OSHA and Healthcare Facilities

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- Complete the questions at the end of the course.
- Return your completed Answer Sheet to NetCE by mail or fax, or complete online at www.NetCE.com. Your postmark or facsimile date will be used as your completion date.
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Faculty

Carol Shenold, RN, ICP, graduated from St. Paul's Nursing School, Dallas, Texas, achieving her diploma in nursing. Over the past thirty years she has worked in hospital nursing in various states in the areas of obstetrics, orthopedics, intensive care, surgery and general medicine.

Mrs. Shenold served as the Continuum of Care Manager for Vencor Oklahoma City, coordinating quality review, utilization review, Case Management, Infection Control, and Quality Management. During that time, the hospital achieved Accreditation with Commendation with the Joint Commission, with a score of 100.

Mrs. Shenold was previously the Infection Control Nurse for Deaconess Hospital, a 300-bed acute care facility in Oklahoma City. She is an active member of the Association for Professionals in Infection Control and Epidemiology (APIC). She worked for the Oklahoma Foundation for Medical Quality for six years.

Faculty Disclosure

Contributing faculty, Carol Shenold, RN, ICP, has disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

Division Planner

Sharon Cannon, RN, EdD, ANEF

Director of Development and Academic Affairs

Sarah Campbell

Division Planner/Director Disclosure

The division planner and director have disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

Audience

This course is designed for healthcare staff in all specialties.

Accreditations & Approvals

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A complete Works Cited list begins on page 25.

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This activity has been designated for 2 Lifelong Learning (Part II) credits for the American Board of Pathology Continuing Certification Program.

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Special Approvals

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The purpose of NetCE is to provide challenging curricula to assist healthcare professionals to raise their levels of expertise while fulfilling their continuing education requirements, thereby improving the quality of healthcare.

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Disclosure Statement

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Course Objective

The purpose of this course is to provide information that will allow facilities to more easily comply with the broad spectrum of rules covered by the OSHA regulations.

Learning Objectives

Upon completion of this course, you should be able to:

1. Explain the history of the Occupational Safety and Health Administration (OSHA).
2. Describe the purpose of the Bloodborne Pathogens Standard as it applies to the healthcare setting.
3. Review the role of OSHA standards in preventing tuberculosis (TB) transmission.
4. Explain the impact of OSHA regulations on employee health, including risk management and safety issues in a healthcare setting.
5. Discuss hazardous materials and waste management in a healthcare facility.
6. Explain the necessity for radiation safety in healthcare facilities.
7. Describe the process of handling blood and chemical spills.
8. Outline the impact of fire safety on patients and employees in the healthcare facility.
9. Discuss indoor air quality, ergonomics, and latex allergy concerns in healthcare facilities.
10. Discuss legal issues and employee safety as applied to the healthcare facility.
11. Describe what might occur during an OSHA consultation and inspection.

Sections marked with this symbol include evidence-based practice recommendations. The level of evidence and/or strength of recommendation, as provided by the evidence-based source, are also included so you may determine the validity or relevance of the information. These sections may be used in conjunction with the course material for better application to your daily practice.

INTRODUCTION

Death and disability due to unsafe or unhealthy workplaces remain ongoing issues in the United States. In 2021, there were 2.6 million job-related nonfatal injuries and illnesses in the private sector alone [1]. The U.S. Bureau of Labor Statistics reported a total of 4,764 employee deaths in 2021, slightly down from the number of fatal injuries reported in 2017. This figure may not include the deaths of workers due to occupationally acquired diseases [2]. The continuous efforts of the Occupational Safety and Health Administration (OSHA) to promote employee safety are part of what makes it such an important regulatory entity.

At one time OSHA compliance was considered an issue important and applicable to industry only. Healthcare facilities did not normally use heavy equipment or have issues regarding noise levels and high-level chemical spills and, therefore, felt safe. Smaller facilities may have felt protected from inspection because of the number of surveys required.

However, bloodborne pathogen compliance, waste management, tuberculosis control, and ergonomics regulations have increased awareness among healthcare facilities about the impact of OSHA. Entities such as OSHA, Medicare, and the Joint Commission now cooperate and review OSHA regulatory issues when conducting surveys.

HISTORY OF OSHA

In 1970, Congress established OSHA as part of the Occupational Safety and Health Act (i.e., the OSH Act). The Act was signed by President Nixon on December 29, 1970, and became effective on April 28, 1971. OSHA has defined its mission as assuring that working men and women are provided with safe, healthful working conditions. The agency fulfills its mission by applying and enforcing standards developed under the Act. It also provides information, education, training, and assistance to employers so they can maintain safe and healthful workplaces [3].

The OSH Act established three permanent federal agencies: OSHA, within the Department of Labor; the Occupational Safety and Health Review Commission (OSHRC); and the National Institute for Occupational Safety and Health (NIOSH), within the Department of Health and Human Services. The OSH Act covers most private sector employers and their workers, in addition to some public sector employers and workers. Its reach includes all 50 states and certain territories and jurisdictions under federal authority [3].

The duties of OSHA include writing standards, inspecting workplaces for compliance with standards, and prosecuting violations. The OSHRC is responsible for resolving disputes between OSHA and violators of the OSH Act (usually employers). NIOSH conducts research on occupational hazards and makes recommendations for standards (e.g., N95 respirators to be used when caring for tuberculosis patients) [4; 5].

Workplace inspection is the responsibility of the Secretary of Labor and may result either from an employee complaint or from a problem identified during a previous inspection. An OSHA inspector may either order compliance with a regulation or issue a penalty, such as a fine. There is only one criminal penalty available under the Act, and this is applied if a worker dies from an employer's willful violation [6].

As mentioned, the healthcare industry had not previously considered OSHA regulations as affecting it. After all, hospitals did not use large machinery, assembly lines, or equipment that would put employees at risk for major injuries. However, research has identified a wide range of biologic, physical, psychosocial, and chemical hazards in the healthcare work environment [7; 8].

With the introduction of the human immunodeficiency virus (HIV) and a new focus on bloodborne pathogens, hospitals and other healthcare facilities were faced with the implementation of OSHA standards that would potentially cost both time and money. Many healthcare industries and organizations did not believe that the federal government should be quite so prescriptive and felt that some of the regulatory requirements for general industry might not be appropriate in a healthcare setting. To ensure that regulatory requirements are appropriate for healthcare settings, organizations such as the Association for Practitioners in Infection Control and Epidemiology (APIC) and the Centers for Disease Control and Prevention (CDC) work together with OSHA to develop standards.

In 1989, OSHA published a proposed rule regarding occupational exposure to bloodborne pathogens in hospitals and other healthcare settings. The proposed rule, based on the concept of Universal Precautions, raised concerns in the infection control community. The imbalance toward precautions that protected personnel and away from precautions that protected patients, the lack of proven efficacy of Universal Precautions, and the costs for implementing the proposed regulations were all concerns. After a series of public hearings by OSHA and a review of written comments, the proposed rule was modified and finalized in 1991. Although the final rule was expected to improve occupational safety during the care of patients infected with bloodborne pathogens, the impact on the cost of patient care and on nosocomial infection control remained undefined [9; 10].

The OSHA Bloodborne Pathogens Standard brought OSHA visibility to healthcare settings and required education about the implementation of and compliance with OSHA regulations. OSHA has become one of the most important organizations in the fight against bloodborne pathogens as a result of its ability to set standards for the use of barrier precautions and enforce the use of such precautions for employee and patient safety.

OSHA continues to urge improved safety in all categories of the workplace. In October 2010, the Assistant Secretary of Labor for OSHA reported that the agency's priorities for the coming fiscal year were to return to basics, update workplace safety and health regulations, and impose fair and strong enforcement [11].

BLOODBORNE PATHOGENS

The purpose of the Bloodborne Pathogens Standard, which was published by OSHA in final form in 1991, is to limit occupational exposure to blood, bodily fluids, and other potentially infectious materials, because any exposure could result in bloodborne pathogen transmission. This standard applies to all reasonably anticipated occupational exposures to blood or other potentially infectious materials that may result from the performance of an employee's duties [12]. "Good Samaritan" acts, such as resuscitating a co-worker, might not be considered occupational exposure [13; 14; 15].

