



Occupational Safety & Health Administration

U.S. Department of Labor

OSHA's Mission

- OSHA's mission is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.
 - Source: <http://www.osha.gov/oshinfo/mission.html>

- Nearly every working man and woman in the nation comes under OSHA's jurisdiction (with some exceptions such as miners, transportation workers, many public employees, and the self-employed). Other users and recipients of OSHA services include: occupational safety and health professionals, the academic community, lawyers, journalists, and personnel of other government entities.

Workplace Substance Abuse

- The vast majority of drug users are employed, and when they arrive for work, they don't leave their problems at the door. Of the 16.7 million illicit drug users aged 18 or older in 2003, 12.4 million (74.3 percent) were employed either full or part time. Furthermore, research indicates that between 10 and 20 percent of the nation's workers who die on the job test positive for alcohol or other drugs. In fact, industries with the highest rates of drug use are the same as those at a high risk for occupational injuries, such as construction, mining, manufacturing and wholesale.
- Source: <http://www.osha.gov/SLTC/substanceabuse/index.html>

- Although OSHA supports workplace drug and alcohol programs, at this time OSHA does not have a standard. In some situations, however, OSHA's General Duty Clause, Section 5(a)(1) of the OSH Act, may be applicable where a particular hazard is not addressed by any OSHA standard.

Citations for violation of the General Duty Clause are issued to employers when the four components of this provision are present, and when no specific OSHA standard has been promulgated to address the recognized hazard. The four components are: (1) the employer failed to keep its workplace free of a "hazard;" (2) the hazard was "recognized" either by the cited employer individually or by the employer's industry generally; (3) the recognized hazard was causing or was likely to cause death or serious physical harm; and (4) there was a feasible means available that would eliminate or materially reduce the hazard. An employer's duty will arise only when all four elements are present.

- Source: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=22577

Biological Agents

- Biological agents include bacteria (*Bacillus anthracis* that causes anthrax; *Clostridium botulinum* that causes botulism), viruses (HIV, HBV, HCV, Hantavirus), fungi (Stachybotrus), other microorganisms and their associated toxins.
- They have the ability to adversely affect human health in a variety of ways, ranging from relatively mild, allergic reactions to serious medical conditions, even death.
- These organisms are widespread in the natural environment; they are found in water, soil, plants, and animals.
- Because many microbes reproduce rapidly and require minimal resources for survival, they are a potential danger in a wide variety of occupational settings.
- Source: <http://www.osha.gov/SLTC/biologicalagents/index.html>

Bloodborne Pathogens and Needlestick Prevention

- Workers in many different occupations are at risk of exposure to bloodborne pathogens such as Hepatitis B, Hepatitis C, and HIV/AIDS.
- First aid team members, housekeeping personnel in some settings, and nurses are examples of workers who may be at risk of exposure.
- In 1991, OSHA issued the Bloodborne Pathogens Standard to protect workers from this risk.
- In 2001, in response to the [Needlestick Safety and Prevention Act](#), OSHA revised the Bloodborne Pathogens Standard [29 CFR 1910.1030](#).
- The revised standard clarifies the need for employers [to select safer needle devices](#) and to [involve employees in identifying and choosing these devices](#).
- The updated standard also requires employers to [maintain a log of injuries from contaminated sharps](#).

- Source: <http://www.osha.gov/SLTC/bloodbornepathogens/index.html>

Chemical Reactivity Hazards

- Chemicals have the ability to react when exposed to other chemicals or certain physical conditions. The reactive properties of chemicals vary widely and they play a vital role in the production of many chemical, material, pharmaceutical, and food products we use daily. When chemical reactions are not properly managed, they can have harmful, or even catastrophic consequences, such as toxic fumes, fires, and explosions. These reactions may result in death and injury to people, damage to physical property, and severe effects on the environment. Process safety management is used to prevent and mitigate chemical reactivity hazards.
- Source: <http://www.osha.gov/SLTC/reactivechemicals/index.html>

Eye and Face Protection

- Thousands of people are blinded each year from work-related eye injuries that could have been prevented with the proper selection and use of eye and face protection. Eye injuries alone cost more than \$300 million per year in lost production time, medical expenses, and worker compensation.

