisturizes skin and hair and is a barrier to toxins. Sebum also manufactures the body’s vitamin D, triggered by exposure to the sun.

Hair is outgrowth of skin but has no sense of feeling due to the lack of nerve endings. It is made up of the protein keratin (also found in skin and nails). Keratin protein is formed by the joining of amino acids. The fact that the acids join at some places along the protein chain makes keratin relatively resistant to change. The chemical makeup of hair also contains carbon, hydrogen, nitrogen, sulfur, and oxygen. Hair protects the body from heat loss and ultraviolet rays. Hair follicles extend down into the dermis (skin layer). A nerve ending surrounds the bulb of each hair follicle. Glands secrete an oily substance directly onto the hair follicle, lubricating the hair shaft.

Hair is composed of cells arranged in three layers: the cuticle, the cortex, and the medulla. The cuticle is the outside layer composed of transparent, scale-like cells. Chemicals raise these scales so solutions such as chemical relaxers, hair color, or permanent wave solutions can enter. The cortex is the inner layer of cells that give hair its strength. It is composed of numerous parallel fibers of hard keratin. These fibers are twisted around one another like a rope. This layer gives hair its color. The medulla is the innermost layer and is composed of round cells. If you have very fine hair, medulla cells may be absent.

Hair’s inner cortex is composed of spindle-shaped cells and an outer sheath, called the cuticle. Within each cortical cell are the many fibrils, running parallel to the fibre axis, and between the fibrils is a softer material called the matrix. It grows from a hair follicle.

CHAPTER 2
CHEMICAL MAKEUP AND CONDITIONS OF HAIR
(2 CE Hours)
(Satisfies Chemical Makeup Requirement)

This is a cross section of a hair fairly close to the surface. You can tell where it’s been cut because there’s a bit of sebaceous gland (SG) next to it. The cortex and medulla of the hair are both present. Some short, curly wool hairs lack a medulla. The outer epithelial root sheath (ORS) is a continuation of the epidermis down into the follicle.

The cuticle is responsible for much of the mechanical strength of the hair fiber. It consists of scale-shaped layers. Human hair typically has 6-8 layers of cuticle. Wool has only one, and other animal hair may have many more layers. Hair responds to its environment, and to its mechanical and chemical history. For example, hair which is wetted, styled and then dried, acquires a temporary ‘set’, which can hold it in style. This style is lost when the hair gets wet again. For more permanent styling, chemical treatments (perms) break and re-form the disulphide links within the hair structure.

In people of European descent, blond hair and black hair are at the finer end of the scale, while red hair is the coarsest. The hair of people of Asian descent is typically coarser than the hair of other groups. Hair with a round cross-section will fall straight, as opposed to curly hair, which has a flat cross-section. The cross-sectional shape of human hair is typically round in people of Asian descent, round to oval in European descent, and nearly flat in African peoples; it is that flatness which allows African hair to attain its frizzy form. In contrast, hair that has a round cross section will be straight. A strand of straight round cross-section hair that has been flattened, for example, with an edge of a coin, will curl up into a micro-afro.

The speed of growth is roughly 11 cm/yr = 0.3 mm/day = 3 nm/s. Cells at the base of the hair follicle divide and grow extremely rapidly. A single strand of human hair can hold approximately 100 g (3.5 ounce) of weight, although this will vary greatly with thickness. Wet hair, however, is very fragile.

Pathology of hair
The term “pathology” refers to the study of disease, including its nature and origins, as well as its effect on the structure and function of the body. A closely related subject is etiology, which investigates the causes or reasons for disease. This chapter reviews diseases and other common conditions of the hair and scalp, which are all part of the integumentary system. The information presented in the following section will help you develop workplace guidelines for recognizing potential health risks, to determine when and how to proceed with service – or if you should proceed at all. This information is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions or concerns regarding the conditions or diseases described below, consult a health care provider.

Disorders of the hair and scalp
The condition and appearance of the hair and scalp are influenced by many factors, including physical health, nutrition, blood circulation, emotional state, function of the endocrine glands, and medications consumed. Common disorders of the hair and scalp include vegetable and animal parasitic infections, staphylococci infections, which cause furuncles (boils), and the following conditions, which may affect the hair follicle and/or sebaceous glands.

Alopecia is the formal term for any abnormal hair loss. It should not be confused with natural hair loss, which occurs when the hair has grown to its full length, falls out, and is replaced by a new hair. Alopecia senilis is hair loss associated with old age, alopecia prematura may occur any time before middle age, and is characterized by slow thinning over time. Alopecia areata is relatively sudden, patchy hair loss, including the spotty baldness that is associated with anemia and typhoid fever, among other conditions. Tension alopecia is caused by tight braiding or hair styles that pull the hair’s roots.

Canities is the formal term for gray hair, which is caused by the loss of pigment. Acquired canities is usually associated with aging, while congenital canites, a condition existing at birth, includes albinism.
Dandruff (or pityriasis) is a condition in which small white flakes or scales appear on the scalp and hair. Excessive dandruff can lead to baldness, if the condition is severe and neglected. Dandruff may be due to microbial infection, poor circulation, nerve stimulation, or diet, and may be associated with specific shampoos, or insufficient rinsing of shampoos. *Pityriasis capitis simplex*, or dry type dandruff is characterized by an itchy scalp and white scales scattered throughout the hair. *Pityriasis steatodes*, a greasy or waxy type of dandruff, is characterized by a scaly skin surface mixed with sebum, and may include bleeding or oozing of the sebum when scales tear off. Refer the client to a physician for medical attention. Dandruff is considered contagious and may spread through the common use of brushes, hair clips, or styling implements.

**Fragilitas crinium** is the formal term for brittle hair, which may include split ends. Conditioners may improve hair flexibility.

**Hair loss** occurs naturally as part of hair growth and regeneration. In women, childbirth, stress, crash dieting, emotional stress and shock can cause greater than normal hair loss, though it is usually temporary. Some older women experience female-pattern hair loss with thinning of the crown and hairline. Drugs used in cancer chemotherapy frequently cause a temporary loss of hair, noticeable on the head and eyebrows, because they kill all rapidly dividing cells, not just the cancerous ones. Other diseases and traumas can cause temporary or permanent loss of hair, generally or in patches.

**Hirsutism** (or hypertrichosis) is excess hair on the body. Genetic background and age can impact how much hair a woman has on the cheeks, upper lip, arms and legs. There are a variety of methods to cope with unwanted hair, such as tweezing, waxing, shaving, bleaching, depilatories and electrolysis. Electrolysis is the only permanent hair-removal method, and is typically among the most expensive and time-consuming means of removal.

**Monilethrix** is the formal term for beaded hair, which breaks between the nodes or beads. Hair and scalp treatments may prove helpful.

**Tinea capitis** (ringworm) is a fungal infection that forms a scaly, ring-like lesion on the scalp. It is highly contagious.

**Trichoptilosis** is the formal term for split ends.

**Trichorrhexis nodosa**, or knotted hair, is characterized by dry, brittle hair with nodular swellings along the length of the hair shaft. Hair breaks easily, but the condition may be remedied somewhat by conditioners.

**Changes in the hair during pregnancy**

Women may experience changes in their hair during pregnancy. In most cases, these changes are temporary and will return to their original condition after the birth. **Hirsutism**, or excessive hair growth, can appear on the face and/or chest due to hormonal changes experienced during pregnancy. Within six months after giving birth, this condition generally dissipates. **Telogen effluvium** refers to excessive hair loss that occurs within five months after pregnancy. This condition does not cause permanent hair loss or baldness, typically returning to normal after six to twelve weeks.

**Hair color change**

Hair color change is probably one of the most obvious signs of aging. Hair color is caused by a pigment (melanin) produced by hair follicles. With aging, the follicle produces less melanin. Graying often begins in the 30’s, although this varies widely. Graying usually begins at the temples and extends to the top of the scalp. Hair becomes progressively lighter, eventually turning white.

Many people have some gray scalp hair by the time they are in their 40s. Body and facial hair also turn gray, but usually later than scalp hair. The hair in the armpit, chest, and pubic area may gray less or not at all. Graying is genetically determined. Gray hair tends to occur earlier in Caucasians and later in Asian races. Nutritional supplements, vitamins, and other products will not stop or decrease the rate of graying.

**Chemical-induced hair color changes**

There have been reports of blond hair, as well as darker hair, turning green after prolonged exposure to chlorine in swimming pools. Usually, the problem is associated with concentrations of copper dissolved in the pool water, which can chemically interact with chlorine. High levels of copper in tap water can also turn hair green.

Chronic smoking has been associated with premature gray hair because toxic substances in tobacco smoke are able to block melanocyte cell pigment producing activity. Heavy smokers with white or gray hair may develop a yellow hair color due, most likely to prolonged exposure to air laden with tar from cigarette smoke. The tar may chemically react with, and preferentially adhere to, the hair fiber.

**Hair thickness changes and hair loss**

Hair is a protein strand that grows through an opening (follicle) in the skin. A single hair has a normal life of about 4 or 5 years. That hair then falls out and is replaced with a new hair. Hair loss usually develops gradually and may be patchy or diffuse (all over). Roughly 100 hairs are lost from your head every day. The average scalp contains about 100,000 hairs.

Hair grows about an inch every couple of months. Each hair grows for 2 to 6 years, remains at that length for a short period, then falls out. A new hair soon begins growing in its place. At any one time, about 85 percent of the hair on your head is in the growing phase and 15 percent is not. Each individual hair survives for an average of 4 ½ years, during which time it grows about half an inch a month. Usually in its 5th year, the hair falls out and is replaced within 6 months by a new one.

Genetic baldness is caused by the body's failure to produce new hairs and not by excessive hair loss. The amount of hair you have on your body and head is determined by your genes. Almost everyone experiences some hair loss with aging, and the rate of hair growth slows. Many hair follicles stop producing new hairs altogether. The hair strands become smaller and have less pigment, with thick, coarse hair of a young adult eventually becoming thin, fine, light-colored hair.

Both men and women tend to lose hair thickness and amount as they age. Inherited or "pattern baldness" affects many more men than women. About a quarter of men begin to show signs of baldness by the time they are 30 years old, and about two-thirds of men have significant baldness by age 60. Men develop a typical pattern of baldness associated with the male hormone testosterone (male-pattern baldness). Hair may be lost at the temples or at the top of the head.

Each hair sits in a cavity in the skin called a follicle. Baldness in men occurs when the follicle shrinks over time, resulting in shorter and finer hair. The end result is a very small follicle with no hair inside. Ordinarily, hair should grow back. However, in men who are balding, the follicle fails to grow a new hair. Why this occurs is not well understood, but it is related to your genes and male sex hormones. Even though the follicles are small, they remain alive, suggesting the possibility of new growth.

Male pattern baldness is the most common type of hair loss in men. It usually follows a typical pattern of receding hairline and hair thinning on the crown, and is caused by hormones and genetic predisposition. Ultimately, one may have only a horseshoe ring of hair around the sides. In addition to genes, male-pattern baldness seems to require the presence of the male hormone testosterone. Men who do not produce testosterone (because of genetic abnormalities or castration) do not develop this pattern of baldness.

Women may also develop a typical pattern of hair loss as they age (female-pattern baldness). In female pattern baldness, the hair becomes less dense all over and the scalp may become visible. Female-pattern
PH of hair

How does the pH scale pertain to hair? **On the pH scale, hair falls on average between 4.5 and 5.5.** This measurement is not the pH of the actual hair, but of the protective film of oily acidic secretions which coats and lubricates the surface of the skin, hair and nails. This combination of oils and water-soluble materials is referred to as our acid mantle, which is produced by the skin. Products with a pH of 4.5 to 5.5 are compatible with the natural biology of the hair and scalp. These products maintain a mildly acidic environment that closely resembles the environment of our acid mantle. We call these products “acid balanced.”

The scalp’s oils keep the hair lubricated and shiny. The scalp’s acidity keeps the fiber compact and strong. Part of the reason long hair tends to be weaker at the ends and dull in appearance is that less of the acid mantle reaches these ends. If, for example, the average pH on the surface of the scalp is measured at 4.8, the pH of the hair at further distances from the scalp will increase, showing that less of the acid mantle reaches the ends of longer hair.

When high pH products, such as alkaline permanent waves or tints, come in contact with the hair, the solution is absorbed through the cuticle layer into the inner layer of the hair called the cortex. The high pH causes the cortex layer to swell. This swelling forces the rigid cuticle layers to be stretched. At this point, the hair is in a very delicate condition and vulnerable to excess stretching and breaking. This condition is necessary for permanent waves to successfully curl the hair and for tints to deposit color molecules into the cortex for lasting color. **Therefore, a high pH is essential for some chemical services to work properly.**

**PH and hair care products**

Shampoos, conditioners, hair colors, and tints all require the proper combination of ingredients and appropriate pH, which plays a crucial role in the success of almost all salon services. Without the correct pH, permanent wave solutions could not create curls or waves, and color molecules from tints would not deposit themselves into the cortex. Continuous use of shampoos and reconditioners with a high pH, however, can damage and dry out the hair.
Shampoo is the most common chemical applied to the hair and therefore is especially important that it be acid-balanced. Do not confuse pH balanced and acid balanced. pH balanced means the pH is balanced at a certain number, but not necessarily at 4.5 to 5.5. Acid balanced means that it is balanced at the appropriate acidic level. Repeated use with shampoo of high pH could make the hair feel dry, dull, and less manageable. There are three basic reasons for using acid-balanced shampoos and conditioners.

The natural pH environment of a healthy hair and scalp is 4.5 to 5.5. Using acid balanced products keep the hair and scalp within this natural range. The acid mantle protects hair and skin from drying out and becoming brittle and dull. Acid-balanced products create an environment that resembles the environment of our natural acid mantle. Also, the hair is structurally compact at a mildly acidic pH value. Swelling is minimized.

How many times have you heard marketing promotions touting their product as “acid- or pH-balanced?” We have been told that a low pH is good for our hair while a high pH is less desirable. This is true when pertaining to products like shampoo and reconditioners, but there are some services, such as permanent waves and tints, that rely on high pH chemicals.

Some products do not have the pH number listed on their labels. If you want to find out the pH of any product you are using, you can use pH test paper or nitazine paper. Just dip the paper into the solution. A product with a 4.5 pH or below will not change the paper from its original yellow shade. A higher pH will change the color to dark blue (4.6 to 7.4) and any product with a pH over 7.5 will turn the paper purple.

**Permanent waves and pH**

Alkaline waves have a pH of approximately 8.5 to 9.5. The high alkalinity softens and swells the hair fibers, making it easier for the chemicals of the wave to penetrate the hair structure. Because of the high alkalinity, cautious and skillful use of the perm is essential to prevent damage to the hair structure. There are pH normalizing conditioners that are made to return hair to its natural pH after chemical services. It is a good idea to use one after giving an alkaline permanent wave.

When high alkaline solutions are used, such as tints and bleaching solutions, they will change the pH of the hair and skin. In this situation, as with alkaline permanent waves, this is desirable. The important thing is to neutralize any extra alkalinity and bring the pH back to 4.5 to 5.5. This minimizes the swelling and strengthens the hair.

PH products work together to assure successful results and beautiful hair. Acid-balanced shampoos protect the hair during cleansing. Conditioners and reconditioners that are acid balanced help return hair to its natural mildly acidic state. Some products need to be alkaline to work properly such as permanent waves and tints. To control damage that might occur from these services, finish with products that have a pH lower than 5.5.

You use chemicals and products everyday. It is important to know what these products do to the hair and why. PH is more than a number. It is a measuring tool, a way for us to select and control products and services. Knowledge of pH enables you to leave the hair and skin in a natural and healthy condition.

**Hair color**

People have been coloring their hair for thousands of years using plants and minerals. Some of these natural agents contain pigments (e.g., henna, black walnut shells) and others contain natural bleaching agents or cause reactions that change the color of hair (e.g., vinegar). Natural pigments generally work by coating the hair shaft with color. Some natural colorants last through several shampoos, but they aren't necessarily safer or more gentle than modern formulations. It's difficult to get consistent results using natural colorants, plus some people are allergic to the ingredients.

Haircoloring is the result of a series of chemical reactions between the molecules in hair, pigments, and peroxide and ammonia, if present. **Hair is mainly keratin.** Its natural color depends on the ratio and quantities of two proteins, eumelanin and phaeomelanin. Eumelanin is responsible for brown to black hair shades while phaeomelanin is responsible for golden blond, ginger, and red colors. The absence of either type of melanin produces white/gray hair.

Bleach is used to lighten hair. The bleach reacts with the melanin in hair, removing the color in an irreversible chemical reaction. The bleach oxidizes the melanin molecule. The melanin is still present, but the oxidized molecule is colorless. However, bleached hair tends to have a pale yellow tint. The yellow color is the natural color of keratin, the structural protein in hair. Also, bleach reacts more readily with the dark eumelanin pigment than with the phaeomelanin, so some gold or red residual color may remain after lightening. Hydrogen peroxide is one of the most common lightening agents. The peroxide is used in an alkaline solution, which opens the hair shaft to allow the peroxide to react with the melanin.

**Hair dye**

Hair dye products may be divided into three categories, i.e., permanent, semi-permanent and temporary hair colors. Semi-permanent and temporary hair coloring products are solutions (on rare occasions dry powders) of various coal tar, i.e. synthetic organic, dyes which deposit and adhere to the hair shaft to a greater or lesser extent. Temporary hair colors must be reapplied after each shampooing. The vehicle may consist of water, organic solvents, gums, surfactants and conditioning agents. The coal tar dyes are either listed and certified colors additives or dyes for which approval has not been sought. The dyes may not be non-permitted metallic salts or vegetable substances.

**Temporary or semi-permanent hair colors deposit acidic dyes onto the outside of the hair shaft or allow small pigment molecules to slip inside the hair shaft, typically using a small amount of peroxide.** In some cases, a collection of several colorant molecules enter the hair to form a larger complex inside the hair shaft. Shampooing will eventually dislodge temporary hair color. These products don't contain ammonia, meaning the hair shaft isn't opened up during processing, and the hair's natural color is retained once the product washes out.

**Permanent hair color**

Permanent hair colors are the most popular hair dye products. They may be further divided into oxidation hair dyes and progressive hair dyes. Oxidation hair dye products consist of (1) a solution of dye intermediates, e.g., p-phenylenediamine, which form hair dyes on chemical reaction, and preformed dyes, e.g., 2-nitro-p-phenylenediamine, which already are dyes and are added to achieve the intended shades, in an aqueous, ammoniacal vehicle containing soap, detergents and conditioning agents; and, (2) a solution of hydrogen peroxide, usually 6 percent, in water or a cream lotion.

The outer layer of the hair shaft, its cuticle, must be opened before permanent color can be deposited into the hair. Once the cuticle is open, the dye reacts with the inner portion of the hair, the cortex, to deposit or remove the color. Most permanent hair colors use a two-step process (usually occurring simultaneously) which first removes the original color of the hair and then deposits a new color. It's essentially the same process as lightening, except a colorant is then bonded within the hair shaft.

**Ammonia is the alkaline chemical that opens the cuticle and allows the hair color to penetrate the cortex of the hair.** It also acts as a catalyst when the permanent hair color comes together with the peroxide. Peroxide is used as the developer or oxidizing agent. The developer removes pre-existing color. Peroxide breaks chemical bonds in hair, releasing sulfur, which accounts for the characteristic odor of haircolor. As the melanin is decolorized, a new permanent color is bonded to the hair cortex. Various types of alcohols and conditioners may also be
present in hair color. The conditioners close the cuticle after coloring to seal in and protect the new color.

The ammoniacal dye solution and the hydrogen peroxide solution, often called the developer, are mixed shortly before application to the hair. The applied mixture causes the hair to swell and the dye intermediates (and preformed dyes) penetrate the hair shaft to some extent before they have fully reacted with each other and the hydrogen peroxide and formed the hair dye.

A hair dye product containing a non-approved coal tar color (but not a non-approved metallic or vegetable dye) that is known to cause adverse reactions under conditions of use cannot be considered adulterated if the label bears the caution statement provided in section 601(a) of the FD&C Act and offers adequate directions for preliminary patch testing by consumers for skin sensitivity. The caution statement reads as follows:

Caution - This product contains ingredients which may cause skin irritation on certain individuals and a preliminary test according to accompanying directions should first be made. This product must not be used for dyeing the eyelashes or eyebrows; to do so may cause blindness.

If the label of a coal tar color-containing hair dye product does not bear the caution statement of section 601(a) and the patch testing directions, it may be subject to regulatory action if it is determined to be harmful under customary conditions of use.

Several coal tar hair dye ingredients have been found to cause cancer in laboratory animals. In the case of 4-methoxy-m-phenylenediamine (4-MMPD, 2, 4-diaminoanisole) which had also been demonstrated in human and animal studies to penetrate the skin, the agency considered the risk associated with its use in hair dyes a "material fact" that should be made known to consumers. The regulation requiring a label warning on hair dye products containing 4-MMPD published in October 1979 was to become effective April 16, 1980. The regulation required that hair dyes containing 4-MMPD bear the following warning:

Warning - Contains an ingredient that can penetrate your skin and has been determined to cause cancer in laboratory animals.

Some hair dye manufacturers held that the potential risk was too small to be considered "material" and challenged the validity of the regulation in court. The agency decided to reconsider its earlier position, entered into a consent agreement with hair dye manufacturers, and stayed the effectiveness of the regulation until completion of an assessment of the carcinogenic risk of 4-MMPD in accordance with scientifically accepted procedures.

In addition to 4-MMPD, the following other hair dye ingredients have been reported to cause cancer in at least one animal species in lifetime feeding studies: 4-chloro-m-phenylenediamine, 2, 4-toluenediamine, 2-nitro-p-phenylenediamine and 4-amino-2-nitrophenol. They were also found to penetrate human and animal skin.

Hair dye reactions

As with hair relaxers, some consumers have reported hair loss, burning, redness, and irritation from hair dyes. Allergic reactions to dyes include itching, swelling of the face, and even difficulty breathing.

Coal tar hair dye ingredients are known to cause allergic reactions in some people. Synthetic organic chemicals, including hair dyes and other color additives, were originally manufactured from coal tar, but today manufacturers primarily use materials derived from petroleum. The use of the term "coal tar" continues because historically that language has been incorporated into the law and regulations.

The law does not require that coal tar hair dyes be approved by FDA, as is required for other uses of color additives. In addition, the law does not allow FDA to take action against coal tar hair dyes that are shown to be harmful, if the product is labeled with the prescribed caution statement indicating that the product may cause irritation in certain individuals, that a patch test for skin sensitivity should be done, and that the product must not be used for dyeing the eyelashes or eyebrows. The patch test involves putting a dab of hair dye behind the ear or inside the elbow, leaving it there for two days, and looking for itching, burning, redness, or other reactions.

The problem is that people can become sensitized – that is, develop an allergy – to these ingredients. They may do the patch test once, and then use the product for 10 years before having an allergic reaction. To guard against this, a patch test must be used every time. Many variables, like what chemicals are already in your hair and what your natural color is, affect what color the hair will turn out.

Hair color and cancer

As indicated above, over the years, some studies have indicated a possible link between hair dye use and cancer, while others have not. In February 1994, FDA and the American Cancer Society released an epidemiologic study involving 573,000 women. Researchers found that women who had ever used permanent hair dyes showed decreased risk of all fatal cancers combined and also of urinary system cancers. The study also revealed that women who had ever used permanent hair dyes showed no increased risk of any type of hematopoietic cancer (cancer of the body's blood-forming systems).

This research, published in the Journal of the National Cancer Institute, did suggest that prolonged use (20 years or more of constant use) of black hair dye may slightly increase the occurrence of non-Hodgkin's lymphoma and multiple myeloma, but these cases represented a small fraction of hair dye users. This study followed previous NCI studies that raised concern about the use of hair dyes and higher rates of non-Hodgkin's lymphoma.

In another study, published in the October 5, 1994, issue of the Journal of the National Cancer Institute, researchers from Brigham and Women's Hospital in Boston followed 99,000 women and found no greater risk of cancers of the blood or lymph systems among women who had ever used permanent hair dyes.

Then in 1998, scientists at the University of California at San Francisco questioned 2,544 people about their use of hair-color products. After integrating the results of this study with those of animal and other epidemiologic studies, they concluded that there was little convincing evidence linking non-Hodgkin's lymphoma with normal use of hair-color products in humans. The study was published in the December 1998 issue of the American Journal of Public Health.

It is still common to hear that the use of permanent or semi-permanent hair color products, particularly black and dark brown colors, is associated with increased incidence of human cancer including non-Hodgkin's lymphoma, multiple myeloma, and Hodgkin's disease. Obviously, for individuals at risk or recovering from cancer, recognizing the links between personal care products and one's health can be vital to preventing continued exposure to possible carcinogens like diethanolamine, contained in many shampoos and other products. According to a 2004 study by the Environmental Working Group (EWG), 93 percent of shampoos possibly contain harmful impurities linked to cancer or other health problems. Additionally, EWG found that 69 percent of hair-dye products may pose cancer risks.

Health and hair care ingredients

In pursuit of cleanliness and beauty, we buy approximately $20 billion worth of personal care products every year. More than 5,000 ingredients are allowed for use in personal care products. Unfortunately, many ingredients are linked to damaging effects on human health. Many are identified by government agencies as hazardous, but many others remain untested. Unlike the pharmaceutical industry, the government does not require safety testing for these products before they go to market. Some ingredients with known health hazards are very common in personal care products, both conventional products and alternative ones.

To avoid potentially harmful ingredients, consult the list below, compiled with information from the Environmental Working Group (EWG) and
the Washington Toxics Coalition. You can also visit EWG’s Skin Deep report, (http://www.ewg.org/reports/skindeep2/), an online searchable database of potentially toxic chemicals in personal care products, including phthalates, which are often not listed on labels. The database also offers brand-specific information and what the group considers safer alternatives.2

Do not underestimate the importance of a patch test before trying any hair color products, even if they are semi-permanent or temporary hair dyes. The best way is to test for allergic reaction is to apply the product to a quarter-sized spot behind the ear or neck several days prior to actually using the product on your scalp.

**Predisposition test**

Federal law mandated under the Pure Food, Drug and Cosmetic Act of 1938 provides that a skin test designed to determine an individual’s oversensitivity to certain chemicals be performed on all clients 24 hours prior to the application of the chemicals. Hypersensitivity to chemical products can only be determined by administering a patch or predisposition test. Allergies may appear suddenly and without warning even if the client has successfully used a product for years.

**NOTE:** Before the application of any chemicals, a thorough analysis of hair must be done to determine the presence of metallic salts.

**Client protection**

Technician’s hands must be washed with soap and warm water before the operation begins.

Drape the client appropriately:

- Skin of the client’s neck must be protected from the re-usable drape by a neck strip.
- Drape must be snug at the neckline and extend over the back of the chair to protect the client’s clothing and the hair.
- Two towels must be used to protect the client from solutions that may drip during the service. One must be under the drape and one must be on top of the drape.

**NOTE:** It is always important to read and follow manufacturer’s directions for any chemical service. Because of the variance in products available for use, in actual practice the manufacturer’s directions take precedence.

Select an area on the back of the neck below the ear lobe to apply the chemical.

**NOTE:** Manufacturer’s directions may indicate a different area on the body for the application of the chemical; be guided by the manufacturer’s directions.

**Cleansing**

- Cleanse a quarter-size area behind client’s ear or in the inner portion of the elbow. Water on a sanitary cotton ball or swab should be used for cleansing.
- Area should air dry.

**Application**

- Product for the test must be mixed in correct proportions according to manufacturer’s directions.
- Product must be applied to test area with a sterile cotton swab.
- Sufficient amount of product must be applied to be effective for testing.
- Area must be left uncovered and undisturbed for 24 hours. Do not wash off.
- After 24 hours, the test area must be examined. If any sign of swelling, burning, itching, redness, or inflammation occurs, the client may be allergic to the product tested and unable to receive an aniline derivative application. (This would be a positive reaction.)

**NOTE:** Only if the reaction is NEGATIVE (no reaction) may the product tested be used.

**NOTE:** Chemical burns may occur if solution saturated cotton is left on the skin.

**In case of chemical burns**

- Wash away the chemical with large amounts of water for at least 5 minutes.
- Remove the victim’s clothing from the affected area to prevent further skin contact.
- Consult the product MSDS for additional first aid information.

**Material safety data sheets (MSDS)**

Hazardous substances are used in this industry on a regular basis and the licensee is responsible for knowing and obeying the laws of all regulatory agencies they may encounter in their careers. The material safety data sheet (MSDS) is the primary source of information describing the hazardous properties of each chemical product used in the profession. It contains information on potential health hazards, proper handling of the chemicals and disposal methods, as well as, emergency first-aid procedures. The MSDS is the tool that will help hair, skin, and nail care professionals work safely in their environment.

The federal OSHA hazard communication standard requires that schools and salons develop and maintain a list of hazardous chemicals present in the work place. Hazardous chemicals may include such products as alcohol, permanent wave solutions, hair straightening solutions, etc. Schools and anyone employing cosmetology licensees are required by law to collect and maintain a file on MSDS for the chemicals used in the establishment.

Manufacturers and distributors of products are, by law, charged with providing an MSDS sheet for each of their products free of charge. Schools are responsible under the hazard communication standard to train and familiarize both their staff and students about hazardous chemicals present in their facilities. An MSDS should be requested each time products containing hazardous substances are purchased or acquired. These files should be updated regularly. MSDS can be requested directly from the manufacturer or distributor of these products.

The MSDS should be reviewed in order to find out all necessary health and safety information about the product before using it. This will help individuals make educated decisions about the products they use in their profession for their own personal safety, as well as the health and safety of their clients.

Regardless of your current health, it’s important to know the ingredients in your personal care items. Shampoo and styling products contain various combinations of parabens, phthalates, fragrance and coal tar colors, which are associated with some risk, so read ingredient labels carefully. Because labels are often difficult to decipher and not all ingredients are necessarily disclosed, finding safer personal care products can be a challenge. Remember it is also the amount, not just the presence, of an ingredient that determines risk.

Women with hair loss or other hair and scalp disorders should not assume hair products are safe. Trying a different hair color or highlights to create the illusion of thicker hair using hair dyes may actually further hair loss or aggravate existing hair and scalp disorders. This is because most professional hair color products contain loads of harsh chemicals such as peroxide, ammonia and p-phenylenediamine that can cause serious damage to the hair and scalp and increase hair loss.

**Danger to eyes**

Whether applying hair chemicals at home or in a hair salon, consumers and beauticians should be careful to keep them away from the eyes. FDA has received reports of injuries from hair relaxers and hair dye accidentally getting into eyes. The use of permanent eyelash and eyebrow tinting and dyeing has been known to cause serious eye injuries and even blindness. There are no color additives approved by FDA for dyeing or tinting eyelashes and eyebrows.
Hair care ingredients
The following ingredients hold some risk or are associated with negative reactions in some individuals:

- Ammonia, used in hair dyes and bleaches, can irritate the eyes and skin and can be toxic when inhaled.
- Bronopol may break down in products into formaldehyde and also cause the formation of carcinogenic nitrosamines, compounds shown to cause cancer in laboratory animals, under certain conditions. Bronopol is often listed as 2-bromo-2-nitropropane-1,3-diol.
- Diethanolamine (DEA), widely used in shampoos as an emulsifier or foaming agent, is a suspected carcinogen, and its compounds and derivatives include triethanolamine (TEA), and monoethanolamine (MEA), all of which can be contaminated with nitrosamines. Contamination is more likely if the product also contains bronopol (see above). DEA, TEA, and MEA are hormone disrupters that are also known to combine with nitrates to form cancer-causing nitrosamines. If a product contains nitrites, which are used as a preservative or present as a contaminant not listed on labels, chemical reactions between nitrites and these substances may occur during the manufacturing process and while products are stored in their containers. This reaction leads to the formation of nitrosamines. Most nitrosamines, including those formed from DEA or TEA, are carcinogenic. There is no way to know which products contain nitrosamines because government does not require manufacturers to disclose this information on the label.

A 1997 study by the U.S. National Toxicology Program found that these compounds themselves might also be carcinogenic. Repeated skin application of DEA was found to cause liver and kidney damage in animals. The study also discovered that when absorbed through the skin, DEA accumulated in organs. TEA may also cause contact dermatitis in some individuals.

FD&C colors (or coal tar colors) are used extensively as coloring agents or coloring additives in personal care products. Coal tar colors have been found to cause cancer in animals and many people experience allergic reactions to them, such as skin irritation and contact dermatitis. They are listed as FD&C or D&C, followed by a color and a number, for example: FD&C Red No. 6, or D&C Green No. 6. FD&C Blue 1 and FD &C Green 3 are carcinogenic, and impurities in other colors – D&C Red 33, FD&C Yellow 5 and FD&C Yellow 6 – have been shown to cause cancer when applied to the skin. Some artificial coal tar colors contain heavy metal impurities, including arsenic and lead, which are carcinogenic.

The law does not require that coal tar hair dyes be approved by FDA, as is required for other uses of color additives. In addition, the law does not allow FDA to take action against coal tar hair dyes that are shown to be harmful, if the product is labeled with a caution statement.

Fragrance: Synthetic fragrances are the most common ingredients found in personal care products. In 1989 the US National Institute of Occupational Safety and Health evaluated 2,983 fragrance chemicals for health effects. They identified 884 of them as toxic substances. The term “fragrance” on a label can indicate the presence of up to 4,000 separate ingredients. A common shampoo and conditioner ingredient, fragrance can include possible skin irritants and allergens. The FDA does not require companies to disclose the ingredients listed as “fragrance” which many include phthalates, chemicals that have been found to produce cancer of the liver and birth defects in lab animals.

Fragrance is a known trigger of asthma, and fragrances more often cause allergic contact dermatitis than any other ingredient, including watery eyes and respiratory tract irritation. Other negative symptoms reported to the FDA have included headaches, dizziness, rashes, skin discoloration, violent coughing and vomiting, and allergic skin irritation. Clinical observations by medical doctors have shown that exposure to fragrances can affect the central nervous system, causing depression, hyperactivity, irritability, and other behavioral changes. Many of the compounds in fragrance are suspected or proven carcinogens.

Hydrogen peroxide is a possible carcinogen used in hair-coloring products that can irritate the skin of hands and scalp and damage hair and eyes.

Phenylenediamine (p-Phenylenediamine or PPD), found in many hair dyes, is linked with skin irritations, respiratory disorders and cancers, and is banned in Europe. Also called oxidation dyes, amino dyes para dyes, or peroxide dyes, PPD can cause eczema, bronchial asthma, gastritis, skin irritation and even death. It is also a carcinogen and can react with other chemicals to cause photosensitivity.

Next to peroxide and ammonia, it is p-phenylenediamine that causes the most concerns among people regarding hair color. To make the situation more confusing for the general public, there are plenty of synonyms for this chemical which makes it quite difficult for the consumer to discern if this chemical is present in a particular hair product or not.

Parabens, an ingredient in many relaxers, are preservatives with antibacterial properties. Widely used in all kinds of personal care products, paraben is usually preceded by the prefixes methyl-, ethyl-, butyl-, propyl, or isobutyl-. Parabens, which are included in some conditioners, can cause allergic reactions or contact dermatitis in some people. (Preservatives are one of the leading causes of contact dermatitis.) The U.S. Food and Drug Administration (FDA) also warns consumers to use caution when using relaxers, as chemicals may accidentally enter the eyes.

Additionally, parabens, according to research published in a 2004 issue of the Journal of Applied Toxicology, have been found in breast tumors. An accompanying article suggested that adolescents and close relatives of breast-cancer patients may be at an increased risk due to continued exposure. Parabens can affect the endocrine system (the glands that produce hormones).

Peroxide is a possible carcinogen used in hair-coloring products that can irritate the skin of hands and scalp and damage hair and eyes.

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Synonyms or components of p-Phenylenediamine:
- Paraphenylenediamine.
- Para-a-minoaniline (p-a-monoaniline).
- PPD.
- PPDA.
- 1,4-Benzenediamine.
- Orsin™.
- 1,4-Penylediamine.
- Ursol™ D.
- Rodol™ D.
- Paradaminobenzene.

Appropriate recommendations on use of concentrations, restrictions and warnings for such application are critical as after active sensitization...
there may be extensive cross reactivity to other commonly encountered chemical substances to which the consumer may be exposed. These include other hair coloring agents, textile dyes, drugs and rubber chemicals.

The U.S. Food and Drug Administration proposed legislation that would have required warning labels on products, advising that this ingredient can penetrate skin and has been determined to cause cancer in lab animals. If passed, beauty salons would have had to post warnings for their customers. Cosmetic industry opposition helped defeat the proposal.

Sodium lauryl sulfate (sodium laureth sulfate, SLS) are used as lathering agents, and are present in 90 percent of commercial shampoos. This chemical is a known skin irritant and appears to increase allergic response to other toxins and allergens, according to the Cosmetics Ingredient Review (CIR), a panel of cosmetics-industry experts established to safety-test ingredients (cir-safety.org). After a review of over 250 existing SLS studies, the CIR concluded that SLS is not cancer-causing. However, some doctors are not convinced and recommend avoiding SLS.

The U.S. government has also warned manufacturers of unacceptable levels of dioxane formation in some products containing SLS. 1,4-Dioxane or para-dioxane is also commonly referred as simply dioxane. However, 1,4-dioxane should not be confused with dioxin (or dioxins), which are a different class of chemical compounds. While dioxane can be removed from products easily and economically by vacuum stripping during the manufacturing process, there is no way to determine which products have undergone this process. Labels are not required to list this information.

Using caution with relaxers and dyes*

According to the Food and Drug Administration's Office of Cosmetics and Colors, hair straighteners and hair dyes are among its top consumer complaint areas. Complaints range from hair breakage to symptoms warranting an emergency room visit. Reporting such complaints is voluntary, and the reported problem is often due to incorrect use of a product rather than the product itself. FDA encourages consumers to understand the risks that come with using hair chemicals, and to take a proactive approach in ensuring their proper use. The agency doesn't have authority under the Federal Food, Drug, and Cosmetic Act to require premarket approval for cosmetics, but it can take action when safety issues surface.

The role of the FDA

When consumers notify the FDA of problems with personal care products, the agency evaluates evidence on a case-by-case basis and determines if follow-up is needed. The FDA looks for patterns of complaints or unusual or severe reactions. The agency may conduct an investigation, and if the evidence supports regulatory action, the FDA may request removal of an item from the market.

Take the example of two popular hair relaxer products by World Rio Corp – the Rio Naturalizer System (Neutral Formula) and the Rio Naturalizer System with Color Enhancer (Black/Licorice). After receiving complaints about these products in November and December of 1994, the FDA warned the public against using them. Consumers complained of hair loss, scalp irritation, and discolored hair.

In December 1994, the World Rio Corp., Inc. of Los Angeles, Calif., announced that it stopped sales and shipments of the product. But reports indicated that the company continued to take orders, and the California Department of Health also stepped in to stop sales. In January of 1995, the U.S. Attorney's Office in Los Angeles filed a seizure action against the company. By then, the agency had received more than 3,000 complaints about the Rio products.

Although most relaxers are alkaline, this product was formulated to be acidic. In the resulting consent decree of condemnation and permanent injunction, FDA alleged that the products were potentially harmful or injurious when used as intended, that they were more acidic than declared in the labeling, and that the labeling described the products as "chemical free" when "allegedly they contained ingredients commonly understood to be 'chemicals.'"

Safer straightening

FDA has received complaints about scalp irritation and hair breakage related to both lye and "no lye" relaxers. Some consumers falsely assume that compared to lye relaxers, "no lye" relaxers take all the worry out of straightening.