The standard requires employers to implement an exposure control plan that mandates Universal Precautions (i.e., treating all body fluids as if they are potentially infectious). The standard also stresses hand hygiene, recommends the use of Personal Protective Equipment (PPE), sets forth processes to minimize needle sticks and blood splashing, ensures appropriate packaging of specimens, and regulates waste by employing biohazardous labeling before shipping [10; 12].

EVIDENCE-BASED PRACTICE RECOMMENDATION

The Association of periOperative Nurses asserts that all healthcare personnel must follow the Occupational Safety and Health Administration (OSHA) bloodborne pathogens standard when there is a risk of exposure to blood or other potentially infectious materials.

(https://www.guidelinecentral.com/guideline/308628. Last accessed January 25, 2023.)

Level of Evidence: Expert Opinion/Consensus Statement

Employers must require the use of, and provide at no cost, barrier items or PPE for employee protection. This includes gowns, masks, mouthpieces, goggles, resuscitation bags, and the proper gloves for the job being performed. Also included in the standard are methods for disposing of contaminated sharps and other regulated waste in OSHA-compliant containers [10].

Another aspect of the Bloodborne Pathogens Standard is the requirement that Hepatitis B vaccination be made available at no cost and within 10 working days of assignment to all employees who have occupational exposure to blood. Postexposure evaluation and follow-up must be made available to all employees who have had an exposure incident. Included in the evaluation and follow-up are laboratory testing, counseling, evaluation, and prophylaxis, if deemed necessary and if the employee consents [9; 12].

Some of the most common bloodborne pathogens include hepatitis C, HIV, and hepatitis B [10].

HEPATITIS C VIRUS

Hepatitis C virus (HCV) may be transmitted from patients to healthcare workers through accidental needle sticks or cuts, or through blood splashed onto the conjunctiva. Following percutaneous injury, the risk of infection is approximately 1.8% [16; 17; 18]. In 2019, 43,136 new cases of HCV were reported to CDC. This number does not include the adjustment made for under-reporting and under-ascertainment, making the estimated number of new HCV cases 57,500 in 2019. HCV is the leading cause of liver transplantation in the United States [19].

The long-term lethal potential of HCV is projected to be higher than that resulting from infection with Hepatitis B. This is due to the high rate of chronic infection and the lack of an effective vaccine. Often, patients with HIV also have HCV, and both pathogens can be transmitted in one exposure. Until 2010, HCV was usually treated with pegylated interferon/ribavirin (pegIFN/RBV); however, the treatment is expensive and has many adverse effects, and response rates were only 40% to 50% [20; 21; 22]. In 2011, the U.S. Food and Drug Administration (FDA) approved telaprevir and boceprevir for treatment of select patients with HCV infection (i.e., based on genotype) [22]. These two serine protease inhibitors are the first generation of direct-acting antiviral drugs approved for use in clinical practice. They are used in combination with pegIFN/RBV and have demonstrated response rates of 68% to 75% in naïve patients and up to 41% to 52% in previous nonresponders [23; 24; 25; 26]. The CDC has concluded that the evidence is insufficient to recommend postexposure prophylaxis for workers potentially exposed to HCV [16].

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

The risk of infection with HIV following percutaneous injury is approximately 0.3%; however, risk is significantly increased if the patient has advanced acquired immunodeficiency syndrome (AIDS), the needle is visibly contaminated with blood, or if the needle has been used in an artery or vein before the exposure occurs [18; 27].

Between 1% and 2% of hospital and surgical patients have HIV. Postexposure prophylaxis with combination drug regimens has been shown to decrease seroconversion risk, but this may be compromised by the presence of increased risk factors [20; 27].

In 2013, the CDC published updated HIV management guidelines, which further refine the treatment of potential exposures to HIV in the workplace [27].

HEPATITIS B VIRUS

Hepatitis B virus (HBV) is highly infectious and transmissible by needlestick in 6% to 30% of exposures, depending on the antigen status of the source [16]. Approximately 90% of infants and 25% to 50% of children 1 to 5 years of age remain chronically infected with HBV [28]. Vaccination has dramatically reduced the threat to healthcare workers from this disease; however, not all healthcare workers who are at risk of exposure to blood have been vaccinated [20; 28]. According to the CDC, postvaccination testing to ensure an adequate antibody response is indicated for those individuals who: are immunocompromised; received the vaccination in the buttock; are infants born to HBV-positive mothers; are healthcare workers who either have had contact with blood or are at risk for continued exposure to blood or body fluids; or are sex partners of persons with chronic HBV [28].

Many exposures can be prevented, using the following guidelines [20; 29]:

- Choose effective PPE (i.e., the right equipment for the job).
- Find alternatives for sharps, such as staples for skin closure, rounded tip scissors, nonpenetrating towel clips, needleless intravenous (IV) systems.
- Use safer sharps.
- Pass and handle sharps safely.
- Adopt safe habits (e.g., make certain that knife blades are removed from knife handles before instruments are sent to be cleaned).
- Dispose of sharps safely.
- Avoid recapping needles.
- Evaluate new safety devices carefully.

The CDC has estimated that 385,000 hospital-based healthcare workers suffer sharps injuries each year [30]. The wounds can range from pinpricks to deep cuts. Statistics such as this spurred OSHA, in 1999, to require facilities to put an exposure control plan into place and update it at least annually. OSHA expects healthcare employers to explore and incorporate new methods to protect staff and patients from bloodborne pathogens [12; 31].

OSHA regulations require that an employer provide a copy of the Bloodborne Pathogens Standard to the healthcare professional evaluating an employee after an exposure to blood or other potentially infectious material. An employer should also have a copy of this regulation accessible to employees who are receiving bloodborne pathogen training. In addition to providing a copy of the standard to employees, training regarding the standard should take place as each employee is hired and on an annual basis. All training should be documented and its effectiveness evaluated. Integral to the Bloodborne Pathogens Standard is a requirement that each job in a facility is evaluated for its risk of exposing the employee to body fluids [9].

As administrators and researchers explore new methods to protect patients, healthcare providers, and the environment from bloodborne pathogens, changes should be balanced with the impact on patient care and user satisfaction. OSHA has cited employers who have failed to implement available safer technology and safe work practices for handling sharps as part of their overall exposure control plan [20].

TUBERCULOSIS CONTROL

The United States has been waging a war against tuberculosis (TB) for more than 150 years. After it was found that a multidrug regimen could effectively kill the *Mycobacterium tuberculosis* organism, the number of those infected decreased dramatically, and many sanitariums were closed. By 1980, prevention programs were ended, and pharmaceutical companies had stopped manufacturing streptomycin. By 1985, the number of new cases of TB had increased, and by the early 1990s, the development of multidrug-resistant TB caused the epidemic to begin anew [32]. Due to recent attention and increased vigilance, incidence rates for TB infection in the United States have begun to decline. In 2021, a total of 7,882 cases of TB were reported in the United States, a 12.4% decrease from 2019. It should be noted that a decrease in 2020 (incidence rate: 7,171 cases) followed by a slight increase in 2021 was observed, but the increase is most likely due to under-reporting, delayed healthcare access, and/or missed diagnosis in 2020 as a result of the COVID-19 pandemic. Overall, the incidence rate has remained relatively stable, at approximately 2.5 cases per 100,000 persons [33]. However, it has been estimated that up to 13 million persons in the United States have latent TB infection, with 5% to 10% at risk for future disease [34; 35]. Furthermore, the increasing incidence of multidrug-resistant strains of the disease remains a problem.

Some of the increase in TB cases in the 1980s and 1990s could be partially attributed to immigration from developing countries, where routine immunization and treatment of communicable diseases was enforced less vigorously than in the United States. It could also be attributed partially to the susceptibility of immunocompromised patients, such as those with HIV. Substance abuse, homelessness, poverty, and a deterioration in public health infrastructures were other factors in the resurgence of TB [36].