Personal protective equipment (PPE) alone should not be relied on to protect against hazards. Use PPE in conjunction with guards, engineering controls, and sound manufacturing practices.

- Source: <http://www.osha.gov/SLTC/eyefaceprotection/index.html>

Fire Safety

- Workplace fires and explosions kill 200 and injure more than 5,000 workers each year. In 1995, more than 75,000 workplace fires cost businesses more than \$2.3 billion. "Fires wreak havoc among workers and their families and destroy thousands of businesses each year, putting people out of work and severely impacting their livelihoods," said then Secretary of Labor Robert B. Reich (1996, October 8). "The human and financial toll underscores the serious nature of workplace fires."
- Source: <http://www.osha.gov/SLTC/firesafety/index.html>

Formaldehyde

- Formaldehyde is common to the chemical industry. During both 1994 and 1995, [Chemical & Engineering News reported U.S. production at 8.1 billion pounds.](#) This ranked it 24th overall. It is well known as a preservative in medical laboratories, as an embalming fluid, and as a sterilizer. Its primary use is in the production of resins and as a chemical intermediate. Urea-formaldehyde and phenol formaldehyde resins are used in foam insulations, as adhesives in the production of particle board and plywood, and in the treating of textiles.
- Source: <http://www.osha.gov/SLTC/formaldehyde/index.html>

Healthcare Facilities

- Healthcare Facilities include hospitals, clinics, dental offices, out-patient surgery centers, birthing centers and nursing homes. Information on [nursing homes](#) is covered by a separate topic page.

There are numerous health and safety issues associated with Healthcare Facilities. They include bloodborne pathogens and biological hazards, potential chemical and drug exposures, waste anesthetic gas exposures, ergonomic hazards from lifting and repetitive tasks, laser hazards, hazards associated with laboratories, and radioactive material and x-ray hazards. Some of the potential chemical exposures include formaldehyde, used for preservation of specimens for pathology; ethylene oxide, glutaraldehyde and paracetic acid used for sterilization; and numerous other chemicals used in health care laboratories.

In addition to the medical staff, large Healthcare Facilities employ a wide variety of trades that have health and safety hazards associated with them. These include mechanical maintenance, medical equipment maintenance, housekeeping, food service, building and grounds maintenance, laundry, and administrative staff.

- Source: <http://www.osha.gov/SLTC/healthcarefacilities/index.html>

Ionizing Radiation

- Ionizing radiation sources can be found in a wide range of occupational settings, including health care facilities, research institutions, nuclear reactors and their support facilities, nuclear weapon production facilities, and other various manufacturing settings, just to name a few. These radiation sources can pose a considerable health risk to affected workers if not properly controlled.
- Source: <http://www.osha.gov/SLTC/radiationionizing/index.html>

Laboratories

- The Occupational Safety and Health Administration, recognizing the unique characteristics of the laboratory workplace, tailored a standard for occupational exposure to hazardous chemicals in laboratories. This standard is often referred to as the "Laboratory Standard". Under this standard a laboratory is required to produce a Chemical Hygiene Plan which addresses the specific hazards found in its location, and its approach to them.
- Source: <http://www.osha.gov/SLTC/laboratories/index.html>

Nursing Homes and Personal Care Facilities

- Nursing and Personal Care Facilities have one of the highest rates of injury and illness among industries for which nationwide **lost workday injury and illness (LWDII)** rates were calculated for Calendar Year 2002. According to the Bureau of Labor Statistics in 2002 (Pg 12), 53.4 KB **PDF**, nursing and personal care facilities (employers within SIC codes 8051, 8052, and 8059) experienced an average LWDII rate of 7.6, despite the availability of feasible controls which have been identified to address hazards within this industry. This is more than double the LWDII rate of 2.8 for private industry as a whole.
- Source: <http://www.osha.gov/SLTC/nursinghome/index.html>

Personal Protective Equipment (PPE)

- OSHA requires employers to use personal protective equipment (PPE) to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective. Employers are required to determine all exposures to hazards in their workplace and determine if PPE should be used to protect their workers.

If PPE is to be used to reduce the exposure of employees to hazards, a PPE program should be initialized and maintained. This program should contain identification and evaluation of hazards in the workplace and if use of PPE is an appropriate control measure; if PPE is to be used, how it is selected, maintained and its use evaluated; training of employees using the PPE; and vigilance of the program to determine its effectiveness in preventing employee injury or illness.