*The U.S. government has also warned manufacturers of unacceptable levels of dioxane formation in some products containing SLS.
People may think because it says “no lye” that it's not caustic, but both types of relaxers contain ingredients that work by breaking chemical bonds of the hair, and both can burn the scalp if used incorrectly. Lye relaxers contain sodium hydroxide as the active ingredient. With no-lye relaxers, calcium hydroxide and guanidine carbonate are mixed to produce guanidine hydroxide.

Research has shown that this combination in no-lye relaxers results in less scalp irritation than lye relaxers, but the same safety rules apply for both. They should be used properly, left on no longer than the prescribed time, carefully washed out with neutralizing shampoo, and followed up with regular conditioning. For those who opt to straighten their own hair, it's wise to enlist help simply because not being able to see and reach the top and back of the head makes proper application of the chemical and thorough rinsing more of a challenge.

Some stylists recommend applying a layer of petroleum jelly on the scalp before applying a relaxer because it creates a protective barrier between the chemical and the skin. Scratching, brushing, and combing can make the scalp more susceptible to chemical damage and should be avoided right before using a relaxer. Parents should be especially cautious when applying chemicals to children's hair and should keep relaxers out of children's reach. There have been reports of small children ingesting straightening chemicals and suffering injuries that include burns to the face, tongue, and esophagus.

How often to relax hair is a personal decision. Relaxing at intervals of six to eight weeks is common, and the frequency depends on the rate of a person's hair growth. Some professionals feel that straightening every six weeks is too frequent, as relaxers can cause hair breakage in the long term, with blow drying and curling doing further damage.

Consumers should be aware that applying more than one type of chemical treatment, such as coloring hair one week and then relaxing it the next, can increase the risk of hair damage. The only color recommended for relaxed hair is semi-permanent because it has no ammonia and less peroxide, compared with permanent color.

The FDA encourages voluntary reporting of adverse reactions to hair products to the FDA, Center for Food Safety and Applied Nutrition, Office of Cosmetics and Colors.

Endnotes
CHAPTER 3
FLORIDA LAWS AND RULES
(2 CE Hours)
(Satisfies Laws and Rules Requirement)

Learning objectives
▶ To list and describe your legal responsibilities according to the Florida Cosmetology Practice Act and Florida Administrative Code.
▶ Know your duties and responsibilities under Florida Law.

Introduction
Two primary areas of law pertaining to the practice of cosmetology in the State of Florida are:
◊ The Florida Cosmetology Practice Act: Chapter 477 of the Florida Statutes.
◊ Chapter 61G5 of the Florida Administrative Code.

The following pages simplify excerpts of these documents, clarifying the regulations that address you as a cosmetologist, and explaining your legal responsibilities and obligations.

Other sections or chapters of the Florida Statutes [FS] and Florida Administrative Code [FAC] that apply to the practice of cosmetology (such as Chapter 456: Health Professions and Occupations; or Chapter 120: Administrative Procedure Act; among others) are not addressed in this chapter.

Text in full for the Laws of Florida may be found at http://www.state.fl.us/dbpr/pro/cosmo/cos_codes.shtml. Please refer directly to the Laws of Florida to determine the effective date of a creating act or a particular amendment.

CHAPTER 477
COSMETOLOGY

477.011 Short title.
477.012 Purpose.
477.013 Definitions.
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477.019 Cosmetologists; qualifications; licensure; supervised practice; license renewal; endorsement; continuing education.
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477.026 Fees; disposition.
477.0263 Cosmetology services to be performed in licensed salon; exception.
477.0265 Prohibited acts.
477.028 Disciplinary proceedings.
477.029 Penalty.
477.031 Civil proceedings.
477.032 Short title.-- This act shall be known and may be cited as the “Florida Cosmetology Act.”
477.032 Purpose.-- The Legislature deems it necessary in the interest of public health to regulate the practice of cosmetology in this state. However, restrictions shall be imposed only to the extent necessary to protect the public from significant and discernible danger to health and not in a manner which will unreasonably affect the competitive market. Further, consumer protection for both health and economic matters shall be afforded the public through legal remedies provided for in this act.

477.013 Definitions - As used in this chapter:
1. “Board” means the Board of Cosmetology.
2. “Department” means the Department of Business and Professional Regulation.
3. “Cosmetologist” means a person who is licensed to engage in the practice of cosmetology in this state under the authority of this chapter.
4. “Cosmetology” means the mechanical or chemical treatment of the head, face, and scalp for aesthetic rather than medical purposes, including, but not limited to, hair shampooing, hair cutting, hair arranging, hair coloring, permanent waving, and hair relaxing for compensation. This term also includes performing hair removal, including wax treatments, manicures, pedicures, and skin care services.
5. “Specialist” means any person holding a specialty registration in one or more of the specialties registered under this chapter.
6. “Specialty” means the practice of one or more of the following:
   a. Manicuring, or the cutting, polishing, tinting, coloring, cleansing, adding, or extending of the nails, and massaging of the hands. This term includes any procedure or process for the affixing of artificial nails, except those nails which may be applied solely by use of a simple adhesive.
   b. Pedicuring, or the shaping, polishing, tinting, or cleansing of the nails of the feet, and massaging or beautifying of the feet.
   c. Facials, or the massaging or treating of the face or scalp with oils, creams, lotions, or other preparations, and skin care services.
7. “Shampooing” means the washing of the hair with soap and water or with a special preparation, or applying hair tonics.
8. “Specialty salon” means any place of business wherein the practice of one or all of the specialties as defined in subsection (6) are engaged in or carried on.
9. “Hair braiding” means the weaving or interweaving of natural human hair for compensation without cutting, coloring, permanent waving, relaxing, removing, or chemical treatment and does not include the use of hair extensions or wefts.
10. “Hair wrapping” means the wrapping of manufactured materials around a strand or strands of human hair, for compensation, without cutting, coloring, permanent waving, relaxing, removing, weaving, chemically treating, braiding, using hair extensions, or performing any other service defined as cosmetology.
11. “Photography studio salon” means an establishment where the hair-arranging services and the application of cosmetic products are performed solely for the purpose of preparing the model or client for the photographic session without shampooing, cutting, coloring, permanent waving, relaxing, or removing of hair or performing any other service defined as cosmetology.
12. “Body wrapping” means a treatment program that uses herbal wraps for the purposes of cleansing and beautifying the skin of the body, but does not include:
   a. The application of oils, lotions, or other fluids to the body, except fluids contained in presoaked materials used in the wraps; or
   b. Manipulation of the body’s superficial tissue, other than that arising from compression emanating from the wrap materials.
13. “Skin care services” means the treatment of the skin of the body, other than the head, face, and scalp, by the use of a sponge, brush, cloth, or similar device to apply or remove a chemical preparation or other substance, except that chemical peels may be removed by peeling an applied preparation from the skin by hand. Skin care services must be performed by a licensed cosmetologist or facial specialist within a licensed cosmetology or specialty salon, and such services may not involve massage, as defined in s. 480.033(3), through manipulation of the superficial tissue.
477.0132 Hair Braiding, Hair Wrapping, and Body Wrapping Registration

1. a. Persons whose occupation or practice is confined solely to hair braiding must register with the department, pay the applicable registration fee, and take a two-day, 16-hour course. The course shall be board approved and consist of 5 hours of HIV/AIDS and other communicable diseases, 5 hours of sanitation and sterilization, 4 hours of disorders and diseases of the scalp, and 2 hours of studies regarding laws affecting hair braiding.

   b. Persons whose occupation or practice is confined solely to hair wrapping must register with the department, pay the applicable registration fee, and take a one-day, 6-hour course. The course shall be board approved and consist of education in HIV/AIDS and other communicable diseases, sanitation and sterilization, disorders and diseases of the scalp, and studies regarding laws affecting hair wrapping.

   c. Unless otherwise licensed or exempted from licensure under this chapter, any person whose occupation or practice is body wrapping must register with the department, pay the applicable registration fee, and take a two-day, 12-hour course. The course shall be board-approved and consist of education in HIV/AIDS and other communicable diseases, sanitation and sterilization, disorders and diseases of the skin, and studies regarding laws affecting body wrapping.

   d. Only the board may review, evaluate, and approve a course required of an applicant for registration under this subsection in the occupation or practice of hair braiding, hair wrapping, or body wrapping. A provider of such a course is not required to hold a license under chapter 1005.

2. Hair braiding, hair wrapping, and body wrapping are not required to be practiced in a cosmetology salon or specialty salon. When hair braiding, hair wrapping, or body wrapping is practiced outside a cosmetology salon or specialty salon, disposable implements must be used or all implements must be sanitized in a disinfectant approved for hospital use or approved by the federal Environmental Protection Agency.

3. Pending issuance of registration, a person is eligible to practice hair braiding, hair wrapping, or body wrapping upon submission of a registration application that includes proof of successful completion of the education requirements and payment of the applicable fees required by this chapter.

477.0135 Exemptions

1. This chapter does not apply to the following persons when practicing pursuant to their professional or occupational responsibilities and duties:

   a. Persons authorized under the laws of this state to practice medicine, surgery, osteopathic medicine, chiropractic medicine, massage, naturopathy, or podiatric medicine.

   b. Commissioned medical or surgical officers of the United States Armed Forces hospital services.

   c. Registered nurses under the laws of this state.

   d. Persons practicing barbering under the laws of this state.

   e. Persons employed in federal, state, or local institutions, hospitals, or military bases as cosmetologists whose practices are limited to the inmates, patients, or authorized military personnel of such institutions, hospitals, or bases.

   f. Persons whose practice is limited to the application of cosmetic products to another person in connection with the sale, or attempted sale, of such products at retail without compensation from such other person other than the regular retail price of such merchandise.

2. A license is not required of any person whose occupation or practice is confined solely to shampooing.

3. A license or registration is not required of any person whose occupation or practice is confined solely to cutting, trimming, polishing, or cleansing the fingernails of any person when said cutting, trimming, polishing, or cleansing is done in a barbershop licensed pursuant to chapter 476 which is carrying on a regular and customary business of barbering, and such individual has been practicing the activities set forth in this subsection prior to October 1, 1985.

4. A photography studio salon is exempt from the licensure provisions of this chapter. However, the hair-arranging services of such salon must be performed under the supervision of a licensed cosmetologist employed by the salon. The salon must use disposable hair-arranging implements or use a wet or dry sanitizing system approved by the federal Environmental Protection Agency.

5. A license is not required of any individual providing makeup, special effects, or cosmetology services to an actor, stunt person, musician, extra, or other talent during a production recognized by the Office of Film and Entertainment as a qualified production as defined in s. 288.1254(2). Such services are not required to be performed in a licensed salon. Individuals exempt under this subsection may not provide such services to the general public.

6. A license is not required of any individual providing makeup or special effects services in a theme park or entertainment complex to an actor, stunt person, musician, extra, or other talent, or providing makeup or special effects services to the general public. The term “theme park or entertainment complex” has the same meaning as in s. 509.013(9).

477.014 Qualifications for Practice - On and after January 1, 1979, no person other than a duly licensed cosmetologist shall practice cosmetology or use the name or title of cosmetologist.

477.015 Board of Cosmetology

1. There is created within the department the Board of Cosmetology consisting of seven members, who shall be appointed by the Governor, subject to confirmation by the Senate, and whose function it shall be to carry out the provisions of this act.

2. Five members of the board shall be licensed cosmetologists and shall have been engaged in the practice of cosmetology in this state for not less than 5 years. Two members of the board shall be laypersons. Each board member shall be a resident of this state and shall have been a resident of this state for not less than 5 continuous years.

3. The Governor may at any time fill vacancies on the board for the remainder of unexpired terms. Each member of the board shall hold over after the expiration of his or her term until a successor is duly appointed and qualified. No board member shall serve more than two consecutive terms, whether full or partial.

4. Before assuming his or her duties as a board member, each appointee shall take the constitutional oath of office and shall file it with the Department of State, which shall then issue to such member a certificate of his or her appointment.

5. The board shall, in the month of January, elect from its number a chair and a vice chair.

6. The board shall hold such meetings during the year as it may determine to be necessary, one of which shall be the annual meeting. The chair of the board shall have the authority to call other meetings at his or her discretion. A quorum of the board shall consist of not less than four members.

7. Each member of the board shall receive $50 for each day spent in the performance of official board business, with the total annual compensation per member not to exceed $2,000. Additionally, board members shall receive per diem and mileage as provided in s. 112.061, from place of residence to place of meeting and return.

8. Each board member shall be held accountable to the Governor for the proper performance of all his or her duties and obligations. The Governor shall investigate any complaints or unfavorable reports received concerning the actions of the board, or its members, and shall take appropriate action thereon, which action may include removal of any board member. The Governor may remove from office any board member for neglect of duty, incompetence, or unprofessional or dishonorable conduct.
477.016 Rulemaking
1. The board may adopt rules pursuant to ss. 120.536(1) and 120.54 to implement the provisions of this chapter conferring duties upon it.
2. The board may by rule adopt any restriction established by a regulation of the United States Food and Drug Administration related to the use of a cosmetic product or any substance used in the practice of cosmetology if the board finds that the product or substance poses a risk to the health, safety, and welfare of clients or persons providing cosmetology services.

477.017 Legal Services - The department shall provide all legal services needed to carry out the provisions of this act.

477.018 Investigative Services - The department shall provide all investigative services required by the board or the department in carrying out the provisions of this act.

477.019 Cosmetologists; Qualifications; Licensure; Supervised Practice; License Renewal; Endorsement; Continuing Education
1. A person desiring to be licensed as a cosmetologist shall apply to the department for licensure.
2. An applicant shall be eligible for licensure by examination to practice cosmetology if the applicant:
   a. Is at least 16 years of age or has received a high school diploma;
   b. Pays the required application fee, which is not refundable, and the required examination fee, which is refundable if the applicant is determined to not be eligible for licensure for any reason other than failure to successfully complete the licensure examination; and
   c. 1. Is authorized to practice cosmetology in another state or country, has been so authorized for at least 1 year, and does not qualify for licensure by endorsement as provided for in subsection (6); or
      2. Has received a minimum of 1,200 hours of training as established by the board, which shall include, but shall not be limited to, the equivalent of completion of services directly related to the practice of cosmetology at one of the following:
         a. A school of cosmetology licensed pursuant to chapter 1005.
         b. A cosmetology program within the public school system.
         c. The Cosmetology Division of the Florida School for the Deaf and the Blind, provided the division meets the standards of this chapter.
         d. A government-operated cosmetology program in this state.
      The board shall establish by rule procedures whereby the school or program may certify that a person is qualified to take the required examination after the completion of a minimum of 1,000 actual school hours. If the person then passes the examination, he or she shall have satisfied this requirement; but if the person fails the examination, he or she shall not be qualified to take the examination again until the completion of the full requirements provided by this section.
3. An application for the licensure examination for any license under this section may be submitted for examination approval in the last 100 hours of training by a pregraduate of a licensed cosmetology school or a program within the public school system, which school or program is certified by the Department of Education with fees as required in paragraph (2)(b). Upon approval, the applicant may schedule the examination on a date when the training hours are completed. An applicant shall have 6 months from the date of approval to take the examination. After the 6 months have passed, if the applicant failed to take the examination, the applicant must reapply. The board shall establish by rule the procedures for the pregraduate application process.
4. Upon an applicant receiving a passing grade, as established by board rule, on the examination and paying the initial licensing fee, the department shall issue a license to practice cosmetology.
5. If an applicant passes all parts of the examination for licensure as a cosmetologist, he or she may practice in the time between passing the examination and receiving a physical copy of his or her license if he or she practices under the supervision of a licensed cosmetologist in a licensed salon. An applicant who fails any part of the examination may not practice as a cosmetologist and may immediately apply for reexamination.
6. Renewal of license registration shall be accomplished pursuant to rules adopted by the board.
7. The board shall adopt rules specifying procedures for the licensure by endorsement of practitioners desiring to be licensed in this state who hold a current active license in another state and who have met qualifications substantially similar to, equivalent to, or greater than the qualifications required of applicants from this state.
8. a. The board shall prescribe by rule continuing education requirements intended to ensure protection of the public through updated training of licensees and registered specialists, not to exceed 16 hours biennially, as a condition for renewal of a license or registration as a specialist under this chapter. Continuing education courses shall include, but not be limited to, the following subjects as they relate to the practice of cosmetology: human immunodeficiency virus and acquired immune deficiency syndrome; Occupational Safety and Health Administration regulations; workers’ compensation issues; state and federal laws and rules as they pertain to cosmetologists, cosmetology, salons, specialists, specialty salons, and booth renters; chemical makeup as it pertains to hair, skin, and nails; and environmental issues. Courses given at cosmetology conferences may be counted toward the number of continuing education hours required if approved by the board.
   b. Any person whose occupation or practice is confined solely to hair braiding, hair wrapping, or body wrapping is exempt from the continuing education requirements of this subsection.
   c. The board may, by rule, require any licensee in violation of a continuing education requirement to take a refresher course or refresher course and examination in addition to any other penalty. The number of hours for the refresher course may not exceed 48 hours.

477.020 Specialty Registration; Qualifications; Registration Renewal; Endorsement
1. Any person is qualified for registration as a specialist in any one or more of the specialty practices within the practice of cosmetology under this chapter who:
   a. Is at least 16 years of age or has received a high school diploma.
   b. Has received a certificate of completion in a specialty pursuant to s. 477.013(6) from one of the following:
      1. A school licensed pursuant to s. 477.023.
      2. A school licensed pursuant to chapter 1005 or the equivalent licensing authority of another state.
      3. A specialty program within the public school system.
      4. A specialty division within the Cosmetology Division of the Florida School for the Deaf and the Blind, provided the training programs comply with minimum curriculum requirements established by the board.
2. A person desiring to be registered as a specialist shall apply to the department in writing upon forms prepared and furnished by the department.
3. Upon paying the initial registration fee, the department shall register the applicant to practice one or more of the specialty practices within the practice of cosmetology.
4. Renewal of registration shall be accomplished pursuant to rules adopted by the board.
5. The board shall adopt rules specifying procedures for the registration of specialty practitioners desiring to be registered in this state who
have been registered or licensed and are practicing in states which have registering or licensing standards substantially similar to, equivalent to, or more stringent than the standards of this state.

6. Pending issuance of registration, a person is eligible to practice as a specialist upon submission of a registration application that includes proof of successful completion of the education requirements and payment of the applicable fees required by this chapter, provided such practice is under the supervision of a registered specialist in a licensed specialty or cosmetology salon.

477.0213 Cosmetology Graduates of Florida School for the Deaf and the Blind; Licenses - The department shall license candidates upon graduation from the Cosmetology Division of the Florida School for the Deaf and the Blind. The department shall, by rule, provide fees for licenses issued to candidates from the Cosmetology Division of the Florida School for the Deaf and the Blind and shall also provide, by rule, for the type of licenses to be issued and for any required applications.

477.0212 Inactive Status
1. A cosmetologist’s license that has become inactive may be reactivated under s. 477.019 upon application to the department.
2. The board shall promulgate rules relating to licenses which have become inactive and for the renewal of inactive licenses. The board shall prescribe by rule a fee not to exceed $50 for the reactivation of an inactive license and a fee not to exceed $50 for the renewal of an inactive license.

477.026 Fees; Disposition
1. The board shall set fees according to the following schedule:

3. Any person, firm, or corporation desiring to operate a cosmetology salon or specialty salon in the state shall submit to the department an application upon forms provided by the department and accompanied by any relevant information requested by the department and by an application fee.
4. Upon receiving the application, the department may cause an investigation to be made of the proposed cosmetology salon or specialty salon.
5. When an applicant fails to meet all the requirements provided herein, the department shall deny the application in writing and shall list the specific requirements not met. No applicant denied licensure because of failure to meet the requirements herein shall be precluded from reapplying for licensure.
6. When the department determines that the proposed cosmetology salon or specialty salon may reasonably be expected to meet the requirements set forth herein, the department shall grant the license upon such conditions as it shall deem proper under the circumstances and upon payment of the original licensing fee.
7. No license for operation of a cosmetology salon or specialty salon may be transferred from the name of the original licensee to another. It may be transferred from one location to another only upon approval by the department, which approval shall not be unreasonably withheld.
8. Renewal of license registration for cosmetology salons or specialty salons shall be accomplished pursuant to rules adopted by the board. The board is further authorized to adopt rules governing delinquent renewal of licenses and may impose penalty fees for delinquent renewal.
9. The board is authorized to adopt rules governing the periodic inspection of cosmetology salons and specialty salons licensed under this chapter.
10. a. The board shall adopt rules governing the licensure, operation, and inspection of mobile cosmetology salons, including their facilities, personnel, and safety and sanitary requirements.
   b. Each mobile salon must comply with all licensure and operating requirements specified in this chapter or chapter 455 or rules of the board or department that apply to cosmetology salons at fixed locations, except to the extent that such requirements conflict with this subsection or rules adopted pursuant to this subsection.
   c. A mobile cosmetology salon must maintain a permanent business address, located in the inspection area of the local department office, at which records of appointments, itineraries, license numbers of employees, and vehicle identification numbers of the license holder’s mobile salon shall be kept and made available for verification purposes by department personnel, and at which correspondence from the department can be received.
   d. To facilitate periodic inspections of mobile cosmetology salons, prior to the beginning of each month each mobile salon license holder must file with the board a written monthly itinerary listing the locations where and the dates and hours when the mobile salon will be operating.
   e. The board shall establish fees for mobile cosmetology salons, not to exceed the fees for cosmetology salons at fixed locations.
   f. The operation of mobile cosmetology salons must be in compliance with all local laws and ordinances regulating business establishments, with all applicable requirements of the Americans with Disabilities Act relating to accommodations for persons with disabilities, and with all applicable OSHA requirements.
11. Facilities licensed under part II of chapter 400 or under part I of chapter 429 are exempt from this section, and a cosmetologist licensed pursuant to s. 477.019 may provide salon services exclusively for facility residents.
a. For cosmetologists, fees for original licensing, license renewal, and delinquent renewal shall not exceed $25.
b. For cosmetologists, fees for endorsement application, examination, and reexamination shall not exceed $50.
c. For cosmetology and specialty salons, fees for license application, original licensing, license renewal, and delinquent renewal shall not exceed $50.
d. For specialists, fees for application and endorsement registration shall not exceed $30.
e. For specialists, fees for initial registration, registration renewal, and delinquent renewal shall not exceed $50.
f. For hair braiders, hair wrappers, and body wrappers, fees for registration shall not exceed $25.

2. All monies collected by the department from fees authorized by this chapter shall be paid into the Professional Regulation Trust Fund, which fund is created in the department, and shall be applied in accordance with ss. 215.37 and 455.219. The Legislature may appropriate any excess monies from this fund to the General Revenue Fund.

3. The department, with the advice of the board, shall prepare and submit a proposed budget in accordance with law.

477.0263 Cosmetology Services to be Performed in Licensed Salon; Exception
1. Cosmetology services shall be performed only by licensed cosmetologists in licensed salons, except as otherwise provided in this section.
2. Pursuant to rules established by the board, cosmetology services may be performed by a licensed cosmetologist in a location other than a licensed salon, including, but not limited to, a nursing home, hospital, or residence, when a client for reasons of ill health is unable to go to a licensed salon. Arrangements for the performance of such cosmetology services in a location other than a licensed salon shall be made only through a licensed salon.
3. Any person who holds a valid cosmetology license in any state or who is authorized to practice cosmetology in any country, territory, or jurisdiction of the United States may perform cosmetology services in a location other than a licensed salon when such services are performed in connection with the motion picture, fashion photography, theatrical, or television industry; a photography studio; a manufacturer trade show demonstration; or an educational seminar.

477.0265 Prohibited Acts
1. It is unlawful for any person to:
   a. Engage in the practice of cosmetology or a specialty without an active license as a cosmetologist or registration as a specialist issued by the department pursuant to the provisions of this chapter.
   b. Own, operate, maintain, open, establish, conduct, or have charge of, either alone or with another person or persons, a cosmetology salon or specialty salon:
      1. Which is not licensed under the provisions of this chapter; or
      2. In which a person not licensed or registered as a cosmetologist or a specialist is permitted to perform cosmetology services or any specialty.
   c. Engage in willful or repeated violations of this chapter or of any rule adopted by the board.
   d. Permit an employed person to engage in the practice of cosmetology or of a specialty unless such person holds a valid, active license as a cosmetologist or registration as a specialist.
   e. Observe or attempt to obtain a license or registration for money, other than the required fee, or any other thing of value or by fraudulent misrepresentations.
   f. Use or attempt to use a license to practice cosmetology or a registration to practice a specialty, which license or registration is suspended or revoked.
   g. Advertise or imply that skin care services or body wrapping, as performed under this chapter, have any relationship to the practice of massage therapy as defined in s. 480.033(3), except those practices or activities defined in s. 477.013.
   h. In the practice of cosmetology, use or possess a cosmetic product containing a liquid nail monomer containing any trace of methyl methacrylate (MMA).

477.028 Disciplinary Proceedings
1. The board shall have the power to revoke or suspend the license of a cosmetologist licensed under this chapter, or the registration of a specialist registered under this chapter, and to reprimand, censure, deny subsequent licensure or registration of, or otherwise discipline a cosmetologist or a specialist licensed or registered under this chapter in any of the following cases:
   a. Upon proof that a license or registration has been obtained by fraud or misrepresentation.
   b. Upon proof that the holder of a license or registration is guilty of fraud or deceit or of gross negligence, incompetency, or misconduct in the practice or instruction of cosmetology or a specialty.
   c. Upon proof that the holder of a license or registration is guilty of aiding, assisting, procuring, or advising any unlicensed person to practice as a cosmetologist.

2. The board shall have the power to revoke or suspend the license of a cosmetology salon or a specialty salon licensed under this chapter, to deny subsequent licensure of such salon, or to reprimand, censure, or otherwise discipline the owner of such salon in either of the following cases:
   a. Upon proof that a license has been obtained by fraud or misrepresentation.
   b. Upon proof that the holder of a license is guilty of fraud or deceit or of gross negligence, incompetency, or misconduct in the operation of the salon so licensed.

3. Disciplinary proceedings shall be conducted pursuant to the provisions of chapter 120.
4. The department shall not issue or renew a license or certificate of registration under this chapter to any person against whom or on whose salon against which the board has assessed a fine, interest, or costs associated with investigation and prosecution until the person or salon has paid in full such fine, interest, or costs associated with investigation and prosecution or until the person or salon complies with or satisfies all terms and conditions of the final order.

477.029 Penalty
1. It is unlawful for any person to:
   a. Hold himself or herself out as a cosmetologist, specialist, hair wrapper, hair braider, or body wrapper unless duly licensed or registered, or otherwise authorized, as provided in this chapter.
   b. Operate any cosmetology salon unless it has been duly licensed as provided in this chapter.
   c. Permit an employed person to practice cosmetology or a specialty unless duly licensed or registered, or otherwise authorized, as provided in this chapter.
   d. Present as his or her own the license of another.
   e. Use or attempt to use a license that has been revoked.
   f. Impersonate any other license holder of like or different name.
   g. Use or attempt to use a license that has been revoked.
   h. Violate any provision of s. 455.227(1), s. 477.0265, or s.477.028.
   i. Violate or refuse to comply with any provision of this chapter or chapter 455 or a rule or final order of the board or the department.

2. Any person who violates the provisions of this section shall be
subject to one or more of the following penalties, as determined by the board:
   a. Revocation or suspension of any license or registration issued pursuant to this chapter.
   b. Issuance of a reprimand or censure.
   c. Imposition of an administrative fine not to exceed $500 for each count or separate offense.
   d. Placement on probation for a period of time and subject to such reasonable conditions as the board may specify.
   e. Refusal to certify to the department an applicant for licensure.

477.031 Civil Proceedings - As cumulative of any other remedy or criminal prosecution, the department may file a proceeding in the name of the state seeking issuance of a restraining order, injunction, or writ of mandamus against any person who is or has been violating any of the provisions of this chapter or the lawful rules or orders of the department.

Administrative Rules Governing the Profession
61G5-18.00015 Cosmetologist and Compensation Defined
A cosmetologist is a person who is licensed to perform the mechanical or chemical treatment of the head, face, and scalp, for aesthetic rather than medical purposes, for compensation, including, but not limited to hair shampooing, hair cutting, hair arranging, hair braiding, hair coloring, permanent waving, and hair relaxing.

A cosmetologist may also perform non-invasive hair removals including wax treatments but not electrolysis.

For the purposes of this act:
“Compensation” is defined as the payment of money or its equivalent, the receipt or delivery of property, or the performance of a service, or the receipt or delivery of anything of value in exchange for cosmetology services.

“Medical purposes” is defined as any form of bodily intrusion into the orifices, skin, muscles, or any other tissues of the body.

61G5-20.0015 Performance of Cosmetology or Specialty Services Outside a Licensed Salon
Cosmetology or specialty services may be performed by a licensed cosmetologist or specialist in a location other than a licensed salon, including a hospital, nursing home, residence, or similar facility. When a client, for reasons of ill health, is unable to go to a licensed salon, the following procedure shall be followed:

   1. Arrangements shall be made through a licensed salon.
   2. Information, including the name of the client and the address at which the services are to be performed, should be recorded in the appointment book.
   3. The appointment book should remain at the salon and be made available, upon request, to any investigator or inspector of the Department.

When cosmetology or specialty services are performed in a location other than a licensed salon, these services may lawfully be performed only upon clients, residents, or patients, who for reasons of ill health are unable to visit a licensed salon. Such services are not to be performed upon employees, persons who do not reside in the facility, or any other non-qualified persons.

Cosmetology services may only be performed in a photography studio salon subject to the following requirements:

   Only hair-arranging services and the application of cosmetic products may be performed in a photography studio salon. Such services may only be performed for the purpose of preparing a model or client of the photography studio for a photographic session. Shampooing the hair, hair cutting, hair coloring, permanent waving of the hair, hair relaxing, removing of hair, manicuring, pedicuring, and the performance of any other service defined as cosmetology may not be performed in a photography studio salon.

All hair-arranging services and applications of cosmetic products to be performed in the photography studio salon shall be performed by a licensed Florida cosmetologist or under the supervision of a licensed cosmetologist employed by the salon. “Under the supervision of a licensed cosmetologist” means that an individual who then holds a current, active Florida license as a cosmetologist must be physically present at the photography studio salon at all times when hair-arranging services or applications of cosmetic products are being performed.

When performing hair-arranging services, the photography studio salon must use either disposable hair-arranging implements or a wet or dry sanitizing system approved by the Environmental Protection Agency.

61G5-20.00175 Fashion Photography
For purposes of Section 477.0263(3), F.S., fashion photography is defined to mean the photographing of one or more human subjects or professional models, for commercial purposes, where the subject or model receives remuneration, compensation, or wages for being photographed. Fashion photography shall not include instances in which the subject pays a photographer a fee to be photographed, or instances in which the photographs are made for the personal use and enjoyment of the subject rather than for commercial purposes.

61G5-20.002 Salon Requirements
1. Prior to opening a salon, the owner shall:
   a. Submit an application on forms prescribed by the Department of Business and Professional Regulation; and
   b. Pay the required registration fee as outlined in the fee schedule in Rule 61G5-24.005, F.A.C.; and
   c. Meet the safety and sanitary requirements as listed below and these requirements shall continue in full force and effect for the life of the salon:

   1. Ventilation and Cleanliness: Each salon shall be kept well ventilated. The walls, ceilings, furniture and equipment shall be kept clean and free from dust. Hair must not be allowed to accumulate on the floor of the salon. Hair must be deposited in a closed container. Each salon which provides services for the extending or sculpturing of nails shall provide such services in a separate area which is adequately ventilated for the safe dispersion of all fumes resulting from the services.

   2. Toilet and Lavatory Facilities: Each salon shall provide – on the premises or in the same building as, and within 300 feet of, the salon – adequate toilet and lavatory facilities. To be adequate, such facilities shall have at least one toilet and one sink with running water. Such facilities shall be equipped with toilet tissue, soap dispenser with soap or other hand cleaning material, sanitary towels or other hand drying device such as a wall-mounted electric blow dryer, and waste receptacle. Such facilities and all of the foregoing fixtures and components shall be kept clean, in good repair, well lighted, and adequately ventilated to remove objectionable odors.

   3. A salon or specialty salon may be located at a place of residence. Salon facilities must be separated from the living quarters by a permanent wall construction. A separate entrance shall be provided to allow entry to the salon other than from the living quarters. Toilet and lavatory facilities shall comply with subparagraph (c)2. above and shall have an entrance from the salon other than the living quarters.

   4. Animals: No animals or pets shall be allowed in a salon, with the exception of fish kept in closed aquariums, or trained animals to assist the hearing impaired, visually impaired, or the physically disabled.

   5. Shampoo Bowls: Each salon shall have shampoo bowls equipped with hot and cold running water. The shampoo bowls shall be located in the area where cosmetology services are being performed. A specialty salon that exclusively provides specialty services, as defined in Section
Each salon shall comply with the following:

2. Each salon shall comply with the following:
   a. Linens: Each salon shall keep clean linens in a closed, dustproof cabinet. Soiled linens must be kept in a closed receptacle. Soiled linens may be kept in open containers if entirely separated from the area in which cosmetology services are rendered to the public. A sanitary towel or neck strip shall be placed around the patron’s neck to avoid direct contact of the shampoo cape with a patron’s skin.
   b. Containers: Salons must use containers for waving lotions and other preparations of such type as this will prevent contamination of the unused portion. All creams shall be removed from containers by spatulas.
   c. Sterilization and Disinfection: The use of a brush, comb or other article on more than one patron without being disinfected is prohibited. Each salon is required to have sufficient combs, brushes, and implements to allow for adequate disinfecting practices. Combs or other instruments shall not be carried in pockets.
   d. Sanitizers: All salons shall be equipped with and utilize wet sanitizers with hospital level disinfectant or EPA approved disinfectant, sufficient to allow for disinfecting practices.
      1. A wet sanitizer is any receptacle containing a disinfectant solution and large enough to allow for a complete immersion of the articles. A cover shall be provided.
      2. Disinfecting methods which are effective and approved for salons: First, clean articles with soap and water, completely immerse in a chemical solution that is hospital level or EPA approved disinfectant as follows:
         a. Combs and brushes, remove hair first and immerse in hospital level or EPA approved disinfectant;
         b. Metallic instrument, immerse in hospital level for EPA approved disinfectant;
         c. Instruments with cutting edge, wipe with a hospital level or EPA approved disinfectant; or
         d. Implements may be immersed in a hospital level or EPA approved disinfectant solution.
   3. For purposes of this rule, a “hospital level disinfectant or EPA approved disinfectant” shall mean the following:
      a. For all combs, brushes, metallic instruments, instruments with a cutting edge, and implements that have not come into contact with blood or body fluids, a disinfectant that indicates on its label that it has been registered with the EPA as a hospital grade bacterial, fungicidal and fungicidal disinfectant;
      b. For all combs, brushes, metallic instruments with a cutting edge, and implements that have come into contact with blood or body fluids, a disinfectant that indicates on its label that it has been registered with the EPA as a hospital grade bacterial, fungicidal and fungicidal disinfectant;
   4. All disinfectants shall be mixed and used according to the manufacturer’s directions.
   e. After cleaning and disinfecting, articles shall be stored in a clean, closed cabinet or container until used. Undisinfected articles such as pens, pencils, money, paper, mail, etc., shall not be kept in the same container or cabinet. For the purpose of recharging, rechargeable clippers may be stored in an area other than in a closed cabinet or container, provided such area is clean and provided the cutting edges of such clippers have been disinfected.
   f. Ultra Violet Irradiation may be used to store articles and instruments after they have been cleansed and disinfected.
   g. Pedicure Equipment Sterilization and Disinfection: The following cleaning and disinfection procedures must be used for any pedicure equipment that holds water, including sinks, bowls, basins, pipeless spas, and whirlpool spas:
      1. After each client, all pedicure units must be cleaned with a low-foaming soap or detergent with water to remove all visible debris, then disinfected with an EPA registered hospital grade bactericidal, fungicidal, virucidal, and pseudomonacidal disinfectant used according to manufacturer’s instructions for at least ten (10) minutes. If the pipe-free foot spa has a foot plate, it should be removed and the area beneath it cleaned, rinsed, and wiped dry.
      2. At the end of each day of use, the following procedures shall be used:
         a. All filter screens in whirlpool pedicure spas or basins for all types of foot spas must be sanitized. All visible debris in the screen and the inlet must be removed and cleaned with a low-foaming soap or detergent and water. For pipe-free systems, the jet components or foot plate must be removed and cleaned and any debris removed. The screen, jet, or foot plate must be completely immersed in an EPA registered, hospital grade bactericidal, fungicidal, virucidal, and pseudomonacidal disinfectant that is used according to manufacturer’s instructions. The screen, jet, or foot plate must be replaced after disinfection is completed and the system is flushed with warm water and low-foaming soap for 5 minutes, rinsed, and drained.
         b. After the above procedures are completed, the basin should be filled with clean water and the correct amount of EPA registered disinfectant. The solution must be circulated through foot spa system for 10 minutes and the unit then turned off. The solution should remain in the basin for at least 6 to 10 hours. Before using the equipment again, the basin system must be drained and flushed with clean water.
      3. Once each week, subsequent to completing the required end-of-day cleaning procedures, the basin must be filled with a solution of water containing one teaspoon of 5.25% bleach for each gallon of water. The solution must be circulated through the spa system for 5 to 10 minutes and then the solution must sit in the basin for at least 6 hours. Before use, the system must be drained and flushed.
      4. A record or log book containing the dates and times of all pedicure cleaning and disinfection procedures must be documented and kept in the pedicure area by the salon and made available for review upon request by a consumer or a Department inspector.
      3. No cosmetology or specialty salon shall be operated in the same licensed space allocation with any other business which adversely affects the sanitation of the salon, or in the same licensed space allocation with a school teaching cosmetology or a specialty licensed under Chapter 477, F.S., or in any other location, space, or environment which adversely affects the sanitation of the salon. In order to control the required space and maintain proper sanitation, where a salon adjoins such other business or school, or such other location, space or environment, there must be permanent walls separating the salon from the other business, school, location, space, or environment and there must be separate and distinctly marked entrances for each.
      4. Evidence that the full salon contains a minimum of 200 square feet of floor space. No more than two (2) cosmetologists or specialists may be employed in a salon which has only the minimum floor space.
      5. A specialty salon offering only one of the regulated specialties shall evidence a minimum of 100 square feet used in the performance of
the specialty service and shall meet all the sanitation requirements stated in this section. No more than one specialist or cosmetologist may be employed in a specialty salon with only the minimum floor space. An additional 50 square feet will be required for each additional specialist or cosmetologist employed.

6. For purposes of this rule, “permanent wall” means a vertical continuous structure of wood, plaster, masonry, or other similar building material, which is physically connected to a salon’s floor and ceiling, and which serves to delineate and protect the salon.

61G5-20.003 Inspections
The Department of Business and Professional Regulation may inspect a proposed salon to determine that all requirements have been met. Each licensed salon should be inspected at least annually by the Department. No person should, for any reason, inhibit or interfere with an authorized representative of the Department performing these inspections.

61G5-20.004 Display of Documents
1. All holders of a cosmetology or specialty salon license shall display within their salons in a conspicuous place which is clearly visible to the general public upon entering the salon the following documents:
   a. The current salon license,
   b. A legible copy of the most recent inspection sheet for the salon.