This increase in TB prompted the CDC, in 1989, to issue a strategic action plan with the goal of decreasing the case rate of TB to less than 1 per million population by the year 2010. However, the plan was not fully implemented, and the number of TB cases increased. In 1993, the CDC outlined basic guidelines for TB control, including the recommendation that all facilities have a formalized plan for the control of TB [36; 37; 38].

Bacille Calmette-Guérin (BCG) is the vaccine for TB disease, although it is not commonly used in the United States. It is most often given to infants and children in countries where TB is common, and it should be considered for only select people in the United States. Healthcare workers may be considered as candidates for the BCG vaccine if they work in a setting in which a high percentage of patients are infected with TB strains that are resistant to both isoniazid and rifampin; there is ongoing transmission of drug-resistant TB strains to healthcare workers and infection is likely; or comprehensive TB infection-control precautions have been implemented but have not been successful [84].

In 2019, the CDC updated their guideline for the prevention of TB transmission in healthcare settings [64; 72]. The updated guideline recommends baseline (preplacement) TB testing and screening for all U.S. healthcare personnel. Although routine follow-up screening is not recommended, healthcare facilities should aim to identify latent tuberculosis infection among personnel and to encourage treatment. Postexposure screening and testing should be conducted for any healthcare personnel with known exposure to a person with potentially infectious TB disease. Healthcare personnel with a newly positive test result should undergo a symptom evaluation and chest radiograph to assess for TB disease. Personnel with latent TB infection and no prior treatment should be offered, and strongly encouraged to complete, treatment with a recommenced regimen, unless a contraindication exits. Finally, the CDC also recommends that healthcare facilities should provide annual education on TB, including risk factors, signs, and symptoms [64; 72].

OCCUPATIONAL EXPOSURE

In 1997, OSHA proposed a rule to establish a standard for occupational exposure to TB. In 1998 and 1999, the agency held public hearings and gathered comments regarding the proposed rule. Following a lull in activity, OSHA reopened the comment period in 2002 [39].

APIC worked to ensure that OSHA had all of the most recent TB studies, contending that those studies that depicted current TB epidemiology should be admitted and considered carefully before OSHA issued a final rule. Other groups, including the American Hospital Association, the American Lung Association, and the American Healthcare Association, all agreed on the need for OSHA to consider current clinical information before finalizing rules that would affect all healthcare facilities.

Despite these recommendations, OSHA concluded that a new rule was not needed due to the decline in the number of TB cases. The agency further concluded that a new rule would create confusion for healthcare facilities that were already voluntarily following TB guidelines published by the CDC. In 2003, OSHA withdrew the standard that applied only to respiratory protection against TB. In response, the American Nurses Association, as well as several labor groups, expressed dismay, believing that TB still posed a serious risk to healthcare workers [39].

In 2010, OSHA published a request for information to determine whether existing standards and organizational voluntary guidelines are effectively protecting healthcare workers from occupational exposure to infectious agents such as TB [42].

RESPIRATORY PROTECTION PROGRAM

The General Industry Standard mandates that all healthcare facilities in which healthcare workers use respiratory protection establish and implement a written respiratory protection program that includes procedures specific to the worksite. Employers must provide respirators, training, and medical evaluation at no cost to employees [43].

Training

The CDC has recommended that healthcare workers receive annual training on the nature, extent, and hazards of TB in the healthcare setting. Recommended training topics include risk assessment, use of environmental controls, how to select and use a respirator, and OSHA regulations regarding respirators. Trainees should be given opportunities to practice handling and wearing a respirator to achieve proficiency. They also should be provided with copies of training materials for future reference [44].

Respirator Selection

The CDC has recommended that protective devices used in healthcare settings be certified by CDC/NIOSH as either a nonpowered particulate filter respirator (i.e., N-, R-, or P-95, 99, or 100) or a powered air-purifying respirator and properly fitted to the wearer. The minimum respiratory protection is a filtering facepiece respirator (e.g., N95 disposable) [44].

Fit Testing

Fit testing ensures that the user understands what constitutes a proper fit in order to select a device that provides adequate protection. Periodic fit testing should be included in the initial respiratory protection program training and conducted periodically thereafter as a supplement to employee training and retraining [44].

OSHA AND EMPLOYEE HEALTH

The Employee Health Department of the healthcare facility has a critical role in the interpretation and implementation of OSHA guidelines. The employee health professional is the point person for many issues discussed in the first sections of this course. Depending on the facility's policies and structure, its Employee Health Department may be responsible for the oversight (in conjunction with the Infection Control Department) of many OSHA-related issues, from employee injuries and bloodborne pathogen exposures to high-efficiency particulate air (HEPA)-type mask fit-testing records.

Because the Employee Health Department is usually the keeper of records related to employee injuries, it becomes responsible for tracking bloodborne pathogen exposures and ensuring that employees are treated appropriately, that laboratory testing follows the appropriate guidelines, and that prophylaxis, if needed, is available. These records should be retained and recorded on the *OSHA 300 Log*.

In 2002, OSHA revised the rule addressing the recording and reporting of occupational injuries and illnesses. The goal of this revision was to simplify the overall recordkeeping for employers, generate more accurate information about occupational injuries, and better protect employee privacy. In 2015, OSHA again updated the recordkeeping rule to include two changes. The first change updated the list of industries that are exempt from routinely keeping OSHA injury and illness records. The second change expanded the list of severe work-related injuries and illnesses that all covered employers are required to report to OSHA. In 2016, OSHA published the new "injury and illness reporting rule." It does not change core recordkeeping requirements, but it does require that select recordkeeping forms be submitted to OSHA annually [45]. In 2019, OSHA published a rule to eliminate the requirement for establishments with 250 or more employees to submit certain forms electronically that may be used to protect personally identifiable information and data, although electronic submission of other forms is still required [45]. *Code of Federal Regulations*, title 29, sec. 1904, addresses recordkeeping [9].

One of the most confusing parts of recordkeeping is determining whether an injury or illness is recordable based on first aid or medical treatment. The revised standard sets new definitions of medical treatment and first aid to simplify recording decisions. An injury or illness is considered work-related if an event or exposure in the work environment either caused or contributed to the condition or significantly aggravated a pre-existing condition [9].

Work-related injuries and illnesses should be recorded if they result in [9; 45]:

- Death
- Hearing loss
- Loss of consciousness
- Days away from work
- Restricted work activity or job transfer
- Medical treatment beyond first aid

Work-related fatalities should be reported within eight hours. Work-related injuries and illnesses that are significant or meet any of the additional criteria listed below should also be recorded. Any significant work-related injury or illness that is diagnosed by a physician or other licensed healthcare professional or that involves cancer, chronic irreversible disease, a fractured or cracked bone, or a punctured eardrum should be recorded as well [9].

The following conditions should be recorded when they are work-related [9; 46]:

- Any needlestick injury or cut from a sharp object that is contaminated with another person's blood or other potentially infectious material
- Any case requiring an employee to be medically removed under the requirements of an OSHA health standard
- Tuberculosis infection as evidenced by a positive skin test or diagnosis by a physician or other licensed healthcare professional after exposure to a known case of active tuberculosis
- Hearing loss as evidenced by a hearing test (audiogram)

Hearing loss has occurred when the audiogram reveals that the employee has experienced a standard threshold shift (STS) in hearing in one or both ears (averaged at 2,000, 3,000, and 4,000 Hz), and the employee's total hearing level is 25 decibels or more above audiometric zero (also averaged at 2,000, 3,000, and 4,000 Hz) in the same ear(s) as the STS [46].