- Source: <http://www.osha.gov/SLTC/personalprotectiveequipment/index.html>

Reproductive Hazards

- Exposure to reproductive hazards in the workplace is an increasing health concern. Reproductive hazards are substances or agents that affect the reproductive health of women or men or the ability of couples to have healthy children. These hazards may cause problems such as infertility, miscarriage, and birth defects. Occupational exposure to reproductive hazards such as workplace chemicals, and physical and biological agents can cause damage to the reproductive systems of both male and female workers.
- Source: <http://www.osha.gov/SLTC/reproductivehazards/index.html>

Respiratory Protection

- An estimated 5 million workers are required to wear respirators in 1.3 million workplaces throughout the United States. Respirators protect workers against insufficient oxygen environments, harmful dusts, fogs, smokes, mists, gases, vapors, and sprays. These hazards may cause cancer, lung impairment, other diseases, or death.

Compliance with the OSHA Respiratory Protection Standard could avert hundreds of deaths and thousands of illnesses annually.

- Source: <http://www.osha.gov/SLTC/respiratoryprotection/index.html>

Severe

Acute Respiratory Syndrome (SARS)

- Severe acute respiratory syndrome (SARS) is an emerging, sometimes fatal, respiratory illness. The first identified cases occurred in China in late 2002, and the disease has now spread throughout the world. Although SARS is believed to be caused by a virus, the specific agent has not been identified, and there is not yet any laboratory or other test that can definitively identify cases. Suspected SARS cases in the United States have involved individuals returning from travel to Asia and health care workers and other contacts of those patients. SARS does not appear to be caused by casual contact; transmission appears to be primarily through close contact with a symptomatic patient.

- Most people with SARS are adults. Those age 40 and older and those with certain medical conditions appear to be at increased risk of more severe disease and of death. Treatment consists of antibiotics and steroids, with other options being explored. Between 10 and 20 percent of SARS patients have required ventilator support for a period of time. To date, about 4 percent of identified SARS cases have been fatal.

- Since the infectivity and route of transmission of SARS are unknown, healthcare workers treating patients known to be infected with SARS should use standard precautions, including good work and hygiene practices and the use of personal protective equipment (PPE) appropriate for bloodborne and airborne exposures. Appropriate PPE includes protective gowns, gloves, N95 respirators, in addition to and eye protection.

If workers providing care to a SARS patient have potential exposure to blood or other potentially infectious materials, they must use PPE in accordance with OSHA's Bloodborne Pathogens Standard, 29 CFR 1910.1030.

- There are no disinfectant products currently registered by the U.S. Environmental Protection Agency (EPA) for the newly identified viruses associated with SARS. The CDC recommends the use of EPA-registered chemical germicides that provide low- or intermediate-level disinfection during general use because these products are known to inactivate related viruses with physical and biochemical properties similar to the suspected SARS agents.
- Source: <http://www.osha.gov/dep/sars/index.html>

Smallpox

- Smallpox is an acute, contagious, and sometimes fatal disease caused by infection with a virus known as the variola virus. Smallpox outbreaks have occurred from time to time for thousands of years, but in 1980, the disease was declared eradicated following worldwide vaccination programs. Except for stockpiles in high-security laboratories, the virus has been eliminated. However, if obtained and deliberately released as a bioweapon, smallpox could cause a public health catastrophe.
- Source: <http://www.osha.gov/SLTC/smallpox/index.html>

Tuberculosis

- Nearly one-third of the world's population is infected with Tuberculosis (TB), which kills almost 3 million people per year. TB causes more deaths than any other infectious agent in the world. In the mid-1980s, a resurgence of outbreaks in the United States brought renewed attention to TB. An increase in high risk, immuno-suppressed individuals, particularly those infected with HIV, lead to an increase in TB cases.

- Drug-resistant strains of this deadly disease also contributed to the problem. However, through a broad range of Federal and community initiatives including the Centers for Disease Control and Prevention (CDC) 1994 publication, [Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities](#), TB rates have declined steadily over the past decade. In 2003, the [CDC](#) reported 14,874 TB cases (5.1 per 100,000 population). These numbers represent a reduction of more than 50% in the rate of TB since the 1992 peak, and more than 43.5% in the number of cases.