2. All holders of a cosmetology or specialty salon license shall require and ensure that all individuals engaged in the practice of cosmetology, any specialty, hair braiding, hair wrapping, or body wrapping display at the individual’s work-station their current license or registration at all times when the individual is performing cosmetology, specialty, hair braiding, hair wrapping, or body wrapping services. The license or registration on display shall be the original certificate or a duplicate issued by the Department and shall have attached a 2” by 2” photograph taken within the previous two years of the individual whose name appears on the certificate. The certificate with photograph attached shall be permanently laminated as of July 1, 2007.

3. By July 1, 2008, all holders of a cosmetology or specialty salon license shall display at each footbath a copy of the Consumer Protection Notice regarding footbaths, sanitation, and safety. Copies of this notice (revised 10/15/07, and incorporated herein by reference) may be obtained from the Department of Business and Professional Regulation at 1940 North Monroe St., Tallahassee, FL 32399-0783, and the Call Center by calling (850)487-1395.
CHAPTER 4
WORKERS’ COMPENSATION
(1 CE Hour)
(Satisfies Workers’ Compensation Requirement)

Learning objectives
- Define workers’ compensation.
- Know the history of workers’ compensation.
- Be able to define the benefits available to you.

Workers’ compensation, a brief history
Simply defined, workers’ compensation recompenses, gives something to a worker, one who performs labor for another, for services rendered or for injuries. This simple definition is taken in part from Webster’s Ninth New Collegiate Dictionary, and in studying this subject closely, we find this definition extremely accurate. Workers’ compensation is not “insurance”; rather, it is social insurance, much the same as unemployment compensation and social security. It is however, the oldest form of social insurance.

Insurance, as defined, is coverage by contract whereby one party undertakes to indemnify or guarantee another against loss by a specified contingency or peril. The very word “insurance” comes from the Latin word for “security.” The word “policy” comes from the Italian language meaning “promise.” The first evidence of insurance appeared in China around 3000 BC when merchants would divide their cargo into several ships, protecting their investments and dividing any losses among themselves. This system was continued forward, and in 1750 BC, the Babylonians devised a system where the merchant would borrow money to finance his shipment of goods. He paid the lender an additional sum of money and in exchange for this additional sum, the lender agreed to cancel the loan should the shipment be lost or stolen. This system was recorded in the Code of Hammurabi around 1750 BC. The Romans are credited with developing life and health insurance through guilds or clubs around 600 AD.

Under the various workers’ compensation systems, insurance is purchased or provided by employers through individual insurance companies, funds, or self insurance plans to provide the worker with the indemnity and medical benefits required by the laws or acts of the various states or provinces. The Jones Act, Harbor workers’, Longshoremen’s Act and the Federal Workers’ Compensation act are all under governmental regulation and administration, but the purpose of these laws are all the same, to compensate the injured worker for loss of wages and medical benefits. All are meant to be self-executing and are constantly changing, but they are still there, protecting not only the worker but the employer as well and have been for many years.

Moving through history, very little is found regarding workers’ compensation, although other forms of protection against the liability of one against another come to light and the term known as “insurance” becomes popular. Common law was the avenue for claims against another. Under liability, the “duty” and “breach of duty” of one to and against another was the rule to follow. It wasn’t until the early 18th century that the “respondeat superior” doctrine under Old English law came into being. Under this doctrine, the master (employer) was held to be liable for damages to a third person caused by a servant’s (employee) act or omission while the servant was acting within the course and scope of employment. Not many workers were protected under this doctrine unless they were injured by a fellow worker. Overall, it was still another step in the right direction.

The modern birth in Europe
Germany took the lead in the protection of injured workers in 1838 by passing legislation protecting railroad employees and passengers in the event of accidents. Further changes were made in 1854 when a law was passed requiring certain classes of employers to contribute to sickness funds, and in 1876 a voluntary insurance act was passed, which failed in actual operation. Bismarck introduced a compulsory plan in 1881, which was enacted in stages and finalized in 1884 and is the model for our present system.

“Workmen’s” compensation bloomed in England in 1880 when the English Parliament passed the Employer’s Liability Act. Industrialization swept across Europe like a storm in the 1800s. In England, under English Common Law, the injured worker had only one recourse and that was to sue the employer. It was virtually the same system that existed in Germany who, for many years, had been closely allied with England in many business ventures.

Enter the legal profession
Barristers, solicitors and others with legal knowledge and training came forward in increasingly large numbers from 1850 forward and represented the injured workers on a contingency or percentage of what they could collect basis. Although the burden of proof was on the worker as well as other legal expenses, the courts became backlogged and the general public suffered from this unfair and inefficient system as crowded dockets and few judges delayed other civil actions. In the midst of this chaos and confusion, it was noticed that the worker was beginning to prevail in these actions and with the growing legal profession’s assistance were tying up machinery, buildings and property of the employers through liens and attachments.

In 1897, England repealed the employer’s liability act of 1880 and replaced it with a workers’ compensation act. Meanwhile, the storm that swept through Europe during this period of industrialization reached the shores of the United States fueled by the aftermath of the Civil War from 1861-1865.

Into the 20th century
The northern states in this great conflict geared up for the war through the building of factories to produce various armaments with the iron and steel industries taking the lead. However, it was the garment industry in the New York/New Jersey area that brought attention to the plight of the injured worker. Previously making uniforms for the soldiers of the Union, this industry converted rapidly to the manufacturing of clothing for civilian wear after the war ended. These “sweatshops” paying very little, yet demanding high production, became the target for the earliest litigation on behalf of injured workers who were usually paid nothing if they were injured on the job. Safety was nearly non-existent.

Through the 1880s to the turn of the century, the legal profession in the United States was also growing, and the increase of lawsuits had the same effect on the judicial system in the United States that it had in England and Germany. First, the crowded dockets, second, few judges to handle the cases and third, and most important to the worker, judgments were rendered in favor of the worker at a steadily increasing rate. By 1908, the workers were winning in nearly 15 percent of all cases. The American concept of workers’ compensation was now based on that of Germany and England’s philosophy, that industry is responsible for the costs of injuries inherent in industrial occupations.

The first workers’ compensation law passed in the United States was the Federal Employer’s Liability act. It covered certain federal government employees engaged in hazardous occupational duties as well as employees of common carriers engaged in interstate and foreign commerce. It was adopted in 1908 at the urging of President Theodore Roosevelt. He pointed out to congress that “the burden of an accident fell upon the helpless man, his wife and children” and that this was “an outrage.” So it was that the federal government took the lead in providing workers with protection in the event of on the job injuries in the United States.

Not quite ready
Prior to 1908, there was an attempt by several states to do something for at least some workers. These attempts were in the form of legislation of employer liability acts. These acts were based on the theory that the employee must bear his own economic loss from an industrial accident unless he could show that some other person was directly responsible,
because of a negligent act or omission, for the occurrence of the accident. These acts brought some of the workers into the same arena of litigation as a common stranger, and the employer’s liability was limited to his own negligence or at most, for the liability of someone for whom he was directly responsible, under the doctrine of Respondeat Superior. Georgia passed its act in 1855, and by 1907, 26 states had passed employer liability acts.

None of these state acts embodied an actual compensation principle, and most simply said, "prove it" and sue. In 1902, the state of Maryland came close, passing an act that provided for a cooperative accident insurance fund. Benefits were provided only for fatal accidents, and the law was ruled unconstitutional 3 years later. In 1908, Massachusetts passed an act authorizing establishment of private plans for compensation upon the approval of the state board of conciliation and arbitration. This act faded into obscurity soon after passage. New York adopted a workers’ compensation act which was compulsory for certain hazardous jobs and optional for others.

In 1911, the Court of Appeal of New York in the Ives v.s. South Buffalo Railway Company case ruled the act unconstitutional on the grounds of deprivation of property without due process of law. The state of New York had been a controversial stage for workers’ compensation since 1898, when the Social Reform Club of New York drafted a bill to take before the state legislature that proposed compensation for certain types of industrial accidents. Labor unions, strangely enough, were the main opposition mainly because they feared that state control of worker’s benefits would reduce the popularity of unions as well as the worker’s loyalty. It essentially never got off the drawing board.

Workers’ Compensation was on the move; the Federal Government took the first solid step with the Federal Employer’s Liability Act, then the states took their turn.

The great trade-off

The individual states moved a little slower and the year 1911 is most significant in the history of workers’ compensation in America. Wisconsin was the first state to adopt a workers’ compensation law that was to remain under debate for many weeks. The employers lobbied the state legislator for what is now known as the “great trade-off.” Through this legislation, the employer agreed to provide medical and indemnity (wage replacement) benefits, and the injured employee agreed to give up his/her right to sue the employer. It was clear that the growing success of litigation was beginning to be felt by the business community. This same year, 1911, ten more states enacted workers’ compensation laws. Four more states adopted laws in 1912, and eight more passed laws in 1913. By 1948, all the states had at least some form of workers’ compensation in effect including the territories of Alaska and Hawaii. Although they did not acquire statehood until 1959, they had taken the step to adopt legislation in 1915 when they were territories. Today, in addition to the 50 states, workers’ compensation laws are in effect in the District of Columbia, Puerto Rico, Virgin Islands, the Navajo Nation, the Dominion of Canada, and 12 Canadian Provinces. Workers’ compensation has become the exclusive remedy for the injured worker. It also protects employers from damage suits filed by the injured worker as well as provides employers with a basis for calculating production costs.

The Florida experience

Florida moved slowly in enacting a workers’ compensation law primarily because Florida had a smaller work force, virtually no manufacturing and no major problems until the Great Depression of the 1930s. Florida industry was limited and consisted primarily of phosphate mining, agricultural harvesting of fruits and vegetables, tobacco, cattle and logging. In addition, there was a steady movement of people, mostly unemployed, moving down from the north, seeking their fortune as well as Florida sunshine. Florida started an aggressive campaign to attract business to the warmer, more economical climate in mid-Depression and the 1935 legislature meeting in regular session and Governor David Sholtz, who was considered to be a liberal and full of new ideas recognized the necessity for this legislation. A workers’ compensation law was necessary to meet the demands and requirements of the increased and industrial employment in the state and as an inducement and invitation to other industries to move to and operate in Florida. Prospective employers knew that they would be open to lawsuits from workers injured on the job. Most states had adopted legislation entering into the tradeoff and now it was Florida’s turn. Employers who had been in Florida for many years saw these new residents bring an increase in accidents and injuries. Lawsuits were on the rise and workers demanded protection. President Franklin D. Roosevelt’s New Deal brought many reforms including workers’ compensation.

This new law was signed May 23,1935, as House Bill 29 and became effective July 1,1935. Florida made the headlines across the country several months later on Labor Day, September 1, 1935, when the most vicious hurricane ever to hit North America came ashore and devastated the Keys and coastal areas. The loss of life was in the hundreds with hundreds more missing. Two records were set that day. The barometer recorded a low of 26.35 inches of mercury and winds blew in excess of 250 miles per hour.

The new act provided for creation of a new Florida Industrial Commission, which began actual operations in June 1935. The commission consisted of three members, two of them appointed by the governor to serve during the governor’s term of office and the third member to be appointed by the governor to serve a four-year term and be chairman of the commission.

The Florida Industrial Commission’s first chairman was Wendall C. Heaton, and he received a salary of $4,200 yearly. The commission was responsible for administering the provisions of the workers’ compensation law, making studies and investigations with respect to safety provisions and the causes of injuries in employment. They were authorized to make rules and regulations dealing with workers’ compensation. The cost of administering the law was borne by a tax on workers’ compensation insurance premiums and upon self-insurers. It is interesting to note that this method of financing the cost of administering the law still exists today.

The way the law was structured regarding benefits to the injured worker is extremely interesting. Initially, no compensation was allowed for the first fourteen days of the disability. Compensation for disability was not to exceed $18 per week nor be less than $4 per week; provided, however, that if the employee’s wages were less than $4 per week, he was to receive his full weekly wage. Compensation for disability was paid at the rate of 50 percent, 55 percent, and 60 percent of the employee’s average weekly earnings, depending upon the number of dependents of the employee. Medical treatment was furnished at a cost not to exceed $250, except in surgical cases in which the maximum expense to the employer was $500. Under no circumstances would compensation be paid for more than 350 weeks, nor would the total amount paid exceed $5,000. Employees not included under the act were domestic servants, and agriculture and horticultural farm laborers.

In the first year of the Florida Industrial Commission, 10,977 cases on workers’ compensation were reported by Florida’s 67 counties. Of these, 2,983 were reported in Dade county, and 1,985 were reported in Duval County. Benefits paid were approximately $290,434.

By 1937, approximately 40,380 cases were handled by the commission, providing benefits of $963,711 to injured employees in compensation and medical treatment. This figure also includes the costs of funerals in the recorded 89 fatalities.

Between 1935 and 1978 few major changes were made in Florida’s workers’ compensation system. The first medical fee schedule was adopted in 1938 during the regular legislative session. The special disability trust fund was established in 1955. Also referred to as the “second injury fund,” the purpose of the fund is to encourage employers
to hire workers with disabilities. The same year, the rehabilitation and medical services section within the Bureau of Workers’ Compensation was established. In 1960, Florida enacted its own coding and description system. By 1978, Florida adopted, for the first time, a conversion index linking Florida’s fee schedule to the Florida Medical Association relative value coding system, which was fully adopted and completed by 1981.

A major overhaul
In 1978, major changes in the state workers’ compensation system were underway in the state legislature, the first major change since 1935. The law had basically been a “fixed benefit” system, with workers paid on the basis of the severity and type of injury related to a fixed schedule of benefits. Those who were able to or even returned to work received lump sum payments while those who could not work were limited to the schedules. This system was replaced by the “wage loss concept” under the new compensation act. Now called workers’ compensation instead of workers’ compensation, effective August 1, 1979, this new act was to apply to all claims for injury arising out of accidents occurring on or after August 1, 1979. The industrial relations commission was abolished on October 1, 1979. After September 30, 1979, appeals from orders of deputy commissioners (eventually called Judges of Compensation Claims 10 years later in 1989) were to be heard by the First District Court of Appeal (1st DCA). The Bureau of Workers’ Compensation under the Department Of Commerce was expanded and replaced by the Division of Workers’ Compensation under the newly created Department Of Labor And Employment Security, which was vested with extensive powers.

This major reform actually reduced premiums nearly 23 percent for employers from 1978 through 1982. They were to be the last reductions for over a decade as the wage loss concept proved not to be the answer to lowering costs.

In 1980, House Bill 1677, as amended by the Florida Senate and passed by the State House of Representatives, was the major legislative cleanup effort. The year of 1981 saw the revised bill for the Workers’ Compensation Act. This bill essentially deleted obsolete provisions relating to the Industrial Relations Commission and Deputy Commissioners of Industrial Claims. The Workers’ Compensation Act of 1986 incorporated pre-1979 and post-1979 concepts, definitions and directions.

By 1988 another major cleanup effort was the talk of state legislators. Consequently, new reforms were adopted in 1989, followed by major changes in the benefit structure during the 1990 session. Also, in 1990, the Bureau Of Workers’ Compensation Fraud was established in the Department Of Insurance to combat fraud within the system, and the Bureau Of Safety within the Division Of Workers’ Compensation was upgraded to full division status to fill the needs of customers for safety inspections and program establishment. The Workers’ Compensation Drug-Free Workplace Program was added to the law this same year. Recognizing the role that drugs and alcohol played in accidents on the job.

Today
We have seen wage loss come in 1979 and go in the 1993 reform, replaced by impairment income and supplemental benefits. The closing years of the 20th Century brought many changes as litigation and medical care continued to be a problem not only in Florida but on a national level as well. The 1993 reform act introduced our system to managed care arrangements (MCAs). The Employee’s Assistance Office (EAO), designed to prevent litigation through education, information, and the Early Intervention Program and to resolve disputes quickly and effectively, became a reality. In addition, the Employer Help Line, known today as Customer Information and Services, was established to assist employers and other customers with their questions and problems. In the 1993 Reform Act the emphasis was, and still is today, placed on re-employment, getting the injured worker back to work as soon as able, therefore reducing costs and increasing productivity.

In 2003, our law again underwent a major reform, with changes to the permanent total, impairment income and death benefit structures, construction industry exemptions, compliance enforcement, medical services; and examination and investigation of carrier and claim handling entities.

The Division of Workers’ Compensation through reorganization continues to emphasize education and information both externally and internally to all customers the division serves. Through outreach programs, workshops, conferences, seminars, brochures, pamphlets and other materials, the division’s customers will better understand and take a proactive role in improving the system.

The future
We are just a few years into 21st century and have already seen sweeping changes with the abolishment of the Department of Labor and Employment Security and the Division of Safety and the Special Disability Trust Fund. The Agency for Health Care Administration was elevated to full department status in 2001 and received the Medical Services portion of the Division of Workers’ Compensation in February 2001, with permanent transfer effective July 1, 2002. The Re-employment section transferred to Department of Education, Division of Vocational Rehabilitation with the remainder of the division moving to the department of Insurance, also effective July 1, 2002. The Department of Insurance and Department of Banking and Finance merged into the new Department of Financial Services effective January 1, 2003.

Yes, there will be changes as we progress into this new century, but workers’ compensation is still here for the citizens of Florida.

History of workers’ compensation timeline
10th Century B.C. Kings and temples and Book of Genesis, first possible indication of a form of workers’ compensation.
1884 Germany passes Industry Compensation Act.
1885 United States, Georgia passes Employer Liability Act in the state legislature. 26 other states pass similar acts between 1855-1907. These acts were simply permission to sue the employer if employee proved a negligent act or omission.
1891 Maryland passes legislation for a Cooperative Accident Insurance Fund.
1895 Maryland Act ruled unconstitutional by state Supreme Court.
1897 New York, the New York Social Club drafts a bill for Partial Compensation for Workers. No action taken by state legislature. Largest opponent is labor unions.
1901 Massachusetts passes legislation establishing private plans for compensation. Never signed by the governor and passed into obscurity.
1908 Federal Employer’s Liability Act passed by the U.S. Congress at the urging of President Theodore Roosevelt. This is the first workers’ compensation law in the United States.
1910 New York, legislature passes a partial workers’ compensation act.
1911 New York Court of Appeals rules that the act is unconstitutional.
1911 New York, Triangle Shirtwaist Company fire in New York City, over 146 workers jump to their deaths to escape fire in 10-story building. Exitis were blocked, leading to many lawsuits. The nation is shocked by this tragedy. New York City immediately adopts first safety codes.
1911 Wisconsin becomes first state in the union to adopt a true workers’ compensation law. Called the Great Trade Off; employers provide coverage, employees give up right to sue.
Frequently asked questions regarding workers' compensation

Q: What kind of medical treatment can I get?
A: You should receive the first check within 21 days after reporting your injury to your employer.

Reference: Section 440.20, Florida Statutes

Q: If I’m only temporarily disabled, how long can I get these checks?
A: You can receive temporary total, temporary partial disability payments or a combination of the two benefits during the continuance of your disability for no more than a maximum of 104 weeks.

Reference: Section 440.15(2), Florida Statutes

Q: Can I receive Social Security benefits and workers’ compensation benefits at the same time?
A: Under Florida law, you are not paid for the first seven days of disability. However, if you lose time because your disability extends to over 21 days, you may be paid for the first seven days by the insurance company.

Reference: Section 440.12, Florida Statutes

Q: What will I be paid if I lose time from work?
A: Yes. However an offset, or reduction in your workers’ compensation check may be applied because the law states that the two combined may not exceed 80 percent of your average weekly wage earned prior to your injury. For further information on Social Security, you may contact the Social Security Administration at (800) 772-1213 or visit its website at www.ssa.gov.

Reference: Section 440.15(9), Florida Statutes

Q: How much can I pay my medical bills?
A: No, all authorized medical bills should be submitted by the medical provider to your employer’s insurance company for payment.

Reference: Section 440.13(14), Florida Statutes

Q: Will I be paid if I lose time from work?
A: You are not paid for the first seven days of disability. However, if you lose time because your disability extends to over 21 days, you may be paid for the first seven days by the insurance company.

Reference: Section 440.13(2), Florida Statutes

Q: Do I have to pay any of my medical bills?
A: No, all authorized medical bills should be submitted by the medical provider to your employer’s insurance company for payment.

Reference: Section 440.13(14), Florida Statutes

Q: How much will I be paid?
A: In most cases, your benefit check, which is paid bi-weekly, will be 66 2/3 percent of your average weekly wage. If you were injured before October 1, 2003, this amount is calculated by using wages earned during the 91-day period immediately preceding the date of your injury, not to exceed the state limit. If you worked less than 90% of the 91 day period, the wages of a similar employee in the same employment who has worked the whole of the 91-day period or your full-time weekly wage may be used. If you were injured on or after October 1, 2003, your average weekly wage is calculated using wages earned 13 weeks prior to your injury, not counting the week in which you were injured. In addition, if you worked less than 75 percent of the 13 week period, a similar employee in the same employment who has worked 75 percent of the 13-week period or your full time weekly wage shall be used.

Reference: Section 440.02(28) & 440.14, Florida Statutes

Q: Do I have to pay income tax on this money?
A: No. However, if you go back to work on light or limited duty and are still under the care of the authorized doctor, you will pay taxes on any wages earned while working. For additional information on income tax, you may want to visit the Internal Revenue Service website at: www.irs.gov.

Q: Will I get my first check?
A: You should receive the first check within 21 days after reporting your injury to your employer.

Reference: Section 440.20, Florida Statutes

Q: When will I get my first check?
A: You should receive the first check within 21 days after reporting your injury to your employer.

Reference: Section 440.20, Florida Statutes

Q: My employer will not report my injury to the insurance company. What can I do?
A: You have the right to report the injury to the company’s insurance company. However, if you need assistance, contact the Employee Assistance Office (EAO) at (800) 342-1741 or e-mail wceao@fldfs.com.

Reference: Section 440.185, Florida Statutes

Q: When should my employer report the injury to its insurance company?
A: Your employer should report the injury as soon as possible, but no later than thirty (30) days or your claim may be denied.

Reference: Section 440.185, Florida Statutes

Q: How long after an accident do I have to report it to my employer?
A: You should report it as soon as possible but no later than thirty (30) days or your claim may be denied.

Reference: Section 440.185, Florida Statutes

Frequently asked questions regarding workers’ compensation

Q: Do I have to pay income tax on this money?
A: No. However, if you go back to work on light or limited duty and are still under the care of the authorized doctor, you will pay taxes on any wages earned while working. For additional information on income tax, you may want to visit the Internal Revenue Service website at: www.irs.gov.

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A: You can receive temporary total, temporary partial disability payments or a combination of the two benefits during the continuance of your disability for no more than a maximum of 104 weeks.

Reference: Section 440.15(2), Florida Statutes

Q: Can I receive Social Security benefits and workers’ compensation benefits at the same time?
A: Yes. However an offset, or reduction in your workers’ compensation check may be applied because the law states that the two combined may not exceed 80 percent of your average weekly wage earned prior to your injury. For further information on Social Security, you may contact the Social Security Administration at (800) 772-1213 or visit its website at www.ssa.gov.

Reference: Section 440.15(9), Florida Statutes
Q: Can I receive unemployment compensation and workers’ compensation benefits at the same time?
A: No, not if you are receiving temporary total or permanent total disability benefits as you must be medically able and available for work to qualify for unemployment. For additional information on unemployment compensation, you may want to utilize the Unemployment Compensation website at: www.floridajobs.org.
Reference: Section 440.15(10), Florida Statutes

Q: What can I do if I am not receiving my benefit check?
A: Call the insurance company and ask for the adjuster or claims representative. If you still have questions and don’t understand why the checks have stopped, call the EAO at (800)342-1741 or e-mail wceao@fldfs.com.
Reference: Section 440.14, Florida Statutes

Q: If I am unable to return to work until my doctor releases me, does my employer have to hold my job for me?
A: No, there is no provision in the law that requires your employer to hold the job open for you.
Reference: Section 440.205, Florida Statutes

Q: Can my employer fire me if I am unable to work because of an injury and am receiving workers’ compensation benefits?
A: No, it is against the law to fire you because you have filed.
Reference: Section 440.491, Florida Statutes

Q: If I am unable to return to the type of work I did before I was injured, what can I do?
A: The law provides, at no cost to you, re-employment services to help you return to work. Services include vocational counseling, transferable skills analysis, job-seeking skills, job placement, on-the-job training, and formal retraining. To find out more about this program, you may contact the Department of Education, Division of Vocational Rehabilitation, Bureau of Rehabilitation and Reemployment Services at (850) 245-3470 or visit its website at: www.rehabworks.org/.
Reference: Section 440.191 & 440.192, Florida Statutes

Q: My employer and the insurance company have denied my claim for workers’ compensation benefits. Do I need legal representation to get my benefits? What should I do?
A: It is your decision whether or not to hire an attorney. However, the EAO can assist you and attempt to resolve the dispute. If unable to resolve, the EAO can further assist you in completing and filing a petition for benefits. This service is provided at no cost to you. For assistance call: (800) 342-1741 or e-mail wceao@fldfs.com. For the location of the nearest EAO, go to: www.fldfs.com/WC/dist_offices.html.
Reference: Section 440.191(1), Florida Statutes

Q: What is the time limit for filing a petition for benefits?
A: In general, there is a two (2) year period to file a Petition. However, it depends on the type of issue in dispute. You may call the EAO at (800) 342-1741 or e-mail wceao@fldfs.com for specific information.
Reference: Section 440.19(1), Florida Statutes

Q: Is there a period of time after which my claim is no longer open?
A: If you were injured on or after January 1, 1994, the claim is closed one (1) year from the date of your last medical treatment or payment of compensation. This period of time is referred to as the Statute of Limitations. If you were injured before January 1, 1994, the period is two (2) years.
Reference: Section 440.19(2), Florida Statutes

Q: Can I get a settlement from my claim?
A: Settlements may be made under certain circumstances and are voluntary; not automatic or mandatory.

Q: If I settle my claim for medical benefits with the insurance company and my condition gets worse later, who pays for my future medical care, surgeries, etc?
A: You are responsible for your future medical needs after your claim for medical benefits is settled.
Learning objectives
- Describe a material safety data sheet (MSDS).
- Know the purpose of an MSDS.
- Know how to safely work with chemicals.
- Be aware of how workplace injuries can occur.

Safety and health add value
OSHA is committed to assuring – so far as possible – that every working man and woman in the nation has safe and healthful working conditions. OSHA believes that providing workers with a safe workplace is central to their ability to enjoy health, security and the opportunity to achieve the American dream. Addressing safety and health issues in the workplace also saves the employer money and adds value to the business. Recent estimates place the business costs associated with occupational injuries at close to $170 billion – expenditures that come straight out of company profits.

When workers stay whole and healthy, the direct-cost savings to businesses include:
- Lower workers’ compensation insurance costs.
- Reduced medical expenditures.
- Smaller expenditures for return-to-work programs.
- Fewer faulty products.
- Lower costs for job accommodations for injured workers.
- Less money spent for overtime benefits.

Safety and health also make big reductions in indirect costs, due to:
- Increased productivity.
- Higher quality products.
- Increased morale.
- Better labor/management relations.
- Reduced turnover.
- Better use of human resources.

Employees and their families benefit from safety and health because:
- Their incomes are protected.
- Their family lives are not hindered by injury.
- Their stress is not increased.

Implementing an accident prevention program will allow a small business to learn firsthand that the cost of accident prevention is far lower than the cost of accidents. Consultation offers free help in identifying workplace hazards and establishing or improving safety and health management systems corporate-wide.

OSHA and you
OSHA has not formulated any rules and regulations that deal specifically with the cosmetology industry. While no specific rules exist, individuals engaged in the practice of cosmetology are expected to abide by basic rules contained within the Code of Federal Regulations (29 CFR) that deal with workplace safety and health. These rules describe the responsibilities of employers and employees in dealing with hazardous chemicals, personal protective devices, proper ventilation, prevention from over exposure to dusts, and overall health and safety plans.

One regulation that indirectly impacts the cosmetology profession is placed on the manufacturers of many of the products that you may use in your business. The federal government requires that product manufacturers make available to customers material safety data sheets (MSDS). Each MSDS must contain basic information on the each product manufactured. There is no standard format for an MSDS, but each one must contain the following:
- Identity chemicals that may present physical or chemical hazards.
- Physical hazards, i.e., volatility, evaporation rate and interaction with other chemicals.
- Health hazards, i.e., possible physical side effects of product usage.
- Primary routes of entry into the body.
- Permissible exposure limits.
- Carcinogen (cancer causing) hazard of the chemical.
- Precautions and handling procedures.
- Control and protection measures.
- Emergency and first aid procedures.
- Storage and disposal information.

Your local product supplier is required by federal law to provide you with an MSDS for each product you purchase from them. It is the legal responsibility of salon owners to collect MSDS for each product that you use in your business and to make them available for reference. The following page is a sample of OSHA form 174 (MSDS) Sheet.
### MATERIAL SAFETY DATA SHEETS (MSDS)

#### SECTION I: MANUFACTURER’S NAME AND CONTACT INFORMATION

Manufacturer’s name and address  
Emergency phone number - Call this number in case of an emergency

#### SECTION II: HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

List hazardous components and safe exposure limits  
Ingredient name can be found here

#### SECTION III: PHYSICAL/CHEMICAL CHARACTERISTICS

Physical state (gas, liquid, or solid), boiling point, freezing point, vapor pressure, specific gravity

#### SECTION IV: FIRE AND EXPLOSION HAZARD DATA

Flash point, extinguishing media, special fire fighting procedures, unusual fire and explosion hazards, if any  
This section explains what may cause the product to catch fire and how to put out the fire

#### SECTION V: REACTIVITY DATA

Stability, incompatibility, hazardous decomposition or by-products, if any

#### SECTION VI: HEALTH HAZARD DATA

Routes of entry/exposure  
Health hazards  
Carcinogenicity  
Signs and symptoms of exposure  
Medical conditions generally aggravated by exposure  
This section indicates if this product contains an ingredient that is listed as a potential cancer-causing agent  
This section explains the hazards and symptoms workers may have if they are exposed to a harmful ingredient  
This section describes physical effects that may be experienced if overexposure occurs, as well as if certain illnesses can be made worse by exposure to this ingredient

#### SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

Emergency and first aid procedures  
Steps to be taken in case material is released or spilled  
Precautions to be taken in handling and storing  
Waste disposal methods  
This section describes how to dispose of this product properly  
This section explains what to do in an emergency  
This section explains how to clean up spills

#### SECTION VIII: CONTROL MEASURES

Respiratory protection  
Ventilation requirements  
Personal protective equipment  
This section describes the proper personal protective equipment (e.g. gloves) to wear and ventilation requirements when using this product
Here are a few tips to avoid exposure to hazardous chemicals:

**Substitution**
- Replace a substance with an alternative product that contains a less hazardous substance. Health information found in an MSDS may assist in the selection of a less hazardous substance.
- Replace pressurized aerosol containers, with pump sprays, e.g., pressurized wrap catalyst, hairsprays.

**Redesign**
- Make sure there is good ventilation so that exposure to airborne contaminants can be prevented or minimized, e.g., local exhaust ventilation.
- Protect against eye splash by installing splash shields in areas where chemicals are mixed.

**Administrative controls**
- Make sure MSDSs are available for all chemicals used in the salon.
- Make sure workers are provided with suitable information, training and supervision on the safe use of chemicals and PPE (personal protective equipment).
- Store chemicals away from energy sources, such as fuse boxes, naked flames, heat and intense light sources.
- Store flammable chemicals in a cool place in a securely locked fireproof cabinet.
- Make sure chemicals are out of reach of children.
- Make sure procedures are in place for the clean up of spills using a suitable absorbent material. Refer to the MSDS.
- Clean up chemical spills promptly.
- Make sure that spilled chemicals and equipment used for chemical clean up are disposed of appropriately. Contact the Environmental Protection Agency for further advice.
- Purchase chemicals in ready-to-use packages rather than transferring from large containers.
- Do not eat, drink or smoke in areas that contain chemicals.
- Wash hands with a pH neutral soap or barrier cream before eating, drinking or smoking.

**Personal protective equipment**
- Provide gloves, glasses, aprons and respiratory protection as required by your hazardous substances risk assessment. Guidance can be found in the MSDS.
- Provide workers with training on the fit, maintenance and use of personal protective equipment.
- Make sure workers apply barrier creams on exposed skin areas if bothered by skin irritation.
- Make sure workers cover broken skin with a waterproof dressing.
- Make sure workers wear eye protection and covered shoes to protect against chemical splashes.
- Other control measures apply specifically to each industry.

**Salon industry**
Many products used in salons are classed as hazardous substances. Some products, such as shampoos, are not classified as “hazardous” but may still cause adverse health effects such as dermatitis.

**Specific control measures**
- Do not use products that are known to contribute to dermatitis or cause sensitization, such as:
  - Formaldehyde/formalin (present in low concentration in some shampoos as a preservative).
  - P-phenylene diamine and paratoluene diamine (present in some hair colors and tints – also known as PPD and PTD).
  - Glycerol monothioglycolate (present in some “acid” permanent wave solutions – also known as GMTG).
  - Thioglycolic acid (present in some hair straighteners).
  - Do not use nickel-plated equipment with permanent wave solutions containing ammonium thioglycolate. Use high quality stainless steel or plastic equipment.

**Everyday hazards facing the cosmetologist**

**Manual tasks**
The manual tasks performed in the hairdressing, nail and beauty industry can be physically demanding and are responsible for the majority of musculoskeletal disorders. Disorders can include lower back pain, neck and shoulder pain, tendinitis of the shoulder or wrist, leg discomfort and carpal tunnel syndrome.

**How do manual task injuries occur?**
Injuries from manual tasks result from ongoing wear and tear to the joints, ligaments, tendons, muscles and discs. Although uncommon, injuries can be caused by a one-off overload situation.

Over a period of time, damage can gradually build up through:
- Holding fixed positions for a prolonged time.
• Performing repetitive movements that are fast and/or involve a lot of muscular effort.
If insufficient breaks are taken, muscle fatigue can lead to inflammation and tissue damage. Injury is more likely to occur when this happens repeatedly.

**What are the risk factors?**
Risk factors are part of the demands of a job that affect the worker and can contribute to injury.

These are set out in the table below.

| Common manual task risk factors in the beauty industry |
|----------------|---------------------------------|------------------|
| **Risk factor** | **Contribution to injury** | **Examples of work problems** |
| Working postures | Awkward postures require greater muscular effort and lead to greater fatigue, particularly when holding a position for a long time. | • Back bent or twisted, e.g., washing hair. • Neck bent forward or twisted, e.g., applying color. • Shoulders raised. • Upper arms held out to the sides and away from the body, e.g., massage, cutting hair. • Wrist bent or twisted, e.g., setting rollers, stabilizing hand when filing nails. |
| Repetition and duration | Continually repeating a movement, particularly with a forceful exertion, increases the risk of injury. | • Rolling hair. • Applying color. • Filing nails. • Prolonged sitting or standing. • Prolonged bending or leaning, e.g., electrolysis. |
| Work area design | The work area design and layout may require workers to bend or reach to perform tasks. | • Equipment and materials not located close to the worker causing workers to bend, reach or twist. • Non-adjustable chairs and benches. • Work surfaces too high or too low. • Poor lighting. • Hard, slippery floors. • Work surfaces too wide or narrow. • Leaning or supporting elbows or arms on work surfaces. |
| Use of tools | Poor design and excessive use of hand tools contributes to disorders of the wrist, elbow and shoulder. | • Working with heavy tools. • Difficult or awkward hand grips. |

| **Control measures /design controls** |
| **Redesign the work area** |
• Provide adequate lighting for the task to decrease bending of the back or neck.
• Make sure there is enough room for easy movement around furniture and work areas.
• Provide non-slip surfaces that are comfortable for standing, e.g., cork.
• Provide adjustable styling chairs and stools to avoid working with arms above shoulder height or constantly bending head forward.
• Provide adjustable tables/benches/massage couches.
• Place required work items within reach and close to waist height.
• Provide trolleys with castors to reduce carrying.
• Make sure the work surface for nail work is wide enough so that you do not bump knees with your client or have to stretch to reach client’s hands.
• Provide access to chairs in lunchroom or office so workers can rest from prolonged standing.

| **Select well designed tools** |
• Discuss the selection and purchase of new tools and equipment with staff prior to purchase.
• Make sure that tools such as blow dryers are as light as possible.
• Provide scissors with bent shaped handles that keep your wrists straight and do not dig into the hand.

| **Redesign work methods** |
• Work as close as possible to the client to reduce bending and reaching.

| **Administrative controls** |
• Make sure workers alternate tasks so that different muscles are used, e.g., recover from cutting hair by folding towels, sweeping floors or reception duties, variation in artificial nail filing techniques.
• Manage the number of bookings per worker, particularly those involving demanding tasks, e.g., highlighting hair.
• Make sure workers take short breaks frequently to give wrists, shoulders or back a rest.
• Make sure workers alternate between sitting and standing when performing tasks such as cutting or drying hair, waxing, facials.
Make sure all tools are maintained so they do not need extra effort to use.
Train workers to do tasks so that problem working postures are avoided or kept to a minimum.

**Personal protective equipment**
- Wear footwear with low heels and shock-absorbing soles or inserts.

**Noise and vibration**
The main risk to health from noise exposure, other than permanent loss of hearing, is stress and fatigue. Noise levels of most equipment, such as hair dryers and radios, in the health and beauty industry are generally not high enough to cause hearing loss. However, some workers and clients may find the noise levels annoying.

If a worker has used a personal security alarm in an emergency situation, he or she should be tested by an audiologist or ear, nose or throat specialist to establish whether or not hearing damage has occurred.

Equipment, such as hand-held hair dryers, body massagers and electric nail files and drills emit vibration. Workers who use this equipment are at risk of developing Raynaud’s disease and/or carpal tunnel syndrome; the onset of these conditions depends on:
- Type of equipment used.
- Length of use.
- Postures when using the equipment.

Employers should consult with workers and take steps to minimize risk from exposure to noise and vibration at work.

**Control measures**

**Substitution**
- Replace existing equipment with equipment that emits a lower level of noise and vibration.

**Redesign**
- Rearrange the layout of the workplace to separate noisy work activities from less noisy activities.
- Install sound absorbing material on ceiling and walls to reduce the sound level.

**Administrative controls**
- Adopt a “buy quiet” policy for all new equipment.
- Make sure all equipment is maintained and in a good condition.
- Make sure workers vary working postures regularly to minimize exposure to vibration, e.g., alternate the equipment between hands.
- Provide workers with training and information about noise and vibration.

**Fire safety and prevention**

**Limiting the damage**
Salons should be equipped with sprinklers and fire detection equipment. The fire detection system should be connected to a central station monitor. Linens need to be stored away from other combustibles in noncombustible or fire-retardant containers.

**What employers should do to protect workers from fire hazards?**
Employers should train workers about fire hazards in the workplace and about what to do in a fire emergency. Employers should train employees on how to escape a possible fire.

**What does OSHA require for emergency fire exits?**
Every workplace must have enough exits suitably located to enable everyone to get out of the facility quickly. Considerations include the type of structure, the number of persons exposed, the fire protection available, the type of industry involved, and the height and type of construction of the building or structure. In addition, fire doors must not be blocked or locked when employees are inside. Delayed opening of fire doors, however, is permitted when an approved alarm system is integrated into the fire door design. Exit routes from buildings must be free of obstructions and properly marked with exit signs.

Develop an emergency action/fire prevention plan.

Not every employer is required by OSHA to have an emergency action plan, but establishing one for your particular workplace is a good rule to follow.