The following interventions are considered medical treatment and are almost always recordable on the *OSHA 300 Log* [9; 45]:

- Administration of immunizations, such as Hepatitis B or rabies (does not include tetanus)
- Use of wound-closing devices, such as sutures and staples
- Use of rigid means of support to immobilize parts of the body
- Physical therapy or chiropractic treatment

Medical treatment does not include [9]:

- Visits to a physician or other licensed healthcare professional solely for observation or counseling
- The conduct of diagnostic procedures (e.g., x-rays and blood tests), including the administration of prescription medications used solely for diagnostic purposes
- Any procedure that may be labeled first aid

If the incident required only the following types of treatment, it is considered first aid and is not reportable [9; 45]:

- Use of a nonprescription medication at nonprescription strength
- Administration of tetanus immunizations
- Cleaning, flushing, or soaking of wounds on the surface of the skin
- Use of wound coverings (e.g., bandages or gauze pads)
- Application of hot or cold therapy
- Use of any nonrigid means of support (e.g., elastic bandages, wraps, and nonrigid back belts)
- Use of temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, or back boards)
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister
- Use of eye patches
- Removal of foreign bodies from the eye using only irrigation or a cotton swab
- Removal of splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs, or other simple means
- Use of finger guards
- Administration of massage
- Drinking of fluids to relieve heat stress

If an injury is considered reportable, and therefore recordable, it should be recorded on the *OSHA 300 Log*. In addition, the injury or illness should be recorded on either the *OSHA Form 301* or an equivalent. The *OSHA Form 301* provides more information about the case and the individual involved. Information such as the events leading up to the injury or illness, affected body parts, and objects or substances involved should be included [45]. Any form, such as a workers' compensation report or accident report, may be used as long as it contains the same information. *OSHA Form 300A* should be used to record work-related hearing loss [46]. Other items that should be covered following an employee injury include:

- Prompt reporting of the injury
- Thorough documentation and investigation
- Timely treatment if the injury requires medical attention
- Consistent follow-up of an accident without injury or lost time to ensure that time is not lost at a later date
- Immediate notification of any insurance carriers
- Fast repair of any involved equipment
- Prompt recovery of a physician statement
- Retention of a physician's release to return to work before the employee returns to duty
- Methods of returning employees to work as early as possible through prompt rehabilitation or temporary job description alteration
- Accurate reporting on the *OSHA 300 Log*

An annual summary of injuries and illnesses that occurred during the calendar year should be reported. The annual summary (*OSHA Form 300A*) is a total of all the columns to the right of the dotted line on the *OSHA 300 Log* [45]. A company executive should certify that the summary is correct and complete, and it should be posted for 3 months in areas where other employee notices are normally posted. The *OSHA 300 Log*, privacy case list (if one exists), annual summary, and *OSHA 301 Incident Report Form*, or other suitable form (e.g., state workers' compensation report, insurance claim report, employer's accident report form) should be retained for 5 years following the calendar year to which they relate [9; 45].

In the hospital setting, most PPE is used as a barrier to blood and body fluids, such as blood-tinged mucous, blood, and urine. *Code of Federal Regulations*, title 29, sec. 1910.132 to 1910.139, originally published in 1994, address PPE. Subsequent revisions to this standard have incorporated current guidelines, hazard assessments for employee work areas, employee training, and properly fitting PPE. Hand equipment should fit properly and provide the proper protection. The type of glove used for protection from blood or body fluids would not be sufficient for a housekeeper handling caustic chemicals. The right glove for the job being performed is an important consideration [9].

The Employee Health Department is often considered to be the expert on PPE. OSHA addresses employee training in *Code of Federal Regulations*, title 29, sec. 1910.132(f). Employees should be trained regarding [9]:

- When to wear PPE
- What type of PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- Limitations of PPE
- Care, maintenance, useful life, and disposal of PPE

To ensure that each employee is properly trained, clear and measurable objectives should be developed. Because the regulation requires that employees demonstrate an understanding of the PPE guidelines, objectives should center on these criteria.

The employer should verify that employees have been provided with all the necessary training. A written form of documentation with the name of the employee and date of training is required, as well as documentation of retraining [9].

SAFETY/RISK MANAGEMENT

Depending on the size of the healthcare facility, the risk manager (in conjunction with the Employee Health Department) may also be responsible for safety issues. All employee injuries and illnesses should be assessed with regard to safety and the possibility that it may somehow have been compromised. When evaluating an employee injury, the safety issues that might affect the outcome (e.g., lifting, glove use, ergonomics, or air quality) should be examined to ensure that no overall safety issues exist. Any safety issues discovered should be documented and reported through the facility's Safety Committee to prove that the issues have been addressed and that no hazards are being neglected. Careful documentation will help the facility avoid the perception that it is ignoring OSHA regulations.

ROLE OF MANAGEMENT

Paramount to a successful employee risk management program is the involvement of the managerial and supervisory staff of the facility. This staff is the first line of defense. It will know the employees and what needs to be done, and it will understand that its example will be emulated. Middle management staff is vital to an employee program. Eliciting cooperation from this staff (i.e., supervisors/managers) will greatly increase the program's success. The staff's concerned attitude, use of necessary protective equipment, and safe work habits will encourage employee participation [47].

The supervisor is frequently first on the scene after an incident is reported and may be responsible for conducting the initial investigation. The supervisor's commitment to safety and accident prevention is key. Strong organizational policies and procedures that are consistently followed may determine whether an incident results in an employee or patient injury [47].

In addition, the direct supervisor may also be first to spot safety hazards, such as unsafe lifting, failure to wear PPE, employees who ignore wet floor signs, or the improper disposal of sharps that could lead to a blood or body fluid exposure. Prompt correction and disciplinary action, when indicated, are effective tools in preventing a reoccurrence of the incident. Consistency, fair play, and discipline, when necessary, are fundamental aspects of employee safety [47].

Controlling Costs

Some facilities have opted to use onsite care for the injured employee in order to control the employee's care and treat the injury quickly, with as little lost work time as possible. Other facilities have opted to contract with a physician who agrees to see all employees injured at the facility. The physician's familiarity with all injuries may help to cut costs and discover fraud. Injury prevention programs and aggressive workers' compensation case management are keys to controlling costs. The primary objective is to eliminate workplace injuries and lost-time accidents [47].

An inherent problem related to employee injury may result from conflict between the employee's private physician and the facility's physician. This situation may result in the failure of the employee to receive any medical or monetary benefits for an injury. Reform legislation in Oklahoma, passed in 2005, allows employers to select the employee's physician as part of the terms of employment [48]. Since then, other states have adopted similar laws.

Incident reporting, documentation, and investigation are all aspects that will be covered later in the course, but all of these factors may have a direct effect on successful cost containment for a facility [47].

WORKERS' COMPENSATION

One of the factors that will complicate any employee injury is workers' compensation. Each state has its own set of laws; however, prompt reporting of treated injuries and an accurate OSHA accident log will help to lessen any conflicts.

Hundreds of thousands of dollars are spent every year on workers' compensation claims, including money for medical/surgical costs, rehabilitation, and legal fees. Back injuries top the list of employee injuries; in a healthcare facility, these are frequently due to a combination of improper patient lifting and failure to ask for assistance when lifting patients. Slips and falls on wet floors account for many employee injuries as well. The physical building, outside surroundings, patient population, equipment in use, and staffing plan all play a part in the assessment of employee risk.

Workers' compensation court usually requires an initial accident report and a first injury report to be filed within ten days of the injury, even if the injury leads to no lost time. The documentation of the injury should be complete and kept at the facility. OSHA requires employee health records to be kept confidential [9].

A record of an employee injury is also provided to any third-party payer (i.e., insurance carrier). Some facilities are self-insured. Others have one insurance company that specializes in employee injuries and a second company that handles liability claims, such as physician malpractice or patient/visitor injuries. Prompt reporting to the facility's various carriers will put the facility in the best position to keep costs down. In addition, a good relationship with the insurance carriers will often result in the receipt of educational material that may lighten the risk manager's education responsibilities.

Employees should understand that prompt reporting will lead to effective treatment and lower overall costs to the facility. Risk managers should be familiar with the workers' compensation laws in their own states. It is wise to have the handbook available for reference.

VIOLENCE IN THE WORKPLACE

Violence in the workplace is an issue that is increasingly receiving public attention. An estimated 2.6 million workers are injured each in the workplace, of which more than 37,000 injuries are intentionally caused by another person. While a majority of these injuries are nonfatal, the U.S. Bureau of Labor Statistics (BLS) reported that of the 5,190 fatalities in the workplace in 2021, 761 workers were fatally injured by assault and/or violent attack [40; 49; 51].

