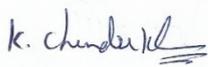




# HOSPITAL

# SAFETY MANUAL

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## POLICY STATEMENT

Our Hospital is committed to safeguarding the health, safety and welfare at work of all its staff, patients and visitors. We consider safety an essential component of all activities within the hospital. The Hospital safety committee is responsible for ratifying and implementing policy on safety matters. The policy will be continually reviewed and developed as we strive for progressively higher standards of health and safety in the Hospital.

Although we the hospital and safety committee is ultimately responsible for safety within the Hospital, it is the responsibility of all staff, patients and visitors to play their own part in the maintenance of our standards and to act in a responsible manner within the hospital. It is also expected that anyone with a supervisory role takes on some of the responsibilities of employer in relation to safety of those in their charge. All who work within the Hospital are encouraged to have input into safety policy by raising issues with their supervisors, Safety Committee representative or directly with the lead technicians within an area.

## ORGANIZATION FOR SAFE WORKING ENVIRONMENT

**Hospital Safety Committee:** Hospital has constituted a safety committee to look after the safety aspects of the hospital. The committee meets regularly at defined interval to discuss the matter related to safety and take appropriate decisions to improve the level of safety within the hospital.

Refer the section on hospital committees for safety committee

**Safety Officer:** From within the committee a safety officer has been appointed to look after the day to day safety aspects and bring the safety issues in committee for deliberation and decision. Roles and responsibilities of safety officer includes

1. Conduct periodic walkthrough inspection of the facility
2. Identify potential hazards and hazardous material in the hospital
3. Obtain MSDS and other information on potential hazards
4. Maintain a record of hazardous chemicals and materials that are used and stored in hospital
5. Identify training needs of staff on safety aspects

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6. Develop training schedule in coordination with HR dept. and begin a training program for workers, based on department / job responsibilities
7. Bring issues and agenda for discussion and decision to hospital safety committee

**Radiation Safety Officer:** radiation safety is recognized as an important aspect of hospital safety. Hospital has appointed a radiation safety officer to look after the radiation safety practices and radiation safety programme. Refer document radiation safety programme.

**Fire safety officer:** If premises are found to be unsafe a fire officer may prosecute the offending organization or even issue a prohibition notice closing the premises until such time that they are made safe. Fire officers also have the power to place anyone committing an offence under police caution.

**HIC safety officer:** Duties of a Safety Officer include supporting OHS policies, advising on safety topics, conducting risk assessments, updating policies, organizing training, inspecting premises, investigating incidents, and reporting occurrences.

**Patient safety officer:** A patient safety officer is a healthcare professional responsible for ensuring patients receive safe care. This includes identifying potential hazards and implementing policies and procedures to minimize the risk of errors and accidents

**Policy and procedure documents:** All policies and procedural documents in the hospital have safety practices included in it. The work practices has been laid down and standardized by taking safety aspects as one of the important components. These standardized policies and procedures and followed by all staff of the hospital and monitored by Departmental in-charges / pioneers, various committees, Quality Assurance department and hospital management.

## **Components of hospital safety programme**

The hospital safety programme is focused in to entire hospital, staff, patients and visitors in general and in specific to

1. Infection control
2. Emergency and disaster preparedness
3. Laboratory safety
4. Radiation safety
5. Occupational health and safety

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## 6. Food safety

**Infection Control:** Infection control is an important component of hospital safety programme and is focused and dealt separately. Hospital infection control committee, Infection control team, infection control manual and infection control programme are the sub-component of Infection control safety of the hospital

Refer: Infection control Manual (**/HIC/Manual**)

**Emergency and Disaster Preparedness:** This component focuses on fire, non-fire emergencies and external disaster situations. The hospital disaster management committee looks after the development and implementation of this component.

**Laboratory Safety:** Laboratory safety is looked after by HOD laboratory. Laboratory safety practices is documented and implemented to ensure safety of employees in laboratory. The safety level as described by OSHA is followed. Hospital safety committee oversees the laboratory safety practices and ensures its proper implementation.

Refer: Laboratory safe practices (**/AAC/Doc 08 a**)

**Radiation Safety:** Radiation safety is looked after by HOD radiology and Radiation safety officer. The safety level as described by AERB is followed. Hospital safety committee oversees the radiation safety practices and ensures its proper implementation.