**The rules for fixed extinguishing systems**
Fixed extinguishing systems throughout the workplace are among the most reliable fire fighting tools. These systems detect fires, sound an alarm, and send water to the fire and heat. To meet OSHA standards, employers who have these systems must:
- Substitute (temporarily) a fire watch of trained employees to respond to fire emergencies when a fire suppression system is out of service.
- Ensure that the watch is included in the fire prevention plan and the emergency action plan.
- Post signs for systems that use agents (e.g., carbon dioxide, Halon 1211, etc.) posing a serious health hazard.
Indoor pollution sources that release gases or particles into the air can affect indoor air quality. These sources can be due to moisture and humidity; and occupant perceptions and susceptibilities. In design, maintenance and operation of building ventilation systems; environments. These factors include: sources of pollutants or odors; temperature and humidity levels can also increase concentrations of pollutant gases. If too little outdoor air enters a facility, pollutants can accumulate to levels that can pose health and comfort problems. While pollutants commonly effects, which include some respiratory diseases, heart disease, and cancer, can be severely debilitating or fatal. While pollutants commonly sources, such as building materials, furnishings, and household products like air fresheners, release pollutants more or less continuously. Other sources, related to activities carried out in the home, release pollutants intermittently. These include smoking, the use of unvented or malfunctioning stoves, furnaces, or space heaters, the use of solvents in nail services, cleaning and hobby activities, the use of paint strippers in renovating activities, and the use of cleaning products and pesticides in housekeeping. High pollutant concentrations can remain in the air for long periods after some of these activities.

Outdoor air enters and leaves a house by: infiltration, natural ventilation, and mechanical ventilation. In a process known as infiltration, outdoor air flows into the house through openings, joints, and cracks in walls, floors, and ceilings, and around windows and doors. Air movement associated with infiltration and natural ventilation is caused by air temperature differences between indoors and outdoors and by wind. Finally, there are a number of mechanical ventilation devices, from outdoor-vented fans that intermittently remove air from a single room, such as bathrooms and kitchens, to air handling systems that use fans and duct work to continuously remove indoor air and distribute filtered and conditioned outdoor air to strategic points throughout the house. The rate at which outdoor air replaces indoor air is described as the air exchange rate. When there is little infiltration, natural ventilation, or mechanical ventilation, the air exchange rate is low and pollutant levels can increase.

Indoor air pollution and health
Health effects from indoor air pollutants may be experienced soon after exposure or, possibly, years later. Immediate effects may show up after a single exposure or repeated exposures. These include irritation of the eyes, nose, and throat, headaches, dizziness, and fatigue. Such immediate effects are usually short-term and treatable. Sometimes the treatment is simply eliminating the person’s exposure to the source of the pollution, if it can be identified. Symptoms of some diseases, including asthma, hypersensitivity pneumonitis, and humidifier fever, may also show up soon after exposure to some indoor air pollutants.

The likelihood of immediate reactions to indoor air pollutants depends on several factors. Age and preexisting medical conditions are two important influences. In other cases, whether a person reacts to a pollutant depends on individual sensitivity, which varies tremendously from person to person. Some people can become sensitized to biological pollutants after repeated exposures, and it appears that some people can become sensitized to chemical pollutants as well. Certain immediate effects are similar to those from colds or other viral diseases, so it is often difficult to determine if the symptoms are a result of exposure to indoor air pollution. For this reason, it is important to pay attention to the time and place symptoms occur. If the symptoms fade or go away when a person is at home, then come back again, during work, for example, an effort should be made to identify indoor air sources at work that may be possible causes. Some effects may be made worse by an inadequate supply of outdoor air or from the heating, cooling, or humidity conditions prevalent in the facility.

Other health effects may show up either years after exposure has occurred or only after long or repeated periods of exposure. These effects, which include some respiratory diseases, heart disease, and cancer, can be severely debilitating or fatal. While pollutants commonly

Learning objectives
- List common sources of indoor air pollutants and ways to address contamination.
- Describe short and long-term health effects of indoor air pollution exposure.
- List and explain the factors that affect individual sensitivity to an indoor air pollutant.
- Define and distinguish between biological contaminants and chemical contaminants.
- List common sources of volatile organic compounds (VOCs) and discuss ways you can protect yourself from overexposure.
- Explain the necessary functions of ventilation systems, barriers to their effectiveness, and types of contamination that occur when they are not functioning properly.
- List five ways you can influence indoor air quality in your workplace or home.

Introduction
Indoor air quality is a major concern to businesses, building managers, tenants, and employees because it can impact the health, comfort, well-being, and productivity of building occupants. Most Americans spend up to 90 percent of their time indoors and spend many of their day at work. Studies conducted by the U.S. Environmental Protection Agency (EPA) and others show that indoor environments sometimes can have levels of pollutants that are actually higher than levels found outside.

Several studies by the EPA, states, and independent scientific panels have consistently ranked indoor air pollution as an important environmental health problem. Pollutants in our indoor environment can increase the risk of illness. While most buildings do not have severe indoor air quality problems, even well-run buildings can sometimes experience episodes of poor indoor air quality.

Indoor air quality is not a simple, easily defined concept like a desk or a leaky faucet. It is a constantly changing interaction of complex factors that affect the levels, types, and importance of pollutants in indoor environments. These factors include: sources of pollutants or odors; design, maintenance and operation of building ventilation systems; moisture and humidity; and occupant perceptions and susceptibilities. In addition, there are many other factors that affect comfort or perception of indoor air quality.

What causes indoor air problems?
Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in homes and businesses. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the home. High temperature and humidity levels can also increase concentrations of some pollutants.

There are many sources of indoor air pollution in any home or office. These include combustion sources such as oil, gas, kerosene, coal, wood, and tobacco products; building materials and furnishings as diverse as deteriorated asbestos-containing insulation, wet or damp carpet, and cabinetry or furniture made of certain pressed wood products; products for household cleaning and maintenance, personal care, or hobbies; central heating and cooling systems and humidification devices; and outdoor sources such as radon, pesticides, and outdoor air pollution.

The relative importance of any single source depends on how much of a given pollutant it emits and how hazardous those emissions are. In some cases, factors such as how old the source is and whether it is properly maintained are significant. For example, an improperly adjusted gas stove can emit significantly more carbon monoxide than one that is properly adjusted.
found in indoor air are responsible for many harmful effects, there is considerable uncertainty about what concentrations or periods of exposure are necessary to produce specific health problems. People also react very differently to exposure to indoor air pollutants. Further research is needed to better understand which health effects occur after exposure to the average pollutant concentrations found in homes or workplaces and which occurs from the higher concentrations that occur for short periods of time.

Many different factors influence how indoor air pollutants impact occupants. Some pollutants, like radon, are of concern because exposure to high levels of the pollutant over long periods of time increases risk of serious, life threatening illnesses, such as lung cancer. Other contaminants, such as carbon monoxide at very high levels, can cause death within minutes. Some pollutants can cause both short and long term health problems. Prolonged exposure to environmental tobacco smoke can cause lung cancer, and short term exposures can result in irritation and significant respiratory problems for some people, particularly young children.

People can react very differently when exposed to the same contaminants at similar concentrations. For example, some people can develop severe allergic reactions to biological contaminants to which other people will not react. Similarly, exposure to very low levels of chemicals may be irritating to some people but not others. For people with asthma and other pre-existing conditions, exposure to irritants like environmental tobacco smoke or gases or particles from various indoor sources may cause more severe reactions than the same exposure would in others.

**Common indoor air pollutants**

Pollutants can be generated by outdoor or indoor sources, including building maintenance activities, pest control, nail services, cleaning products, renovation or remodeling, new furnishings or finishes, and building occupant activities. Some of the key pollutant categories include biological contaminants (like mold and mildew), chemical contaminants, and particles.

Sources of chemical pollutants include tobacco smoke, emissions from products used in the building (e.g., office equipment; furniture, wall and floor coverings; and cleaning and consumer products) accidental spill of chemicals, and gases such as carbon monoxide and nitrogen dioxide, which are products of combustion. Particles are solid or liquid substances which are light enough to be suspended in the air, the largest of which may be visible in sunbeams streaming into a room. However, smaller particles that you cannot see are likely to be more harmful to health. Particles of dust, dirt, or other substances may be drawn into the building from outside and can also be produced by activities that occur in nail salons. One important goal of an indoor air quality program is to minimize people’s exposure to pollutants from these sources.

The pollutants listed below are very common and have been shown to cause the health effects mentioned. However, it is not necessarily true that the effects noted occur at the pollutant concentration levels typically found in the home or workplace. In many cases, our understanding of the pollutants and their health effects is too limited to determine the levels at which the listed effects could occur.

**Biological contaminants**

Sources: Wet or moist walls, ceilings, carpets, and furniture; poorly maintained humidifiers, dehumidifiers, and air conditioners; bedding; household pets.

Health effects: Eye, nose, and throat irritation; shortness of breath; dizziness; lethargy; fever; digestive problems. Can cause asthma; humidifier fever; influenza and other infectious diseases.

Levels: Indoor levels of pollen and fungi are lower than outdoor levels (except where indoor sources of fungi are present). Indoor levels of dust mites are higher than outdoor levels.

Steps to reduce exposure:
- Install and use fans vented to outdoors.
- Empty water trays in air conditioners, and refrigerators frequently.
- Clean and dry or remove water-damaged carpets.

**Organic gases (VOCs)**

Sources: products including: nail products, paints, paint strippers, and other solvents; wood preservatives; aerosol sprays; cleansers and disinfectants; moth repellents and air fresheners; stored fuels and automotive products; hobby supplies; dry-cleaned clothing; solvents used in manicures and pedicures.

Health effects: Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. Some organic chemicals can cause cancer in animals; some are suspected or known to cause cancer in humans.

Levels: Studies have found that levels of several organics average 2 to 5 times higher indoors than outdoors. During and for several hours immediately after certain activities, such as paint stripping, levels may be 1,000 times background outdoor levels.

Steps to reduce exposure:
- Use products according to manufacturer’s directions.
- Make sure you provide plenty of fresh air when using these products.
- Throw away unused or little-used containers safely; buy in quantities that you will use soon.
- Keep out of reach of children and pets.
- Never mix products unless directed on the label.

**A closer look: biological contaminants**

Biological contaminants include bacteria, molds, mildew, viruses, animal dander and cat saliva, house dust, mites, cockroaches, and pollen. Many of these biological contaminants are small enough to be inhaled. There are many sources of these pollutants. Pollens originate from plants; viruses are transmitted by people and animals; bacteria are carried by people, animals, and soil and plant debris; sometimes, rodents, insects or bird droppings can be a source of biological contaminants. Contaminated central air handling systems can become breeding grounds for mold, mildew, and other sources of biological contaminants and can then distribute these contaminants through the facility. Bacteria, molds, pollen, and viruses may breed in stagnant water that has accumulated in ducts, humidifiers and drain pans, or where water has collected on ceiling tiles, carpeting, or insulation.

By controlling the relative humidity level in a facility, the growth of some sources of biologicals can be minimized. Standing water, water-damaged materials, or wet surfaces serve as a breeding ground for molds, mildews, bacteria, and insects. Dust mites, the source of one of the most powerful biological allergens, grow in damp, warm environments. As biological contaminants are, or are produced by, living things, they are often found in areas that provide food and moisture or water. For example, damp or wet areas such as cooling coils, humidifiers, condensate pans, or unvented bathrooms can be moldy. Draperies, bedding, carpet, and other areas where dust collects may accumulate biological contaminants.

General good housekeeping, and maintenance of heating and air conditioning equipment is very important. Adequate ventilation and good air distribution also help. If mold is a problem, clean up the mold and get rid of excess water or moisture. Maintaining the relative humidity between 30 percent - 60 percent will help control mold, dust mites, and cockroaches. Employ integrated pest management to control insect and animal allergens.

Physical symptoms related to biological contamination include cough, chest tightness, fever, chills, muscle aches, and allergic responses such as mucous membrane irritation and upper respiratory congestion. Some biological contaminants trigger allergic reactions, including hypersensitivity pneumonitis, allergic rhinitis, and some types of asthma. Infectious illnesses, such as influenza, measles, and chicken pox are
transmitted through the air. Molds and mildews release disease-causing toxins. Symptoms of health problems caused by biological pollutants include sneezing, watery eyes, coughing, shortness of breath, dizziness, lethargy, fever, and digestive problems.

Allergic reactions occur only after repeated exposure to a specific biological allergen. However, that reaction may occur immediately upon re-exposure or after multiple exposures over time. As a result, people who have noticed only mild allergic reactions, or no reactions at all, may suddenly find themselves very sensitive to particular allergens. Mold, dust mites, pet dander, and pest droppings may trigger asthma. Biological contaminants, including molds and pollens, can cause allergic reactions in a significant portion of the population.

Some diseases, like humidifier fever, are associated with exposure to toxins from microorganisms that can grow in large building ventilation systems, home heating and cooling systems and humidifiers. Children, elderly people, and people with breathing problems, allergies, and lung diseases are particularly susceptible to disease-causing biological agents in the indoor air.

A closer look: Volatile organic compounds - VOCs

Most indoor air pollution comes from sources inside the building.

Nail products, adhesives, carpeting, upholstery, manufactured wood products, copy machines, pesticides, and cleaning agents may emit volatile organic compounds (VOCs), which evaporate easily and can be inhaled. VOCs may have short- and long-term adverse health effects. Research shows that some VOCs can cause chronic and acute health effects at high concentrations, and some are known carcinogens. Low to moderate levels of multiple VOCs may also produce acute reactions. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

Paints, varnishes, and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing, and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored. Examples include: nail products; paints and lacquers; paint strippers; cleaning supplies; pesticides; building materials and furnishings; office equipment, such as copiers and printers, correction fluids and carbonless copy paper; graphics and craft materials, including glues and adhesives; permanent markers; photographic solutions; wood preservatives; aerosol sprays; cleansers and disinfectants; moth repellents and air fresheners; stored fuels and automotive products; hobby supplies; and dry-cleaned clothing.

EPA studies indicate that while people are using products containing organic chemicals, they can expose themselves and others to very high pollutant levels, and elevated concentrations can persist in the air long after the activity is completed.

Design, maintenance and operation of building ventilation systems

Maintaining good indoor air quality requires attention to the building’s heating, ventilation, and air conditioning (HVAC) system; the design and layout of the space; and pollutant source management. HVAC systems include all of the equipment used to ventilate, heat, and cool the building; to move the air around the building (ductwork); and to filter and clean the air. These systems can have a significant impact on how pollutants are distributed and removed. HVAC systems can even act as sources of pollutants in some cases, such as when ventilation air filters become contaminated with dirt and/or moisture and when microbial growth results from stagnant water in drip pans or from uncontrolled moisture inside air ducts. Because of the HVAC system’s importance, good indoor air quality management includes attention to:

Ventilation system design. The air delivery capacity of an HVAC system is based in part on the projected number of people and amount of equipment in a building. When areas in a building are used differently than their original purpose, the HVAC system may require modification to accommodate these changes. For example, if a storage area is converted into space occupied by people, the HVAC system may require alteration to deliver enough conditioned air to the space.

Outside air supply. Adequate supply of outside air, typically delivered through the HVAC system, is necessary in any office environment to dilute pollutants that are released by equipment, building materials, furnishings, products, and people. Distribution of ventilation air to occupied spaces is essential for comfort.

Outdoor air quality. When present, outdoor air pollutants such as carbon monoxide, pollen, and dust may affect indoor conditions when outside air is taken into the building’s ventilation system. Properly installed and maintained filters can trap many of the particles in this outdoor supply air. Controlling gaseous or chemical pollutants may require more specialized filtration equipment.

Space planning. The use and placement of furniture and equipment may affect the delivery of air to an occupied space. For instance, the placement of heat generating equipment, like a computer directly under an HVAC control device such as a thermostat may cause the HVAC system to deliver too much cool air because the thermostat senses that the area is too warm. Furniture or partitions that block supply or return air registers can affect IAQ as well, and need to be positioned with attention to air flow.

Equipment maintenance. Diligent maintenance of HVAC equipment is essential for the adequate delivery and quality of building air. All well-run buildings have preventive maintenance programs that help ensure the proper functioning of HVAC systems.

Controlling other pollutant pathways. Pollutants can spread throughout a building by moving through stairwells, elevator shafts, wall spaces, and utility chases. Special ventilation or other control measures may be needed for some sources.

Moisture and humidity. It is important to control moisture and relative humidity in occupied spaces. The presence of moisture and dirt can cause molds and other biological contaminants to thrive. Relative humidity levels that are too high can contribute to the growth and spread of unhealthy biological pollutants, as can failure to dry water-damaged materials promptly (usually within 24 hours) or to properly maintain equipment with water reservoirs or drain pans (e.g., humidifiers, refrigerators, and ventilation equipment). Humidity levels that are too low, however, may contribute to irritated mucous membranes, dry eyes, and sinus discomfort.

Do you suspect your workplace has an indoor air problem?

Many buildings have significant air pollution sources. Some of these buildings may be inadequately ventilated. For example, mechanical ventilation systems may not be designed or operated to provide adequate amounts of outdoor air. A number of well-identified illnesses, such as Legionnaires’ disease, asthma, hypersensitivity pneumonitis, and humidifier fever, have been directly traced to specific building problems. These are called building-related illnesses. Most of these diseases can be treated; nevertheless, some pose serious risks.

Sometimes, however, building occupants experience symptoms that do not fit the pattern of any particular illness and are difficult to trace to any specific source. This phenomenon has been labeled “sick building syndrome.” People may complain of one or more of the following symptoms: dry or burning mucous membranes in the nose, eyes, and throat; sneezing; stuffy or runny nose; fatigue or lethargy; headache; dizziness; nausea; irritability and forgetfulness. Poor lighting, noise, vibration, thermal discomfort, and psychological stress may also cause, or contribute to, these symptoms. In the opinion of some World Health Organization experts, up to 30 percent of new or remodeled commercial buildings may have unusually high rates of health and comfort complaints from occupants that may potentially be related to indoor air quality.
The three major reasons for poor indoor air quality in workplaces are:
1. The presence of indoor air pollution sources.
2. Poorly designed, maintained, or operated ventilation systems.
3. Uses of the building that were unanticipated or poorly planned for when the building was designed or renovated.

Controlling indoor air quality involves integrating three main strategies. First, manage the sources of pollutants either by removing them from the building or isolating them from people through physical barriers, air pressure relationships, or by controlling the timing of their use. Second, dilute pollutants and remove them from the building through ventilation. Third, use filtration to clean the air of pollutants.

Mechanical ventilation systems in large buildings are designed and operated not only to heat and cool the air, but also to draw in and circulate outdoor air. If they are poorly designed, operated, or maintained, however, ventilation systems can contribute to indoor air problems in several ways. For example, problems arise when, in an effort to save energy, ventilation systems are not used to bring in adequate amounts of outdoor air. Inadequate ventilation also occurs if the air supply and return vents within each room are blocked or placed in such a way that outdoor air does not actually reach the breathing zone of building occupants. Improperly located outdoor air intake vents can also bring in air contaminated with automobile and truck exhaust, boiler emissions, fumes from dumpsters, or air vented from restrooms. Finally, ventilation systems can be a source of indoor pollution themselves by spreading biological contaminants that have multiplied in cooling towers, humidifiers, dehumidifiers, air conditioners, or the inside surfaces of ventilation duct work.

Indoor air pollutants can be circulated from portions of the building used for specialized purposes, such as salons, restaurants, print shops, and dry-cleaning stores, into offices or homes in the same building. Carbon monoxide and other components of automobile exhaust can be drawn from underground parking garages through stairwells and elevator shafts into office spaces.

In addition, buildings originally designed for one purpose may end up being converted to use as salon space. If not properly modified during building renovations, the room partitions and ventilation system can contribute to indoor air quality problems by restricting air recirculation or by providing an inadequate supply of outdoor air.

**What to do if you suspect a problem**

If you or others at your office are experiencing health or comfort problems that you suspect may be caused by indoor air pollution, you can do the following:
- Talk with other workers and your supervisor to see if the problems are being experienced by others and urge that a record of reported health complaints be kept by management, if one has not already been established.
- Inform the building management of your concerns through your usual and proper channels.
- Talk with your doctor or other healthcare provider, and report your problems to a physician, nurse, or health and safety officer. Ask that person if you should call your state or local health department to discuss your symptoms and possible causes.
- Cooperate with management during any indoor air quality investigation to aid the sometimes difficult process of identifying and solving problems.
- Call your state or local health department (see the Where You Live pages at www.epa.gov/iaq/whereyoulive.html) or air pollution control agency to talk over the symptoms and possible causes.

In many cases, indoor air quality problems in large commercial buildings cannot be effectively identified or remedied without a comprehensive building investigation. These investigations may start with written questionnaires and telephone consultations in which building investigators assess the history of occupant symptoms and building operation procedures. In some cases, these inquiries may quickly uncover the problem and on-site visits are unnecessary.

If a professional company is hired to conduct a building investigation, select a company on the basis of its experience in identifying and solving indoor air quality problems in non-industrial buildings. Call the National Institute for Occupational Safety and Health (NIOSH) for information on obtaining a health hazard evaluation of your office (800-35NIOSH), or contact the Occupational Safety and Health Administration, (202) 219-8151.

**A shared responsibility**

Some of the factors that contribute to poor indoor air quality may originate from inadequate HVAC design. Some may be solely in the control of the building management, such as maintenance of the HVAC system and the amount of outside air being mechanically brought into the building. Others are largely in the control of building tenants and occupants, such as materials used in renovations and products and furnishings brought into or used in the building by occupants. Some, like cleanliness and general housekeeping of the building, require the cooperation of both the building management as well as all of the individuals who work in the building. For these reasons, indoor air quality is a shared responsibility.

Good indoor air quality management practices can make a big difference. However, some factors, like reactions to indoor air contaminants among highly susceptible individuals, or the quality of the outside air, may not be within anyone’s immediate control. It is also important to remember that any building, no matter how well operated, may experience periods of unacceptable indoor air quality due to equipment breakdown, inadequate maintenance, or in some cases, the actions of building occupants.

It is also important to keep in mind that many perceived indoor air quality problems are often comfort problems, such as temperature, humidity, or air movement in the space being too low or too high. In addition, many symptoms, such as headaches, can have causes that are not related to factors in the building.

Even though the factors that affect the quality of the indoor environment are numerous, the good news is that most indoor environmental problems can be prevented or corrected easily and inexpensively through the application of common sense and vigilance on the part of everyone in the building. Success depends on cooperative actions taken by building management and occupants to improve and maintain indoor air quality. By becoming knowledgeable about indoor air quality, tenants and occupants are in a good position to help building managers maintain a comfortable and healthy building environment. Work with management any time you:
- Identify or suspect an indoor air problem.
- Need cleaning and maintenance service.
- Plan to install new office equipment.
- Plan for renovations and/or remodeling with a professional interior designer and/or an architect.
- Experience leaks, spills, or accidents.

**What managers can do to promote good indoor air quality**

- Assess the current condition of the indoor air in the building by:
  - Identifying and reviewing records pertaining to the HVAC design and operation.
  - Developing an indoor air profile of the building, identifying potential pollutant sources, if feasible.
- Address any existing and potential indoor air quality problems.
- Educate building staff about indoor air quality management by:
  - Providing training opportunities.
  - Establishing clear pollutant source management policies.
- Operate and maintain the building and ventilation system for good indoor air by:
- Establishing or reinforcing standard operating and maintenance procedures.
- Responding quickly to leaks, floods, and other accidents that occur in buildings to prevent indoor air quality problems from developing.
- Manage potential pollutant sources such as:
  - Smoking.
  - Remodeling and renovation materials and furnishings.
  - Housekeeping and pest control products.
  - Exhaust fumes from loading docks or garages.
- Communicate with tenants and occupants about their roles in maintaining good indoor air quality.
- Establish clear procedures for responding to indoor air-related complaints.
- Keep a record of reported health complaints to aid in solving indoor air-related problems. This will help improve the chances of correctly diagnosing and then fixing problems, especially if a pattern in complaints can be detected.

**Things everyone can do**

All of the occupants of a building can have a great influence on indoor air quality. Everyday activities like heating food in a microwave and using the photocopier can generate odors and pollutants. By being aware of indoor air issues, occupants can help prevent problems. Here are some things you can do:

**Do not block air vents or grilles.** Keep supply vents or return air grilles unblocked, so you won’t unbalance the HVAC system or affect the ventilation of a neighboring business. Furniture, boxes or other materials near supply vents or return air grilles may also affect air flow. Follow your office’s procedures to notify building management if your space is too hot, too cold, stuffy or drafty.

**Clean up all water spills promptly, water and maintain plants properly and report water leaks right away.** Water creates a hospitable environment for the growth of microorganisms such as molds or fungi. Some of these microbes, if they become airborne, can cause health problems. Dispose of garbage promptly and properly. Dispose of garbage in appropriate containers that are emptied daily to prevent odors and biological contamination.

**Store food properly.** Food attracts pests. Some foods, if left unrefrigerated, can spoil and generate unpleasant odors. Never store perishable food products in your desk or on shelves. Refrigerators should be cleaned on a regular basis to prevent odors. Keep kitchens and dining areas clean and sanitize as necessary to prevent pests and maintain hygiene.

**Notify your building or facility manager immediately if you suspect an indoor air quality (IAQ) problem.** This helps management determine the cause of the problem quickly so that a timely solution can be reached. Maintain a good working relationship with building management on indoor environmental issues. Cooperative efforts are the best way to solve many indoor air quality problems. Follow your internal guidelines to ensure that building facility management is informed of, and involved in, all indoor air quality issues. Be as knowledgeable as possible when dealing with building management on indoor air issues.

**Place work furniture, partitions, and equipment with air circulation, temperature control, and pollutant removal functions of the HVAC system in mind.** Make sure air supply vents and return grilles are not blocked by furniture or equipment. Computers and other heat-producing equipment placed near or under an HVAC sensor device system can trigger cooling, even if the actual temperature for occupants is cool. Place such equipment away from HVAC sensors to avoid this kind of situation.

**Coordinate with building management in instances when responsibility for design, operation, and maintenance of the HVAC system is shared.** Sometimes the portion of the HVAC system servicing a leased space is the responsibility of the tenant. In such cases, work closely with building management to ensure that all parts of the building are receiving optimal service from the system. Ensure that filters in window air conditioners and perimeter heating and cooling units are changed frequently.

**Establish an effective smoking policy.** Most of us today are aware of the health risks of smoking, not only to smokers, but to those who are exposed to secondhand smoke. In addition, environmental tobacco smoke in a building can increase costs for maintaining the ventilation system and for cleaning and replacing smoke-soiled furnishings and materials. Establish a smoke-free policy in the space under your control or work with building management to design properly ventilated smoking rooms that don’t allow smoke to circulate through the central ventilation system or to adjoining spaces.

**Avoid procedures and products that can cause problems.** Many common products used in offices, like solvents, adhesives, cleaners, and pesticides can give off pollutants and odors, as can office equipment such as copiers, printers, and fax machines. If any of these items are used in the office environment, adequate and sometimes separate ventilation should be provided. In nail salons, which generate indoor air pollutants, exhaust ventilation is especially important. Pollutants and odors (which may or may not indicate a health concern) generated in your space may not only bother those in the immediate area, but may enter the building ventilation system and cause problems for other tenants in other parts of the building.

**Integrate indoor air quality concerns into your purchasing decisions.** Take steps to reduce exposures to contaminants from cleaning products and from new furnishings and building materials, when odors and chemical emissions are usually highest. Ask the designers, suppliers, and manufacturers to provide information on chemical emissions from products and any potential associated respiratory hazards. While emissions information may not yet be available for many products, many product manufacturers are starting to do emissions testing. The more consumers request such information, the sooner it will become widely available.

**Work with the building owner or manager to ensure use of only necessary and appropriate pest control practices, and non-chemical methods where possible.** Pesticides can contribute to poor indoor air quality and can cause serious health effects when used improperly. Unacceptable levels of pest activity and damage should be prevented by the most economical means and with the least possible hazard to people, property, and the environment. For example, if roaches are a problem, seal their entry points and properly store and dispose of food as part of a long-term control strategy. If a chemical pesticide is selected, it should be used in strict accordance with label directions. To reduce airborne exposure to pesticides, consider using baits to kill pests instead of spraying. Work with building management to select the most appropriate pesticide to achieve your purpose, and do not purchase or use more than needed.

**Work with building management and contractors before you conduct remodeling or renovation activities to identify ways of keeping exposure to pollutants to a minimum.** Properly isolating the area to be remodeled or renovated from other spaces and the HVAC systems, and scheduling these activities for evenings and weekends if possible, can go a long way toward minimizing potential occupant problems. If the renovation work is contracted through you, ensure that the architect or interior designer and contractor are made aware, in advance, of the practices and procedures to be used during construction activities. If possible, try to arrange for plastic wrappings to be removed from partitions, carpet rolls, and other new materials before they are brought into the space. Ask to have the materials aired out in a clean, dry location outside the building for a few days before installation. This can significantly reduce chemical emissions and odors inside the building.
Encourage building management to obtain and use the joint EPA/NIOSH guidance document entitled: Building Air Quality: A Guide for Building Owners and Facility Managers: [http://www.epa.gov/iaq/largebldgs/baqtoc.html](http://www.epa.gov/iaq/largebldgs/baqtoc.html) The EPA and the National Institute for Occupational Safety and Health (NIOSH) have published comprehensive guidance for building owners and managers to help them prevent and solve indoor air quality problems. Ensuring that your building management is knowledgeable about and committed to management of indoor air quality issues is an essential first step in preventing and fixing indoor air problems. You can also encourage commercial building management to follow guidance in EPA’s IAQ Building Education and Assessment Model (I-BEAM): [http://www.epa.gov/iaq/largebldgs/i-beam/index.html](http://www.epa.gov/iaq/largebldgs/i-beam/index.html) I-BEAM updates and expands EPA’s existing Building Air Quality guidance and is designed to be comprehensive state-of-the-art guidance for managing IAQ in commercial buildings. This guidance was designed to be used by building professionals and others interested in indoor air quality in commercial buildings. I-BEAM contains text, animation/visual, and interactive/calculation components that can be used to perform a number of diverse tasks.

For more information...

There are many sources of additional information on indoor air quality in the workplace, homes, and schools and what people can do to ensure that their indoor environment is a healthy one. For further information, see The EPA Indoor Air Quality Website at: [http://www.epa.gov/iaq/index.html](http://www.epa.gov/iaq/index.html).

Glossary of terms

- **Acid aerosol**: Acidic liquid or solid particles that are small enough to become airborne. High concentrations of acid aerosols can be irritating to the lungs and have been associated with some respiratory diseases, such as asthma.
- **Animal dander**: Tiny scales of animal skin.
- **Allergen**: A substance capable of causing an allergic reaction because of an individual’s sensitivity to that substance.
- **Allergic rhinitis**: Inflammation of the mucus membranes in the nose that is caused by an allergic reaction.
- **Building-related illness**: A discrete, identifiable disease or illness that can be traced to a specific pollutant or source within a building. (Contrast with “Sick building syndrome.”)
- **Chemical sensitization**: Evidence suggests that some people may develop health problems characterized by effects such as dizziness, eye and throat irritation, chest tightness, and nasal congestion that appear whenever they are exposed to certain chemicals. People may react to even trace amounts of chemicals to which they have become “sensitized.”
- **Environmental tobacco smoke (ETS)**: Mixture of smoke from the burning end of a cigarette, pipe, or cigar and smoke exhaled by the smoker (also secondhand smoke or passive smoking).
- **Fungi**: Any of a group of parasitic lower plants that lack chlorophyll, including molds and mildews.
- **Humidifier fever**: A respiratory illness caused by exposure to toxins from microorganisms found in wet or moist areas in humidifiers and air conditioners. (Also called air conditioner or ventilation fever.)
- **Hypersensitivity pneumonitis**: A group of respiratory diseases that cause inflammation of the lung (specifically granulomatous cells). Most forms of hypersensitivity pneumonitis are caused by the inhalation of organic dusts, including molds.
- **Organic compounds**: Chemicals that contain carbon. Volatile organic compounds vaporize at room temperature and pressure. They are found in many indoor sources, including many common household products and building materials.
- **Picocurie (pCi)**: A unit for measuring radioactivity, often expressed as picocuries per liter (pCi/L) of air.
- **Pressured wood products**: A group of materials used in building and furniture construction that are made from wood veneers, particles, or fibers bonded together with an adhesive under heat and pressure.
- **Radon (Rn) and radon decay products**: Radon is a radioactive gas formed in the decay of uranium. The radon decay products (also called radon daughters or progeny) can be breathed into the lung where they continue to release radiation as they further decay.
- **Sick building syndrome**: Term that refers to a set of symptoms that affect some number of building occupants during the time they spend in the building and diminish or go away during periods when they leave the building. Cannot be traced to specific pollutants or sources within the building. (Contrast with “Building related illness.”)
- **Ventilation rate**: The rate at which indoor air enters and leaves a building. Expressed in one of two ways: the number of changes of outdoor air per unit of time (air changes per hour, or “ach”) or the rate at which a volume of outdoor air enters per unit of time (cubic feet per minute, or “cfm”).

Bibliography

Florida laws and rules set forth required minimum standards for sanitation, sterilization and disinfection in salon settings. The following chapter will describe additional steps you can take to further ensure the health and safety of your clients and yourself. These steps should be used to augment Florida laws and rules, not replace them.

Learning objectives
- Explain the difference between pathogenic and nonpathogenic bacteria.
- Identify the primary forms of pathogenic microorganisms and explain their relationship to disease.
- List infections caused by common viruses, bacteria, and fungus that may exist in a salon or spa.
- Explain the significance of avian flu to the cosmetologist.
- Contrast disinfectants and antiseptics and explain the significance of those differences.
- List the steps necessary to properly sanitize hands, and to disinfect, handle, and store tools appropriately.
- List special infection control responsibilities for cosmetologists.
- List infection control responsibilities according to universal sanitation precautions.
- Contrast sanitation and sterilization and explain the significance of those differences.
- Explain the risks of antibiotic resistance.
- Explain the significance of material safety data sheets (MSDS).

The significance of sterilization in spas and salons
Late in the year 2000, a mysterious outbreak of bacterial infections in Watsonville, California, baffled health professionals for many weeks. Painful sores appeared on the skin of more than 140 women who were found to have visited the same beauty salon. The infections were difficult to treat, even with the use of antibiotics. After some weeks, investigators in the health department determined that these women had been infected with bacteria in the course of receiving a spa pedicure. The salon was shut down after testing indicated high levels of tuberculosis-related bacteria in all of the salon’s footbaths. Dangerous bacteria had built up on the suction screens of the footbaths, which had not been properly cleaned. While the boils and skin ulcers eventually healed, the infections left deep purple scars on the legs of more than 100 women.4

Soon after the Watsonville discovery, a “20/20” investigation revealed salons in Phoenix, Boston, and Houston were also guilty of unsanitary conditions. While the boils and skin ulcers eventually healed, the infections left deep purple scars on the legs of more than 100 women.4

Unfortunately, the message is still not out. As recently as August 2005, nine salons in California were named in a lawsuit over pedicure-related infections.5 Of even greater concern is a death in Texas, resulting from a pedicure-related infection. The following information is excerpted from the Dallas/Fort Worth Channel 8 report, published at WFAA.com, and can be found in full at http://www.wfaa.com/sharedcontent/dws/wfaa/bwatson/stories/wfaa060222_m_mrnsdeath.537e22dd.html:

Family Believes Pedicure Led to Woman’s Death: 02:26PM CST on Thursday, February 23, 2006
By BRAD WATSON/WFAA-TV

Something as simple as a pedicure is said to have been the cause of Kimberly Jackson’s death.

A MRSA staph bacteria that’s sometimes found in nail salons is very aggressive. Usually it causes open sores that take strong antibiotics over weeks or even months to knock down.

However, in some cases MRSA can lead to death and the family of the Fort Worth woman said that’s what happened in this case.

Her husband, David Jackson of Fort Worth, said he still can’t believe his wife is gone, and the cause of her death only adds to the agony.

“Something so stupid like a pedicure took her life,” Jackson said.

The death certificate signed by the JPS Health Center doctor who treated her showed Jackson died from a heart attack due to a staph infection on her foot that infected her blood.

“She couldn’t get it healed no matter what she was doing, and the antibiotics just wouldn’t stop it,” Jackson said.

Jackson’s family said she went to a Fort Worth salon last July for a pedicure in a whirlpool foot spa. Jackson, a paraplegic, could pull her wheelchair up to the tub, according to close friend and neighbor Patricia Mathis.

“She had said she had gone to get a pedicure and that they were all sitting there talking and she looked down and the girl had the pumice stone turned on the corner edge and she pulled back and Kim saw blood,” she said.

Medical records obtained by News 8 showed that over the next seven months the JPS doctor at a clinic treated Jackson for the MRSA staph infection on her foot from the cut.

MRSA is an aggressive bacteria resistant to common antibiotics and is sometimes found in the water of salon foot spas that are not disinfected properly.

The doctor put Jackson on a cocktail of strong oral and intravenous antibiotics.

“It got pretty big and she got pretty scared she was going to lose her foot,” Mathis said.

But on February 12, the 46-year-old woman lost her life.

At her funeral, friends and family remembered Jackson as the mother of a 17 year old boy, twin 13 year old boys and the wife of a man who took care of her after she lost the use of her legs 6 years ago.

“It’s hard,” Jackson said. “Nobody has a clue. I mean everybody can say, I can only imagine. It’s hard... It’s real hard.”

The family said they know the salon where Jackson picked up the cut, but wants to confirm it through bank records.

The Texas Department of Licensing and Regulation that oversees nail salons said it will be investigating Jackson’s death.

Until licensees and salon owners follow the necessary disinfection procedures without fail, news stories and media attention will undoubtedly continue to highlight such disturbing cases, putting the health of clients, the reputation of the industry, and your business at risk. This chapter will address these health risks with information you can use to protect yourself, your clients, and coworkers.

Your responsibilities as a cosmetologist
As a cosmetologist, you have responsibilities to the state and your profession to learn and use appropriate precautionary measures and cleaning procedures. You must follow these procedures to protect both you and your clients, reduce the incidence of bacterial, viral, and fungal infection, and prevent the spread of disease. You, your instruments, and work station must be kept as clean as possible; meaning no short cuts, or omissions, of any precautionary measures discussed in this chapter. Violations can result in legal penalization, as well as infection.
This chapter will review these subjects:

- The biology of pathogens, how they function, reproduce, and infect.
- Universal sanitation and sterilization precautions.
- Regulations that apply to cosmetology.
- The difference between decontamination, sanitation, and disinfection.
- How to effectively disinfect tools and surfaces in your environment, and sanitize hands.
- Sanitary procedures for facial services.

### Microorganisms and infectious agents

Microorganisms are tiny living particles (organisms) with many different characteristics. They live in our air, water, and earth, and are found everywhere on the planet. Some microorganisms are associated with infection or disease; others are harmless or even helpful. Bacteria, viruses, and parasites are three major categories of microorganisms that you encounter every day.

#### Bacteria

**Bacteria** are tiny one-celled vegetable microorganisms (plants) that can only be seen with a microscope. The most plentiful organisms on the earth, bacteria are found virtually everywhere around us, existing in dust, dirt, and decay, our skin and body tissues, the air we breathe, and the water we drink. Bacteria produce slimy fluids or waxy coatings, which moisten them and help them survive in inhospitable environments. **Fimbria** (hairlike tendrils) that anchor the bacteria to an object, make bacteria “sticky,” requiring one to use some degree of pressure when scrubbing, to break the hold of these tenacious fibers.