The BLS also has reported that in 2020, the majority (61%) of nonfatal workplace assaults occurred in service settings, most commonly affecting healthcare support, followed by healthcare practitioner and technical occupations (24%) [50]. This increased risk may be attributed to several factors, such as the prevalence of weapons (e.g., firearms) among patients, their families, or friends; the use of hospitals by the criminal justice system as places to hold disturbed and/or violent individuals; the unrestricted movement of the public in healthcare facilities; and isolated work with patients [50; 51]. Workplace assaults result in lost workdays and millions of dollars in lost wages each year [51]. For healthcare workers, these assaults comprise 10% to 11% of workplace injuries involving days away from work, compared with 3% for private sector employees [50; 51].

Ongoing and thorough employee safety education should be an inherent component of the facility's risk management and employee injury prevention programs. Education on back injuries is especially important, as such injuries are costly. In addition, safety information should always be part of a new employee's orientation to a facility and should include safe patient lifting, hazardous material handling, bloodborne pathogen precautions, sharps handling, and incident reporting. Documentation of this education is essential.

The mission of OSHA is to provide a safe workplace for all employees. A well-organized employee health risk management program can help a facility meet OSHA requirements.

SAFETY DATA SHEETS/ HAZARDOUS MATERIAL

The Hazard Communication Standard, also known as the Right-to-Know Law, was first enacted by OSHA in 1983. It was modified in 1987–1989, 1994, and 2012 and is referenced as *Code of Federal Regulations*, title 29, sec. 1910.1200 [9; 52].

The purpose of this standard is to ensure that chemical hazards in the workplace are identified and evaluated. This is the responsibility of chemical manufacturers and importers, who are required to provide hazard information to employers who purchase their products [53]. Employers are then required to inform employees about the hazards of workplace chemicals—from liquid correction fluid to formaldehyde—to ensure that employees can monitor their exposure to hazardous chemicals and protect their health. Employers who neither produce nor import chemicals are only required to ensure that hazard information is transferred to its employees by means of a comprehensive hazard communication program, which should include container labeling and other forms of warning [9]. Regardless of who performs the hazard determination, the procedures used must be described in writing and made available on request to employees and their designated representatives, as well as to OSHA and NIOSH officials [53].

The Hazard Communication Standard defines a hazardous chemical as one that presents either a physical hazard (i.e., fire, explosive, or reactive) or a health hazard (i.e., one with systemic or target organ effects) in the workplace. Certain chemicals have been specifically designated as hazardous. A list of these chemicals is provided by several agencies, including [53]:

- OSHA Toxic and Hazardous Substances (*Code of Federal Regulations*, title 29, sec. 1910.1030 App A)
- American Conference of Governmental Industrial Hygienists

- National Toxicology Program Annual Report on Carcinogens
- International Agency for Research on Cancer Monographs

If a chemical is encountered that is not found on one of these lists, it is the employer's responsibility to search other scientific literature to determine if the chemical is hazardous [53]. Every chemical used or encountered in the facility should have a Safety Data Sheet (SDS) readily available to employees, which should be updated on a regular basis. Training and documentation of the training should be provided and take place at the time of initial assignment, whenever a new, potentially dangerous chemical is introduced into the workplace.

A hazard communication program may include, but is not limited to [9]:

- Understanding OSHA requirements
- Assigning responsibility for tasks
- Preparing an inventory of chemicals
- Determining where to maintain a list of the hazardous chemicals (i.e., in each work area or in a central location)
- Ensuring that containers are labeled
- Obtaining SDS for each chemical
- Ensuring that employees are informed of the hazards associated with chemicals contained in unlabeled work areas
- Developing and maintaining a written hazard communication program for the workplace
- Preparing and distributing SDS to workers
- Training workers regarding hazards and protective measures
- Establishing procedures to evaluate the program's effectiveness

HAZARDOUS WASTE

Approximately 15% of wastes generated by healthcare facilities are considered hazardous materials that may be infectious, toxic, or radioactive. These materials include [54]:

- Infectious and anatomic waste (This represents the greatest proportion and consists of cultures/stocks of infectious agents; wastes from infected patients; wastes contaminated with blood/blood derivatives; infected laboratory animals; contaminated medical supplies or equipment; and recognizable body parts.)
- Chemicals (e.g., solvents/disinfectants) and pharmaceuticals
- Sharps (e.g., syringes, disposable scalpels, or blades)
- Genotoxic waste (i.e., highly hazardous, mutagenic, or carcinogenic), radioactive matter, and wastes with high heavy metal content (e.g., broken mercury thermometers)

Hospitals and other healthcare facilities, laboratories, research clinics, mortuaries, autopsy clinics, blood banks, and nursing homes are major sources of healthcare waste. The wealthiest nations can produce up to 5 kg of hazardous waste per person per year. Although poorer nations generate lesser amounts of waste, they typically do not distinguish between hazardous and nonhazardous waste [54]. Each facility that generates infectious waste should have a waste management plan that covers: the segregation, packaging, storage, treatment, transport, and disposal of the waste; and employee training on the proper handling of the waste. Sharps should be kept in leak-proof, rigid, puncture-resistant containers that are either red in color or visibly labeled with the word "sharps" and the biohazard symbol. Infectious waste, other than sharps, should be kept in containers that are impenetrable to moisture, strong enough to resist tearing, and stored in a secure area. The area should be air conditioned and inaccessible to animals, rodents, and vermin [10].

The waste should be autoclaved or incinerated before being disposed of in regular landfills, depending on state laws. If waste is transported away from the facility, it should be placed in containers or compartments that prevent scattering, spillage, and/or leakage of waste during transport, and it should not be transported along with noninfectious waste unless all of the waste is handled as infectious [10].

Assessment of a facility's waste management program should include [55; 56]:

- The importance of a facility-wide approach to ensure compliance
- The necessity for use of established benchmarks, such as pounds of regulated medical waste (RMW) per patient day, or pounds of RMW as a percentage of overall waste in the facility
- The careful placement of RMW containers
- The issues relating to bidding for services
- The appropriateness of waste logos
- Reusable versus disposable issues
- The treatment options for medical waste

Determining how to reduce waste is an ongoing concern. Comprehensive education that encourages replacing disposable waste items from dialysis, surgery, or autopsy (e.g., towels, sheets, lab coats, underpads) with reusable items has the potential to reduce red-bag waste to only 6% to 10% of a hospital's total waste [56; 57]. It is estimated that only 2% to 3% of hospital waste truly needs to be disposed of as red-bag waste [56].

RADIATION

Employers are responsible to evaluate and measure levels of any radiation or concentrations of radioactive material present, where applicable. Appropriate personnel monitoring equipment, such as film badges, should be available, and each radiation area should be conspicuously posted with a sign or signs bearing the radiation caution symbol [9]. (Employers should refer to state guidelines for information regarding the radiation produced by radiographic [x-ray] machines.)

The Nuclear Regulatory Commission (NRC), OSHA, and individual states all provide regulations regarding radiation safety. It is the responsibility of the healthcare organization to determine which regulations are applicable to its facility. NRC regulations apply to facilities that have radioisotopes on site, such as facilities that are engaged in nuclear medicine and using radioactive sources. OSHA regulations apply to organizations that are merely performing medical imaging, including magnetic resonance imaging (MRI). If the facility is a Veteran's Administration or other federal facility, it should always comply with OSHA regulations. However, if a facility is located in a state that has an agreement with OSHA to set its own occupational safety standards (which must be at least as stringent as OSHA's), then the state's requirements apply [58; 59].

OSHA has set standards for radiation exposure levels and requires a radiation monitoring program. However, the radiation monitoring program need not continue indefinitely. Employers are not required to provide monitor badges to employees just because they work in an area where radiation is used. They are only required to provide monitor badges to those employees likely to receive a dose of radiation in excess of 25% of the allowed quarterly exposure limits and to employees who work in a high-radiation area. When an organization has compiled the necessary data through radiation surveys and monitoring results, it may reduce the scope of a program that is costly and time-consuming. The acquired data should document that employee exposure levels to radiation are less than 25% of the allowed quarterly limits set by OSHA [9].