Refer: Radiation safety Manual (**/AAC 9/ ,10 Manual**)

**Occupational health and safety:** Hospital has identified Occupational risks within the hospital and orients all the staff on precautions to be taken from occupational hazards. Hospital safety committee ensures that occupational health and safety is properly addressed. These occupational health risks are documented in this document

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## STEPS INVOLVED IN IMPLEMENTATION OF HOSPITAL SAFETY PROGRAMME IS DOCUMENTED BELOW

S. No.	Item	Component tasks
1	Administrative support	<ul style="list-style-type: none"> <li>• Formulation of hospital safety committee</li> <li>• Adherence to committee meeting schedules and time for surveys</li> <li>• Funding to evaluate and monitor hazards, implement controls, and conduct health examinations</li> <li>• Provision of safety devices and personal protective equipment's</li> <li>• Fulfilling necessary infrastructural requirement to increase safety within the hospital building</li> </ul>
2	Hazard identification	<ul style="list-style-type: none"> <li>• Conduct periodic walk-through inspections.</li> <li>• Obtain material safety data sheets (MSDS's) and other information on potential hazards</li> <li>• Maintain a log of hazardous chemicals and materials that are used or stored in each department.</li> </ul>
3	Hazard evaluation	<ul style="list-style-type: none"> <li>• Conduct safety inspections and hygiene monitoring of potential hazards and determine needs for hazard controls.</li> <li>• Conduct medical evaluations where necessary.</li> <li>• Select appropriate medical surveillance programs.</li> </ul>
4	Training	<ul style="list-style-type: none"> <li>• Identify training needs for health and safety</li> <li>• Develop training schedule and begin a training program for workers, based on department / job responsibilities.</li> </ul>
6	Program review	<ul style="list-style-type: none"> <li>• Preview results of periodic safety</li> </ul>

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		<p>inspections to find patterns of hazards, to measure the success of the safety and health program, and to determine the effectiveness of controls.</p> <ul style="list-style-type: none"> <li>• Modify the safety and health program as new materials or procedures are introduced or as new hazards are identified in the review process.</li> </ul>
7	Recordkeeping	<ul style="list-style-type: none"> <li>• Maintain records of results for all surveys, evaluations, monitoring, corrective actions, and worker medical examinations.</li> </ul>

## OCCUPATIONAL HEALTH RISKS IN HOSPITAL

The staffs of this hospital setting possess risks of facing many kinds of hazards. It is important for staff to determine which hazards can affect him/her and what can be done to prevent illness and injuries.

Following Occupational health risks have been identified as general hazard applicable throughout the organization. Staff shall keep him / her aware of these health hazards and follow the recommendation given by hospital, to avoid the occurrence of these hazards.

S. NO.	OCCUPATIONAL HEALTH RISKS THAT YOU SHOULD KNOW	PREVENTION STRATEGIES
1.	<p><b>Infectious Diseases</b></p> <p>Infectious diseases can be caused by coming into contact with bacteria, viruses, fungi or parasites when handling patients, contaminated objects, body secretions, tissue or fluids.</p>	<p>Get all high-risk staff immunization done</p> <p>Wash hands frequently (proper hand washing is the best way to prevent communicable diseases)</p>

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S. NO.	OCCUPATIONAL HEALTH RISKS THAT YOU SHOULD KNOW	PREVENTION STRATEGIES
	<p>Hepatitis B, Hepatitis C and Human Immunodeficiency Virus (HIV) can be spread by infected blood and body fluids when they come into direct contact with broken, scraped, chapped or inflamed skin or when skin is punctured by a sharp object such as a needle</p>	<p>Follow "Routine Practices" at all times for all patients</p> <p>Follow post needle stick injury protocol</p> <p>Adhere to standard precautions</p>
2.	<p><b>Back Injuries</b></p> <p>Back injuries are the most frequent injury in hospitals. Heavy lifting and frequent bending or twisting when moving objects or patients increases the risk of back injury.</p>	<p>Use available lifts</p> <p>Get help to lift if mechanical device is not appropriate or not available</p> <p>Use proper lifting technique</p>
3.	<p><b>Repetitive Strain Injuries</b></p> <p>A repetitive strain injury (RSI) is an injury that occurs over time as a result of repetitive, forceful or awkward body movements. The injury usually affects the wrist, hand, shoulder, elbow, back, knee or ankle. It can cause pain, weakness, numbness or difficulty in grasping objects.</p>	<p>Organize your work day so repetitive tasks are done for short periods throughout the day</p> <p>Take regular breaks</p>