**Bacteria exist in one of two modes: an active, vegetative mode, and an inactive, spore-forming mode.** In the active stage, bacteria grow and multiply at an astonishing speed. Reproducing through binary fission (a process in which one bacteria splits into two), bacteria produce millions of copies within hours. Bacteria are only able to reproduce when the environment meets their specific needs in temperature and degree of moisture. They require a warm, damp, usually dark, and often dirty environment that provides a supply of food adequate to sustain the bacteria and provide fuel for reproduction. If conditions are not favorable for reproduction, the bacteria will move into a spore-forming stage, producing spores with tough outer surfaces that are almost impervious to wind, heat, cold, harsh cleaners, or disinfectants. These characteristics help spores survive for long periods between reproductive phases.

While there are hundreds of different kinds of bacteria, they are primarily sorted into one of two types, according to the danger they pose to us. Potentially harmful bacteria are called pathogenic; harmless or beneficial bacteria are called nonpathogenic. The great majority (about 70 percent) of bacteria are nonpathogenic. Called saprophytes, these organisms do not produce disease and carry out necessary functions, such as decomposing dead matter, for example. Nonpathogenic bacteria also exist in the human digestive tract, and in the mouth and intestines, where they facilitate digestion by breaking down food.

A much smaller minority (about 30 percent) of organisms are pathogenic organisms, also called **microbes or germs.** These are harmful, and produce disease when they invade animal or plant life. Pathogenic bacteria commonly exist in the salon environment. Bacterial infection occurs when a body is exposed to and cannot successfully fight off bacterial invasion. **General infections** typically begin as local infections, which may start as a boil or pimple accompanied by pus (a compilation of bacteria, decayed tissue, waste, and blood cells) that is often associated with infection. Bacterial toxins, from local infections, can spread to different parts of the body through the bloodstream, increasing the likelihood of general infection.

Pathogenic bacteria are distinguished by their characteristic shapes: **Bacilli** are rod-shaped, and the most common bacteria, causing diseases such as influenza, tetanus, and diphtheria. **Spirilla** are spiral-shaped bacteria, and cocci are round bacteria that produce pus. **Cocci** rarely move on their own, but are usually transported through the air in dust particles or other substances. Bacilli and spirilla are both capable of self-movement (motility), using hairlike projections (flagella or cilia) to propel themselves.

#### Viruses

**Viruses** are infectious biological entities that are very small – much smaller than bacteria – and cause disease by entering a healthy cell, maturing, and reproducing. Unlike bacteria, viruses do not survive for any length of time without the protection of a living cell. Viruses are dangerous because their replication inside the cell eventually causes the death of that cell. They are parasites; taking the cell’s nutrients, and destroying the cell in the process. The cell is then used to breed hundreds, thousands and even millions of new mature infectious viruses that leave to infect other cells. Viruses cause diseases like hepatitis, influenza, and measles, and are the source of colds, chicken pox, cold sores and genital herpes, mononucleosis, hepatitis, and HIV/AIDS.

Viruses are a particular concern in salons because of their potential severity and the way they spread. Viruses occupy the surfaces of objects you touch, including door handles, coffee mugs, and scissors; they can be inhaled on tiny dust particles, or travel on the minute amount of saliva expelled in a cough. **Viral infections can be transmitted from one person to another through casual contact with an infected individual or contact with what he or she touched.** Both hand-to-surface and hand-to-hand contact are both highly effective methods for transferring virus particles from one individual to another.

#### Plant parasites

**Plant parasites, such as fungus or mold, mildew, and yeasts** are multi-cellular organisms that are as prevalent as bacteria, and consume both live and dead tissue to survive. Fungi usually prefer a damp environment, but can also survive in a warm, dry climate. They reproduce and spread a number of different ways, and can invade the human body easily, requiring no break in the skin.

Ringworm and athlete’s foot are two common contagious diseases that are spread by fungi. Another is favus, which affects the scalp. Cosmetologists should not serve any individual with signs of any fungal infection. If you have a fungal infection, do not work, and seek treatment immediately. If you think a client has ringworm, identified by a ring-shaped, circular pattern on the skin, or athlete’s foot, do not provide service to the individual, as it is highly contagious. Tell the individual to consult a physician for treatment.

#### Precautions with plant parasites

Fungal infections can be stubborn. They often affect the skin, but also can cause severe respiratory infections. More common versions of fungal infection are those caused by yeast (including nail fungus, athletes foot, and jock itch) and ringworm. Both over-the-counter and prescription treatments are available for relief from the unpleasant, itchy symptoms of common yeast infections.

Plant parasites, like fungus and mold, are contagious, with fungus a significant communicable risk between clients and technicians given improper sanitation techniques at a salon. Nail fungus appears as discoloration of the nail plate (on either the fingernails or toenails), initially white, but growing darker over time. Clients with nail fungus should be referred to a physician for treatment.

#### Animal parasites

Animal parasites may be single-cell (protozoans) like amoebas or malaria, or multi-cell, like mites orlice. Protozoans consume both plant and animal tissue, and are found in blood and body fluids, water, and food. Multi-cell animals, like lice and mites, can hide in the hair and burrow under the skin. Be aware of the signs of scabies, identified by bite marks on the skin, Rocky Mountain spotted fever, or typhus, which is caused by rickettsia, animal parasites carried by fleas, lice, and tics that are even smaller than bacteria.
For any individual with a visible communicable disease, like pediculosis (head lice), open sores, or marks suggesting scabies, it is recommended that the person furnish a statement signed by a physician that the disease or condition is not in an infectious, contagious, or communicable stage. The same is true if the nail technician has symptoms or indications of a visible disease, lice, or open sores; he or she should not return to work until obtaining a statement signed by a physician stating that the disease or condition is not in an infectious, contagious, or communicable stage. If lice (which infect both head and pubic hair), small, white eggs, or nits, are found in the hair, it is up to the individual if they want to provide a shampoo treatment to kill the infestation, only. After the lice are no longer present, other services may be offered.

Modes of contamination and transmission
Diseases are communicable or contagious when they move from one individual to another. Working with the public means encountering potentially dangerous pathogens and opportunistic organisms everyday. Always assume your clients, co-workers, and environment could be carrying illness, and use proper infection control procedures every day.

Humans have some level of immunity against infection, but our level of protection varies with age, health, and a range of other factors. Skin is our first line of defense; when there are no cuts or scrapes, skin is excellent protection against pathogens. In the vast majority of cases, bacteria, fungi, and viruses enter the body through the portals of the nose, and mouth, small tears or openings in the skin, and to a lesser extent, the eyes and ears. Once inside the body, the pathogen reproduces rapidly, at a rate that can overwhelm the immune system, resulting in disease.

Transmission may occur through direct or indirect contact. Germs may spread from one individual to another through direct contact holding hands or kissing, for example, or indirectly inhaling contaminated droplets in the air (airborne transmission), or touching a contaminated surface and then touching one’s nose, eyes, or a mucous membrane. Try to avoid touching your face during the day, and always wash your hands between clients.

Yeast, scabies, lice and many other skin infections do not require an open sore or mucosal surface to infect. Athlete’s foot, for example, contaminates through indirect transmission. When someone with athlete’s foot walks barefoot on a wet bathroom floor, the person leaves spores behind that will stick to the foot of anyone else walking barefoot on that floor, infecting the individual, even if he or she has no cuts or openings on the feet. Fungi, like athlete’s foot, will survive for some time on a damp or wet floor. Shower stalls and soaking baths that retain small amounts of water must be thoroughly cleaned and disinfected with the appropriate disinfectant.

The primary modes of travel for common contagions are:
- Unclean hands.
- Unclean implements.
- Open sores.
- Pus.
- Mouth and nose discharge.
- Shared cups or towels.
- Coughing or sneezing.
- Spitting.

Pathogenic bacteria can also enter the body through:
- A break in the skin, including pimples, scratches, or cuts.
- The nose and the mouth, during breathing.
- The mouth, during eating and drinking.

Humans are excellent sources of contamination because we are constantly leaving organic particles behind wherever we go, a mixture of dead skin cells, with viral, bacterial, and fungal particles, along with other microorganisms that consume skin cells or use us to travel to an appropriate host. Every time you touch something, you deposit some of this organic matter on another surface. Simple actions, like touching a client’s hair, brushing some of your hair out of your eyes with your hand, or touching a spray bottle can move microorganisms from one item to another, from you to your client, or your client to you.

Dirty instruments and poor sanitation at salons or spas also puts clients at risk for diseases such as athlete’s foot and hepatitis B and C. Many health care resources recommend no shaving of the legs before or the day of a salon footbath, as “scrapes and nicks can make you more susceptible to infection.” They also suggest that manicurists push back cuticles instead of cutting them.

Individuals who are susceptible to infection, due to a compromised protection system or some failure in their ability to resist invasion, are also the targets of opportunistic microorganisms. In contrast to pathogens, opportunistic organisms do not cause initial illness, but will infect an individual once pathogenic organisms have already weakened its immune system. Opportunistic organisms cling to the skin and the hair, and exist in the bodies of healthy people.

Microbes also contaminate ventilation systems; to discourage their growth, vents, filters, humidifiers, and dehumidifiers should be cleaned and maintained regularly. Investigate any mildewy or musty odors, which are a good indication of microbe growth. Germs in a ventilation system easily spread throughout a salon, landing on people, surfaces, and implements, whenever the blower or fan turns on.

Germ not only float through the air, settling constantly on salon surfaces, such as sinks and countertops, they can also “hitchhike” on human skin, hair, and clothing, contaminating anything with which they come into contact. Pathogenic and opportunistic microorganisms are able to thrive in a salon or spa warm, moist places; like the drain of the shampoo sink, the footbaths, hot and cold water handles and tap, etc. Implements like scissors, files, brushes, or nippers can be major sources of contamination because they often contain organic matter, an optimum growth environment for pathogenic and opportunistic microorganisms.

Some of the most dangerous areas in a salon or spa are the places contaminated tools or equipment are kept, including the table and the trash cans in which you deposit dirty implements. Microbes can also exist on seemingly unlikely products, like bars of soap, for example. Because germs and other microorganism have been shown to thrive on bar soap, salons should use liquid soap that can be dispensed from a container for each customer. In addition, soaking solutions, lotions, and creams, which initially are uncontaminated, may lose preservatives that keep them safe from pathogenic or opportunistic microbes from growing in them. Changes in color, texture, appearance, or odor can be signs of contamination.

Fighting infection may be a matter of staying home when you are sick. Just as you should avoid working with contagious clients, you should not go to work if you have infection, such as a bad cold or flu. Cover your mouth and nose to control pathogens escaping through sneezes and coughs. Avoid causing wounds; if your client’s skin is dry or fragile, tears and breaks can occur easily. Use abrasive instruments with care and a gentle touch, especially around sensitive skin.

Decontaminating your environment
You have a responsibility to control exposure to pathogens by decontaminating your environment and tools. Remember that pathogens collect anytime an object or surface is exposed to air. Doorknobs, handles, the telephone, money, cabinets, the cash register—all are surfaces touched by coworkers and clients that may harbor harmful pathogens, so all must be decontaminated to some degree. Cleaning is only the first step of the process. The following sections review the meaning of sanitation, sterilization, and disinfection, terms that are commonly used interchangeably, but have very different meanings and require different procedures.

Sanitation
Sanitation is the lowest level of decontamination. Sanitation will reduce
germs on a surface, but will not kill all organisms. Sanitation provides a minimum level of cleanliness, protecting public health by preventing the spread of some, but not all, bacteria and fungi. Instruments that are sanitized are **not** sterile. Countertops and workstations should also be sanitized and wiped down with soap and water; this process should not be confused with, and does not replace, disinfection, which requires an appropriate disinfectant. Remember that soap and water will kill most of the bacteria on your hands, workstation, or chair, but will not kill all the bacteria or fungal spores.

The term sanitation is most often used in reference to cleaning the hands. Hand washing is absolutely essential to controlling bacteria and the most effective way to prevent the spread of infectious agents from one person to another. Hands cannot be sterilized, because it is impossible to remove all microorganisms from the surface of the skin; water and soap, in fact, are not sterile, and can introduce new bacteria and infectious agents. (Even anti-bacterial soaps will not remove all the organisms on your hands.)

Your hands are populated by both **resident** and **transient** organisms. **Resident** organisms are a normal part of your skin’s environment; their natural habitat. They grow and multiply in an oxygen environment, and rarely cause infection, or harm the individual who is their host. These organisms cannot be removed easily by hand-washing. Sanitation controls minimize exposure to **transient** organisms. These organisms, like E. coli and salmonella, cause dangerous infections in humans. In contrast to resident organisms, transient organisms cannot live long on the surface of our skin. They function poorly in an oxygen environment, usually surviving less than 24 hours. These organisms can be removed easily through the process of hand-washing, using friction, soap, and water.

**Effective hand-washing**

To wash hands in a way that removes transient organisms requires soap, water, and friction. Soap need not be antibacterial, as it is no more effective against pathogens than traditional soaps. Friction is perhaps the most crucial component, as it is friction that typically removes the transient organisms. The entire procedure should take at least 10 to 20 seconds and be repeated after each client.

1. Wet hands with running water.
2. Apply soap in the middle of the wet hands; use an FDA listed, antimicrobial liquid hand soap.
3. Lather well.
4. Use vigorous friction by rubbing the hands together; pay attention to nail beds and the webs between the fingers and thumbs.
5. Rinse hands thoroughly with water (leave the water running).
6. Dry hands with a paper towel.
7. Turn water off, using a paper towel.

**Cleaning agents for hands**

Cleaning agents assist in the process of removing substances from surfaces. Soaps and detergents are two common cleaning agents that are often confused for each other, but are composed of very different ingredients and have different cleaning properties. Soaps are the product of a chemical reaction, formed by vegetable oil reacting with lye, for example, and the addition of chemicals that add a desirable smell or quality to the soap, such as glycerine, to make it milder. While soap does not kill microorganisms, soap and water will help remove them from surfaces.

Detergents are manufactured for the express purpose of cleaning specific substances off of specific items, and are created using chemicals that can be very harsh to skin. In contrast to detergents that do not leave a residue or require rinsing, soaps leave a coating or residue on the body, typically one designed to make skin smoother or more attractive. Soaps also remove less fat from the skin than detergents, which have a drying quality and may strip the skin. Be sure to use the appropriate cleaning agent for the job. Different cleaning and disinfecting agents have many different properties. Always read the ingredients, instructions, and recommendations for use on the item’s label.

**Sterilization and disinfection**

“Sterile” means free from all germs; **sterilization is the most effective level of decontamination**, involving the removal of all bacterial life from a surface. This is the level of decontamination required for tools and surfaces in hospital surgeries. Hospitals use steam autoclaves to heat instruments to a very high temperature, but this is an impractical method for salon sterilization. Some businesses choose to boil instruments, but most cosmetology salons sterilize instruments with the use of disinfectants.

**Disinfection** is the process of killing specific microorganisms, bacteria or germs, using physical or chemical processes. **Disinfectants** are chemical agents that destroy organisms on contaminated instruments or surfaces. Disinfectants can be dangerous and must be used with caution. They are effective at destroying bacteria on equipment and implements but should not be used on the skin. In a salon atmosphere, disinfectants must be able to kill viruses, fungus, and dangerous bacteria. Disinfectants may be used in **ultrasonic cabinets** if desired. These cleaners use high-frequency sound waves to form bubbles that clean instruments. Ultrasonic cleaners, however, are only effective when used with an appropriate disinfectant. **Ultraviolet sanitizers** should not be used to disinfect tools, as they are ineffective against viruses and do not clean the crevices of instruments. **Bead sterilizers** are also ineffective in sterilizing or disinfecting implements.

A critical part of sterilization is effectively storing the sterilized items without recontaminating them. Touching sterilized instruments with bare hands, placing them on a surface that is not sterile, or storing in an unsterile compartment will contaminate the instrument, and require resterilization. After cleaning and disinfecting instruments, place them in a clean, dry storage container until ready for use. Ultraviolet electrical sanitizers may be used as a dry storage container. Do not keep articles such as pens, pencils, money, paper, mail, etc. in the same container as sterilized or unsterilized instruments. Disposable instruments may be a practical alternative, especially for instruments or objects, such as needles, that can easily penetrate the skin.

**Disinfectants**

Controlling bacteria in a salon requires some degree of effort, vigilance, and good sense. In choosing a disinfectant, always look for the EPA registration number (awarded by the Environmental Protection Agency) to ensure you are using an approved disinfectant. This number indicates a level of safety for specific kinds of disinfection, killing bacteria including staphylococcus, salmonella, and pseudomonas. Salons and spas must use not only EPA-approved disinfectants, but those with an EPA rating of **hospital-level (tuberculocidial) quality**. These disinfectants are especially effective for salon use and are capable of killing viruses, dangerous bacteria, and fungi.

Disinfectants can be hazardous if prepared or used incorrectly. Consult the manufacturer’s material safety data sheets (MSDS) for information on preparing the solution, and read precautions regarding chemicals listed on the label to determine what, if any, safety hazards they pose. To ensure safety, use an appropriate ratio of concentration in the solution, and clean only approved items, according to label instructions. Wear gloves and safety glasses, as indicated, when mixing and using solutions.

Sanitation and disinfection are often misunderstood or confused. Sanitizing refers to cleaning of all visible residue or debris. This must be followed with disinfection, which refers to the use of chemicals to destroy germs on non-living surfaces. Salon or spa disinfectants include EPA-registered disinfectant products, 10 percent bleach, or 70 percent or higher isopropyl or ethyl alcohol.

Do not confuse disinfectants, which destroy harmful microorganisms, with **antisepsics**, products designed to slow the growth of microorganisms. Antiseptics do not kill microorganisms and should not
be confused with disinfectants or used for salon disinfection. Antiseptics may be safely applied to the skin and used as sanitizers.

**Household disinfectants**, commonly used to clean offices and homes, may be used to clean floors, doorknobs, walls, etc., as directed on the container label, but should not be used in place of a hospital grade salon disinfectant, which is required to sterilize instruments.

**Bleach** can be used as an effective disinfectant, but it is not a cleaning agent and should only be applied to clean surfaces. Bleach must be used with caution because it can release toxic fumes when mixed with certain substances. Bleach is far too harsh to be used to disinfect tools, as it may damage them. Bleach may be safely used in the laundry.

**Do not use alcohol as a disinfectant.** Alcohol was used as a disinfectant for many years, due to a widely-held misconception that it could be used for sterilization purposes. Not only is alcohol a poor disinfectant, it is also highly flammable, creating a potential fire hazard.

**Formalin** and formalin tablets are not accepted disinfectants and should not be used in a salon. Both release formaldehyde, a toxic cancer-causing gas that is highly irritating to the eyes, nose, lungs, and throat. Long-term exposure to formaldehyde may damage the respiratory track, causing bronchitis or other respiratory conditions.

**Quaternary ammonium compounds** ("quats") are the most widely used disinfectants in nail salons and schools, but they do not kill **tuberculosis bacteria**. Quats are safe and work quickly; most instruments can be disinfected in 15-20 minutes with a quat solution. Do not leave instruments in a solution for an extended period of time, as the instruments may be damaged by rust or erosion of their cutting edges. New **super quats** destroy bacteria quickly and can disinfect your instruments in an even shorter time (10-15 minutes). Once instruments have been submerged for the recommended time interval, remove them from the solution and place them in closed cabinet or drawer. Quats can also be used to clean surface areas that come in contact with food.

**Phenolic disinfectants** ("phenols") are excellent disinfectants with few limitations. They kill a broad range of germs, including resistant microbes like tuberculosis. Their disadvantages include their relative expense, danger to the skin, and potential reactions with some types of rubber and plastics used on implements, causing tools to soften and corrode. Concentrated or undiluted phenol disinfectants can cause severe burns to the skin and eyes, and are toxic if swallowed. Even diluted phenols can irritate the eyes and skin. If phenol disinfectants are used in the salon, they must be kept safely out of children’s reach, be clearly labeled, and be used strictly according to manufacturer’s instructions.

**Disinfection techniques for non-electrical and electrical instruments and equipment**

1. **Disinfection of non-electrical instruments**

   **Deciding to dispose or not to dispose of non-electrical instruments and equipment:**

   Before attempting to disinfect an implement, determine if the tool is porous or non-porous, and whether it is single-use or multi-use item.

   Porous items are made of absorbent material such as wood and cloth. This category includes the majority of nail files, orangewood sticks, and buffer blocks. Porous items that are damaged in cleaning or disinfection procedures are single-use items. They should be disposed of in the garbage after one use.

   Any porous item that is contaminated: blood, body fluid, broken skin, infections, or any other unhealthy conditions **cannot** be disinfected. It must be disposed of in the garbage.

   Non-porous items are constructed of hard materials, including metal, glass, or hard plastic, such as scissors, combs, nippers, drill bits, and metal or fiberglass-backed nail files.

   All non-porous tools can be disinfected, even if they come into contact with blood or infectious conditions. These are all multi-use items.

   Clean off all visible debris, then completely immerse non-porous tools for 10 minutes in an EPA-registered disinfectant, 1 percent bleach, or 70 percent or higher isopropyl or ethyl alcohol.

   Towels, chamois, buffing bits, and similar items can be cleaned in a washing machine with regular detergent at the end of each day. Instruments, including brushes, that are not designed to touch skin and are used in waterless products such as nail polish, acrylic monomer and powder, or light-cured gels, do not spread germs and do not need to be disinfected. If you are not sure that a file or tool can be safely cleaned, disinfected, and used again, don’t take the risk. When in doubt, throw it out.

   a. Scrub each implement with a clean brush in a solution of soap and water to remove all organic matter.

   b. Rinse implements thoroughly in clean water.

   c. Pat the implements dry with a clean towel (paper or cloth) to prevent the dilution of the disinfection solution.

   d. Totally immerse in an EPA registered disinfectant with demonstrated bactericidal, viricidal and fungicidal capabilities according to manufacturer’s directions.

   e. Implements must be removed by either gloved hands or clean tongs to prevent contamination of the solution.

   f. Implements should then be rinsed with clean water again and patted dry. At this point in the disinfection process, pointed or sharp edged implements should be oiled to prevent rusting and maintain the cutting edge.

   g. Store implements in a clean, covered container until they are used, to prevent contamination.

2. **Disinfection of electrical instruments**

   a. **Removable parts.**

      1. Scrub each removable part with a clean brush in a solution of soap and water to remove all organic matter.

      2. Rinse removable part thoroughly in clean water.

      3. Pat the removable part dry with a clean towel (paper or cloth) to prevent dilution of the disinfection solution.

      4. Totally immerse in an EPA registered disinfectant with demonstrated bactericidal, viricidal, and fungicidal capabilities according to manufacturer’s directions.

      5. Removable parts must be removed by either gloved hands or clean tongs to prevent contamination of the solution.

      6. Removable parts should then be rinsed with clean water again and patted dry. At this point in the disinfection process, pointed or sharp edged non-removable parts should be oiled to prevent rusting and maintain the cutting edge.

      7. Store removable parts in a clean, covered container until they are used, to prevent contamination.

   b. **All non-removable parts must be disinfected according to manufacturer’s directions.**

      1. Remove all foreign matter from the clippers, vibrators, or other electrical instruments.

      2. Commercially prepared disinfectant sprays are available that meet state requirements for use on non-removable parts which cannot be immersed in a disinfectant container.

      3. The container for disinfecting implements must be clean and large enough to thoroughly immerse (completely cover) all implements.

      4. The disinfectant container must be properly labeled as to its contents ("quats," etc.). The container must be covered to help prevent evaporation, as well as product contamination from airborne bacteria.

      5. The disinfectant solution must be changed at least weekly or whenever visibly cloudy or dirty. If it becomes contaminated (visibly cloudy or dirty) in less than a week, it must be changed.
6. If the technician is unable to immediately attend to used implements, used implements must be placed into a covered, properly labeled receptacle until such time as disinfection can be accomplished.

NOTE: All disinfectant solutions used must be EPA registered and possess bactericidal, fungicidal, and viricidal capabilities. You will find this information printed on the label if it is an EPA registered disinfectant.

Sanitary maintenance area procedures
Purpose: To maintain previously disinfected implements in a sanitary condition while serving the client.

There are two acceptable sanitary maintenance areas ("SMAs"); one or the other must be used to maintain sanitary conditions in the individual work areas to ensure the client and technician’s maximum protection.

Dry sanitary maintenance area
1. Use a clean paper towel to maintain a sanitary work area.
2. Place previously disinfected implements to be used on this paper towel.
3. Place the towel and implements on a clean working surface and begin the client service.
4. Implements to be re-used must be wiped free of lotions, creams, or organic matter prior to returning them to the sanitary maintenance area.
5. At the conclusion of the service, the implements must be properly disinfected before re-use, and the paper towel must be disposed of. A sanitary cloth towel may be used in place of paper but should not be confused with the normal table set-up. A separate towel is required.

Universal sanitation precautionary measures
For sanitation procedures not addressed specifically by your state, follow the universal sanitation and sterilization checklist below, including the steps for salon or spa sanitation and laundry. Never take shortcuts or omit necessary steps in your personal hygiene practices or use of sanitizers, disinfectants, gloves, or gogles, to maintain salon or spa cleanliness and provide a safe environment for you, your clients, and coworkers. While some requirements are not the sole responsibility of cosmetologists, you should be aware of risks associated with other spa or salon services:
1. Walls, ceilings, floors, and equipment must be free from dust.
2. Clean floors, sinks, and toilets with commercial products that kill germs.
3. Working area must be well lighted, heated, and ventilated.
4. Plumbing must be installed properly and provide both hot and cold water.
5. You must have one operational sink and toilet. Toilet tissue and waste receptacles must be provided.
6. Hand cleaning with antimicrobial liquid soap, sanitary towels or a hand-drying blower must be provided.
7. Premises must be kept free from rodents, vermin, or other animals.
8. A drinking fountain with paper cups should be provided.
9. Clean doorknobs, especially in restrooms.
10. Clean linens should be kept in a dustproof cabinet.
11. Soiled linens should be kept in closed receptacles.
12. Sanitary towel/neck strips need to be provided for every patron.
13. Keep your nail services in a separate area of the salon.
14. Hair needs to be removed from the floor and placed in a closed container.
15. Do not allow pets or animals in a salon, except those trained to assist impaireed or disabled individuals.
16. All personnel should wear clean uniforms.
17. Do not treat any inflammatory disease or condition of skin, scalp, face or hands.
18. Gloves need to be worn during manicuring, waxing, facials, shampoos, pedicuring, tweezing and any service where you may come in contact with any blood or body fluids.

19. Always use clean cotton balls, sponges, or tissues when applying any cosmetics or skin creams.
20. Do not place items, such as combs, bobby pins, tools etc, in your mouth.
21. Do not place combs or other instruments in pockets.
22. The use of any article on more than one patron without being disinfected is prohibited.
23. Avoid touching your client’s face or eye area unless necessary to the service.
24. Dust and filings carry pathogens, so be sure to clean your work area after every client.
25. Make-up should never be shared.
26. Capses should not touch clients’ skin.
27. Place all disinfected implements in a covered container. Each container should be labeled with cosmetologist’s or nail tech’s name, especially for booth licensees.
28. Never use the same towel on more than one client.
29. Discard all disposable materials after use with one client.
30. Tools should be cleaned after every use and stored only with other clean instruments.
31. Sanitize your work area with a disinfectant.
32. Always wash hands after using the restroom.
33. Always use a hospital level disinfectant on salon or spa implements.
34. Disinfecting products should be available at all times to clean scissors, razors, clippers, etc.
35. Have a first-aid kit available in case of a blood spill. The kit should include adhesive bandages, gauze, antiseptic, and disposable latex gloves.
36. All products used directly on patrons should be labeled, be clean and be in closed containers.
37. Cotton should be in a storage area or covered container so hair does not contaminate.
38. All paraffin wax that has come in contact with a client’s skin should be disposed of after each use. Used wax should never be re-used.
39. Head rests of chairs should be cleaned with a hospital grade EPA registered disinfectant.

Steps for sanitation between clients
1. After concluding service with the client, discard disposable materials in a closed waste receptacle. Empty waste receptacle daily.
2. Spray the table with disinfectant.
3. Disinfect metal equipment or tools with an EPA-registered disinfectant and store them in a clean, closed, and clearly labeled container after use with each client.

Other tips
◊ Have at least two complete sets of implements; on busy days, one set can be disinfecting while you work.
◊ For regular clients, you may want to keep their single-use implements in a separate closed container labeled with their name and only use these implements on that customer.
◊ Use a dust mask and safety goggles when appropriate.
◊ Keep caps on all products to reduce the amount of vapor that escapes into the air.

Laundry
◊ Soiled linens may harbor pathogens, but rarely transmit disease. Handle used linens as little as possible to avoid contamination.
◊ All soiled linen should be bagged or placed in containers at the location where it was used and should not be sorted or rinsed in the location of use.
◊ Gloves and other appropriate protective apparel should be worn by employees sorting soiled linen.
◊ Commercial laundry facilities often use water temperatures of at least 160°F and 50-150 ppm of chlorine bleach to remove significant quantities of microorganisms from contaminated linen. In the salon, normal washing and drying cycles including “hot” cycles are adequate to ensure client safety (studies suggest that satisfactory
The problem of antibiotic resistance

Overview
The triumph of antibiotics over disease-causing bacteria is one of modern medicine’s greatest success stories. Since these drugs first became widely used in the World War II era, they have saved countless lives and blunted serious complications of many feared diseases and infections. After more than 50 years of widespread use, however, many antibiotics don’t pack the same punch they once did.

Over time, some bacteria have developed ways to outwit the effects of antibiotics. Widespread use of antibiotics is thought to have spurred evolutionary changes in bacteria that allow them to survive these powerful drugs. While antibiotic resistance benefits the microbes, it presents humans with two big problems: it makes it more difficult to purge infections from the body; and it heightens the risk of acquiring infections in a hospital.

Diseases such as tuberculosis, gonorrhea, malaria, and childhood ear infections are now more difficult to treat than they were decades ago. Drug resistance is an especially difficult problem for hospitals because they harbor critically ill patients who are more vulnerable to infections than the general population and therefore require more antibiotics. Heavy use of antibiotics in these patients hastens the mutations in bacteria that bring about drug resistance. Unfortunately, this worsens the problem by producing bacteria with greater ability to survive even our strongest antibiotics. These even stronger drug-resistant bacteria continue to prey on vulnerable hospital patients.

To help curb this problem, the Centers for Disease Control and Prevention (CDC) provides hospitals with prevention strategies and educational materials to reduce antimicrobial resistance in health care settings. According to CDC statistics:

- Nearly 2 million patients in the United States get an infection in the hospital each year.
- Of those patients, about 90,000 die each year as a result of their infection, up from 13,300 patient deaths in 1992.
- More than 70 percent of the bacteria that cause hospital-acquired infections are resistant to at least one of the drugs most commonly used to treat them.
- Persons infected with drug-resistant organisms are more likely to have longer hospital stays and require treatment with second or third choice drugs that may be less effective, more toxic, and more expensive.

In short, antimicrobial resistance is driving up health care costs, increasing the severity of disease, and increasing the death rates from certain infections.

Environment forces evolutionary change
A key factor in the development of antibiotic resistance is the ability of infectious organisms to adapt quickly to new environmental conditions. Bacteria are single-celled creatures that, compared with higher life forms, have small numbers of genes. Therefore, even a single random gene mutation can greatly affect their ability to cause disease. And because most microbes reproduce by dividing every few hours, bacteria can evolve rapidly. A mutation that helps a microbe survive exposure to an antibiotic drug will quickly become dominant throughout the microbial population. Microbes also often acquire genes, including those that code for resistance, from each other.

The advantage microbes gain from their innate adaptability is augmented by the widespread and sometimes inappropriate use of antibiotics. A physician wishing to placate an insistent patient ill with a cold or other viral condition sometimes inappropriately prescribes antibiotics. Also, when a patient does not finish taking a prescription for antibiotics, drug-resistant microbes not killed in the first days of treatment can proliferate. Hospitals also provide a fertile environment for drug-resistant germs as close contact among sick patients and extensive use of antibiotics force bacteria to develop resistance. Another controversial practice that some believe promotes drug resistance is adding antibiotics to agricultural feed.
An NIAID-funded project at The Institute for Genomic Research recently discovered that small pieces of DNA that can jump between chromosomes or organisms helped a strain of E. faecalis bacteria develop resistance to vancomycin. The researchers found that these “mobile elements” of DNA appear to contain a newly identified vancomycin resistance segment carrying vancomycin resistance genes. These results were published in the journal Science.

Related Information:

Partnerships and interagency collaborations
In addition to sponsoring research, NIAID co-chairs the federal government’s Interagency Task Force on Antimicrobial Resistance. This task force is made up of representatives from NIAID, CDC, the Food and Drug Administration, the Agency for Healthcare Research and Quality, the Department of Agriculture, the Department of Defense, the Department of Veterans Affairs, the Environmental Protection Agency, the Center for Medicaid and Medicare Services, and the Health Resources and Services Administration. The task force is working on implementing an antimicrobial resistance action plan that reflects a broad consensus of these agencies with input from a variety of constituents and collaborators. The plan is available online at http://www.cdc.gov/drugresistance/actionplan/index.htm.

Other federal agencies are involved in combating the problem of drug-resistant microbes. See the links below for more information.

Centers for Disease Control and Prevention:
http://www.cdc.gov/drugresistance/community/

Food and Drug Administration:

National Library of Medicine Medline database:

Public Health Action Plan to Combat Antimicrobial Resistance
http://www.cdc.gov/drugresistance/actionplan/index.htm

NIAID is a component of the National Institutes of Health (NIH), which is an agency of the Department of Health and Human Services. NIAID supports basic and applied research to prevent, diagnose, and treat infectious and immune-mediated illnesses, including HIV/AIDS and other sexually transmitted diseases, illness from potential agents of bioterrorism, tuberculosis, malaria, autoimmune disorders, asthma and allergies.

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Bethesda, MD 20892

U.S. Department of Health and Human Services

NIAID also co-sponsors the annual conference on Antimicrobial Resistance with the Infectious Disease Society of America and other government and not-for-profit agencies. The conference updates attendees on the science, prevention, and control of antimicrobial resistance and provides a forum for discussion of new methods of treatment and control.

Table of antibacterials

<table>
<thead>
<tr>
<th>Substance group</th>
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<tbody>
<tr>
<td>Alcoholso</td>
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<td>Isopropanol.</td>
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<td>Aldehydes</td>
<td>Glutaraldehyde.</td>
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<td>Formaldehyde.</td>
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<td>Halogen-releasing compounds</td>
<td>Chlorine compounds.</td>
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<td></td>
<td>Iodine compounds.</td>
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Peroxides Hydrogen peroxide.
Ozone. Peroxide.

Gaseous substances Ethylene oxide.
Formaldehyde.

Residue-producing antibacterials

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<thead>
<tr>
<th>Substance group</th>
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<tr>
<td>Anilides</td>
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<td>Biguanides</td>
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<td>Alexidine.</td>
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<td>Polymeric biguanides.</td>
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<td>Bisphenols</td>
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<td>Hexachlorophene.</td>
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<td>Halophenols</td>
<td>PCMX (p-chloro-m-xylenol).</td>
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<td>Heavy metals</td>
<td>Silver compounds.</td>
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<td></td>
<td>Mercury compounds.</td>
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<td>Phenols and cresols</td>
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<td>Cresol.</td>
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<td>Quaternary ammonium</td>
<td>Cetrimide.</td>
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<td>compounds</td>
<td>Benzalkonium chloride.</td>
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<td></td>
<td>Cetylpyridinium chloride.</td>
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APUA: Alliance for the prudent use of antibiotics antibacterial agent information sheet

What is an antibacterial and how are antibacterials classified?
What are some common antibacterials?
How common are antibacterials in consumer products?
Is the use of antibacterial agents regulated in the U.S.?
What is the difference between bacteriostats, sanitizers, disinfectants and sterilizers?
How beneficial are antibacterials?
Are antibacterial agents safe?
Do antibacterials create resistant bacteria?
Can the widespread use of antibacterial agents lead to more resistant bacteria?
Are there other concerns about the use of antibacterial agents?
Are there other effective cleaning methods to prevent disease spread?
When are antibacterials useful?

What is an antibacterial and how are antibacterials classified?
In its broadest definition, an antibacterial is an agent that interferes with the growth and reproduction of bacteria. While antibiotics and antibacterials both attack bacteria, these terms have evolved over the years to mean two different things. Antibacterials are now most commonly described as agents used to disinfect surfaces and eliminate potentially harmful bacteria. Unlike antibiotics, they are not used as medicines for humans or animals, but are found in products such as soaps, detergents, health and skincare products and household cleaners.

What are some common antibacterials?
Antibacterials may be divided into two groups according to their speed of action and residue production: The first group contains those that act rapidly to destroy bacteria, but quickly disappear (by evaporation or breakdown) and leave no active residue behind (referred to as non-residue-producing). Examples of this type are the alcohols, chlorine compounds, peroxides, and aldehydes. The second group consists mostly of newer compounds that leave long-acting residues on the surface to be disinfected and thus have a prolonged action (referred to as residue-producing). Common examples of this group are triclosan, triclocarban, and benzalkonium chloride.

How common are antibacterials in consumer products?
All products that claim to kill bacteria and/or viruses have some kind...
of antibacterial agent. Alcohols, chlorine and peroxides have been used for many decades in healthcare and cleaning products. Within the past two decades, the residue-producing antibacterials, once used almost exclusively in health care institutions, have been added to increasing numbers of household products, particularly soaps and cleaning agents. A recent survey reported that 76 percent of liquid soaps from 10 states in the U.S. contained triclosan, and approximately 30 percent of bar soaps contained triclocarbarm. Many cleaning compounds contain quaternary ammonium compounds. Because these compounds have very long chemical names, they are often not easily recognized as antibacterial agents on packaging labels. More recently, triclosan has been bonded into the surface of many different products with which humans come into contact, such as plastic kitchen tools, cutting boards, highchairs, toys, bedding and other fabrics.

Is the use of antibacterial agents regulated in the U.S.? Whether or not an antibacterial agent is regulated depends upon its intended use and its effectiveness. The U.S. Food and Drug Administration (FDA) regulates antibacterial soaps and antibacterial substances that will either be used on the body or in processed food, including food wrappers and agents added to water involved in food processing.

If a substance is not intended for use on or in the body, it is registered by the U.S. Environmental Protection Agency (EPA) under the federal Insecticide, Fungicide, and Rodenticide Act. Substances are registered either as public health or as non-public health antimicrobial agents.

What is the difference between bacteriostats, sanitizers, disinfectants and sterilizers? The EPA classifies public health antimicrobials as bacteriostats, sanitizers, disinfectants and sterilizers based on how effective they are in destroying microorganisms. Bacteriostats inhibit bacterial growth in inanimate environments. Sanitizers are substances that kill a certain percentage of test microorganisms in a given time span. Disinfectants destroy or irreversibly inactivate all test microorganisms, but not necessarily their spores. Sterilizers destroy all forms of bacteria, fungi, and other microorganisms and their spores.

Disinfectants can be further categorized as broad or limited spectrum agents. A broad-spectrum disinfectant destroys both gram-negative and gram-positive bacteria. A limited-spectrum disinfectant must clearly specify the specific microorganisms against which it works.

How beneficial are antibacterials? Antibacterials are definitely effective in killing bacteria, however, there is considerable controversy surrounding their health benefits. The non-residue-producing agents have been used for many years and continue to be effective agents for controlling disease organisms in a wide variety of health care and domestic settings. When used under strict guidelines of application, the residue-producing agents have proven effective at controlling bacterial and fungal infection in clinical settings such as hospitals, nursing homes, neonatal nurseries and other health care facilities where there may be a high risk of infection.