If data are available to show that employee exposures do not exceed 25% of these quarterly limits and that the employees do not work in a high-radiation area, then the employees need not be monitored or provided with monitor badges. Additional monitoring requirements may apply to employees younger than 18 years of age or those working with radioisotopes. They may also apply if new equipment and processes have been introduced [9].

The radiation monitoring requirements for the majority of small, rural healthcare organizations are minimal for two reasons. First, these smaller facilities typically use only general radiographic equipment, and second, they do not normally have nuclear medicine programs that utilize radioisotopes.

CHEMICAL AND BLOOD SPILLS

Part of the healthcare facility's responsibilities for workplace safety rests with its ability to have a plan in place for managing spills of all kinds [9]. Both blood spills and chemical spills (e.g., formaldehyde) contain the potential for employee injury.

Because of the potential for injury, these spills (and their cleanup) are regulated by OSHA [9; 10; 53]. Factors to consider if a spill occurs include:

- Location of the spill (i.e., counter, cabinet, or surgery)
- Quantity of the chemical or biologic product released
- Physical properties of the released substance
- Hazardous properties of the material released (i.e., toxicity, flammability, and corrosivity)
- Types of protective equipment needed

Clean-up supplies should include, but are not limited to:

- Neutralizing agents, such as sodium bicarbonate or sodium bisulfate
- Absorbents, such as sand or vermiculite
- Pans, small shovels, or scoopers
- Containers with lids for disposal

The healthcare facility should follow these guidelines if a spill occurs:

- Attend immediately to all personnel who may have been contaminated.
- Notify personnel in the immediate area of the spill.
- If spilled material is flammable, turn off any electrical sources.
- Contain the spill using an absorbent material, for example:
  - Pour absorbent material around the perimeter of the spill.
  - Once contained, pour additional absorbent into center of spill.
  - Use a small shovel or scooper to work absorbent located around the perimeter into the middle until all the chemical is absorbed.
- During clean up, use protective equipment, such as gloves, safety glasses, and respiratory protection.
- Leave on or establish exhaust ventilation, if safe to do so.

Spill kits for both chemical and blood spills should be placed strategically around the facility. All personnel should be trained in the use of the spill kits, and the training should be documented. Policies should be in place that cover spill cleanup, protective equipment, handling solid or liquid spills, and the storage and handling of any chemicals.

The easiest way to prevent spills is through careful storage and handling. Chemicals should be stored in properly labeled containers with special attention to hazard warnings. Flammables should be stored in special storage areas; this includes items such as paint and turpentine. Water-reactive chemicals require dry storage. Compressed gas cylinders should be secured and properly supported.

FIRE SAFETY

Workplaces that handle flammable chemicals, process hazardous waste, or house patients should be concerned with the risk of fire. Fire safety should be part of any hazard communication training program. Smoke alarms, sprinklers, and/or fire extinguishers should be present. All employees should know about the fire risks associated with chemicals, gases, or equipment used. They should also know how to respond to a fire, which includes how to rescue patients and other employees, and how to locate and properly use fire extinguishers.

EVIDENCE-BASED PRACTICE RECOMMENDATION

According to the American Society of Anesthesiologists, all anesthesiologists should have fire safety education, specifically for operating room fires, with emphasis on the risk created by an oxidizer-enriched atmosphere.

(https://pubs.asahq.org/anesthesiology/article/118/2/271/13592/Practice-Advisory-for-the-Prevention-and. Last accessed January 25, 2023.)

Level of Evidence: Expert Opinion/Consensus Statement

Fire safety plans should include fire emergency preparation, including alarm systems, marked exits, and written emergency plans. Many hospitals use acronyms such as RACE (Rescue, Alert, Confine, Extinguish) to help employees remember the proper steps for fire emergency response.

Annual inspections by the fire marshal, quarterly fire drills, annual fire safety in-services, and monthly fire extinguisher documentation are all elements of a successful fire safety program. Staff education and documentation of the education are integral parts of the fire safety plan.

OSHA requires that employers develop and maintain on site a written fire prevention plan. The plan must be available for employee review; employers with 10 or less employees may orally communicate the plan. The plan should include a list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and how to control them, and the type of protective equipment needed to control each type of hazard [9].

INDOOR ENVIRONMENTAL QUALITY

Over the last several decades, concerns about the quality of indoor office environments have risen dramatically in the United States. The term "sick building syndrome" (SBS) describes a range of acute health and comfort effects that workers link to time spent in a building. Workers identify the building as the cause of their symptoms because they find relief from the symptoms when they leave the building [60]. SBS may be caused by inadequate ventilation, chemical contaminants from indoor or outdoor sources, and biologic contaminants. Although some symptoms and illnesses have been associated with a building's characteristics (e.g., dampness), medical and environmental tests often are not able to identify an offending contaminant in SBS. In contrast, a building-related illness (BRI) is one in which the symptoms of a diagnosable illness can be both identified and directly attributed to a specific airborne building contaminant. Examples of such illnesses include asthma, hypersensitivity pneumonitis, inhalation fever, rhinosinusitis, and infection [60; 61; 62].

NIOSH uses the term indoor environmental quality (IEQ) to describe the problems associated with air quality in an office or other building environment. NIOSH investigates potential health hazards in the workplace by means of a Health Hazard Evaluation (HHE), conducted under the authority of the OSH Act. Results of HHEs have indicated that, in addition to concerns about a building's air quality, employees have reported concerns about comfort, noise, and lighting as well as job-related ergonomic and psychosocial stressors [61].

When NIOSH conducts an HHE, it investigates a building's pollutant sources and pathways, its heating, ventilating, and air conditioning (HVAC) system, and its occupants. The HVAC system impacts how pollutants are distributed throughout the building as well as how they are removed from the building's air supply. Common pollutants and their sources include carbon dioxide, molds, bacteria, cleaning products, copy machines, and pesticides. An improperly maintained HVAC system may also be a source of pollutants [61].

An area of IEQ concern for hospitals is the operating room, where workers may be exposed to waste anesthetic gases, including nitrous oxide and halogenated anesthetics (e.g., halothane, enflurane, and isoflurane), while administering anesthesia. Exposure may also occur in the recovery room when the patient exhales the gases.

Some studies have reported miscarriage, genetic damage, and cancer among workers in operating rooms who have experienced long-term exposure to low concentrations of these gases. Exposure to high concentrations may cause headache, irritability, fatigue, nausea, drowsiness, difficulties with judgment/coordination, and liver and kidney disease. NIOSH has recommended the following safeguards to reduce worker exposure to waste anesthetic gases [63]:

- Install a well-designed scavenging system that includes securely fitting masks, sufficient flow rates for the exhaust system, and properly vented vacuum pumps.
- Install a ventilation system that circulates and replenishes the air in operating rooms and recovery rooms.
- Monitor anesthetic equipment with leak test equipment and monitor the room air. Maintain good records of all collected air samples.
- Prevent leakage from the anesthetic delivery system by replacing loose-fitting connections, loosely assembled or deformed slip joints and threaded connections, and defective or worn seals, gaskets, breathing bags, and hoses.
- Provide employee training on hazard awareness, prevention, and exposure control.
- Obtain baseline liver/kidney data for operating-room workers and periodically monitor their organ functioning.

ERGONOMICS

The word ergonomics is derived from the Greek words *ergon* (work) and *nomos* (principle or law). It was first coined by a Polish scientist and educator in 1857 [65]. The science of ergonomics was not widely applied until World War II, when the fast pace of war manufacturing created physical and psychologic problems among workers [65]. Ergonomics is now defined as the science of fitting workplace conditions and job demands to the capabilities of the working population. Successful fits assure high productivity, reduced worker illness and injury, and increased worker satisfaction [66].

Although the scope of ergonomics is broad, OSHA primarily uses the term to define and assess work-related factors that put individuals at risk of musculoskeletal disorders (MSDs), which account for 33% of all worker injury and illness cases annually [65]. Examples of ergonomic risk factors have been identified in jobs and tasks that require prolonged, repetitive movements; recurrent heavy lifting, pushing, or pulling; and prolonged, awkward working positions. Employee exposure to vibration and cold may also be risk factors [66].