- The number of reported TB cases and the national TB case rate are now at their lowest levels since TB reporting began in 1953. OSHA recognizes, however, that continued vigilance is necessary to maintain the gains achieved so far. OSHA intends to provide guidance to workplaces with less medical expertise and fewer resources than hospitals, and to use cooperative relationships with employers, public health experts and other government agencies to promote TB control.
- Source: <http://www.osha.gov/SLTC/tuberculosis/index.html>

Waste Anesthetic Gases

- The anesthetic gas and vapors that leak out and into the surrounding room during medical procedures are considered waste anesthetic gases. At any given time more than 250,000 people who work in hospitals, operating rooms, dental offices and veterinary clinics, might be exposed unnecessarily to harmful levels of waste anesthetic gases. The waste anesthetic gases and vapors of concern are nitrous oxide and halogenated agents (vapors) such as halothane, enflurane, methoxyflurane, trichloroethylene, and chloroform. Some potential effects of exposure to waste anesthetic gases are nausea, dizziness, headaches, fatigue, and irritability, as well as sterility, miscarriages, birth defects, cancer, and liver and kidney disease, among operating room staff or their spouses (in the case of miscarriages and birth defects). Employers and employees should be aware of the potential effects of waste anesthetic gases and be advised to take appropriate precautions.
- Source: <http://www.osha.gov/SLTC/wasteanestheticgases/index.html>

Workplace Violence

- Violence in the workplace is a serious safety and health issue. Its most extreme form, homicide, is the third-leading cause of fatal occupational injury in the United States. According to the Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI), there were 639 workplace homicides in 2001 in the United States, out of a total of 8,786 fatal work injuries.

Environmental conditions associated with workplace assaults have been identified and control strategies implemented in a number of work settings. OSHA has developed guidelines and recommendations to reduce worker exposures to this hazard but is not initiating rulemaking at this time.

- Source: <http://www.osha.gov/SLTC/workplaceviolence/index.html>

THE Standard – 29 CFR

- To this point, we've glossed over OSHA's goodies – NOW we get to the meat.

29 CFR 1910.132(a): General Requirements

- Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

29 CFR 1910.132(f)(4)

- The employer (faculty member) shall verify that each affected employee (student) has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

29 CFR 1910.133(a)(1)

- The employer (faculty member) shall ensure that each affected employee (student) uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

29 CFR 1910.133(a)(3)

- The employer (faculty member) shall ensure that each affected employee (student) who wears prescription lenses while engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, or wears eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

29 CFR 1910.138(a)

- General requirements. Employers (faculty members) shall select and require employees (students) to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

29 CFR 1910.138(b)

- Selection. Employers (faculty members) shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

Bloodborne pathogens

29 CFR 1910.1030

- **Bloodborne Pathogens** means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).
- **Contaminated** means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

- **Contaminated Sharps** means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.
- **Decontamination** means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

- **Exposure Incident** means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.
- **Handwashing Facilities** means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.

- **Other Potentially Infectious Materials** means (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.
- **Parenteral** means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

- **Personal Protective Equipment** is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

- **Regulated Waste** means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

- **Sterilize** means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.
- **Universal Precautions** is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.
- **Work Practice Controls** means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

29 CFR 1910.1030 (d)(1)

- **General.** Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

- **1910.1030(d)(2)(iv)**
- When provision of handwashing facilities is not feasible, the employer shall provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. When antiseptic hand cleansers or towelettes are used, hands shall be washed with soap and running water as soon as feasible.
- **1910.1030(d)(2)(v)**
- Employers shall ensure that employees wash their hands immediately or as soon as feasible after removal of gloves or other personal protective equipment.
- **1910.1030(d)(2)(vi)**
- Employers shall ensure that employees wash hands and any other skin with soap and water, or flush mucous membranes with water immediately or as soon as feasible following contact of such body areas with blood or other potentially infectious materials.

- **1910.1030(d)(2)(ix)**
- Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.
- **1910.1030(d)(2)(x)**
- Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets or on countertops or benchtops where blood or other potentially infectious materials are present.