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S. NO.	OCCUPATIONAL HEALTH RISKS THAT YOU SHOULD KNOW	PREVENTION STRATEGIES
4.	<p><b>Shift Work</b></p> <p>Changing shifts and working at night disrupts your body's natural rhythms. It can contribute to digestion problems, heart disease, and sleep problems. It also makes participation in social activities and family life difficult.</p>	<p>Ask your doctor's advice before becoming a shift worker if you have diabetes, asthma, epilepsy or mental health problems</p> <p>Improve your sleep by practicing a regular bedtime ritual and avoid caffeine, smoking and sleeping pills.</p>
5.	<p><b>Violence</b></p> <p>Health care workers are at risk from violence when dealing with angry and stressed patients and their families.</p> <p>Workplace violence can result in loss of sleep, fear or depression, post traumatic stress disorder, and sometimes even death. It is, therefore, very important for workplaces to develop strategies to prevent violence</p>	<p>Follow policies and intervention guidelines</p> <p>Report incidents to your <b>health</b> and safety representative and/or committee.</p>
	<p><b>Radiation</b></p> <p>Radiation is used in diagnostic procedures such as x-ray, fluoroscopy and angiography. It is also used in treatments using radioactive material.</p>	<p>Follow procedures and use PPE</p> <p>Use TLD badges appropriately and follow recommendations of</p>

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S. NO.	OCCUPATIONAL HEALTH RISKS THAT YOU SHOULD KNOW	PREVENTION STRATEGIES
	<p>Other forms of radiation are used in microwaves, magnetic fields and lasers.</p> <p>Long term and repeated exposure to radiation can cause genetic damage and reproductive health problems. Light beams from lasers can harm the eyes and skin.</p>	<p>AERB</p> <p>Take all safety concerns to your health and safety representative and/or committee</p>
	<p><b>Chemicals</b></p> <p>Chemicals found in hospitals can be in the form of dusts, vapors, gases or liquids. A chemical can enter your body in three main ways</p> <ul style="list-style-type: none"> <li>• It can be breathed in</li> <li>• it can go through your skin</li> <li>• it can be swallowed</li> </ul> <p>Many chemicals can cause serious illness and in some cases, death. Often the effects are not noticeable right away.</p>	<p>Take concerns to your workplace health &amp; safety representative and/or committee</p> <p>Read labels of all chemicals used and if more information is required, go to the MSDS</p> <p>Use PPE</p>
	<p><b>Noise</b></p> <p>High levels of noise are often found in hospital kitchens, laundries and boiler rooms. Long</p>	<p>Maintain equipment in good working order</p> <p>Report any equipment</p>

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S. NO.	OCCUPATIONAL HEALTH RISKS THAT YOU SHOULD KNOW	PREVENTION STRATEGIES
	<p>term exposure to high levels of noise (more than 80 decibels) can cause permanent hearing loss.</p> <p>Noise can distract work, ears and make it difficult to communicate and concentrate.</p>	<p>malfunction as soon as possible</p> <p>Wear hearing protection</p> <p>Have hearing checked regularly</p>

Staff shall contact safety committee seek further information, or recommendation to include additional health risks in safety manual.

## HAZARD IDENTIFICATION AND RISK ANALYSIS

Hospital has identified the potentially hazardous materials in the hospital. These materials are analyzed for their potential risks and measures to minimize the risk and action to take in case of emergency. It has been documented in 'Material Safety Data Sheet' of the hazardous material. These Material Safety Data Sheets contain vital information regarding safety from these hazardous materials. The MSDS are pasted at the location where these hazardous materials are kept.

List of Hazardous Materials:

1. Ethylene Oxide
2. Formaldehyde
3. Glutaraldehyde (cidex)
4. Mercury
5. Phenol
6. Sodium Hypochlorite
7. Compressed gases
8. Radiation rays
9. Waste Anesthetic gases
10. Latex

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## 11. Cytotoxic agents

The hazardous materials are continually identified and their risk is analyzed. If found to be of substantial risk, it is included in the above list of hazardous material and its Safety instruction is prepared.