When seeking to identify conditions that may be contributing to MSDs, OSHA has recommended that employers [66]:

- Review/analyze injury/illness records (i.e., *OSHA 300 Logs*, and workers' compensation claims) to determine whether certain jobs/tasks are associated with ergonomic-related injuries;
- Analyze the jobs/tasks before assigning them to workers and before injuries have occurred; include employee input and make corrections where necessary; and
- Be aware of industry-wide conditions that contribute to ergonomic-related injuries (e.g., back injuries among healthcare workers).

Medical management, employee training and education, and workstation design are important components of an ergonomics program. Many hospitals and physicians' offices have gone paperless, and millions of workers in the United States work with computers every day [65]. OSHA has developed guidelines for helping employers and employees create workstations that are both safe and comfortable [67]. Although no single correct posture or workstation arrangement exists, adhering to some basic design goals may help to minimize or eliminate problems. Adjustable chairs, footrests, armrests, and computer monitors may help to reduce injuries. Lighting, work processes, and worker posture are additional factors to consider when conducting an ergonomic assessment of the workplace [68]. Employees should be trained on ergonomic issues to help them identify problem areas within their jobs. Failure to recognize some of the early warning signs (e.g., numbness, blurred vision, aching or tingling, and weakness) may allow a small problem to become a serious injury [68].

In 1999, OSHA published a proposed Ergonomic Program Standard. This proposed standard applied to general-industry employers whose employees performed manufacturing or manual handling tasks and reported MSDs [69]. In 2000, the House voted to block federal rules aimed at preventing some of the 1.8 million workplace injuries that American workers were suffering annually. In 2001, President George W. Bush signed a joint resolution of Congress that disapproved OSHA's proposed Ergonomics Standard. As a result, the standard is no longer in effect, and employers and employees are not bound by its requirements [65; 70].

Although no standards exist to universally regulate ergonomics, OSHA has established a protocol for developing industry and task-specific ergonomic guidelines [63]. OSHA has developed guidelines for poultry processing, retail grocery stores, shipyards, and nursing homes [66]. Although specific ergonomic standards for healthcare professionals have yet to be established, in 2014, OSHA published a new educational web resource that contains a variety of guidance products and materials to help hospitals prevent worker injuries, assess workplace safety needs, and enhance safe patient handling programs. The products and materials are available at https://www.osha.gov/hospitals [71].

Despite the lack of a final standard, employers are still obligated to follow the General Duty Clause, Section 5(a)(1), of the OSH Act, which requires employers to maintain a workplace that is free of serious hazards, including ergonomic hazards, whether or not voluntary guidelines exist. OSHA will continue to cite for ergonomic hazards [73; 74].

LATEX ALLERGY AND GLOVE MANAGEMENT

Concern over public health issues and the need for occupational PPE has led to an increase in the use of latex gloves among healthcare workers. This increase has in turn resulted in high reports of skin reactions to latex among this population [75]. OSHA has estimated that 8% to 12% of healthcare workers may be sensitive to latex [76]. Most reactions are not serious and can be prevented. However, for some individuals, exposure to latex may be life threatening. Sensitivity to latex has been found to persist for as long as five years beyond discontinued use among some healthcare workers [77].

Individuals with a high risk of developing a latex allergy include healthcare workers, those with a history of allergies, and anyone who frequently comes in contact with latex products. Latex allergies commonly begin with a rash on the hand after wearing a latex glove. The three main types of reactions are irritant contact dermatitis, allergic contact dermatitis, and hypersensitivity immune system response [78].

Irritant contact dermatitis is a nonallergic, inflammatory response characterized by dry, itchy, flaky skin (usually on the hands) with cracks and sores. It may be caused by skin irritation from wearing gloves, exposure to other products and chemicals in the workplace, or repetitive hand washing and drying. Powders added to gloves, combined with sweat, may aggravate existing dermatitis. Wearing cotton liners, choosing a nitrate or vinyl glove, and avoiding the use of gloves when possible may provide relief for the dermatitis [78; 79].

Allergic contact dermatitis, also referred to as delayed hypersensitivity or chemical sensitivity dermatitis, is not easily distinguished from irritant contact dermatitis because the reactions resemble those caused by poison ivy. However, in spite of the similar symptoms, allergic contact dermatitis is caused by a cellular immune response in the body, activated by repeated exposure to the allergen, latex [78; 79].

Hypersensitivity immune system response is an actual latex allergy. This type of response is characterized by pruritus, inflammation, swelling, hives, and wheezing, usually immediately after exposure. Even low levels of exposure may trigger allergic reactions in some sensitized individuals. The response may progress to anaphylaxis in susceptible individuals, which is evidenced by hypotension, confusion, and extreme airway constriction. Individuals experiencing anaphylactic shock require immediate treatment. Allergy to latex should be suspected in any individual who develops specific symptoms, such as nasal irritation, hives, shortness of breath, wheezing, or unexplained shock [78; 79].

Changing to a nonlatex glove to eliminate reactions may not work because some nonlatex gloves may still contain chemical sensitizers. Gloves labeled hypoallergenic do not necessarily eliminate allergic reactions. The use of hypoallergenic gloves may minimize the likelihood of an allergic reaction but will not eliminate the possibility of a reaction. Additional protective measures recommended by NIOSH include [78]:

- Good housekeeping practices in the workplace to minimize dust that contains latex
- Employee education and training on latex allergy
- Periodic screening for high-risk employees
- Employer evaluation of prevention strategies

Employers should take all measures to find the kind of glove that may be worn safely by employees without exposing them to the external hazards of harmful material or the internal hazards of a reaction to the equipment providing protection [9].

TRAINING AND EDUCATION

Employee training and education are emphasized throughout the OSHA standards. Employers should consider the following components when developing a training program [9]:

- Designate a person responsible for conducting the training
- Design a specific format for the training program (e.g., audiovisuals on classroom instructions)
- Identify the important elements of the training program
- Develop and implement procedures to train new employees at the time of their initial assignments

When OSHA visits a facility, it expects the facility to be able to produce a written training program that addresses all aspects of safety, including fire safety, hazard communication, and disaster plans. OSHA will additionally expect employers to provide proof of employee education (e.g., lesson plans, inservice dates, sign-in sheets, and education evaluations). The Bloodborne Pathogens Standard requires employee education to occur immediately on hire and at least annually thereafter. Documentation should reflect that this has occurred [80].

LEGAL ISSUES

In today's litigious society, any facility is at risk for lawsuits. If an employee is injured on the job and able to show that a lack of safety equipment or training or unsafe conditions caused the injury, the facility is at risk for litigation. Lack of proper treatment of the injury and continuing unsafe conditions might also contribute to an employer's risk for litigation.

Attorneys who investigate incidents of employee injury will expect to be able to examine available documentation, including incident reports, medical records that include treatment of the employee, and training and education records. Safety conditions that might have caused the injury, any perceived unsafe conditions that exist, the safety committee minutes that show how the facility has addressed the condition, and further actions to correct the condition may also be reviewed.

Knowing what the standards prescribe for a particular facility and properly documenting all programs (e.g., written plans, the education program, or follow-up of existing conditions) will provide the employer with the best protection possible. Employers should carefully read the standards and provide training seminars and other relevant employee resources to ensure that their facilities are in compliance.

SURVEYS, COMPLIANCE, AND DOCUMENTATION

CONSULTATION

The General Duty Clause mandates employers to furnish employees with a workplace that is free from recognized hazards that may cause death or serious physical harm. To avoid citations, employers should comply with standards. This may be accomplished by employing an internal safety staff or by employing an outside private consultant. Free consultations are available to small businesses with no more than 250 employees at one site and no more than 500 employees total at all sites [81]. Consultation may be invaluable for small, rural facilities.

Requests for the OSHA consultation service may be made in person, over the telephone, or in writing. The consultation will include an opening conference and an inspection to examine building structure, air and noise monitoring procedures, PPE, job training, safety and health programs, injury and illness records, and hazard communication procedures [81].