- **1910.1030(d)(2)(xi)**
- All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.
- **1910.1030(d)(2)(xii)**
- Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.
- **1910.1030(d)(2)(xiii)**
- Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

Personal Protective Equipment

- [1910.1030\(d\)\(3\)\(i\)](#)
- **Provision.** When there is occupational exposure, the employer shall provide, at no cost to the employee, appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection, and mouthpieces, resuscitation bags, pocket masks, or other ventilation devices. Personal protective equipment will be considered "appropriate" only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

- **1910.1030(d)(3)(iii)**
- **Accessibility.** The employer shall ensure that appropriate personal protective equipment in the appropriate sizes is readily accessible at the worksite or is issued to employees.
Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.
- **1910.1030(d)(3)(iv)**
- **Cleaning, Laundering, and Disposal.** The employer shall clean, launder, and dispose of personal protective equipment required by paragraphs (d) and (e) of this standard, at no cost to the employee.

- **1910.1030(d)(3)(ix)**
- **Gloves.** Gloves shall be worn when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin; when performing vascular access procedures except as specified in paragraph (d)(3)(ix)(D); and when handling or touching contaminated items or surfaces.

- **1910.1030(d)(3)(x)**
- **Masks, Eye Protection, and Face Shields.** Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.
- **1910.1030(d)(3)(xi)**
- **Gowns, Aprons, and Other Protective Body Clothing.** Appropriate protective clothing such as, but not limited to, gowns, aprons, lab coats, clinic jackets, or similar outer garments shall be worn in occupational exposure situations. The type and characteristics will depend upon the task and degree of exposure anticipated.

- **1910.1030(e)(2)(i)**
- **Standard Microbiological Practices.** All regulated waste shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

- **1910.1030(e)(2)(ii)(F)**
- Laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing shall be used in the work area and animal rooms. Protective clothing shall not be worn outside of the work area and shall be decontaminated before being laundered.
- NOTE: This is interesting – it applies specifically to HIV/HBV labs – yet notice the applications it could have to HCW’s wearing their scrubs in public after a day’s work with sick patients.

- **1910.1030(e)(4)(v)**
- An autoclave for decontamination of regulated waste shall be available within or as near as possible to the work area.

- **1910.1030(f)(1)(i)**
- The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident.
- **1910.1030(f)(1)(ii)**
- The employer shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis, are:
 - **1910.1030(f)(1)(ii)(A)**
 - Made available at no cost to the employee;
 - **1910.1030(f)(1)(ii)(B)**
 - Made available to the employee at a reasonable time and place;
 - **1910.1030(f)(1)(ii)(C)**
 - Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional; and
 - **1910.1030(f)(1)(ii)(D)**
 - Provided according to recommendations of the U.S. Public Health Service current at the time these evaluations and procedures take place, except as specified by this paragraph (f).

Ionizing Radiation

29 CFR 1910.1096

- **1910.1096(a)(1) *Radiation*** includes alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles; but such term does not include sound or radio waves, or visible light, or infrared or ultraviolet light.
- **1910.1096(a)(2) *Radioactive material*** means any material which emits, by spontaneous nuclear disintegration, corpuscular or electromagnetic emanations.

- **1910.1096(a)(5) Dose** means the quantity of ionizing radiation absorbed, per unit of mass, by the body or by any portion of the body. When the provisions in this section specify a dose during a period of time, the dose is the total quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time. Several different units of dose are in current use. Definitions of units used in this section are set forth in paragraphs (a)(6) and (7) of this section.
- **1910.1096(a)(6) Rad** means a measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit of mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue (1 millirad (mrad)=0.001 rad).
- **1910.1096(a)(7) Rem** means a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of 1 roentgen (r) of X-rays (1 millirem (mrem)=0.001 rem). The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions for irradiation. Each of the following is considered to be equivalent to a dose of 1 rem:
 - **1910.1096(a)(7)(i)** A dose of 1 roentgen due to X- or gamma radiation;
 - **1910.1096(a)(7)(ii)** A dose of 1 rad due to X-, gamma, or beta radiation;
 - **1910.1096(a)(7)(iii)** A dose of 0.1 rad due to neutrons or high energy protons;
 - **1910.1096(a)(7)(iv)** A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye;

- Do you see where I get my lab safety rules, now?
- This was just a brief overview – it gets WAY hairier the deeper into it you get.