HAZARDS IN OPERATION THEATRE	
1	Waste Anesthetic Gases
<p>The principal source of waste anesthetic gas in the hospital is leakage from anesthetic equipment. Nitrous oxide, enflurane, halothane, and isoflurane</p> <p>Hazard Location</p> <ul style="list-style-type: none"> <li>▪ Exposures occur in operating rooms; labor delivery, and recovery rooms; dental operatories; emergency rooms; outpatient clinics; and miscellaneous locations.</li> <li>▪ Leakage from anesthetic equipment is in most cases associated with the work practices and habits of the anesthesiologists and nurse anesthetists.</li> <li>▪ Incorrect installation and maintenance of scavenging systems is also a major factor.</li> </ul> <p>Exposures may occur in the following</p>	<p>Environmental monitoring</p> <ul style="list-style-type: none"> <li>▪ The vapors of anesthetic agents such as enflurane, halothane and isoflurane can be monitored with charcoal tubes. Nitrous oxide can be monitored with a direct-reading infrared analyzer or by passive dosimeters.</li> <li>▪ Records of all collected air samples should be kept, and results should be noted in the medical records of the corresponding staff</li> </ul> <p>Engineering controls</p> <ul style="list-style-type: none"> <li>▪ A scavenging system is the basic engineering control for waste anesthetic gases.</li> <li>▪ Such systems collect waste gas and ventilate it from the operating room.</li> </ul>

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<p>ways:</p> <ul style="list-style-type: none"> <li>• Gas may escape during hook-up and check-out of the system.</li> <li>• Excess gas may seep over the lip of the patient’s mask.</li> <li>• The patient may exhale gas into the room.</li> <li>• Leaks may occur in the anesthetic breathing system.</li> <li>• Scavenging systems may be misused or not used at all.</li> </ul> <p>Degree of Exposure</p> <ul style="list-style-type: none"> <li>▪ The degree of exposure in the operating room depends on the amount of leakage, the adequacy of the ventilation system, and the type of operation being done.</li> <li>▪ Gas leakage occurs primarily when face masks are used for short procedures and a problem exists with the anesthetist’s technique or with the patient’s facial anatomy (e.g. when the patient has no teeth).</li> <li>▪ A related problem is the exposure of recovery room personnel to waste gases in the exhaled breath of post-operative patients.</li> <li>▪ Nitrous oxide, halothane, and Methoxyflurane have all been found in the exhaled breath of both patients and operating room staff for periods ranging from hours to several days af-</li> </ul>	<ul style="list-style-type: none"> <li>▪ Although some scavenging systems are elaborate and costly, adequate systems can be inexpensive and can dramatically reduce contamination of the operating room environment.</li> <li>▪ The equipment must be regularly monitored for leakage, improper design, or tubing defects. In some cases, poor wall connections and compression fittings or other defective equipment may be the sources of leakage.</li> </ul> <p>Personal protective equipment</p> <ul style="list-style-type: none"> <li>▪ Personal protective equipment is not needed or recommended if an adequate control program is in place. However, monitoring should be done, and personal protective equipment should be available for use in case of an emergency.</li> </ul> <p>Work practices</p> <ul style="list-style-type: none"> <li>▪ Operating-room staff can protect themselves from excess exposure by properly connecting the scavenging equipment, turning the gas off when the breathing system is disconnected from the patient, and ensuring that all patients have properly fitting</li> </ul>
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<p>ter the administration of the anesthetic. This phenomenon may pose a significant health hazard to staff in crowded recovery rooms with a high patient turnover rate.</p> <p><b>Potential Health Effects</b></p> <p><b>Acute effects</b></p> <ul style="list-style-type: none"> <li>▪ Staff exposed to excessive amounts of anesthetic gases begin to feel like anesthetized patients, experiencing drowsiness, irritability, depression, headache, nausea, fatigue, and problems of judgment and coordination.</li> <li>▪ These behavioral effects are of particular concern because both the success of the surgery and health of the operating room staff may be compromised.</li> </ul> <p><b>Chronic effects</b></p> <ul style="list-style-type: none"> <li>▪ Epidemiologic studies have found increased incidences of embryo toxicity, liver and kidney disease, and cancer among groups of female personnel working in the operating room.</li> <li>▪ Some observers have suggested a relationship between exposure to waste anesthetic gases and reports of increased cancer rates and adverse effects on reproduction among</li> </ul>	<p>masks.</p> <p><b>Training programs</b></p> <ul style="list-style-type: none"> <li>▪ Staff involved with waste anesthetic gases should be trained to recognize, understand, monitor, and reduce the health and safety risks of exposure to these substances.</li> </ul> <p><b>Medical Monitoring</b></p> <ul style="list-style-type: none"> <li>▪ Staff exposed to anesthetic gases should have complete medical histories on file.</li> <li>▪ These should include family, genetic, and occupational histories and the outcomes of all pregnancies of female staff or of the wives of male staff.</li> <li>▪ Baseline data should be obtained on the hepatic, renal, and hematopoietic systems.</li> <li>▪ Exposed staff should be monitored periodically for liver and kidney function.</li> </ul>
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	exposed staff.	
2.	<b>Blood Borne Pathogens (Infections)</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure to blood and OPIM and life threatening BBPs such as Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV).</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Wear appropriate PPE as required by the Blood borne Pathogens Standard if blood or Other Potentially Infectious Materials exposure is anticipated.</li> <li>▪ The type and amount of PPE depends on the anticipated exposure.</li> <li>▪ Gloves must be worn when hand contact with blood, mucous membranes, or non-intact skin is anticipated, or when handling contaminated items or surfaces.</li> <li>▪ Minimize the hazards of exposure to Blood Borne Pathogens in the surgery area by promoting the use of:             <ol style="list-style-type: none"> <li>1. Safer needle/other sharps device</li> <li>2. Blunt suture needles</li> <li>3. Needleless IV connectors</li> <li>4. Proper containerization of sharps</li> <li>5. "No Pass Zone" for surgical instruments</li> </ol> </li> <li>• A Hands-free technique for passing instruments The hands-free technique is a work practice whereby a tray or other means are used to eliminate simultaneous handling of sharp instruments during surgery.</li> <li>• Discarding of contaminated needles and other sharp instruments <b>immediately</b> or as soon as feasible after use into appropriate containers</li> <li>• Sharps containers need to be available, and in close proximity to</li> </ul>