A certain few consumer products have demonstrated effectiveness for specific conditions: antibacterial toothpaste helps control periodontal (gum) disease; antibacterial deodorants suppress odor-causing bacteria, and antidandruff shampoos help control dandruff. However, to date, there is no evidence to support claims that antibacterials provide additional health benefits when used by the general consumer.

Are antibacterial agents safe? When used as directed for external surfaces, antibacterial agents are considered to be relatively non-toxic. However, some may cause skin and eye irritation, and all have the potential for doing harm if not stored or used properly. Furthermore, evaluations of risk are based on single agents, and do not consider the effects of multiple uses or multiple compounds. Recently, triclosan has been reported in surface waters, sewage treatment plants, the bile of fish, and breast milk, but the significance of these findings is presently unknown.

Do antibacterials create resistant bacteria? Because of their rapid killing effect, the non-residue producing antibacterial agents are not believed to create resistant bacteria. Resistance results from long-term use at low-level concentrations, a condition that occurs when consumer use residue-producing agents such as triclosan and triclocarbarm. Until recently, it was accepted that these agents did not affect a specific process in bacteria, and because of this, it was unlikely that resistant bacteria could emerge. However, recent laboratory evidence indicates that triclosan inhibits a specific step in the formation of bacterial lipids involved in the cell wall structure. Additional experiments found that some bacteria can combat triclosan and other biocides with export systems that could also pump out antibiotics. It was demonstrated that these triclosan-resistant mutants were also resistant to several antibiotics, specifically chloramphenicol, ampicillin, tetracycline and ciprofloxacin.

Resistance to antibacterials has been found where these agents are used continuously (as in the hospital and food industry); however, at the present time, this modest increase in resistance has not yet created a clinical problem.

Can the widespread use of antibacterial agents lead to more resistant bacteria? Many scientists feel that this is a potential danger, but others argue that the laboratory conditions used in the research studies do not represent the “real world.” So far, studies of antibacterial use in home products such as soap, deodorant and toothpaste have not shown any detectable development of resistance. However, such products have only been in use for a relatively short period of time and studies of their effects are still extremely limited.

Are there other concerns about the use of antibacterial agents? Yes, experts believe that the use of these agents creates a false sense of security that may cause individuals to become lax in their hygiene habits. Antibacterial use should not be considered an alternative to normal hygiene, except where normal hygiene practices are impossible.

It should always be remembered that most bacteria are harmless and in many cases, even beneficial. Very few bacteria actually cause disease. Antibacterials are not discriminating and an all-out attack on bacteria in general is unjustified. Constant use of disinfecting agents tends to disrupt the normal bacteria that act as barriers against invading pathogens. This may cause shifts in bacterial populations and create a “space” for disease-causing bacteria to enter and establish infection.

In addition, some scientists have gathered evidence showing that overly hygienic homes during early childhood may be linked to the appearance of allergies later in life. In this “hygiene hypothesis,” allergies develop because the childhood immune system fails to mature properly due to lack of contact with immune-stimulating bacteria. This hypothesis remains controversial and requires further research for validation.

Are there other effective cleaning methods to prevent disease spread? For most purposes, washing with regular soap and rinsing with running water, followed by thorough drying is still considered the most important way of preventing disease transmission. This is especially important after using the toilet, changing a diaper, emptying a diaper pail, cleaning the toilet, or after handling raw meat or poultry. Several common traditional agents are effective against a wide range of disease-causing organisms. These include 70 percent solutions of ethyl or isopropyl alcohol, household bleach and hydrogen peroxide. Unlike triclosan and other long-acting agents, these products destroy multiple cells components at once rather than attacking a specific bacterial process.

When are antibacterials useful? While there is no evidence that the routine use of antibacterials confer
a health benefit, they are useful where the level of sanitation is critical and additional precautions need to be taken to prevent spread of disease. Thus, they are important in hospitals, day care centers and health care facilities and other environments with high concentrations of infectious bacteria. In the home environment, they may be needed for the nursing care of sick individuals with specific infections, or for those whose immune systems have been weakened by chronic disease, chemotherapy or transplants. Under these circumstances, antibacterials should be used according to protocol, preferably under the guidance of a health care professional.

**Handwashing is one of the most important means of preventing the spread of infection.**

--- U.S. Centers for Disease Control & Prevention

Handwashing – rubbing your hands together with soap and water – reduces the spread of germs from one person to the next. According to the Centers for Disease Control and Prevention, handwashing is one of the most important means of preventing the spread of infection.

If you track when you wash your hands, you may find it is not as often as you think. A recent survey found that 94 percent of Americans say that they always wash their hands after going to the bathroom, but observations in public restrooms show that only 68 percent of adults did so.

**Why should you wash?**

Germs are so small that you cannot see them. A few of them can cause illnesses like diarrhea and colds as well as more serious, and life-threatening diseases.

Washing your hands correctly greatly reduces the chances of spreading germs. Disease-causing germs can enter your body when your unwashed hands touch your nose, mouth, and open wounds. Some of those germs may have changed to protect themselves against an antibiotic, which is called antibiotic resistance.

While your health care providers have a professional responsibility to wash their hands, it is important that everyone make handwashing a personal priority.

**When should you wash?**

Before you...
- Prepare or eat food.
- Treat a cut or wound or tend to someone who is sick.
- Insert or remove contact lenses.

After you...
- Use the bathroom.
- Handle uncooked foods, particularly raw meat, poultry or fish.
- Change a diaper.
- Blow your nose, cough or sneeze.
- Play with or touch a pet, especially reptiles and exotic animals.
- Handle garbage.
- Tend to someone who is sick or injured.

**How should you wash?**

How you wash your hands is just as important as when you wash them, especially when it comes to eliminating germs. Just rinsing them quickly is not enough. When you wash your hands:
- Use soap and warm, running water.
- Wash all surfaces thoroughly, including wrists, palms, back of hands, fingers and under the fingernails.
- Rub hands together for at least 10-15 seconds.
- When drying, use a clean or disposable towel if possible, and pat your skin rather than rubbing to avoid chapping and cracking.
- Apply hand lotion after washing to soothe your skin and help prevent drying.
CHAPTER 8
ASPECTS OF COLOR
(2 CE Hours)
(Elective)

Learning objectives
- Describe the structure of hair and explain how it is affected by semi-temporary, semi-permanent, and permanent (oxidation and non-oxidation) colors.
- List the primary types of melanin and explain how each influences hair color.
- Describe the changes that occur to hair throughout an individual’s life, including color, texture, and density.
- Explain the significance of primary, secondary and tertiary colors on a color wheel and in the process of coloring. Identify all 12 tertiary colors in order.
- Define what is meant by “warm” and “cool” colors, “complementary” colors, and “browning out” or “neutralizing” colors.
- Explain the importance of light in a hair salon that provides color services.
- Compare and contrast color levels and tones.
- Explain what the pH scale measures and how this is important to hair color.
- Describe the process of oxidation and why it is associated with permanent color.
- Describe what is meant by “working volume” of hydrogen peroxide.
- Identify the major categories of color and describe the characteristics associated with each.

Introduction
There are good reasons to develop your color skills. Hair care services are constantly evolving, but a steadily increasing demand for color services seems a certainty. From covering gray, restoring or “tweaking” the original color, “highlighting” or truly transformative color services, color can improve hair texture and strength, increasing confidence as much as good makeup. Clients receiving color services tend to visit more frequently than other types of clients and spend more money each time, using both services and products. Additionally, application time is typically brief, with the potential for substantial profits – avoiding different colored roots keeps clients timely about services.

Yet while the demand for skilled colorists grows, most come out of school rank amateurs in the art of science and color, and many are rightfully fearful of making mistakes. Above all, hair coloring requires technical precision, and the only way to become an expert is by doing it many times. Find a good resource for hair samples and testing materials and practice, practice, practice. The best hair colorists have done it many times. Find a good resource for hair samples and testing materials and practice, practice, practice. The best hair colorists have done it many times. Find a good resource for hair samples and testing materials and practice, practice, practice. The best hair colorists have done it many times.

Careful reading is also integral to successful hair coloring, starting with the critical information in product directions and manufacturer’s information. One can also “read up” on new hair color developments and the latest technologies in magazines and on the Internet. Artful hair coloring is enhanced by reading and doing. Not only can you find information about getting the best results with specific products, such as details on how to mix and apply hair color, but you can see pictures of the results. The more you learn about hair color, the more valuable your services, and the more your clients will appreciate you. Let your clients know that the magic is not just in the materials, but also in the expert choice of product and application. Clients know little about their options in hair color products and services. You provide that knowledge. And, as an experienced professional, you are able to maximize a good product.

New do-it-yourself products are both a boon and a burden. Many clients may try to color their own hair with varying results. You may have to “correct” a client’s mistake. Your knowledge and abilities will ensure that the client’s money is well spent and you’ll find your confidence stretched with each success. Coloring accidents can be a nightmare – but great color correction can make you invaluable to that client. Remember, the product is only one part of the equation (and maybe not the most important part).

This course helps increase your value in the color equation. Instead of living in fear of hair coloring disasters, you might even get a reputation for correcting them. However, you will need some informational tools for this endeavor. To really understand how color works, you need to have a basic understanding of a number of topics:
- The structure of hair and natural hair color.
- The laws of color (color wheel), including primary, secondary, and tertiary colors.
- Color levels and tones.
- PH, alkalinity, acidity, and hair.
- The chemistry of artificial hair color.
- Types of products or materials.

This course will review basic color theory, the chemistry of color, what products are available, how they differ and how they work. A basic understanding of color takes into account how we see color and the chemical processes involved in coloring. We start, however, with a solid understanding of hair structure and natural color.

Hair structure

A hair consists of a shaft that projects above the skin and a root that is embedded in the skin. Its basic components are keratin (a protein), melanin (a pigment), and trace quantities of metallic elements. These elements are deposited in the hair during its growth and/or absorbed by the hair from an external environment. After a period of growth, the hair remains in the follicle in a resting stage to eventually be shed from the body.

A single hair has many layers and sublayers, but three main parts: the medulla, cortex, and cuticle. The medulla is the very center of the hair shaft, and does not exist in every type of hair. Thick or coarse hair is more likely to have a medulla, while fine of lighter colored hair will not. Most of the hair’s mass (90 percent) comes from the cortex, which gives hair many of its qualities, including is color and flexibility. Hair is mostly protein. The cortex is made up of small squarish cells filled with the protein keratin that are tightly bonded to one another. Proteins are made of amino acids, linked together by chemical bonds called peptides (end bond).

Long chains of amino acids linked by peptides, called polypeptides, form longer chains. These protein structures, resembling long, curvy telephone cords, give hair its elasticity. The long chains of amino acids are like strong bridges, chemically and physically bound together by links of keratin, with millions of keratinized cells chemically and physically bound in the cortex and protected by the cuticle, which acts as a shield.
These millions of polypeptide helixes are cross-linked together by three types of side-bonds: hydrogen bonds, salt bonds, and disulfide bonds. Salt bonds are affected by pH, and are easily broken by strongly acidic or alkaline solutions. The side bonds twist together to make larger bundles of thread-like chains, or helixes, which twist into larger, longer groups. Cystine is the most common amino acid. It makes hair strong, giving it the ability to hold a permanent curl or the effects of chemical relaxers. The 18 amino acids making up hair are:

1. Alanine.
2. Arginine.
3. Aspartic acid.
4. Cysteic acid.
5. Cystine.
7. Glycine.
8. Histidine.
9. Isoleucine.
10. Leucine.
11. Lysine.
12. Methionine.
13. Phenylalanine.
15. Serine.
16. Threonine.
17. Tyrosine.
18. Valine.

Cuticle
The cortex is surrounded by a cuticle, much like the cuticle on your finger that holds the nail in place. The overlapping cells appear like shingles on a roof [See Figure 2], with each individual cuticle attached to the cortex. The cuticle is clear, showing the color of the cortex beneath it. The cortex would become damaged without the hard cuticle to protect it. The cuticle acts as a barrier to some chemicals such as tints, but high temperatures combined with high pH can loosen it.

Hair color
The appearance of color is associated with the color of melanin in the hair’s cortex. In general, for hair color to look natural, synthetic color must penetrate into that layer. Temporary and semi-permanent hair color typically coat the clear cuticle of the hair, while permanent hair color is able to take color from the cortex, as well as deposit color into it.

Melanin gives hair its color and tone. Most melanin is in the cortical layer, although the medulla contains melanin, as well. In some rare cases, melanin may be found in the cuticle, but only in the darkest hair. Melanin is produced at the root of the hair follicle and moves within granules called melanosomes, through the hair toward the scalp.

There are two main primary types of melanin: eumelanins (eumelanosomes), which are black and brown, and pheomelanins (pheomelanosomes), which range from reddish brown and reddish yellow to yellow. A third type of melanin, called trichochromes, occurs rarely in hair, but produces the yellow/red pigment found in carrot-colored hair. It is related to pheomelanin but is not the same. [Some categorize hair color into three types: eumelanin (black), pheomelanin (red and yellows), or one that is a mixture of the two (gold and auburn).] Americans of Asian or African descent are more likely to contain eumelanin in their hair than other individuals. Most hair contains both eumelanin and pheomelanin in varying amounts and patterns of distribution. The only hair without pigment is pure white.

The color of each strand of hair is a function of how much melanin it contains, what kind of melanin and/or the specific amount of all of the pigments, in combination, and how they are distributed throughout the hair shaft. The darkest hair contains the most melanin, and a majority of eumelanin, as well as larger granules (melanosomes). Blond hair has less melanin than dark hair, more pheomelanin than eumelanin, and more diffuse melanosomes. Gray hair has very little melanin, while albinos, which is pure white, has no melanin.

As a person ages, the number of melanocytes decreases, and produces less melanin, with resulting graying of the hair. Hair color may also change during the teen years, naturally darkening blond, red, or light brown hair because of increased melanin production during those years and the resulting higher pigment density.

The number, size, and arrangement (density) of pigment granules is associated with the specific color of hair, as well as its level of resistance to change. All hair colors, from blond to black to red, are a function of hair thickness, the total number and size of pigment cells or granules (melanocytes), and the proportion of eumelanin to pheomelanin. Natural hair color varies from light to dark due to the concentration of eumelanin (dark brown or black) or its absence (lighter hair). Each strand varies in its amount of melanin, which affects how the hair fades or decolorizes. Hair with significant amounts of eumelanin, for example, will fade before pheomelanin, which resists losing its red color. Black hair has the greatest concentration of melanin granules, with brown hair having somewhat less, red hair, even less, and blond hair, with the least of all.

The client’s new color will depend as much on the natural color of the hair (melanin) as the artificial color used. One color will look one way on one person and completely different on the next. We’ve all seen it. Assessing the quality of hair, and correctly determining color from the start will help you achieve the desired result. Know this: color depends on what you have, plus what you add. Other characteristics of hair that need to be assessed include the diameter of the hair shaft, the coarseness or texture of the hair, its density on the head, and body (which typically refers to the strength, volume, and flexibility of hair).

Density is a measure of thickness or fullness, expressing how many hairs are growing on a square inch of scalp. Density varies by population and individual. Men tend to have greater density of hair than women. Average density is estimated at over 2000 hairs per square inch but is affected by factors such as hair products and services used, health, and diet, etc. In general, redheads have the least number of hairs per square inch and blondes have the most. Hair density tends to be highest in young adulthood and begins to decrease after the age of 50. Thinning is sometimes a side effect of excessive or damaging chemical processing.

The diameter of the hair is categorized as fine, medium, or course. Hair diameter is mostly a matter of genetics. Fine hair is more susceptible to processing than medium or coarse hair, which has a wider diameter and a greater resistance to processing. Color will develop faster on fine or thin hair. Hair lighteners and hair color have a harder time penetrating course hair. To prevent potential damage to fine hair, you will need to check constantly for subtle changes to determine the length of the coloring process.

Hair texture and density change over a person’s life. Children have soft hair that becomes more coarse as they grow older. Environmental conditions, poor nutrition, medications, and quality of hair care affect the
appearance of the hair, including patchiness in hair color, lack of sheen, thinning, and weakness.

Basic color theory
Color is what we see when we view a combination of light and pigment. Light is what reveals color; there can be no color without light. Pigments are a feature of living things and objects that reflect or absorb a certain amount of light. Our eyes are built to see those reflections — what we know as color. For example, an object looks blue in white light because it reflects blue and absorbs all other wavelengths in the spectrum: red, orange, yellow, green, blue, and violet, which together create white light. When white light is viewed through a prism, one can see how color separates into a rainbow of colors, split into its component wavelengths.

Black is the absence of all light or the absorption of all light waves, while white is the reflection of all light waves. There are also colors at each end of this spectrum of white light that our eyes are unable to see. Ultraviolet light, for example, is the spectral wavelength next to violet, which we are unable to see with the naked eye. Infrared light is also invisible to us.

The color wheel
The color wheel is a useful tool developed years ago to help understand the way color works. There are many different kinds of color wheels used for different purposes. The color wheel described below was developed in the 1700s, using a theory of primary colors. The color wheel shows every possible color combination, what actually occurs when pigments are mixed. To test your color mixing prowess, you can physically combine paint (watercolor paints or food coloring) or clay (play-doh works!) to demonstrate these principles for yourself.

Primary Colors
Three colors make up all the colors in the world: they are red, yellow, and blue. These are the primary points of a color wheel, often portrayed in a triangle, like this:

```
Red

Blue

Yellow
```

Secondary colors
Combining two of these primary pigments or colors in equal measure creates a secondary color. Three combinations make up the three secondary colors: equal parts of red and yellow make orange; equal parts of yellow and blue make green; and equal parts of blue and red make purple (also called violet).

```
Red

Violet

Orange
```

Tertiary colors
Tertiary colors are formed by mixing equal parts of one primary color and the secondary color next to it. The six tertiary colors are blue violet, blue green, yellow green, yellow orange, red orange and red violet (although they may be called by different names). These tertiary colors form six new complementary color pairs; each tertiary is directly opposite from another tertiary color. They also divide the color wheel into twelve equal color points around the color circle. It is worth your while to print out a copy of a color wheel showing primary, secondary and tertiary colors for easy referral.

Warm and cool colors
If you divide the color wheel into two halves, separating violet, blue, and green on one side, from red, orange, and yellow on the other, you distinguish the cool colors from the warm. Warm colors, which include red, orange, and yellow, get their name from the “heat” they seem to radiate; Cool colors (also called ash) include green, blue, and violet. Mixtures of cool and warm colors can produce both cool and warm outcomes. Red violet is a cool red, while red orange is a warm red. Note that warm and cool colors meet at some point, so while yellow is warm and green is cool, a yellow or greenish tertiary may be either warm or cool. The more warm a tone is, the less cool it can be, and vice-versa.

Complementary/contrasting colors
Complementary or contrasting colors are those colors that sit opposite one another on the color wheel: Red ** Green; Violet ** Yellow; and Blue ** Orange. When one of these colors is mixed with the other, the result is a neutral tone. Note, in each pair, one color is warm and one is cool. This is another way complementary tones “cancel out” one another. In each pair of complementary colors, one of the colors is a secondary color and the other is a primary. When two complements combine, all three primary colors are mixed.

Complementary colors neutralize or even one another out when combined. Looking at the color wheel, it makes sense that a mixture of complements creates a neutral tone, as primaries combine to neutralize. Green, for example (a combination of yellow and blue), is reduced or eliminated by red (the missing primary). Orange, a combination of yellow and red, is reduced or eliminated by blue. This neutralizing effect is critical in hair color science. One might use blue to neutralize a brassy orange tone in hair. This kind of corrective color is referred to as balancing or over-toning an undesirable hue.

Much of what we do in selecting desired hair tones is express, what we don’t want in our hair color and how to neutralize the things we don’t like. In choosing to enhance a color, you can use a color whose base is...
on the same side of the color wheel (adding to that color), or choose to neutralize it by adding a color across the color wheel.

The perception of warm and cool tones is important when it comes to hair and skin tones. Some people look much better in warm tones, others in cool. Some of these effects are cultural, some a function of optics (for example, warm colors appear closer, while cool colors seem further away). Neutral colors may look softer than bright colors. Colors also look different depending on the kind of light in the room, and which colors are viewed together. Contrasting one color with another often brings out latent optical effects of the other colors surrounding it.

Color is very subjective. Not only is our perception of it influenced by personal meanings and social significance, it appears very different in different kinds of lighting. Good lighting in a salon is essential for good hair coloring. You need to see the client’s current hair color as clearly as possible in order to produce the desired result. The best light for analyzing hair color is indirect natural daylight. Direct light tends to emphasize yellow and orange tones, while low light makes colors muted. The walls in your salon also absorb and reflect light. Certain colors are more much flattering to skin and hair tones – something to consider when you redecorate.

Level and tone
What we perceive as hair color is really a subtle mixture of many colors that can be categorized by level and tone. Level refers to the depth of color of the hair. Each level is one degree lighter or darker than the one next to it. Level measures are typically 1 through 10, with 10 being the lightest and 1, the darkest. Each brand or company uses a slightly different system to indicate each level. In other words, Company A’s level 3 may be slightly different than Company B’s level 3, but both company’s use a 1 to 10 measuring system that progresses from lowest (1, the darkest) to highest (10, the lightest).

A level is determined by its darkness or lightness. It may also be referred to as saturation, density, or concentration of color. All colors at the same level have the same lightness or depth, without the richness of other tones discussed below. When you consider how a color film or picture looks in black and white, you are seeing levels of color, not tones. The missing reflected colors are tones.

<table>
<thead>
<tr>
<th>Color level</th>
<th>Degree of darkness/lightness</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black.</td>
<td>Dark</td>
</tr>
<tr>
<td>2</td>
<td>Brown black/darkest brown.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Very dark brown/dark brown.</td>
<td>Medium</td>
</tr>
<tr>
<td>4</td>
<td>Dark brown/light brown.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Medium brown/light brown.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Light brown/dark blond.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dark blond/medium blond.</td>
<td>Light</td>
</tr>
<tr>
<td>8</td>
<td>Medium blond/ light blond.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Light blond/very light blond.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Very light blond/lightest blond.</td>
<td></td>
</tr>
</tbody>
</table>

While the level system is universal (in that it is used worldwide), there are two main variations to it. Some companies have one or two more levels than the 10 shown here. In those cases, the highest value (typically 11 or 12) will be the lightest that they make (1 is still the darkest). Remember, color levels do not necessarily match one another across different manufacturers.

The first hair colors used the shade system, which measures the tonal value of the hair. Those familiar with the shade system should know that about three or four shades are equivalent to one level of the level system. If you are using a product and the level is not apparent, you may have a product that uses the shade system. Most technicians prefer the level system, once they get used to it, for its consistency and ease of use. The level system formulation is much more cut and dried, with fewer steps and unknowns. Their increased predictability of results makes you more confident. Additionally, level systems typically have lower ammonia levels than shade products.

Tones
There are a number of different ways to conceptualize or describe tonal value, or tones. The level system usually uses letters to refer to tonal value. In some cases, tone is the main pigment in a series of color products that vary by manufacturer. Hair tones are primarily natural or neutral, red, gold, or ash. These are usually abbreviated “A,” for ash, “N” for natural or neutral, “G” for gold, “R” for red, and “S” for silver. Every color can be categorized as both a level and a tone.

Tone, or color, is sometimes referred to as a “shade.” Shade is most closely associated with a specific tonal quality within each particular level. Depending what system you use, there are about 4 different shades within each level. Each manufacturer develops its own system for defining colors in each level (color lines). Ashes, gold, red, and natural or neutral are the most common. Shades vary. One company’s auburn is not another company’s auburn.

Tonal intensity refers to the degree of warmth or coolness in the tone. Cool tones have an absence of red, orange, and yellow; warm tones contain the presence of red, orange, and yellow. Intensity is important in relation to coloring gray; the more intense colors are inappropriate for white or gray coverage. Products vary in intensity, with the richest colors (concentrates) at one end of the spectrum; they are typically not meant to be used alone at full strength.

While each manufacturer develops its own tonal systems, many conceptualize all hair color as a variation on brown, with warm tones like gold, yellow, or auburn, and cool tones like ash. Hair with red and golden highlights is warm in tone, while ash highlights produce a cooler tone. Learning to see the level and tones making up hair color takes time, but is critical to successful coloring.

In general:
- Blue, black, and ash refer to cool tones.
- Gold, red, and yellow refer to warm tones.

Three factors determine all natural colors from the darkest black to the lightest blond:
1. Hair thickness/density.
2. The total number and size of pigment granules (melanosomes).
3. The ratio of pigments to one another.

We have noted that the amount and type of melanin in the cortex determines the tone of a hair color. In pigment terms, all natural hair colors come from a combination of eumelanin or phaeomelanin. Together, eumelanin, (blue/black), phaeomelanin (reds and yellows), a mixture of the two (gold and auburn), and triochromes, (orange) compose all hair colors.

Conceptualizing black hair as blue pigment (cool), one can think of hair color in terms of the color wheel. While it may seem odd to equate black hair color (or any hair color) with blue pigment, laboratory research using melanin molecules from natural hair shows that no matter what color the hair is, all hair examined on a molecular level has yellow, red, and blue pigments. These three colors alone make all the different types of browns, golds, and reds we perceive. In blond hair, the yellows are dominant, with some reds, and minimal blue. In black hair, the blues are dominant with some reds, and minimal yellow.

It is important to remember that all tones are the result of a combination of the three primary colors: red, yellow, and blue. Mixed in unequal portions, these colors create a neutral or brown tone; more red or yellow makes the brown warmer, more blue makes it cooler. The mixture of two complementary colors also creates a color with all the primary colors in unequal amounts, making brown (browning or neutralizing a color). The terms natural and neutral are sometimes used interchangeably in discussions about color.
Some systems divide natural hair colors into 4 or 5 categories, such as:

**B (black and dark brown):** Usually encompasses levels 1 and 2; in some cases, 3, may have reddish highlights; hair typically darkens throughout life, then turns gray.

**W (warm brown):** People born with blond hair that darkens through childhood and young adulthood. Tends to lose some of its warmth and dimension before graying; undertones are still there, even with graying hair; a good candidate for highlights; usually encompasses levels 5-10.

**L (Light brown):** Those born with blond hair that stays blond until the 10s, when it gradually darkens to a light brown. Light or soft brown category usually encompasses level 5 or 6.

**R (Red):** Those born with red hair that stays that color until young adulthood. Hair usually begins darkening noticeable in the teens. Hair tends to lose warm tones with age. Red usually encompasses 5-7.

**Blond:** Not actually a category, blond hair usually encompasses 8-10. This group often highlights their hair or starts to lighten when their hair begins to darken naturally. These are usually grouped into the light category.

**Neutral/Natural**: Hair is softened and physically shaped to a wave or curl. In a physical change, no new substance is formed and the process is reversible.

**Permanent:** The chemistry of hair color

- **A basic understanding of certain chemical processes is essential to hair coloring.** Many of the services performed in a salon, and all hair coloring services, wouldn’t be possible without chemistry. Hair coloring is the result of physical and chemical changes to hair based on its chemical properties. Oxidation – one specific kind of chemical reaction – is capable of drawing natural pigment out of hair.

- Some hair styles are the result of physical changes, such as those where hair is softened and physically shaped to a wave or curl. In a physical change, no new substance is formed and the process is reversible. Physical changes, like shampooing, setting, or styling hair are temporary. Temporary hair color is also the result of a physical change in which temporary hair color molecules stain the surface of the hair. The chemical structure of the hair stays the same. No new chemicals are formed.

- Chemical reactions cause permanent changes in hair that form new substances, and are not reversible. The rate of change of a chemical reaction varies or is controlled by the temperature, concentration of materials, amount of exposure time, and pH of the solution. Both bleaching and tinting are examples of chemical processes that are the result of chemical reactions that create new chemicals. Permanent hair color is an example of a chemical reaction in which dye is formed and driven into the internal structure of the hair. The chemical reaction changes the structure of the dye molecules, as well as the hair, forming new chemicals.

**Elements and chemical compounds**

Everything can be classified as a pure chemical substance or a physical mixture. Pure substances always have the same fixed chemical composition and characteristics. Elements and chemical compounds
are the two types of pure substances. Chemical compounds are a combination of two or more elements bound together in a specific way. Chemical compounds result from a chemical reaction that generates new chemical structures and characteristics.

Mixtures are combinations of substances combined physically that retain identifiable properties. Solutions, suspensions, and emulsions are mixtures of two or more substances that are defined by their particle size and degree of solubility. All of these are just different ways to talk about mixtures of different things. An emulsion, for example is the mixture of one liquid dispersed in the other in a characteristic way (suspension) that tends to separate over time. Styling aids are common examples of emulsions.

There are well over a hundred known elements, and more will are likely to be discovered. About 1/10th of all the elements occur naturally. The rest are produced artificially. Elements are substances that cannot be reduced into simpler substances. They make up everything around us. A periodic table of the elements is a schematic list of all the substances, with information about how atoms (the building blocks of elements) are put together to form elements.

Elements may be metal or nonmetal, gases, or liquids. The letter in each square is the abbreviation of the specific element, with the number in the same square corresponding to characteristics of each element. The elements in natural hair include over 51 percent carbon (C), 21 percent oxygen (O), 17 percent nitrogen, 6 percent hydrogen (H), and 5 percent sulfur (S). Like all other elements, these substances interact with one another in specific, predictable ways.

When all the atoms forming a molecule are the same, the molecule is called an elemental molecule. (Elemental molecules are made up of two or more atoms of the same element.) Compound molecules are chemical combinations of atoms of different elements. Chemical notation is a way of signifying the chemical name using the abbreviation from the Table of Elements. Water, for example, is H2O, which refers to its makeup of 2 hydrogen atoms and one oxygen atom.

Elements exist in three states: solid, liquids or gases, usually dependent on temperature. Water, for example, exists as ice (solid), water (liquid) or vapor (gas) depending on the temperature. No matter what form it takes, it still has the same chemical structure: H2O is 2 hydrogen atoms and 1 oxygen atom bound together. Solids have volume and shape, while liquid have volume and take the shape of their container. Gases do not have volume or shape. Steam, for example, is heated water.

### PH scale

The pH scale is used to determine the acidity or alkalinity of a water-based solution. The scale ranges from 0, the most acidic, to 14, the most alkaline. Seven is associated with a neutral solution (a pH above 7 is alkaline, and a pH below 7 is acidic). The pH scale is a logarithmic scale (logarithm means multiples of 10), meaning that each number on the scale is 10 times stronger than the one next to it. A pH of 9 is 10 times more alkaline than a pH of 8. A pH of 10 is 100 times more alkaline than a pH of 8.

<table>
<thead>
<tr>
<th>Product</th>
<th>Approximate pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid</td>
<td></td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>0-1</td>
</tr>
<tr>
<td>Lemon juice</td>
<td>2</td>
</tr>
<tr>
<td>Hydroxide neutralizers</td>
<td>3</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>4</td>
</tr>
<tr>
<td>Conditioners</td>
<td>3-6</td>
</tr>
<tr>
<td>Distilled water (neutral)</td>
<td>7</td>
</tr>
<tr>
<td>Semi-permanent color</td>
<td>8</td>
</tr>
<tr>
<td>Soap</td>
<td>9</td>
</tr>
<tr>
<td>Lighteners</td>
<td>10</td>
</tr>
<tr>
<td>Tints</td>
<td>9-11</td>
</tr>
<tr>
<td>Ammonia</td>
<td>12</td>
</tr>
</tbody>
</table>
The pH of the scale refers to “potential hydrogen” or “parts hydrogen,” the strategy used to measure acidity and alkalinity. What is actually being measured is the concentration of hydrogen ions: Small “p” (quantity) of capital “H” (hydrogen ion). Because these numbers may be vary large or very small, they are often written using logarithms (logs), a kind of scientific notation, to write very large or very small numbers (with lots of 0’s) in a simpler way. For example, 100,000,000,000,000 is a multiple of 10 that can be written any of the following ways:

\[10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 100,000,000,000 = 10^{11}\]

The small number to the right of the ten is called the “exponent,” or the “power of ten.” It represents the number of zeros that follow the 1. So we would write 200,000,000,000 in scientific notation as: 2.0 \times 10^{11}. This number is read as follows: “two point zero times ten to the eleventh.” The exponent refers to the number of zeros that follow the 1. So: 10^1 = 10; 10^2 = 100; 10^3 = 1,000, etc.

Negative exponents indicate negative powers of 10, which are expressed as fractions with 1 in the numerator (on top) and the power of 10 in the denominator (on the bottom). So, 10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001. This allows us to express other small numbers this way. For example: 2.5 \times 10^{-3} = 2.5 \times \frac{1}{1000} = 0.0025. In a pH scale, the pH is simply the same number as the exponent if written in scientific notation (without the minus sign). Writing the pH of water in scientific notation is: 1 \times 10^{-7}.

### Number representation and logarithms

<table>
<thead>
<tr>
<th>Number</th>
<th>Exponent notation</th>
<th>Log of the number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>10^2</td>
<td>3</td>
</tr>
<tr>
<td>100</td>
<td>10^1</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>10^0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>10^{-1}</td>
<td>0</td>
</tr>
<tr>
<td>0.1</td>
<td>10^{-1}</td>
<td>-1</td>
</tr>
<tr>
<td>0.01</td>
<td>10^{-2}</td>
<td>-2</td>
</tr>
<tr>
<td>0.001</td>
<td>10^{-3}</td>
<td>-3</td>
</tr>
<tr>
<td>0.0001</td>
<td>10^{-4}</td>
<td>-4</td>
</tr>
</tbody>
</table>

Water solutions (aqueous) are the only solutions that have pH. Non-aqueous solutions (alcohol or oil, for instance) do not have pH. To understand how pH works, you need to know the behavior of ions. An ion is an atom or molecule with an electrical charge. When a molecule ionizes, it splits in two, creating a pair of ions. The first ion’s electrical charge will be the opposite of the two electrical charges formed. (An ion with a negative electrical charge is called an anion, while an ion with a positive electrical charge is a cation.)

PH could not occur without the ionization of water. The ionization of water is a natural process in which water molecules split (ionize) into two distinctions: H+ and OH. The H+ ion is the hydrogen ion, which is acidic. The OH ion is the hydroxide ion, which is alkaline. Each water molecule ionizes to produce one hydrogen ion and one hydroxide ion. In pure water, these cancel each other out, creating water, a neutral solution. It is neutral because it has an even balance of H+ and OH [the same number of hydrogen ions as hydroxide ions (50 percent acidic and 50 percent alkaline)].

As alkalinity increases, pH increases; as alkalinity decreases so does pH. This means a higher pH is more alkaline than a lower pH. Acidity increases as pH decreases, with a lower pH more acidic than higher pH. (The pH scale measures acidity (hydrogen ion), not alkalinity (hydroxide ions) but the alkalinity can be estimated because the addition of both hydrogen ions and hydroxide ions always totals 14.) The pH of any solution is the exponent of the concentration of hydrogen ions.

Each number on the pH scale is ten times more alkaline or acid than the one next to it. A very small change on the pH scale is a big change in the concentration of hydrogen and hydroxide ions.

### pH and hair

Our acid mantle has a pH of 4.5 to 5.5, and our hair and skin like to maintain that slightly acidic balance. Certain services, however, require other levels of pH to work effectively. Pure water, at a pH of 7, is 10 times more alkaline than a pH of 5, closer to the average pH of hair and skin. That means that water is 100 times more alkaline that your hair and skin (even though its pH is neutral). When we apply shampoo, we strip oil, dirt, and other hair products, out of our hair and off the scalp. When the cuticle is not protected by the acid mantle, the cortex swells and the cuticle stretches. Damage during shampooing can be minimized by using acid-balanced products.

Acids are able to contact the hair and make it brittle, while alkaline softens and swells hair. All aqueous solution (those that contain water) contains both acid and alkaline ions. Water alone can cause the hair to swell up to 20 percent. Hair lighteners require an alkaline pH to do what they’re supposed to do: soften and open the cuticle, allowing the lightener to enter the cortex of the hair, where the melanin is located. Most hair lighteners have a pH in a range of 9.5 to 10. A higher alkalinity causes the hair to swell and soften even more. They penetrate even deeper into the cortex.

Acids, which make hair brittle, are chemically reactive because they have a hydrogen ion (H+). Alkalis (bases), which soften and swell hair, are chemically reactive because they have a hydroxide ion (OH-). The hydrogen ion associated with all acid reactions, and the hydroxide ion is responsible for all alkaline reactions. Strong acids and alkalis ionize more completely and create more ions. Weak acids and bases do not completely ionize, and produce fewer ions. All acids produce hydrogen ions and all alkalis produce hydroxide ions. They differ on how many they produce. Acids and alkalis can be combined in equal amounts to neutralize one another, resulting in salt and water.

### pH and Hair

<table>
<thead>
<tr>
<th>Solution</th>
<th>Results</th>
<th>Noteworthy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very strong acid (pH0-1).</td>
<td>Hair dissolves.</td>
<td>Keep away from hair and scalp.</td>
</tr>
<tr>
<td>Strong to mild acid (pH 1-4.5).</td>
<td>Hair contracts and becomes brittle.</td>
<td>Products.</td>
</tr>
<tr>
<td>Neutral (pH 4.5-5.5).</td>
<td>Hair is normal.</td>
<td>Acid or cream rinse restores body to bleached, overly porous hair.</td>
</tr>
</tbody>
</table>

• Conditioners and fillers address and correct excess porosity of damaged hair.
• Mildly acidic shampoos reduce tangling and prevent fading.
• Hair creams increase reflectability/shine, color rinses offer temporary color.
alkaline substance like ammonia (NH₃), acts as a catalyst, causing oxidation (NH₃ + H₂O₂ → reaction). The ammonia neutralizes the acid (melanin) in the hair, begins at the same time as the deposit process. This process of oxidation, lift (or lightening), the removal of natural color as many as five or six different intermediates to make a specific color. In addition, an oxidizing agent (typically hydrogen peroxide) to produce color. The colorless molecules called intermediates (which are either in the form of an oxidizing agent or are otherwise present), the hair color receives oxygen (oxidized), and the hydrogen peroxide loses oxygen and is reduced (when oxygen is taken out of a substance, it is called “reduced.”) In this situation, the hair coloring is called the “reducing agent”.

Oxidation and reduction always occur at the same time. This is referred to as a “redox reaction.” Permanent waving is a common example of a redox reaction. In a redox reaction, the oxidizing agent is always reduced and the reducing agent is always oxidized. Oxidation can also result from the loss of hydrogen, with reduction resulting in the addition of hydrogen. Oxidation is typically defined by the addition of oxygen or the loss of hydrogen, while reduction is defined by the loss of oxygen or addition of hydrogen.

Oxidizing agents are potentially very dangerous. Eyes, skin, and lungs must be protected from these potentially corrosive products. Always wear safety goggles, gloves, and a mask to avoid breathing in the dust when working with powdered (dry) oxidizers or high volume peroxides and bromates, which are particularly harmful to the eyes. Oxidizers can cause burns, severe scarring, and skin damage.

Oxidation colors have two parts and are not used directly from the bottle. Instead, oxidation colors must be mixed with an activator or developer immediately before application. These activators or developers contain an oxidizing agent that produces the chemical reaction that develops the color. Permanent oxidation colors are able to both deposit color and lighten natural color in one use. The color in the bottle is not the color deposited on the hair because each individual’s specific hair color contributes to the final color that develops on the hair and dye molecules have not reached their final form yet.