After the inspection has been completed, a closing conference will occur during which potential problems will be discussed. If the consultant has deemed a condition to be an "imminent danger," the employer should take immediate action to correct the condition. If a condition is deemed to be a "serious violation" (according to OSHA regulations), the consultant and employer will together devise a corrective action plan. The consultant may also recommend increased training and monitoring, safety promotion, and accountability procedures [81].

Employers may benefit from a one-year exemption from inspection (not including inspections prompted by employee complaints or fatalities) if all identified hazards have been corrected and the employer has instituted a comprehensive safety program. The consultant will not issue citations, impose penalties, routinely report violations to OSHA, or guarantee that a worksite will pass an OSHA inspection [81].

SURVEYS/OSHA INSPECTIONS

An OSHA inspector will visit a facility to conduct either a programmed inspection or an unprogrammed inspection. A programmed inspection is generally scheduled due to OSHA's selection criteria, such as injury/death rates, toxic substance exposure, and a high number of lost workdays for the industry type. An unprogrammed inspection occurs when an employee formally complains to OSHA about either a potentially unsafe working condition or an imminent danger at the workplace [82].

Employers should understand the limits of the OSHA inspection. For example, employers may voluntarily consent to an inspection but they are not required, according to the Fourth Amendment to the U.S. Constitution, to admit inspectors who do not present a warrant [83]. Although the additional time it takes OSHA to secure a warrant may allow the employer to resolve immediate and critical compliance issues, employers who proactively create and use area-specific self-inspection checklists may help minimize hazards and avoid compliance violations [83].

OPENING CONFERENCE

During the opening conference, the OSHA inspector will explain the purpose of the visit, provide OSHA pamphlets, request identification of trade secrets, and review the employer's records. Employers are not required to provide records that are not specified by the warrant. Records and programs that are usually specified include the written hazard communication and safety programs, the injury/illness log, and hazard exposure records. The results of the records review determine whether a comprehensive workplace inspection is needed. A short tour of the facility may also be conducted [81; 82; 83].

TOUR OF THE FACILITY

The OSHA inspector and any accompanying representatives determine the route and duration of the tour; however, the inspector should always be accompanied by a representative of the employer. If the inspector wishes to see a specific part of the facility, the employer's representative should escort the inspector directly there. During the tour the inspector may talk with employees or meet with them in private (with their permission), take notes, make instrument readings, and take photos or videos. If the inspector takes notes or measurements or uses a camera, the employer should do the same and should also record everything that has happened during the tour, noting the time and date. If the inspector has identified potential problems (even when the employer agrees and immediately corrects the problems), the inspector will likely issue citations and fines [82].

CLOSING CONFERENCE

The purpose of the closing conference is to [82]:

- Advise the employer about conditions observed in the facility
- Obtain further information
- Relate possible citations, appeal rights, and associated time limits
- Answer the employer's questions

If violations are voluntarily and immediately corrected, the employer should make certain that the inspector acknowledges this before leaving the facility. This should be confirmed in the presence of a witness, with the date and time noted.

The U.S. Department of Labor will notify the employer, in writing, about any citations or penalties. The employer then has 15 working days to either pay the penalties or to contest the citations, penalties, or both. If the employer fails to contest the citations, the penalties are final [82; 83].

In 2015, Congress enacted legislation requiring federal agencies to adjust their civil penalties to account for inflation, resulting in a 78% increase in penalties. The adjusted penalties took effect August 1, 2016. Since then, the maximum penalty has been adjusted for inflation each year [82].

As of January 2023, the violations, and their associated penalties, that have been structured for the workplace include [41; 82]:

- **Willful violation**: Given when the employer intentionally and knowingly commits a violation. The penalty may be up to $156,259 per violation. The minimum willful penalty is $5,000. A willful violation that causes an employee's death may result in a fine of up to $250,000 (or $500,000 if the employer is a corporation), or imprisonment up to six months, or both. A second conviction doubles the possible term of imprisonment.
- **Serious violation**: Given when the employer is aware of a hazard that may result in death or serious physical harm (e.g., not locking out or tagging out equipment). The fine may be up to $15,625for each violation.
- **Other than serious citation**: Given when violations are not likely to cause death or serious harm (e.g., lack of labeling a biohazard). The fine may be up to $15,625.
- **Failure to abate**: Given when the employer has not corrected a previously issued OSHA citation and the abatement date has passed or when the employer has not timely complied with interim measures involved in a long-term abatement. The fine may be up to $15,625 per day.
- **Repeat violation**: Given when a violation has not been corrected. The fine may be as much as $156,259 for each such violation within the previous three years.

To plan for an OSHA inspection, employers should understand the law (consult *Code of Federal Regulations*, title 29, sec. 1910), know what the inspector is likely to do, develop and implement a self-inspection program, and ensure that safety and health training programs are in place.

GLOSSARY OF ACRONYMS

AIDS: Acquired immune deficiency syndrome

APIC: Association for Practitioners in Infection Control and Epidemiology

BRI: Building-related illness

CDC: Centers for Disease Control and Prevention

CFR: Code of Federal Regulations

HBV: Hepatitis B virus

HCV: Hepatitis C virus

HEPA: High-efficiency particulate air

HHE: Health Hazard Evaluation

HIV: Human immunodeficiency virus

HVAC: Heating, ventilating, and air conditioning

IEQ: Indoor environmental quality

IV: Intravenous

MRI: Magnetic resonance imaging

NIOSH: National Institute for Occupational Safety and Health

NRC: Nuclear Regulatory Commission

OSHA: Occupational Safety and Health Administration

OSH Act: Occupational Safety and Health Act

OSHRC: Occupational Safety and Health Review Commission

PPE: Personal protective equipment

RACE: Rescue, alert, confine, extinguish

RMW: Regulated medical waste

SBS: Sick building syndrome

SDS: Safety Data Sheet

STS: Standard threshold shift

TB: Tuberculosis

UP: Universal Precautions

VDT: Video display terminals

RESOURCES

The most important resource is the *Code of Federal Regulations*, title 29, sec. 1910. Additional resources include:

Association for Professionals in Infection Control and Epidemiology
1400 Crystal Drive, Suite 900
Arlington, VA 22202
(202) 789-1890
https://apic.org

National Institute for Occupational Safety and Health (NIOSH)
Patriots Plaza 1
395 E Street, SW, Suite 9200
Washington, DC 20201
(800) 232-4636
https://www.cdc.gov/niosh

National Institute of Environmental Health Sciences (NIEHS)
P.O. Box 12233, MD K3-16
Research Triangle Park, NC 27709-2233
(919) 541-3345
https://tools.niehs.nih.gov/wetp

U.S. Department of Labor, Bureau of Labor Statistics
Postal Square Building
2 Massachusetts Avenue, NE
Washington, DC 20212-0001
(202) 691-5200
https://www.bls.gov

U.S. Department of Labor, Occupational Safety and Health Administration
200 Constitution Avenue NW
Washington, DC 20210
(800) 321-6742
https://www.osha.gov

Implicit Bias in Health Care

The role of implicit biases on healthcare outcomes has become a concern, as there is some evidence that implicit biases contribute to health disparities, professionals' attitudes toward and interactions with patients, quality of care, diagnoses, and treatment decisions. This may produce differences in help-seeking, diagnoses, and ultimately treatments and interventions. Implicit biases may also unwittingly produce professional behaviors, attitudes, and interactions that reduce patients' trust and comfort with their provider, leading to earlier termination of visits and/or reduced adherence and follow-up. Disadvantaged groups are marginalized in the healthcare system and vulnerable on multiple levels; health professionals' implicit biases can further exacerbate these existing disadvantages.

Interventions or strategies designed to reduce implicit bias may be categorized as change-based or control-based. Change-based interventions focus on reducing or changing cognitive associations underlying implicit biases. These interventions might include challenging stereotypes. Conversely, control-based interventions involve reducing the effects of the implicit bias on the individual's behaviors. These strategies include increasing awareness of biased thoughts and responses. The two types of interventions are not mutually exclusive and may be used synergistically.

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