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		<p>areas where sharps may be found.</p> <ul style="list-style-type: none"> <li>• Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except as noted in paragraphs.</li> <li>• Employers must provide readily accessible hand washing facilities, and ensure that employees wash their hands immediately or as soon as feasible after removal of gloves.</li> </ul>
3	<b>Latex Allergy</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Developing latex allergy from exposure to latex from using products that contain latex such as, gloves, catheters, tubing.</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>▪ Staff should wear appropriate gloves for employees to wear, including "hypoallergenic gloves, glove liners, powderless gloves or other <b>similar alternatives</b>"</li> <li>▪ <b>Hypoallergenic gloves are not to be assumed to be non-latex or latex-free.</b></li> <li>▪ If latex must be used, choose a low protein, powder-free glove. (Powder-free gloves seem to reduce systemic allergic responses.)</li> </ul>
4	<b>Methyl Methacrylate</b>	
	<p>Hazard Location</p> <ul style="list-style-type: none"> <li>▪ Methyl methacrylate is an acrylic cement-like</li> </ul>	<p>Preventive Precautions</p> <p>Engineering controls</p>

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<p>substance commonly used in operation rooms to secure surgical prostheses to bone, e.g. in total hip replacements.</p> <ul style="list-style-type: none"> <li>▪ This compound is also used in dental prostheses. The two components, a liquid and a powder, are mixed immediately before use.</li> </ul> <p>Potential Health Effects</p> <p>Acute effects</p> <ul style="list-style-type: none"> <li>▪ Methyl methacrylate affects the central nervous system.</li> <li>▪ Methyl methacrylate is an eye, skin, and mucous membrane irritant.</li> <li>▪ Patients exposed to this compound have suffered acute episodes of hypotension, low blood pressure, and cardiac arrest</li> </ul> <p>Chronic effects</p> <ul style="list-style-type: none"> <li>▪ Methyl methacrylate has been reported to produce degenerative liver changes in experimental animals.</li> </ul>	<ul style="list-style-type: none"> <li>▪ A local exhaust hood should be used to conduct exhaust fumes from the area in which methyl methacrylate is mixed. A tent hood may be used unless mixing can be done in a separately ventilated area.</li> <li>▪ Portable hoods are available for operating room use.</li> </ul> <p>Protective equipment</p> <ul style="list-style-type: none"> <li>▪ Staffs who handle methyl methacrylate should wear personal protective equipment and clothing.</li> <li>▪ This may include gloves, goggles, face shields, and respirators, as appropriate.</li> <li>▪ Portable hoods are available for operating room use.</li> </ul> <p>Work practices</p> <ul style="list-style-type: none"> <li>▪ Staff should be instructed to avoid touching contaminated hands or gloves to their eyes or mouths.</li> </ul> <p>Medical Monitoring</p> <ul style="list-style-type: none"> <li>▪ Pre-exposure data should be recorded for the skin and respiratory systems of staff that may be exposed to methyl methacrylate.</li> <li>▪ Periodic monitoring thereafter should emphasize the skin and respiratory systems.</li> </ul>
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	<ul style="list-style-type: none"> <li>▪ This chemical has also been reported to be mutagenic.</li> </ul>	
5	<b>Compressed Gases</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Compressed gases present a unique hazard. Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards. Gases may be:             <ol style="list-style-type: none"> <li>1. Flammable or combustible</li> <li>2. Explosive</li> <li>3. Corrosive</li> <li>4. Poisonous</li> <li>5. Inert</li> <li>6. or a combination of hazards</li> </ol> </li> <li>▪ If the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion.</li> <li>▪ Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen.</li> </ul>	<p><b>Preventive Precautions:</b></p> <ul style="list-style-type: none"> <li>▪ Careful procedures are necessary for handling the various compressed gases, the cylinders containing the compressed gases, regulators or valves used to control gas flow, and the piping used to confine gases during flow</li> <li>▪ Identification             <ol style="list-style-type: none"> <li><b>1. The contents of any compressed gas cylinder must be clearly identified.</b> Such identification should be stenciled or stamped on the cylinder or a label.</li> <li><b>2.</b> Commercially available three-part tag systems may also be used for identification and inventory.</li> <li><b>3.</b> No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name.</li> <li><b>4.</b> If the labeling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked "contents unknown" and re-</li> </ol> </li> </ul>

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- Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb

turned directly to the manufacturer.



**Always  
read the  
label!!**

- **Never rely on the color of the cylinder for identification.** Color coding is not reliable because cylinder colors may vary with the supplier. Additionally, labels on caps have little value because caps are interchangeable.



- All **gas lines** leading from a compressed gas supply should be clearly labeled to identify the gas, the laboratory or area served, and the relevant emergency telephone numbers.
- The labels should be color coded to distinguish hazardous gases (such as flammable, toxic, or corrosive substances) (e.g., a yellow

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	<p>background and black letters).</p> <ul style="list-style-type: none"> <li>Signs should be conspicuously posted in areas where flammable compressed gases are stored, identifying the substances and appropriate precautions (e.g., HYDROGEN - FLAMMABLE GAS - NO SMOKING - NO OPEN FLAMES).</li> <li><b>Handling &amp; Use</b></li> </ul> <div style="display: flex; align-items: center; margin: 10px 0;">  <p><b>Gas cylinders must be secured at all times to prevent tipping.</b></p> </div> <ul style="list-style-type: none"> <li>Cylinders may be attached to a bench top, individually to the wall, placed in a holding cage, or have a non-tip base attached. Chains or sturdy straps may be used to secure them.</li> <li><b>If a leaking cylinder is discovered, move it to a safe place (if it is safe to do so) and inform the Engineering Department.</b></li> <li>You should also call the vendor as soon as possible.</li> <li><b>Under no circumstances should any attempt be made to repair a cylinder or valve.</b></li> <li>To minimize undesirable connections, only standard combinations of valves and fittings should be used in compressed gas installations; the assembly of miscellaneous parts should be avoided.</li> </ul>
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- The threads on cylinder valves, regulators and other fittings should be examined to ensure they correspond and are undamaged.
- Cylinders should be placed with the valve accessible at all times.
- The main cylinder valve should be closed as soon as it is no longer necessary that it be open (i.e., it should never be left open when the equipment is unattended or not operating).
- This is necessary not only for safety when the cylinder is under pressure, but also to prevent the corrosion and contamination resulting from diffusion of air and moisture into the cylinder after it has been emptied.
- Cylinders are equipped with either a hand wheel or stem valve.
- For cylinders equipped with a stem valve, the valve spindle key should remain on the stem while the cylinder is in service.
- Only wrenches or tools provided by the cylinder supplier should be used to open or close a valve. At no time should pliers be used to open a cylinder valve.
- Some valves may require washers; this should be checked before the regulator is fitted.
- Cylinder valves should be opened slowly.
- Oxygen cylinder valves should be opened all the way.
- Open up the oxygen cylinder valve stem just a crack. Once the needle on the high pressure gauge has stopped, open up the valve all the way.
- This back-seats the valve.