The chemical reactions that produce dye molecules are very complicated; a series of specific chemical reactions occurring at the right time are necessary to produce a specific shade. The final color develops on and with the hair. Most of the raw ingredients used in hair color are colorless molecules called intermediates (which are either in the form of a clear liquid or coupling agents which combine with the intermediates) and an oxidizing agent (typically hydrogen peroxide) to produce color. Intermediates are small dye molecules that are able to form new permanent color molecules when combined with peroxide. It may take as many as five or six different intermediates to make a specific color. In the process of oxidation, lift (or lightening), the removal of natural color (melanin) in the hair, begins at the same time as the deposit process.

Intermediates and coupling agents penetrate the hair shaft where they oxidize. In this chemical reaction, hydrogen peroxide is converted to water and oxygen. Water forces pigment into the hair and oxygen exposure develops the pigment color. The molecules in the hair shaft are attracted to one another (a function of the hydrogen peroxide), and cluster in the hair shaft. The intermediary color molecules rearrange and lock together to create new color molecule combinations, developing permanent, insoluble colored pigments that are fixed into the hair structure. Once developed, molecules of pigment are unable to leave the hair shaft. The chemical reaction causes a fusing of molecules which results in the permanent hair color.

While it seems counter-intuitive, the oxidation process both lifts melanin and deposits synthetic color. Lift works most quickly right after application, while deposit processing accelerates near the end of the waiting period. Early removal can mean insufficient deposit of new color. If the oxidation process is slower than it should be, it can mean insufficient lift.

The ionic (sulfur) and the disulfide (sulfur) bonds in the cortex are exposed with oxidation, with damage varying in degree according to the strength of the solution, its pH level, and the amount of time exposed to treatment. Minimizing keratin damage is largely a function of careful reading, measuring, and timing. Use only the recommended amount of activator and avoid peroxide boosters, which can cause severe damage to the hair and scalp.

Oxidation colors include long lasting semi-permanent or demi-permanent and permanent colors. The color base can be a cream, gel, shampoo, oil, wax or other material that holds the ingredients together in one product. The kind of base typically determines the final form of the product (liquid, gel, cream, etc.). Cream developers are emulsions of hydrogen peroxide, water, and other agents that thicken the developer or act as conditioners.

Cream and gel bases tend to make measuring, combining, and applying ingredients easier. A number of high-end products have protein in their base, which assists the pigment in penetrating the hair, because pigment molecules adhere to the hair’s protein. Liquids and cream colors are applied with a brush or applicator. Liquid colors tend to have more ammonia than creams colors, but cream colors typically need a higher volume developer to oxidize.

Color lines are typically categorized by the predominance of a specific color or tone (e.g.: “Gold Series”). “Pigment weight” (percentage of dye in the container) refers to the amount of pigment concentration associated with each level of color. Darker colors mean higher counts of pigment weight. Level 1 (black) has a pigment weight around 250, while a level 10 blond may have a pigment weight of about 5. The percentage of lift is controlled by the amount of ammonia, and the percentage of deposit is controlled by the amount of dye. The depositing capability of the dye is associated with the number of dye molecules in the color. Combining hydrogen peroxide with the color (dye) produces oxidation, which triggers the process of depositing dye (color molecules) into the cortex of the hair shaft.

Typically, ammonia (NH₃), or a similar substance, is used to increase alkalinity, making the cuticle swell, which allows color pigment molecules to penetrate the cortex and accelerate lightening. Alkalinity accelerates the rapid decomposition of hydrogen peroxide, which speeds up the de-colorization process. Both ammonia and alkanolamines can be used to increase alkalinity, but ammonia is losing its popularity as an alkalinizing agent, mostly disliked for its strong, unpleasant smell. Alkanolamines are a low-odor way to lighten that is replacing ammonia in some salons. They are organic alkali (containing carbon), without the volatility of ammonia, but also not as effective in all cases. Alkanolamines are formed by a chemical reaction that produces MEA, DEA, and TEA, harsh chemicals that can be very hazardous, even if they don’t smell bad. Referred to as ammonia-free, it can still damage the
Diluting hydrogen peroxide

<table>
<thead>
<tr>
<th>Amount hydrogen peroxide (in ounces)</th>
<th>Amount water (in ounces)</th>
<th>Total quantity (in ounces)</th>
<th>Working volume hydrogen peroxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>3.5</td>
<td>16</td>
<td>100 volume</td>
</tr>
<tr>
<td>7.5</td>
<td>8.5</td>
<td>16</td>
<td>60 volume</td>
</tr>
<tr>
<td>6.5</td>
<td>9.5</td>
<td>16</td>
<td>50 volume</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>16</td>
<td>40 volume</td>
</tr>
<tr>
<td>3.5</td>
<td>12.5</td>
<td>16</td>
<td>30 volume</td>
</tr>
<tr>
<td>2.5</td>
<td>13.5</td>
<td>16</td>
<td>20 volume</td>
</tr>
<tr>
<td>1.5</td>
<td>14.5</td>
<td>16</td>
<td>10 volume</td>
</tr>
</tbody>
</table>

Most product lines use developers that range from 10 volume and up, although volumes beyond 40 volume tend to become unstable. The volume of peroxide determines how long the process of lifting will continue (not how powerful the lifting will be). The more stable the hydrogen peroxide, the more controlled lift you get; the higher the volume, the greater the lift. The higher percentage of oxygen in the combination, the more oxidation occurs. Lower volumes of hydrogen peroxide and ammonia create shorter processing times, which is associated with less lift (loss of natural pigment) and more deposit. Higher volumes of hydrogen peroxide and ammonia produce a longer processing time and more natural hair color lifted.

Again, the volume of the developer (hydrogen peroxide) and the amount of ammonia in the color determine the amount of lifting action. Adjust the hydrogen peroxide according to whether you are lifting or depositing color. Deposit-only requires less of a concentration of hydrogen peroxide, usually 10 or 20 volume. Developers usually range from 10-40 volume, with 10 typically used for deposit only; 20 volume, for the same level or one level of lift; 30 volume for two levels of lift; and 40 volume for three to four levels of lift.
Each formula will have specific information about recommended volumes with the product instructions, and scales to help you determine the right amount. Always consult the table of developers provided by the manufacturer and follow manufacturer’s instructions regarding the appropriate volume to use for the specific amount of lift desired. Using the recommended hydrogen peroxide volume ensures you have the appropriate working volume at the appropriate time for the optimum chemical process.

Although professional coloring products are timed to take advantage of the swelling cortex and stretched cuticle, leaching melanin from the cortex at just the right time and depositing color, excessive alkalinity and the process of oxidation exposes the hair to potential damage. Once chemicals are deposited in the hair, the pH adjusts to lock the new color in. The process of oxidation is complete once the chemical process stops, turning the hydrogen peroxide into water. At that point, the color has been deposited; the molecules are trapped in the structure of the cortex, and the cuticle closes up.

Alkalinity, hydrogen peroxide, and the oxidation process can be hard on hair. Excess ammonia should be washed from the hair with water after coloring. Using an acid balanced product allows the cortex to shrink and the cuticle to tighten, restoring pH to the normal range for skin and hair.

### Hair coloring product categories

Not all hair coloring uses oxidation to create color. However, only oxidation colors are able to lift natural pigment (melanin). Non-oxidation colors include temporary, semi-temporary, and traditional semi-permanent colors. Non-oxidation colors are typically used straight from the bottle and do not mix with an activator or developer. No chemical reaction occurs and no new chemicals are created. Instead, a physical change occurs in the hair. Non-oxidation colors can only deposit already formed dye molecules, not create new molecules. They cannot lighten or remove color.

#### Temporary

The main property of temporary color is that it is superficial, changing the appearance of the surface of the hair but not penetrating the cuticle. Instead, it coats the hair shaft, laying on the cuticle surface. Temporary colors are typically slightly acidic, so are removed by shampooing. Most temporary colors are more enduring when applied with heat (especially on previously colored or premixed hair). Because they do not cause a chemical change in hair, they are not able to lighten hair beyond its natural color. Dye molecules for these products are too big to pass into the cortex of the hair. Temporary dyes may be labeled acid, basic, D&C, and FD&C dyes. They are made of pigment (certified color) in a base (liquid, gel, etc.).

Because temporary color works without causing any chemical changes to the keratin or other parts of the hair, they are less harsh. The hair looks healthier because it is coated with a color that absorbs and reflects light differently than the original color. Eventually water or other ingredients wash off the hair, returning it to its natural color. Although they coat the hair temporarily, they do not damage hair, and can improve the look and feel of hair, as well as provide color, especially when used with conditioning agents. However, too much temporary product coats the hair, reducing the natural shine of hair and making the color look dull or fake.

While these products are typically safe and easy to use, there is a danger of staining hair when using darker colors, especially if the hair is porous. This is because, though the molecules making up temporary color are too large to penetrate the cuticles of healthy hair, highly porous hair may allow some in. If stains won’t shampoo out, be aware that the presence of a lot of temporary color residue in the hair will affect the way other hair coloring services turn out.

Temporary colors are not capable of significantly changing hair color, but can provide highlights or subtle differences in shades. In some cases, the color may not completely leave the hair. Temporary products can become unevenly permanent, tending to sink into hair more if heat (hair dryer, iron, etc.) is applied. Extremely porous (damaged) hair will remain colored by the material longer than healthy hair. In particular, ends that are too porous are the most likely to show the excess color. Temporary hair colors may be called rinses, “addition only,” or “certified” colors and come in every kind of product from colored shampoos, rinses, conditioners, and styling products, like gels, as well as finishing or setting lotions and sprays, mousses, and pomades. Rinses and shampoos are usually water based and applied to the hair when it’s damp. Because they are water soluble, they are affected by the amount of moisture in the air, or even perspiration. Be aware that hair near the scalp (if it is oilier) may not coat as easily.

Temporary or certified hair colors may be made from vegetable dyes and do not require a patch test for potential allergic reaction, although some people may react to vegetable dyes with allergic symptoms. Colored setting lotions and foams are softened polymer films dissolved in a solvent and combined with hair coloring, which dries leaving a thin colored film on the hair shaft. These films prevent color from penetrating even porous hair, and their thickness increases ease and control of application.

Temporary colors are most often used to enhance the more enduring color products like (semi-, demi-, and permanent colors). Temporary products are a great way to try out color for the first time, a gentle introduction for people who are a little timid about changing their color. They are also great for fun effects with styling and finishing products – similar to makeup – providing a little accent of color.

Temporary colors are often used in corrective coloring, either as a stopgap measure if there is no time for permanent color, or to address tonal issues. Temporary color can be used to maintain tone in highlighted, lifted, or bleached clients and eliminate unpleasant tones. Clients prone to fading may benefit from a pigmented shampoo or conditioner, rather than filling and toning. Custom shampoo color can also be developed especially for color clients. Perhaps the most common functions of temporary color is toning or neutralizing the yellow tinge of some white or gray hair, or applied to overlightened hair. In cases where there is bleaching or extensive corrective color, and the scalp is sensitive, a temporary color may be used where the scalp or hair is too sensitive for oxidative processes. Because temporary products can cause permanent staining, they should be used with the same care and precision as permanent dyes.

Read manufacturers directions regarding temporary product removal. Oil based removers, clarifying treatments/shampoo, or other treatments, may not all be equally effective. Some temporary dyes require peroxide or bleach to decolorize effectively.

#### Semi-temporary

Semi-temporary color endures longer than most temporary color because it contains some semi-permanent dyes. Included as an ingredient in some color shampoos, mousses, and styling products, it is not exactly temporary but not exactly semi-permanent; they may last longer than one expects. Semi-temporary products are sometimes referred to as color and shine products (including glazes) and vary enormously by manufacture in degree of penetration. While heat makes the color more enduring, the quality of the hair and maintenance routine also influences the result and length of endurance significantly, especially in multi-porous hair. The manufacturer can give you some idea of the product’s degree of endurance, but it will vary by individual.

#### Semi-permanent

Semi-permanent color dyes are typically categorized as semi-permanent if they do not lighten the natural color of hair (deposit only). Semi-permanent colors are also called direct colors because, like temporary colors, the color does not occur through a chemical change. Semi-permanent color (direct dyes) lasts through about four shampoos. While it penetrates the hair more than temporary coloring, it does not leave a regrowth line, as it fades
with repeated shampooing. Semi-permanent products include traditional semi-permanent (aniline derivatives that both coat and penetrate the hair) and polymers (certified dyes that coat, but do not penetrate). Semi-permanent color is deposit only, and does not lighten, but it can be used to brighten an existing color or tone.

Different coloring products have different abilities to bind to keratin. Some semi-permanent products bond more tightly to keratin, providing longer lasting color. Traditional semi-permanents are stains that do not need a developing agent. Instead, semi-permanent dyes utilize preformed dyes, with molecules that are fully formed before application (unlike permanent color which requires the oxidation process), which stain the cuticle and in some cases, the cortex. Most of the color, however, is absorbed by the outer layer, coloring the cuticle, only.

Semi-permanent, direct dyes, may be labeled as HC dyes, nitro dyes, acid dyes, or disperse dyes. Traditional dyes usually use no developer (hydrogen peroxide) nor ammonia, and require no mixing. Clients allergic to permanent hair coloring can often wear traditional semi-permanent coloring, although a patch test is necessary. Direct dyes, used alone, penetrate only the outer layers of the cortex, with a first application that lasts from four to six shampoo. They last longer than temporary color, but not as long as permanent colors. In some cases, semi-permanent colors may last take longer than 4 to 6 shampoos to fade, especially in the case of repeat applications, which penetrate further than the first application, and over time may even cause a regrowth line.

Porosity influences the degree of deposit (intensity) and the endurance of the color, so great variation in porosity of the hair can be a problem. Semi-permanent colors may produce uneven results, selectively coloring different parts of the hair different colors. It is common, for example, that chestnut brown has porous ends that absorb larger amounts of green than you bargained for. Using a mix of smaller and higher weight dyes on one head of hair is a way to produce a more even coloring effect.

Semi-permanent color can give the effect of highlighting on individuals with about 25 percent evenly distributed gray hair. Semi-permanent color can also be used on higher percentages of gray to make it appear blond. While some semi-permanent colors are excellent for covering gray, others are less effective. Traditional semi-permanent color is a good way to try out the coloring process as the color appears brighter, fades gradually, and leaves no color line. The easiest traditional semi-permanent colors require no mixing before use. If you want all the hair to be one color, choose the color at the level of the darkest natural color on the head.

To increase permanence, color must be able to penetrate the cortex. Referred to as “increasing color affinity,” it means increased binding of the color to keratin in the cortex. There are a number of ways to encourage this process. Characteristics such as smaller size color molecules and the use of alkaline agents allow the dye to penetrate further. Raising the pH level lifts and swells the cuticle, allowing deeper color penetration. When these other tools are used, the semi-permanent is typically called a long-lasting, semi-permanent dye.

Most long-lasting, semi-permanent color contains pigment (sometimes an aniline derivative, requiring a patch test) a base, such as a shampoo, cream, or gel that keeps all the ingredients together, an alkaline substance (usually ammonia) which encourages the penetrating effect of semi-permanent color, and a processing lotion, typically hydrogen peroxide. Aniline dyes are liquid chemicals that are derived from coal tar and are used in commercial semi-permanent hair dyes. The various aniline dyes are often considered to be toxic and irritating to the eyes, skin and mucous membranes. Hypersensitive people may experience allergic reactions to these dyes. Historically, these dyes have also been proven to cause blindness in some cases when used in the eye areas.

Color endurance (how long it lasts) depends on hair texture, porosity (more porosity equals more deposit), and the amount of heat applied, as well hair maintenance routine, including the choice and frequency of shampooing. Slightly porous hair typically produces somewhat better coloring.

Long-lasting, semi-permanent color was initially developed to blend gray, which is probably its most common use. It works effectively to deposit color for clients who want to conceal a small amount of gray, but are not ready for the commitment of permanent hair color. Although long-lasting, semi-permanent color fades over time, it sometimes leaves a color residue. The application of heat, as well as pretreatments and post-treatments, encourage dye penetration as they help open the cuticle and/or promote absorption. Semi-permanent dyes in the form of glazes (gel coatings that add color and shine) are often heat activated, with fading that varies by individual, ranging from semi-temporary to permanent staining of the hair, in cases of strong colors or heat processing.

Long-lasting semi-permanent colors tend to be gentler to the hair than permanent oxidation colors, which are able to lift color. Hair decolorization requires a higher pH and higher concentration of hydrogen peroxide. Long lasting semi-permanents are usually less alkaline than permanent colors and are combined with a low volume developer. Always follow any application of alkaline products with a mild acid shampoo and conditioner or rinse, to neutralize alkaline residue and restore normal pH.

Demi-permanent
Some semi-permanents are actually oxidizing hair colors, a new category called demi-permanents. They are usually deposit-only, but can be used to lighten pigment as well. If you are mixing products, you may be using an oxidation tint. These products contain indirect dyes (aniline derived intermediates or precursors, see oxidation section). The development of demi-permanent colors was an attempt to address deficiencies of semi-permanent colors, to make them less sensitive to porosity, and deposit more evenly, a semi-permanent dye with a developer.

Demi-permanent colors do perform better than traditional semi-permanent colors, with an enhanced degree of penetration, more even deposit and coverage, more natural looking color, longer endurance, and they are less subject to varying porosity. Demi-permanent colors produce more color on unevenly porous hair, are great at covering gray, and can even look like highlighting on evenly distributed gray hair (25 percent). They can also be used in many of the same ways semi-permanent colors are used, but last longer.

Both long-lasting, semi- and demi-permanent dyes can be used for corrective coloring to improve tone, darken lighter ends, tweak highlights, correct excessive highlighting, and/or even out patchy color. Many long-lasting, semi-and demi-permanent dyes can be used as fillers, to condition and plump hair, increasing its shine and body, and making hair appear full and healthy. Traditional semi-permanents are usually best for a little gray, while demi-permanent colors should be used for coverage of more gray.

Long-lasting, semi-permanent and demi-permanent colors use a variety of different alkalizing agents, including ammonia, to swell the cuticle, soften hair, and increase absorption, as well as oxidizing agents, such as hydrogen peroxide, among others. In some cases, the packaging may suggest that non-ammonia products are less damaging, or that different alkalizing agents and oxidizers may be milder to hair. Even in cases where the active ingredients are less concentrated, the active ingredients in these products can still damage the hair.

Permanent color
Permanent hair color or tint, also know as single-process hair coloring, includes oxidative color, henna, metallic and compound dyes, and bleach. Vegetable dyes (henna) and metallic dyes belong to this group, but are completely different from oxidizing aniline-derivative tints.

Permanent non-oxidation color
Many different products that permanently color hair do not require
oxidation to work. Nonoxidizing permanent colors include natural products like botanical dyes that are heat-activated and produce no lift. Some natural vegetable dyes have been used to color hair for thousands of years. Henna is one plant that is still used today. Generally, the dried plant is combined with water to make a paste that’s applied to the hair, which turns dark hair an auburn color.

A drawback of using henna is that the plant also contains tannic acid, which increases hair stiffness. This may act to improve the texture of fine hair, but can make hair dry if used repeatedly. Henna fades slowly with shampooing. It is best used on dark hair and can turn bleached hair greenish. Henna also can interact with other chemicals in the hair. It bonds well with salt bonds in the cortex of the hair, so builds up on the hair’s surface and the cortex, which act as a barrier to permanent wave applications. Non-oxidizing permanent colors are not recommended for gray coverage because the colors tend to look too bright on gray hair.

**Permanent oxidation color**

The best identifying characteristic of permanent oxidation colors is the capability to lift melanin as well as deposit permanent color. Not all oxidation colors, however, are used to lighten color. Some are used in a process called deposit-only, used to deposit color, but not lift. Color with ammonia mixed with a developer may be an oil or cream base and vary significantly by manufacturer. The main components of permanent color are pigment, base, alkaline substance, and hydrogen peroxide. All oxidation dyes have small dye molecules able to penetrate the cortex that change structure to form large molecules that cannot escape the hair shaft and become fixed into the keratin structure of the hair. The old name for permanent dyes was “penetrating tints” because they penetrate the cortex.

Permanent hair color using oxidation dyes include paraphenylenediamine, para-toluidenediamine, metaphenylenediamine, and paraaminophenol, among others. (Additionally, some permanent hair coloring contains pre-formed (direct) dyes as well. These combination colors will not appear the same color you see in the tube or bottle before mixing.) Permanent hair coloring will always show a demarcation line growing out.

Because of the severity of allergic reactions to ingredients in permanent colors, health care experts consider the use of hair dye a potential risk factor. Many consider PPD, which is short for p-phenylenediamine, the leading cause of hair color allergic reactions. All of the various PPD derivatives may cause allergic reactions in chemically sensitive individuals. When PPD makes contact with the skin, it may cause rashes and contact dermatitis. Eye contact may cause irritation, redness and pain. Corneal damage and loss of vision has been reported in some very isolated cases. Chronic exposures to PPD may affect kidney or liver function and can cause bluish discoloration of the lips or tongue. Some argue that serious reactions in hair color can be linked to ingredients like ammonia, peroxide or other ingredients, like diaminobenzene, ammoniated mercury, and related metallic chemicals with bleaching agents that encourages lift.

**PPD may also be referred to as phenylenediamine, phenylenediamine dihydrochloride, or benzenediamine dihydrochloride. It is also known by the name aminoaniline dihydrochloride. This compound is used in almost every permanent hair color brand. Darker colors usually mean higher concentrations. Even some "natural" and "herbal" hair colors, without ammonia, contain PPD. “Black henna,” for example, has PPD added to it.**

**Permanent deposit-only color**

Not all permanent oxidation colors lighten the natural color of the hair, though most have that ability. If the client desires a deposit-only, without lifting of the natural color, a mixture of equal parts 5 or 10 volume peroxide will provide the same concentration of peroxide used in semi-permanent long-lasting colors. At this level and/or with a slightly higher pH, the peroxide concentration is adequate for developing the dye in the color, but not enough to produce any obvious lightening of the natural color. Accelerating the processing with additional alkalinity or peroxide volume is a dangerous game that can cause serious harm to the hair and scalp. Always use manufacturers’ recommended amounts. Strand testing is absolutely essential, providing necessary information about how the hair reacts to chemical exposure. Timing is also critical to protecting the scalp and hair from damage.

Deposit-only hair color is made up of pigment (an aniline derivative, so a patch test is required), base, and an alkaline substance (typically ammonia), which opens the cuticle, allowing pigment to penetrate. The percentage of ammonia or alkalinity, and volume of hydrogen peroxide (developer) in deposit-only color is much lower than in lift and deposit color. Deposit-only hair color is not the same as semi-permanent color because it contains dye molecules small enough to penetrate the cuticle layer of the hair. Deposit-only color leaves a diffuse re-growth line and lasts about 6 weeks.

Corrective coloring and reverse highlighting all use deposit-only color. While it does not lighten hair, it can brighten color by adding subtle tones. Use deposit-only color to make hair either darker or brighter than its natural color using a low volume developer (5 or 10 volume). On gray hair, use deposit-only as a color refresher.

**Permanent single-process (lift and deposit)**

Permanent single-process oxidation colors both lighten (lift natural pigment) and deposit new artificial color in one chemical process. They can do this because they are more alkaline than long-lasting semi-permanent oxidation products and are typically mixed with a higher volume of hydrogen peroxide or other developer. Permanent hair color will typically only lift natural pigment (melanin), it will not lighten artificial color.

In a process that lifts natural color (subtracting original color) and adds (deposits) synthetic color, permanent single-process color is able to penetrate the cortex of the hair, locking into its structure through the process of oxidation. This is a chemical reaction that permanently alters the color and texture of hair. Color remains in the hair until it grows out or is cut. The color in permanently tinted hair cannot be removed or “un-tinted.”

The degree of lift is a function of the pH of the color and the concentration of peroxide in the developer. Most permanent colors are mixed in equal portions (a 1:1 ratio), or contain 2 parts of 20-volume peroxide and one part hair color (referred to as double peroxide). Increasing the ratio of peroxide, from 1:1 to 2:1 (two parts peroxide to one part color) produces a color mixture of 27-volume (increased from 20-volume).

Any type of lightening risks damaging the hair, with the potential damage increasing as the color increases. Some extreme-lift permanent oxidative colors recommend 40-volume peroxide, which increases the finished color from 40 volume to 54-volume. Extreme-lift permanent colors are capable of causing great damage to hair.

**Bleaches**

The terms “bleaching,” “lightening,” and “highlighting” are used interchangeably, but mean different things to different people. Hair lighteners (bleaching products) come in many different forms. They may be found in shampoos and pastes, creams or gels. All use oxidizers, but affect hair in different ways. Bleached hair is usually different from natural hair. Changes include increased porosity; the hair may feel dryer or more brittle and may tangle more easily. It may take longer to dry, and the cuticle layers may be raised and roughened after the bleaching process. Hair can be significantly weakened and strands may stretch more easily. In addition, increased porosity makes further services more complicated, limiting future bleaching or other chemical services because damaged, and highly porous hair absorbs greater amounts of dyes and conditioners.
Slight or normal bleach application need not qualitatively degrade hair, however. Porosity and weakness can be countered through the use of proper conditioning and hair care. In fact, some increase in porosity can improve the look of hair, as tints and toners are better able to absorb into the hair after the lightening process. Repeated bleaching, however, will substantially degrade the hair’s appearance and softness. One lengthy bleach application can weaken the hair by as much as 15 percent or more, with repeated treatments causing even more damage, as each time molecules are pulled from the cortex, stripping it of proteins.

Bleach is likely to come into contact with the client’s scalp during application, which due to the high alkalinity and use of an oxidizer, can cause irritation (dermatitis, see below). The scales of the cuticle are roughened up and damaged by bleaching, and the scalp may become dry and sensitive. Clients may experience drying or tightness on the scalp. Avoid contact as much as possible, and follow all bleaches with an acid rinse and a mildly acidic shampoo. Some different forms of bleach are:

**Pigmented highlighting bleaches:** Used for lightening and off the scalp coloring, tend to use higher amounts of ammonia, produce rich color pigments; may or may not use heat.

**Oil bleaches/lighteners:** Mild, usually clear or blue in bottles, these are normally used for lightening on the scalp. Oils keep the scalp from feeling too dry. Additionally, oil or gel bleaching products are transparent, allowing the user and client to see the degree of lightening that has occurred. They are good for steady lightening and can be mixed with color for extra lift. Some consider them inconvenient because they must be used with booster to increase pH level, and can damage the hair shaft. When using oil lighteners on the scalp, never use hydrogen peroxide volumes over 30.

**Gel lighteners:** Usually packed in a tube, with lower pH than other lighteners; not recommended for use with color formulas; ideal for on the scalp lightening, or foiling and weaving. Gel lighteners do not lift as quickly as cream or oil lighteners.

**Cream lightener:** Comes in different colors that provide steady lifting ability, and are used with a booster to increase lift. They are potentially damaging to the hair shaft. When using cream lighteners on the scalp, never use hydrogen peroxide volumes over 30. Creams are convenient to use because they are less likely to run, and the combination of an alkaline substance thickened with fatty materials functions as a conditioner to prevent possible damage.

**Powdered lighteners:** Stronger, for off-the-scalp use only. Usually packed in cans, packets, or plastic envelopes, these products have a pH of 10.2 or higher, providing good lift in a shorter time (color requires more time). This is usually mixed with 20-volume hydrogen peroxide. In some cases, may bleed into hair not intended for bleaching. Powdered lighteners are sometimes used instead of hydrogen peroxide. The powdered product is potentially very hazardous. Follow safe handling precautions and use a dust mask when working with powdered materials so you do not accidentally inhale the very dangerous powders.

When using powdered off-the-scalp hair lighteners, take care to mix the ingredients carefully before use as these products may separate during shipping. The mixture of ingredients should be thorough enough to ensure that the same ingredients are in all parts of the mixture. Uneven mixtures can generate high heat, which can damage the hair and burn the client.

**Other hair coloring products**

**Metallic dyes**

Metallic dyes are not used professionally, but you should be aware of their existence for a number of reasons. Metallic colors have also been used as long as henna, but are not widely used currently for a number of good reasons. Unfortunately, “home use” still occurs. Also known as progressive hair color or color restorers (a misnomer, because they do not restore original color.), metallic dyes get their name from the naturally occurring metallic salts found in lead, silver, copper, and nickel. When used with henna, they are sometimes called compound dyes.

Metallic dyes have a number of drawbacks: they are dangerous if swallowed and produce poor quality colors, with unpredictable, risky results (green hair, for example, if too much copper-based metallic color is used. Metallic dyes are able to dissolve sulfur structures in the cortex, causing hair breakage. They also interfere with permanent wave and other chemical processes used in cosmetology services. Most disturbing, metals can be absorbed through the skin and build up in the body. Side-effects of use can include headaches, dermatitis of the skin, swelling, lead poisoning, and hair weakness, loss, and damage. Clients who have used metallic or compound dyes are a constant risk. Even strand testing may not ensure safety. Metal within the keratin can produce violent chemical reactions with oxidizers, with devastating results. NO chemical services, but especially no services using oxidizers, should be performed on hair treated with metallic products.

The problem, often, is that the client does not know if the color used contained metal ingredients. Beware of the word “restorer” or “progressive” in hair products, as these usually refer to metallic color ingredients. Ask to see the box of the product used, or look up the product’s name. Always test a piece of the client’s hair according to standard procedures. Removal of metallic colors is so complicated and risky that the safer alternative is to cut that portion of the hair off rather than risk use of any product.

**Color fillers**

Slightly porous hair improves color absorption, but is also associated with uneven lightening and color (porosity gradients). Fillers address this problem. The more damaged the hair shaft, the more filler it will absorb. Fillers are able to plug small holes in the hair shaft (caused, for example, by chlorine bleach or other caustic materials). Fillers penetrate the broken cuticle and correct excessively porous hair. After use of fillers, typically made from fats or proteins, the coloring is smoother and more reflective, with more even coloring throughout. Because they often contain conditioners, the hair has a healthier look and feel. They may also contain other ingredients including direct tints, or other coloring or toning agents.

**Hair color accelerators**

Many different products and processes are used to assist the color process, either shortening the amount of time the product must remain on the hair (possibly reducing potential damage), or claiming to improve results in one way or another.

Machines that use moist or dry heat: The application of dry heat is easy with a hair dryer or heat lamp. Because dry heat encourages evaporation, the client should wear a plastic cap to keep the color mixture moist. Chemicals must remain wet to continue processing color. However, excess heat should be allowed to escape through small holes in the cap. If the cap has no holes, chemical gases or excess heat produced in the reaction may be unable to escape, raising the heat of the reaction further and risking damage to the hair or scalp.

The addition of a heat source typically increases the rate of chemical reaction. An increase in temperature from average room temperature (about 72 degrees F) to room temperature on a hot day (90 degrees F), or subject to moist heat (vapor or steam), doubles the rate of a typical chemical reaction used to process hair color. That means the hair color will process two times, or twice as fast, as it would under normal room temperature conditions.

**Chemical hair color accelerators:** A variety of liquid additives are used to speed up the color process and/or shorten waiting time. They typically require heat to work. A number of them use Vitamin E (on ingredient labels, tocopherol acetate), or other oils, and claim to eliminate free radicals, minimize fading or damage, as well as improve the hair’s condition. These ingredients, which are nonirritating when
added to the color mixture before application (covered in a plastic cap and dried under a hair dryer, for example) will process hair much faster.

**Enzymes**: Enzymes in our bodies produce chemical reactions at carefully regulated intervals. They are typically large protein molecules made by the body to act as biological catalysts, meaning they can trigger chemical reactions. When hydrogen peroxide is applied to a cut, it comes into contact with an enzyme in human blood called catalase, which triggers a reaction in the hydrogen peroxide, decomposing it into water and oxygen gas. This is why hydrogen peroxide bubbles when applied to a cut.

Professional products, like hair colors, sometimes contain enzymes that claim to reduce waiting time and cause less damage to the hair. Some claim they are less harsh or damaging to hair because they increase the oxidation rate, shortening exposure time and protecting hair. As yet, it is still not clear whether these products are significantly more or less damaging to the hair than peroxide. Enzymes are large protein molecules, hence they do not penetrate the cortex of the hair where enduring color needs to be deposited.

With all these products and methods to speed processing time, it is important to remember that manufacturers carefully determine an optimum rate of processing for each product. That means, when combined and used according to manufacturer’s recommendations, the dyes develop in exactly the manner they are supposed to. This careful timeline for the development of dyes used in oxidation colors is wasted if accelerators are used to speed up the processing. The color, for example, might develop at a less optimum time, perhaps before it is positioned to penetrate and deposit color into the cortex of the hair.

**Color removal products**

**While oxidation colors remove natural pigment, artificial color in the form of semi-permanent and permanent dyes are far more difficult to remove from hair than natural melanin.** Removal of dyes should only be attempted by experienced professionals who are familiar with their materials. Manufacturers typically recommend specific methods and materials for removing a particular product. It can be risky business, as improper use can cause injury to the scalp and damage hair.

Oil-based hair color removers remove dye molecules from the cuticle but will not remove color from the cortex. They can be used to lighten oxidation tints without further damaging the keratin, and can be used to make subtle, but not significant, changes in the color level.

Dye solvents lighten to a greater degree than oil-based removers because they contain ingredients that are able to break down color molecules. The most common are sodium hydrosulphite, sodium hydrosulphate, and sodium formaldehyde sulphohydrate. Peroxides are also used. Dye solvents are alkaline so they open the cuticle, allowing penetration of the lifting ingredients. Color removers are made with corrosive materials and are dangerous to inhale in both gas and powder form. Always wear a dust mask, gloves and ventilate the area well if using dye solvents. **Dye solvents must not be used on hair that has been tinted with home coloring products that contain metallic dyes.** Metallic dyes and dye solvents are inherently incompatible.

**Some safety issues**

**Different people develop allergies to different substances.** Our proclivity to react is partly genetic, and partly environmental, as it depends on what we come in contact to. An allergic reaction is the immune system’s response to repeated exposure to a sensitizer or allergen, a substance that causes allergic response, such as itching, hives, and in the most severe cases, anaphylactic shock, which can kill. Hypersensitivity builds over time, so that the early exposures do not cause a reaction. Continued exposure however, may last months or years before a severe attack.

A severe allergic reaction may look initially like skin irritation; there may be swelling both near the site of contact, as well as other parts of the body (the throat may close up). Symptoms may not become full blown for 24-48 hours after contact. Skin breaks increase the chances of sensitization to an ingredient. The patch test is a way of performing a controlled exposure test to aniline derivatives 24-48 hours before applying it to the whole head. It gives you some gauge of the client’s level of sensitization to determine if he or she might be prone to a mild or serious allergic reaction.

**Any time a semi-permanent, demi-permanent, or permanent oxidative color is used, a patch test is required and should be performed at least 24 hours before the color appointment.** In a patch test, a small amount of the color formula that is going to be used on the client is applied to the skin behind the ear (including a small portion of the hair) and also on the inside of the elbow. The location should be observed over a period of 24 hours. If there is any allergic reaction or symptoms, do not proceed. If the client refuses a patch test, use a foil or off-the-scalp color, instead. It is best to bring this up when the client calls for an appointment. If the service includes color, ask if this is the first time he or she has had color. If the answer is yes, the client must come in a minimum of 24 hours before the color appointment for a patch test. Explain that federal law and their safety demands the necessity of an allergy test.

**Contact dermatitis**

Many chemicals used in hair coloring are harsh or caustic, causing dermatitis (irritation), inflammation, and damage to the skin. Hairdressers regularly develop irritant contact dermatitis after years of exposure to salon chemicals. Irritant reactions affect people differently; some occur within a short time of exposure (acute), others take great lengths of time to develop. Symptoms include itchiness, redness and swelling, scaliness, and chemical burns. The chemical you use every day can damage skin severely. Semi-permanent and permanent (oxidation) hair coloring products, such as these, are common culprits:

- Bleach
- Off-the-scalp hair lighteners
- Hydrogen peroxide

Additionally, hair relaxers and permanent wave solutions contain corrosive chemicals of danger to salon workers. Frequent, repeat exposure to caustic materials causes chronic dermatitis. No less painful than acute dermatitis, it can be triggered by exposure to something as seemingly benign as hard water, a common salon irritant. Excessive moisture (caused by insufficient drying after hands are washed or used for services) can lead to irritation and cracking of the skin. If you shampoo often in your work, you are at risk for contact dermatitis. Some shampoos contain detergents that deplete the skin’s natural acid mantle, reducing lipids that affect the natural moisturizing factor (NMF). The NMF is a combination of amino acids and salts that protect the skin and maintain moisture.

Gloves help keep irritating substances away from the skin and are an excellent way to reduce your risk of contact dermatitis. Using them with any chemical application is a must as the long term health risks of your constant exposure increase over time. Gloves commonly come in vinyl, natural latex, polyethylene, and polyurethane. Some provide more sensitivity or grip, resistance to chemicals, and/or strength than others. Try to find a material that is safe and feels comfortable to you. In some cases, hair coloring products will recommend a particular type of glove to use with the product that may have a higher or lower resistance to the chemicals used.

Unfortunately, gloves themselves can cause contact dermatitis as some hairdressers become allergic to chemicals in the rubber or the cornstarch used in the powdered versions. While this is not common, it does occur. Moisture building up underneath the glove can also be a problem (which is why many contain cornstarch powder) causing more irritation than it prevents. If you develop sensitivity to rubber, find another kind that works for you. There are many alternatives.
Precautions

As noted throughout this chapter, alkaline substances mixed with hydrogen peroxide react, causing oxidation and heat, and, in some cases, chemical burns. Protect clients’ skin with a protective cream or petroleum jelly. Make sure they are comfortable. Keep an eye on your client at all times that they have chemicals in contact with their hair or skin (do not leave the client in another room, for example), and watch him or her for signs of discomfort, like scratching or redness. If they feel pain or discomfort, immediately remove the product and rinse with cool or tepid water, followed with a soothing rinse.

Working with chemicals:
- Avoid contaminating the materials by pouring anything back into the original container.
- Protect your eyes from splashing chemicals.
- Wear a mask when using powdered materials.
- Read the material safety data sheets (MSDS), as well as all other package and insert instructions. Take special notice and precaution with corrosives and oxidizers. Always use the manufacturer’s recommended procedure and precautions.
- Always do a predisposition/patch test.
- Always wear gloves when working with chemicals (including hydrogen peroxide).
- Do not leave color tools around; applicator bottles may swell or explode if not disposed of properly.
- Be aware that stains can ruin clients’ clothing and discolor skin.
- Do not use aniline derivative color on eyelashes or eyebrows due to risk of blindness.
- Do not color if the client has any break in the skin.
- Only use heat or a hair dryer on clients with color if the manufacturer specifically states to do so.

ENDNOTES
2. Halal; TABLE 7-1, p 84.

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CHAPTER 9
UNDERSTANDING DOMESTIC VIOLENCE
(2 CE Hours)
(Elective)

Learning objectives
- Explain why salons are an important “point of intervention” for domestic violence.
- List the defining features of domestic violence.
- Explain some of the reasons why it is difficult to accurately estimate the rate of domestic violence.
- List possible clues of domestic violence, including behavioral and physical signs.
- List some of the common obstacles the victim confronts when leaving the batterer.

Hair stylists as confidantes
Popular depictions of salons in movies like “Steel Magnolias” encourage the stereotype of the stylist as a confidante. Certainly, there is a great deal of anecdotal evidence that women tell their stylists things they wouldn’t tell anyone else, even family members. Now recent research confirms this claim, showing that women are more likely to confide in a personal acquaintance than call the police or other authorities about domestic abuse. As one woman noted, “Salon professionals are experienced listeners, and it is not uncommon for women who are experiencing abuse to confide in them.”