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- Oxygen cylinders must have the valve opened up all the way because of the high pressure in the cylinder.
- There is a back-seating valve on the oxygen cylinder. This prevents the high-pressure gas from leaking out through the threaded stem.
- When opening the valve on a cylinder containing an irritating or toxic gas, the user should position the cylinder with the valve pointing away from them and warn those working nearby.



- An open flame shall never be used to detect leaks of flammable gases. Hydrogen flame is invisible, so "feel" for heat.
- One common practice is to use a natural bristle broom to "sweep" the air in front of you.
- All cylinders containing flammable gases should be stored in a well-ventilated area.
- Oxygen cylinders, full or empty, shall not be stored in the same vicinity as flammable gases.
- Greasy and oily materials shall never be stored around oxygen; nor should oil or grease be applied to fittings.

# SAFETY MANUAL

**Regulators are gas specific and not necessarily interchangeable!**



**Always make sure that the regulator and valve fittings are compatible.**

- If there is any question as to the suitability of a regulator for a particular gas, check with Engineering department.
- After the regulator is attached, the cylinder valve should be opened just enough to indicate pressure on the regulator gauge (no more than one full turn) and all the connections checked with a soap solution for leaks.
- Never use oil or grease on the regulator of a cylinder valve.
- Plastic piping shall not be used for any portion of a high-pressure system.
- Do not use cast iron pipe for chlorine

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- Do not conceal distribution lines where a high concentration of a leaking hazardous gas can build up and cause an accident.
- Distribution lines and their outlets should be clearly labeled as to the type of gas contained.
- Piping systems should be inspected for leaks on a regular basis.
- Special attention should be given to fittings as well as possible cracks that may have developed.
- Empty and full cylinders should be stored in separate areas.
- Where the possibility of **flow reversal** exists, the cylinder discharge lines should be equipped with approved check valves to prevent inadvertent contamination of cylinders connected to a closed system.
- "Sucking back" is particularly troublesome where gases are used as reactants in a closed system.
- If there is a possibility that the container has been contaminated, it should be so labeled and returned to the supplier.
- **Liquid bulk cylinders**
  1. These cylinders usually have a number of valves on the top of the cylinder.
  2. All valves should be clearly marked as to their function.
  3. These cylinders will also vent their contents when a preset internal pressure is reached, therefore, they should be stored or placed in service

where there is adequate ventilation.



**Always use safety glasses (preferably with a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines.**

- All compressed gas cylinders, including lecture-size cylinders, must be returned to the supplier when empty or no longer in use.
- Transportation of Cylinders
  1. The cylinders that contain compressed gases are primarily shipping containers and should not be subjected to rough handling or abuse. Such misuse can seriously weaken the cylinder and render it unfit for further use or transform it into a rocket having sufficient thrust to drive it through masonry walls.
  2. To protect the valve during transportation, the cover cap should be screwed on hand tight and remain on until the cylinder is in place and ready for use.

# SAFETY MANUAL

		<ol style="list-style-type: none"> <li>3. Cylinders should never be rolled or dragged.</li> <li>4. When moving large cylinders, they should be strapped to a properly designed wheeled cart to ensure stability.</li> <li>5. Only one cylinder should be handled (moved) at a time.</li> </ol>
6	<b>Electrical Hazards</b>	
	<p><b>Potential Hazard:</b></p> <ul style="list-style-type: none"> <li>▪ The staff in the operating room can get electrical current shocks due to damage wires which supply electric current to the equipment.</li> <li>▪ Due to damaged wires in contact with the wet floor.</li> <li>▪ Due to improper maintenance of the supply resulting in the leakage of the current in the body of the equipment.</li> </ul>	<p><b>Preventive precautions:</b></p> <ul style="list-style-type: none"> <li>▪ There should be no wires lying on the floor of the Operating Room.</li> <li>▪ Proper preventive maintenance calendar for the equipment.</li> <li>▪ Use of three pronged plugs for all the equipment in the OT.</li> </ul>
7	<b>Equipment Hazards</b>	
	<p><b>Potential Hazard</b></p> <p>Staff exposure to burns or shocks from poorly</p>	<p><b>Preventive Precautions:</b></p> <ul style="list-style-type: none"> <li>▪ Employees will be trained on safe use of Equipment</li> </ul>