According to an article in the New York Times, “The idea of a hair stylist’s chair as the equivalent of a barstool or psychiatrist’s couch took hold in the 1950s when women had closer relationships with their stylists because they saw them weekly.” As the needs of women started to change, the business changed along with it. The mindset, however, of the salon as a safe place or a refuge of a sort, remains.

In March of 2004, Charlie Christ, then Florida’s attorney general, launched an important program designed to help those who suffer from domestic violence. His Cut Out Domestic Violence initiative as inspired by Cut It Out, a program of the Salons Against Domestic Abuse Fund, first developed in Birmingham, Alabama, and now with programs in all 50 states. Professionals interested in receiving training may call the Domestic Violence Hotline (1-800-500-1119) in order to be scheduled for training in their area.

Cut Out Domestic Violence, dedicated to fighting domestic abuse in Florida, is mobilized in large part by salon professionals. It seeks to reach victims of domestic abuse through the neighborhood salon or spa, using its strategic position as an anchor in the community. The organization builds awareness of domestic abuse and trains salon professionals to recognize warning signs and safely refer clients to local resources.

Why enlist the help of hair stylists, nail technicians, and estheticians? Most victims of domestic violence feel powerless to leave their abuser. For them, the hair salon may be a brief moment of freedom from an overly controlling partner. Because beauty professionals already pay close attention to the physical condition of their customers, this puts them in an ideal position to spot victims of abuse. This “new point of intervention” it is a way to reach victims who are increasingly isolated and hard to approach, and is a potential channel to get educational resources and additional assistance to the victim. By reaching them at a place where they feel at ease, the program hopes to keep women safe by helping them break free from those who commit violence.

Program participants are instructed not to give advice to women or force them to take any particular action. Instead, their role is to provide information and act as an advocate. Salon professionals are trained on the nature and signs of domestic violence, what to listen for in their conversations with customers, and how to put victims in touch with the appropriate resources and authorities. With the proper training, they can guide these women to domestic violence centers for help in breaking the cycle of violence in which they have been trapped. Domestic violence counselors are trained professionals who can help victims through the emotional upheaval, as well as address practical matters such as safety, housing relocation, childcare, and medical insurance.

The program has already shown impressive results, with over 25,000 operators trained and as much as a 17 percent increase in referrals since the program started. In Kentucky, every class that has been presented has resulted in a disclosure by a participant. While the high incidence of abuse is evident in each class taught, it is encouraging to see positive results occur for women who may now know where to turn for help.

It builds awareness of domestic abuse by educating the public and providing awareness materials to display in salons. Go to www.Cutitout.org, or call 1-800-383-0210 to order educational and promotional materials (like posters with help-line phone numbers and related information) that you can place in private areas of your salon.

Cut It Out also offers educational seminars by domestic violence service providers across the country. Seminars are conducted in cosmetology schools, continuing education classes, hair shows, and a variety of other venues. If you work in a larger salon, seminars may be conducted there, depending on the size of your staff and your local Cut It Out trainer’s availability. Contact the program to find out if Cut It Out seminars are offered in your area, or to express your interest in attending a Cut It Out seminar.

Heidi Markow, who hosted an educational event in Georgia in 2007, started raising awareness about domestic violence because her sister was murdered by her estranged husband. She conducted her state’s first Cut It Out seminar for salon and spa professionals. When Markow asks the audience of salon workers if they have seen potential signs of domestic abuse, many hands go up. Control manifests itself in countless ways. One stylist shares the story of a husband who wouldn’t stop calling his wife’s cell phone during her hair appointment. In another case, a husband refused to leave his wife’s side during her hair appointment, even choosing the style and color. In some cases the client is unable to shut off the phone or stop talking calls (from the partner); appointments may be cancelled, especially if there is an injury that must be hidden; clients may pay for services with cash to conceal how much money was spent for services.

Cut It Out emphasizes that stylists are not meant to be therapists or counselors. They fulfill an important role by learning to recognize signs of emotional or physical abuse and providing literature and resources to help the victims find their way out of the situation. By listening and caring, you can give much needed understanding and assistance, possibly providing victims a way to leave a violent situation. The following information about domestic violence will help you understand the dynamics of abuse and the cycle of violence that goes along with it.

Scope of the problem
Domestic violence (also called spousal abuse) has no age, gender, social, ethnic, geographic, education, economic, or race boundaries. There is no typical victim, yet it affects the health and well-being of all persons involved in the crime. While most victims are women, men may also be victims of abuse. The chapter discusses important aspects of domestic violence and common misunderstandings associated with it. Domestic abuse is a problem that is likely to touch you or someone you know; it is the single largest cause of injury to women in the United States.

In 2007 alone, there were more than 120,000 cases of domestic violence in Florida – that’s more than 325 cases per day, 13 per hour, or more than one incident every five minutes, around the clock. And that’s just the cases that were reported.

Domestic abuse is very real:
- One out of every three women is physically or sexually abused at
Domestic abuse affects the whole family:
- Approximately one in five female high school students reports being physically and/or sexually abused by a dating partner. (The Journal of the American Medical Association, 2001.)
- Slightly more than half of female victims of intimate violence live in households with children under age 12. (U.S. Department of Justice, Violence by Intimates, 1998.)

Abuse doesn’t stay at home:
- Domestic violence costs employers $4.1 billion in health care and related costs. (American Institute on Domestic Violence, 2001.)
- 13.5 million work days are lost each year due to domestic violence. (American Institute on Domestic Violence, 2001.)

Abuse kills:
- 1,232 women are killed each year by an intimate partner. (American Institute on Domestic Violence, 2001.)
- 500,000 women are stalked by an intimate partner each year. (American Institute on Domestic Violence, 2001.)

Signs that a client or someone you know may be abused:
One sign does not prove abuse. However, a combination of them, or repeated signs, may indicate abuse. Such as:
-Bruising in different stages of healing, especially if the bruising is in areas not usually seen by others, such as the scalp.
- Bald spots indicating hair has been torn or pulled out.
- Frequent injuries, especially with unusual explanations.
- Injuries not seen but indicated by general mobility difficulties due to soreness, tenderness, bruising.
- Isolation from friends and family.
- Low self-esteem, a sense that she doesn’t deserve better treatment.
- Self-blame or unrealistic guilt (“It’s my fault; I shouldn’t have made him mad.”).
- Partner always accompanies client to appointments or waits outside in the parking lot.
- Fear of the partner, insecurity about his actions.

You may also notice the following behavior:
- The partner dictates the frequency of salon visits.
- The partner will not allow the client to change her hair color or style.
- The partner is controlling or excessively jealous.

What can you do if a client or someone you know is being abused?
- Believe the person who tells you that she is being abused. Her abuser may have her convinced that she is at fault or that she doesn’t deserve better treatment.
- Keep whatever she tells you confidential. Her life may be at stake.
- Gently guide her to find help. Suggest that she contact her local domestic violence agency or call the National Domestic Violence Hotline (1-800-799-SAFE). Suggest that she needs to consult a qualified, objective third party.
- Don’t try to fix the problem for her or become her counselor — your local domestic violence agency is staffed with trained personnel to counsel victims and help to ensure their safety. All have access to a shelter or safe house. Don’t put yourself in harm’s way or increase the danger for the victim by getting in the middle.

Help others to understand that domestic violence is absolutely, totally unacceptable and usually escalates over time. Have the number of your local agency or the National Domestic Violence Hotline number (1-800-799-SAFE) handy.

Adopt-a-shelter
Cut It Out’s Adopt-a-Shelter program supports the thousands of shelters that are on the front lines everyday in the war against domestic violence. The program offers salons the tools to reach out and help shelters in their local community. You can adopt a shelter by yourself, with your salon peers, or with your entire local salon community to reach out to the shelters and the victims who need your contributions, and your understanding. You will be rewarded with the knowledge that you have made a difference in the lives of many.

As a salon professional, you can also help these women who are starting new lives without abuse. Simple things can mean a lot to a woman and her children who have left an abusive relationship without anything but the clothes on their backs. While each shelter has different needs depending on their clientele, here is a “wish list” of common needs:
- Personal care items for women, children and babies.
- New or gently used clothing and outerwear for women, children and babies.
- Taxi vouchers or transit passes.
- Bed and bathroom supplies.
- Kitchen supplies and small appliances.
- Electronic and office supplies.
- School supplies and uniforms.
- Art and craft supplies.
- Gift certificates.
- Financial support.

Identify a shelter in your area
Call your state coalition or network against domestic violence (listed below) and ask for the name and phone number of a shelter in your town.
- Once you know how to reach your local shelter, call the executive director to ask for a “wish list” of specific needs. Maybe there’s an opportunity to provide services to the shelter’s clients, coordinate an item donation drive or host a fund-raiser.
- The shelter can guide you in how best to meet their specific needs.

As women transition out of shelter and struggle to support themselves and their children on their own, basic toiletries become a luxury. As a result, women at these sites often request full-size personal care products such as shampoo, conditioner, soap, deodorant, lotion, and toothpaste as the number one items on their wish list.

How salons can help
1. Donate
Make regular donations of:
- Hair care products (shampoo, conditioner, and styling products).
- Skin care products (soap, cleansers, moisturizers, lotion).
- Nail care items (nail files, clippers, polish).

Ask your distributor or manufacturer for any unused or discontinued items.

2. Ask your clients for needed items
- Contact your local shelter and see what type of items they need (toiletries, clothing, toys, food, etc.).
- Post the list of needed items in your salon next to a collection box.
- Place a collection bin in your salon for donating needed items.
- Ask clients and/or staff to bring in items for the shelter.

3. Raise funds
Organize a fund-raising event, such as:
- A day for our shelter — donate a percentage of revenue or ask stylists to donate their tips. (Be sure to let clients know by posting signs, advertising or distributing flyers.)
- A fashion show with a neighboring boutique.
- A cut-a-thon.
Domestic violence occurs in intimate relationships. These relationships may include current or former spouses, partners, and significant others, including boyfriends/girlfriends, family members, and persons with whom one has a child. Domestic violence can be distinguished from one-time situational violence, which can occur in any intimate relationship, such as the individual who shoves or slaps his spouse when learning she is having an affair or filing for a divorce. While this means of conflict resolution is not acceptable and may result in an arrest and prosecution, it is not domestic violence because it is not a pattern of abuse.

Where does domestic violence occur?
Domestic violence occurs in intimate relationships. These relationships may include current or former spouses, partners, and significant others, including boyfriends/girlfriends, family members, and persons with whom one has a child. Domestic violence can be distinguished from one-time situational violence, which can occur in any intimate relationship, such as the individual who shoves or slaps his spouse when learning she is having an affair or filing for a divorce. While this means of conflict resolution is not acceptable and may result in an arrest and prosecution, it is not domestic violence because it is not a pattern of abuse.

Why does a person engage in domestic violence?
A person engages in domestic violence because he or she wishes to gain and/or maintain power and control over an intimate other and believes he or she is entitled to do so.

Types of abuse
Domestic violence is not limited to physical abuse. It includes multiple forms of abuse – physical, sexual, emotional or psychological.

Physical abuse is usually recurrent and usually escalates both in frequency and severity.

Sexual abuse in violent relationships is often the most difficult aspect of abuse for victims to discuss. It may include any form of forced sex or sexual degradation.

Emotional or psychological abuse may precede or accompany physical violence as a means of controlling through fear and degradation. It may include the following:
- Threats of harm.
- Physical and social isolation.
- Extreme jealousy and possessiveness.
- Deprivation of resources to meet basic needs.
- Intimidation, degradation, and humiliation.
- Name calling and constant criticizing, insulting, and belittling the victim.
- False accusations, blaming the victim for everything.
- Ignoring, dismissing, or ridiculing the victim’s needs.
- Lying, breaking promises, and destroying the victim’s trust.
- Driving fast and recklessly to frighten and intimidate the victim.
- Leaving the victim in a dangerous place.
- Refusing to help when the victim is sick or injured.
- Threats or acts of violence/injury upon pets or animals.
- Destruction of belongings.
- Causing economic dependence by controlling finances and assets.
- Isolating the victim from any and all outside support, including family and friends.

The batterer may make threats against property, pets and other family members, and can include:
- Yelling, shouting, screaming.
- Blaming.
- Threatening to cause harm to self or victims.
- Put-downs.
- Using children to relay messages, induce guilt and to harass the victim.
- Play mind games.

And using privilege by:
- Treating the victim like a servant.
- Behaving like a “master of the castle”.
- Defining male and female roles.

What is the prevalence of domestic violence?
It is very difficult to estimate the rate of domestic violence because the majority of victims never disclose that they are involved in partner violence. It is estimated that regarding violent behavior toward females within the context of an intimate relationship, only 20 percent of all rapes, 25 percent of all physical assaults, and 50 percent of all stalking are ever reported to the police. Victims may be reluctant to come forward for a variety of reasons. First, they may fear retaliation from their partner. They may have been directly threatened that if they tell anyone they will be killed, or they may just fear the worst. Second, there is shame associated with choosing a partner who could be violent, and there is shame associated with staying with a violent partner. Finally, some victims may have tried to seek help from the police, the courts, or others and been dissatisfied with the help they received.

The National Crime Victimization Survey, conducted in 2005, estimated that:
- Nearly 5.3 million intimate partner victimizations occur each year among U.S. women ages 18 and older. This violence results in nearly 2 million injuries and 1,300 deaths.8
- 44 percent of women murdered by their intimate partner had visited an emergency department within two years of the homicide. Of these
women, 93 percent had at least one injury visit.9

- Intimate partner violence occurs across all populations, irrespective of social, economic, religious or cultural group.
- Young women and those below the poverty line are disproportionately affected.10
- Seventy-four percent of all murder-suicides involved an intimate partner. Of these, 96 percent were females killed by their intimate partners and 75 percent of those incidents occurred in the home.11
- Homicide committed by an intimate or former intimate partner is the leading cause of death of pregnant women in the United States.12
- The Uniform Crime Report Program’s Supplementary Homicide Report Table “Murder by Relationship” listed 1,823 deaths in the category “Family” in 2005. Of those, 594 deaths were under the heading of “Wife” and 135 were “Husband.”13
- Female murder victims are substantially more likely than male murder victims to have been killed by an intimate or former intimate partner.14
- Women whose partners had been drinking were significantly more likely to be injured than were women whose partners had not been drinking. A woman’s own alcohol use was unrelated to victimization outcomes.15
- When updated to 2003 dollars, intimate partner violence costs exceed $8.3 billion, which includes $460 million for rape, $6.2 billion for physical assault, $461 million for stalking and $1.2 billion in the value of lives lost.16
- Victims of intimate partner violence lose a total of nearly 8 million days of paid work – the equivalent of more than 32,000 full-time jobs – and nearly 5.6 million days of household productivity each year as a result of abuse.17
- Individuals who were physically punished during childhood are more likely to engage in physical and verbal aggression with their spouses. Individuals who were physically punished during childhood are more controlling with their spouses and individuals who were physically punished during childhood are less able to take their spouse’s perspective.18
- Women with a history of intimate partner violence report 60 percent higher rates of health problems than do women with no history of abuse.19
- Women who experienced any level of physical assault or sexual coercion by their intimate partners (before or during pregnancy) had higher levels of depressive symptoms compared to non-victims.20
- Women residing at domestic violence shelters were nearly 11 times more likely to report that their partner had hurt or killed pets and that often their children had witnessed abuse, than a comparison group of women who said they had not experienced intimate violence.21
- Abusive men who kill are generally more conventional with respect to their childhood backgrounds, education, employment and criminal careers and are more likely to be possessive and jealous. They are also more likely to be separated from their partner at the time of the event, but less likely to have been drunk at the time of the event.22

**Signs of domestic violence**

In general, victims of repeated domestic violence can, over time, experience more serious consequences than victims of one-time incidents. Outward physical indicators or signs are often present within a domestic violence relationship, but there are other signs in victims that reflect battering and include:

- Depression and other mental and emotional disorders
  - Domestic Violence creates oppression and depression in victims because its theme revolves around power and control. Because some abusers (victimizers) often throw their victims off guard following the “honeymoon” phase in the cycle of violence, anxiety disorders can be present as well. In addition, post-traumatic stress disorder can occur following the extreme fear and helplessness victims experience during their assault.

- Symptoms of post-traumatic stress disorder can include:
  - Emotional detachment.
  - Sleep disturbances.
  - Hyper-arousal.

- Difficulty maintaining employment
  - Physical signs of domestic violence inhibit victims and can cause them to miss work. They may also fear retribution at work by the victimizer. In addition, depression may keep victims from meeting deadlines and getting to work on time. If transportation has been denied by abusers, victims can literally not get to work unless they have access to public transportation. In addition, day care remains a major issue for women with children.

- Becoming welfare recipients
  - In their effort to maintain control, victimizers often control the purse strings and may withhold child and living support. If victims have been isolated and do not have visible means of support, welfare is an avenue that enables victims to temporarily “get on their feet.”

- Becoming homeless
  - Homelessness remains a serious problem among victims of domestic violence due to all the factors listed, as well as the absence of family availability and/or support.

- Abusing children, as well as other vulnerable populations
  - Victims of domestic violence may have experienced childhood abuse or other trauma that has modeled inappropriate parenting for them as adults. Hence, their coping skills can be marginal, especially when stressed. Their aptitude for handling work and building healthy relationships can be impaired if they experience a mental health problem due to their domestic violence situation as well. In addition, if victims are abusing drugs or alcohol, their ability to parent their children or work with other vulnerable populations is diminished.

**Victim behavioral signs**

- The victim may exhibit:
  - Anxiety disorders.
  - Mood disorders.
  - Suicide and suicidal inclinations.
  - Physical complaints.
  - Substance abuse.
  - Eating disorders.
  - High risk behaviors.
  - Sleep disturbance.
- He or she may:
  - Seem evasive.
  - Embarrassed.
  - Provide false information.
  - Seem unconcerned about injuries.
  - Be overly solicitous.
  - Delay seeking assistance.
  - Visit doctor/hospital multiple times.
  - Be overly protective of the batterer.

- Other physical signs can include:
  - Contusion or injuries in the head, neck, or cheek.
  - Evidence of alcohol or drug use.
  - Injuries during pregnancy.
  - Injuries that suggest a defensive posture.
  - Injuries that appear inconsistent with victim’s explanation.
  - Gastrointestinal disorders.
  - Injuries that indicate sexual assault/rape.
  - Knife wounds.
  - Broken bones.
  - Headaches.
  - Gynecological disorders.
  - Back pain.
  - Pelvic pain.
  - Heart and circulatory conditions.
  - Sexually transmitted diseases.
  - Central nervous system disorders.
Traditionally fall into one of three types.

Be described as unpredictable. According to one theory, men who abuse to listen to their partner's thoughts. Many such men's behavior can also inability to express feelings in ways other than anger and unwillingness to demonstrate lack of concern for victim. Exhibit anti-social behaviors.

**Batterer behavioral signs**
- Domestic violence batterers can:
  - Become defensive, aggressive or angry when questioned.
  - Be overly solicitous and answer questions for victim.
  - Set up communication barriers between victim and helpers.
  - Be overly protective and controlling of victim.
  - Demonstrate lack of concern for victim.
  - Exhibit anti-social behaviors.

**Characteristics of batterers**
**There is no simple way to describe a “typical” abuser.** Abusers are as different from one another as any two people may be. However, studies have shown that abusers often have some things in common, such as feelings of low self-esteem, lack of trust, inability to take responsibility, and family history of substance abuse. Other characteristics often include:
- Feeling that their life is not worth anything.
- Having a history of alcohol or drug abuse in their family.
- Fearing loss of control and power.
- Being out of touch with feelings other than anger.
- Believing that men must always behave in certain ways and women in others.
- Acting very charming sometimes, but being very angry and mean at other times.
- Not trusting people.
- Wanting the woman all to himself.
- Blaming others for their actions, not assuming responsibility for their actions.
- Handling stress in an unhealthy way.
- Believing that the male always rules the household.
- Having experienced violence between their parents, or being abused by their parents, as a child.
- Always thinking other people are hostile.
- Having problems figuring out why other people act the way they do.

Other similar characteristics among individuals who batter include an inability to express feelings in ways other than anger and unwillingness to listen to their partner's thoughts. Many such men's behavior can also be described as unpredictable. According to one theory, men who abuse traditionally fall into one of three types.²³

**Type 1: Men who have experienced the most severe childhood physical abuse**
This man engages in the most severe violence and battering. He is generally under-controlled (i.e., acts violent frequently) and uses violence to control people, both inside and outside his family. He is more likely to exhibit antisocial and narcissistic traits such as generalized aggression, substance abuse problems, little if any remorse or empathy, rigid gender roles, and little ability to attach to another person.

**Type 2: Men who have experienced the most severe parental rejection**
This man experienced severe parental rejection as a child. While he also is frequently violent, he does not have the same level of violent intent (i.e., to control or punish). He is more impulsive in his use of violence, exhibits high levels of dependency needs, and fits perfectly into Lenore Walker's “cycle of violence” stages. He often shows ambivalent attachment patterns in relationships. He most often is diagnosed with borderline personality disorder and schizoid disorders.

**Type 3: Men who have experienced less childhood trauma than the previous two:**
This man experienced less childhood trauma than the two other types of male abusers. He is over-controlled and often is unable to admit anger. This results in the denial of his anger while still experiencing chronic frustration and resentment. He is often passive-dependent, compulsive, and emotionally suppressed, and presents himself with secure or preoccupied attachment styles. He is often diagnosed with either no personality disorder, or avoidant, dependent, or passive-aggressive disorders.

**Domestic violence among gay, lesbian, bisexual, and transgender (GLBT) people**
In recent years, GLBT survivors of domestic violence have begun speaking out about their experience in increasing numbers. New organizations have been created to address the issue and provide support to survivors.

Historically though, there has been an overwhelming silence about same-sex domestic violence. Many people still don't believe that same-sex domestic violence really exists, and people who are victims are often ashamed to tell their communities or families. In fact, numerous studies have shown that violence in heterosexual and same-sex relationships occurs at approximately the same rate (one in four).

Domestic violence in lesbian or gay couples is largely the same as it is in heterosexual couples. One partner maintains control over the other person and limits his or her freedom to socialize. The abused partner becomes isolated and confused. The abuse can be physical, sexual, emotional, psychological, economic, and/or verbal. The abuse doesn’t happen all of the time - there are sweet and close periods that are interrupted by unpredictable violence.

After the violence the abuser may be apologetic, asking forgiveness. Many survivors find that when they move to end the relationship, their partner may increase the threats and manipulation. The abuse often gets worse over time. If there are children living in the home, they are terrorized by the violence even if they are not hit themselves.

**Myths about same-sex domestic violence**
**Myth: “Violence between two men or two women is a ‘fight’ between equals.”**
**Truth:** Domestic violence is not the same as a consensual fight, no matter who is involved. Loving, healthy relationships do not include physical fighting. Domestic violence is about control and domination of one person by another; either person could be male, either person could be female. Batterers do not have to be bigger or stronger than the person they abuse.

**Myth: “If you fight back, then it’s not abuse.”**
**Truth:** Fighting back is not abuse, nor does it make the relationship “mutually abusive.” Survivors have used violence for many reasons, including self-defense, desperation, anger, and to try to stop the abuse. When survivors use violence the results can be complicated. Police are often confused by same-sex domestic violence and may arrest the wrong party or both parties. Friends may disbelieve the survivor. Using violence to survive is a sign that something is wrong – making a plan to get support is important.

**Myth: “Women are not violent.”**
**Truth:** There is ample evidence that both genders have capacity for violence. Some women abuse other women, men, and children. Abusers and their victims come from all genders, races, classes, religions, and regions.

**Myth: “Lesbian relationships are based on equality – lesbians have ideal, loving relationships.”**
**Truth:** Lesbian relationships are just as good or as bad as all other relationships and have most of the same problems. The myth that
lesbian relationships are perfect leads to silence among lesbians who are abused.

**Myth:** “Domestic violence primarily occurs among GLBT people who hang out at bars, are poor or are people of color.”

**Truth:** Abusers and their victims come from all genders, races, classes, religions, and regions. Racist and classist stereotypes around domestic violence are common not just in the GLBT community, but also in the dominant heterosexual culture.

**Myth:** “The law does not, and will not, protect victims of same-sex domestic violence.”

**Truth:** Although many law enforcement professionals and court systems are still confused about same-sex domestic violence, there have been many constructive changes in recent years. In many jurisdictions, mandatory arrest policies require the police to intervene and arrest the person they perceive to be the batterer. Although many police remain confused when attempting to sort out incidents involving same gender couples and may end up arresting the wrong or both parties in a battering situation, opportunities to educate and train the police and courts about the realities of domestic violence in same-sex relationships are increasing.

**Differences between same-sex and opposite-sex domestic violence**

Although domestic violence is largely the same in heterosexual and homosexual relationships, gay, lesbian and bisexual victims of domestic violence have some additional problems.

**Fewer services**

To get help, you have to come out. There aren’t very many services to help lesbians, and women who have been abused by another woman are sometimes treated with ignorance or homophobia by the domestic violence service agencies and shelters that are supposed to help them. There are few or no shelters and services for male victims of domestic violence, gay or straight.

**Risk factors for violence**

Violence against a partner has two main purposes:

1. Keeping or making use of power.
2. Keeping or making use of control.

Many risk factors can increase the chance of violence in a family. A family that has many risk factors has more of a chance of becoming violent than a family with one or two risk factors.

Some risk factors are:

- Past victim or witness of family abuse.
- Alcohol and drug abuse.
- Stress outside the home (e.g., work, financial).
- Poverty or problems with money.
- Loss (e.g., loss of a job, death, relationship).
- Family trouble.
- The idea that all men have to act a certain way or believing that all women should stay home and not work.
- History of abusive relationships.
- Mental or physical problems in the family.
- Isolation from others.
- Pregnancy.

**Obstacles preventing a victim from leaving**

The reality is that most people in abusive relationships do not immediately leave even when they believe there is a problem with the relationship. Most people leave more than once before they finally sever the relationship. Victims of domestic violence act just like everyone else: they waiver; they return; and they give it another chance. Rather than saying victims of domestic violence do not leave, it is more accurate to describe their pattern as coming and going from the relationship. Most victims of domestic violence repeatedly attempt to leave the relationship, but return when they cannot overcome the obstacles of getting away from the abuser. They will make a final separation if they are able to find a combination of resources to attend to the needs of their children and themselves, and to do so safely.

The question is not: “Why does a victim stay?” But rather, “What are the obstacles that prevent a victim from leaving?” A victim may face any/or all of these or other obstacles:

1. Economic dependence on the abuser.
2. Fear for her safety and the safety of her children and/or other family members.
3. Isolation. She has no support system or others with whom to do a reality check.
4. Low self-esteem, especially after years of being told by the abuser how worthless she is and how she is to blame for all the violence that occurs.
5. Beliefs about family. She may believe that a family is not to air its dirty laundry and that all families encounter hard times. These beliefs are often reinforced by family, church members, and the legal system.
6. Beliefs about marriage. She may believe she must stay married forever, that it is “God’s will.”
7. Belief that she is the only person who can stop the abuser, which is reinforced by the abuser who says that she is the only one who ever understood him.
8. Belief that he will find her no matter what she does to try to leave. This belief is based in reality if the abuser has hurt the victim when she attempted to leave.
9. Lack of options and resources. She does not have the money or the resources to support herself and her children.
10. Fear of being seriously hurt or killed if she attempts to leave. This fear is reinforced by the abuser who tells her that he will kill her if she ever tries to leave. Victims know these are not idle threats, as they have feared for their lives before.
11. Threats against others if the victim leaves. The abuser frequently threatens to hurt all those whom the victim knows and loves, including children, family members, friends, and co-workers.
12. Health concerns. A victim of family violence may experience her own health issues in later life that make it difficult for her to leave, or she may feel that she must stay to take care of the abusive partner because of his health issues.
13. Society’s ageist responses to elder victims. When elder victims of domestic violence report abuse, those to whom the abuse is reported often presume the abuse is the result of the victim’s age, not the result of abuse. For example, people may blame the bruises on the victim’s frail condition rather than on abuse. People may interpret the victim’s silence around financial and other issues as senility and lack of ability rather than fear to speak up in the presence of the abusive person.

**Leaving does not mean safety**

Statistics indicate that women are at a greater risk of becoming victims of domestic homicide when they attempt to leave the relationship. In fact, women who leave their batterers are at a 75 percent greater risk of being killed by their batterer than those who stay (Wilson and Daly 1993).

Victims who attempt to leave are often hunted down – stalked, harassed, threatened, and pursued across county and state lines. Because abusers believe they are entitled to control the behavior of their partners, they may continue this behavior even after the petition for divorce is filed or granted. This is so common it is known as “separation violence.” The rate of attack against women separated from their husbands is about three times higher than that of divorced women and 25 times higher than that of married women.

**Advocacy for victims of domestic violence**

There are thousands of individuals in communities across the country that work or volunteer to assist, support, and serve victims of domestic violence. Often these professionals provide a lifeline to women and
children who desperately need assistance and direction but are confused by the dynamics of their victimization or the thought of leaving a violent environment, and in some cases, entering into the criminal justice system.

The following are goals of advocacy for victims of domestic violence:

- Empower women with the ability to make significant changes and solve problems.
- Increase a victim’s ability to make a successful transition from a battering environment to independence.
- Connect the victim - both in the short and long-term - with community resources that provide support, encouragement, and assistance.
- Provide information and support throughout the criminal justice system and beyond.
- Provide information and referrals to community resource agencies, including public assistance, child protective agencies, public and mental health agencies, social services, and schools.
- Work to establish or strengthen a coordinated community response to domestic violence and its victims.
- Generate greatly needed public awareness about domestic violence and its effects on victims, witnesses, communities, and society in general.
- Work to affect changes in laws, agency policies, protocols, and programs that enhance rights and services for victims of domestic violence.

**Victim validation**

One of the most crucial skills a victim advocate must possess is the ability to validate the victim’s feelings, experiences, and fears. Many domestic violence victims do not view themselves as victims and fail to realize that domestic violence is a crime perpetrated against many other women.

Guidelines for validation of domestic violence victims include the following:

- Empathize with the victim and validate her feelings, stressing the criminal nature of the violence, and the fact that the victim is not to blame.
- Provide information and referrals for continued support and assistance, including local, state, and national resources.
- Affirm the fact that the victim is not alone and that there are people and programs available to assist and support her.

**HOTLINES AND OTHER RESOURCES FOR DOMESTIC VIOLENCE AND RELATED ISSUES**

WWW.CUTITOUT.ORG

1-800-383-0210

National Toll-Free Domestic Violence Hotline: 1-800-799SAFE (7233)

(800) 787-3224 (TDD)

The National Domestic Violence Hotline links individuals and services using a nationwide database of domestic violence and other emergency shelters, legal advocacy and assistance programs, and social services programs. The hotline provides crisis intervention, information about sources of assistance, and referrals to battered women’s shelters.

**Rape, Abuse, and Incest National Network (RAINN):** (800) 656-4673

RAINN links 628 rape crisis centers nationwide. Sexual assault survivors who call will be automatically connected to a trained counselor at the closest center in their area.

**Childhelp USA/National Child Abuse Hotline**

(800) 4A-CHILD

With a focus on children and the prevention of child abuse, this hotline provides crisis counseling, referrals, and reporting guidance to callers in crisis, including children, troubled parents, and adult survivors of abuse.

All calls are answered by a staff of professional counselors. In addition, statistical and other informative materials can be ordered through this number.

**National Resource Center on Domestic Violence**

Project of the Pennsylvania Coalition Against Domestic Violence

Suite 1300

6400 Flank Drive

Harrisburg, PA 17112

(800) 537-2238

(717) 545-9456 (fax)

The National Resource Center on Domestic Violence (NRC), operated by the Pennsylvania Coalition Against Domestic Violence, is a source of comprehensive information, training, and technical assistance on domestic violence prevention and intervention. NRC serves as a central resource for the collection, preparation, analysis, and dissemination of information on domestic violence, identifies and supports the development of innovative and exemplary intervention and prevention resources and maintains a comprehensive database of information to coordinate resource development and technical assistance throughout the nation. Although its target groups are domestic violence programs and state coalitions, NRC also serves government agencies, policy leaders, media, and other professionals and organizations involved in the prevention or response to domestic violence.

**Health Resource Center on Domestic Violence**

Project of the Family Violence Prevention Fund

Suite 304

383 Rhode Island Street

San Francisco, CA 94103-5133

toll free (888) Rx ABUSE, weekdays 9 a.m. to 5 p.m., P.S.T.

(415) 252-8991 (fax)

http://www.fvpf.org/health

The Health Resource Center, which focuses on strengthening the health care response to domestic violence, provides resources and training materials, technical assistance, and information and referrals to health care professionals and others who help victims of domestic violence. Its products and services include comprehensive resource manuals providing the tools for an effective multidisciplinary response; multidisciplinary protocols emphasizing routine screening and identification of domestic violence; assistance with health care training programs and protocol development; models for local, state, and national health policymaking; a national network of experts for public speaking, training, and consultation; and educational materials specifically developed for health care providers.

**BIBLIOGRAPHY**

- Excerpted sections written by:
  1. Kathryn Brohl, M.A., L.M.F.T. Rene Loffald, L.C.S.W; and
- *Batterer Intervention Services Coalition*
- *Batterer Intervention Services Coalition*
- *Center for Disease Control (CDC), National Center for Injury Prevention and Control. April 1998. The Co-concurrence of
1. Studies of families of HIV-infected people have shown clearly that HIV is not spread through casual contact such as the sharing of food utensils, towels and bedding, swimming pools, telephones, or toilet seats.
   True   False

2. The term AIDS applies to the most advanced stages of HIV infection.
   True   False

3. When AIDS first surfaced in the United States, there were no medicines to combat the underlying immune deficiency and few treatments existed for the opportunistic diseases that resulted.
   True   False

4. The Americans with Disabilities Act (ADA) prohibits discrimination against all people with disabilities or perceived disabilities, with the exception of people with HIV infection and AIDS.
   True   False

5. Hair’s inner cortex is composed of spindle-shaped cells and an outer sheath, called the cuticle.
   True   False

6. A single hair has a normal life of about 15 – 20 years.
   True   False

7. PH is a unit of measurement; just as degrees measure temperature and inches measure distance, pH numbers measure the amount of acid or alkali in water-based solution.
   True   False

8. On the pH scale, hair falls on average between 12.5 and 13.5.
   True   False

9. In 1994, the FDA and the American Cancer Society released a report showing that researchers have found that women who have used permanent hair dyes showed increased risk of all fatal cancers combined and also of urinary system cancers.
   True   False

10. A cosmetologist may perform non-invasive hair removals such as electrolysis.
    True   False

11. Each salon shall provide (either on the premises, or in the same building as, and within 300 feet of, the salon) adequate toilet and lavatory facilities.
    True   False

12. All holders of a cosmetology or specialty salon license shall display (in a conspicuous place within the salon and clearly visible to the general public entering the salon) the current salon license and a legible copy of the most recent inspection sheet for the salon.
    True   False

13. The first workers’ compensation law passed in the United States was the Federal Employer's Liability act.
    True   False

14. By 1948, all the states had at least some form of workers’ compensation in effect as did the territories of Alaska and Hawaii.
    True   False

15. You should report to your employer any workplace accident as soon as possible but no later than thirty (30) days or your claim may be denied.
    True   False

16. Your employer can terminate you if you are unable to work because of an injury and are receiving workers' compensation benefits.
    True   False

17. If a hazardous substance is transferred from one container into a second container, and the substance is not entirely used immediately, you must ensure that the second container is properly labeled.
    True   False

18. Injuries from manual tasks result from ongoing wear and tear to the joints, ligaments, tendons, muscles and discs.
    True   False

19. Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in homes and businesses.
    True   False
20. Most indoor air pollution comes from sources outside the building.  
   True   False

21. Some of the factors that contribute to poor indoor air quality may originate from inadequate HVAC design.  
   True   False

22. Bacteria exist in one of two modes: an active, vegetative mode, and an inactive, spore-forming mode.  
   True   False

23. Viral infections cannot be transmitted from one person to another through casual contact with an infected individual or contact with what he or she touched.  
   True   False

24. Yeast, scabies, lice and many other skin infections do not require an open sore or mucosal surface to infect.  
   True   False

25. Sterilization is the least effective level of decontamination.  
   True   False

26. Widespread use of antibiotics is thought to have spurred evolutionary changes in bacteria that allow them to survive these powerful drugs.  
   True   False

27. The appearance of color is associated with the color of melanin in the hair’s cortex.  
   True   False

28. There are two main primary types of melanin: eumelansins (eumelanosomes), which are black and brown, and pheomelansins (pheomelanosomes), which range from reddish brown and reddish yellow to yellow.  
   True   False

29. The first hair colors used the level system.  
   True   False

30. A basic understanding of certain chemical processes is essential to hair coloring.  
   True   False

31. A patch test is not required when using a semi-permanent, demi-permanent, or permanent oxidative color.  
   True   False

32. In 2004, Charlie Crist, then Florida attorney general, launched an important program designed to help those who suffer from domestic violence.  
   True   False

33. In 2007 alone, there were more than 120,000 cases of domestic violence in Florida – that’s more than 325 cases per day, 13 per hour, or more than one incident every five minutes, around the clock.  
   True   False

34. Domestic violence occurs as a single isolated incident.  
   True   False

35. Domestic violence is limited to physical abuse.  
   True   False
16 Hour Course for Cosmetologists

Final Examination Answer Sheet:

Using the spaces provided below, please PRINT the information below in CAPITAL LETTERS. All information below must be filled in completely to ensure the State of Florida receives your completion data correctly. The cost of our test is $21.95. Upon completion, please place this sheet in the envelope provided and mail. If paying by check or Money Order, please make payable to Elite CME. For faster service, specify your credit card information on this form in the space provided and fax to 1-866-673-3663. For faster service, we offer this test online with instant grading and certificate issuance. Please visit www.elitecme.com to complete your test on the web.

Please PRINT NEATLY in the areas below using black or blue pen only:

First Name
MI.
Last Name
Street Address
Suite / Floor / Apartment Number
City (do not abbreviate)
State
Zip Code
Telephone Number
(Please include area code)
Cosmetology License #
(Starts with two letters: CL- not AC#)

Use the spaces to the right to note any additional Florida Cosmetology license number(s):

E-Mail Address

Payment Method
☐ Check / M.O. Enclosed for $21.95
☐ Visa / Mastercard / AMEX / Discover

Credit Card Expiration Date

Cardholder Signature:

Shade circles like this: ○ ○ ○. Not like this: ○ ○ ○. Final Exam questions are located on pages 73-74. Unanswered questions will be scored as incorrect.

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CFL 15E10

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This is the attendee’s evaluation of the continuing education course
(any comments will be appreciated)

(Circle one - 1 being the worst 10 being the best)

I would rate this course................................................................. 1 2 3 4 5 6 7 8 9 10

The content of this course met my expectations......................... 1 2 3 4 5 6 7 8 9 10

The course material was presented in a clear, concise
and well organized format........................................................... 1 2 3 4 5 6 7 8 9 10

I would recommend this course.................................................... Yes No

The material presented met the course’s stated objectives......... Yes No

I found this course affordable....................................................... Yes No

Comments___________________________________________________________________________________________
                                                                                                         
                                                                                                         
                                                                                                         
                                                                                                         
                                                                                                         
                                                                                                         
                                                                                                         
                                                                                                         
                                                                                                         

☐ I agree to allow Elite Continuing Education to use my above comments.

Did you remember:
  1) To clearly print your name and address on the answer sheet?
  2) To fill out your license number on the answer sheet?
  3) To include your payment or credit card information?
  4) A $15.00 fee will be added for all checks that are returned for insufficient funds.

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