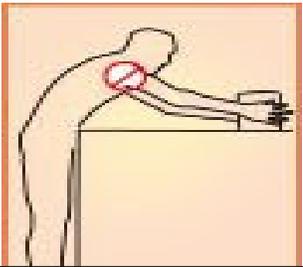
# SAFETY MANUAL

	<p>maintained equipment or improperly trained staff (e.g., autoclaves, warming cabinets, defibrillators).</p>	<ul style="list-style-type: none"> <li>▪ Maintain adequate working space and access to equipment.</li> <li>▪ Visually inspect cords. Do not use if frayed or damaged. Equipment cords should be grounded.</li> <li>▪ Visual inspection of equipment before using.</li> <li>▪ If something doesn't look right, don't use the machine, and call for assistance from Biomedical Engineering Department.</li> <li>▪ Ensure that all electrical service near sources of water is properly grounded</li> <li>▪ Use appropriate personal protective equipment and safe work practices for assessed hazards (e.g., when handling hot items use gloves, and don't open autoclaves or sterilizers until items are sufficiently cooled</li> </ul>
8	<b>Slips/Trips/Falls</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Staff exposure to trips, and falls, e.g., falling over portable equipment that easily blends into the floor or slipping on debris, (bandages, tubing, blood, IV fluids) that are spilled on the floor.</li> <li>▪ Electrical cords crossing floors may also be a trip hazard.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ All places of employment shall be kept clean and orderly and in a sanitary condition</li> <li>▪ Aisles and passageways shall be kept clear and in good repairs, with no obstruction across or in aisles that could create a hazard.</li> <li>▪ Provide ceiling or floor plugs for equipment, so power cords need not run across pathways</li> <li>▪ Mark mobile equipment with a bright color, or a tape "X", to help distinguish it from the floor and make it more visible to employees</li> </ul>

# SAFETY MANUAL

9	<b>Hazards due to heavy lifting, awkward positions in OT</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to MSD from repetitive, prolonged, reaching, when sorting sterilized packages or lifting above shoulder height to reach high shelves of equipment or when pushing and pulling heavy carts full of dirty or clean items.</li> <li>▪ During shifting of the patients.</li> <li>▪ Carrying used instruments for cleaning and disinfection after usage.</li> <li>▪ Static postures may occur from continuously standing in one position while sorting instruments.</li> <li>▪ Standing for long hours during the Operative procedures.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Use carts with large, low rolling, low resistance wheels that can easily roll over mixed flooring so that they can transfer the instruments easily.</li> <li>▪ Minimize prolonged overhead activity (e.g., lower stacking shelves to shoulder height).</li> <li>▪ Use height-adjustable work surfaces or lift tables to minimize head tilt.</li> <li>▪ Rotate workers through repetitive tasks.</li> <li>▪ Pad the edge of work surfaces which come into contact with the elbow or forearm which could cause contact trauma.</li> <li>▪ Use anti-fatigue mats.</li> <li>▪ Use shoes with well-cushioned insteps and soles.</li> <li>▪ Provide a foot rest bar so employees can continually alter their posture by raising one foot.</li> </ul> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">  <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>Well Maintained Cart</b></p> </div> </div>

# SAFETY MANUAL

	 <p>Reaching/Lifting</p>	
1 0	<b>Hazards due to sharp instruments in OT</b>	
	<p><b>Potential Hazard:</b></p> <ul style="list-style-type: none"> <li>▪ Cuts and injuries to the staff due to improper handling</li> <li>▪ Infections due to cuts or pricks from instruments contaminated with infected blood or potentially infectious material.</li> </ul>	<p><b>Preventive Precautions:</b></p> <p>When passing sharps</p> <ul style="list-style-type: none"> <li>▪ Uncapped or otherwise unprotected sharps should never be passed directly from one person to another. In the operating theater or procedure room, pass sharp instruments in such a way that the surgeon and assistant are never touching the item at the same time. This way of passing sharps is known as the <b>"hands-free" technique:</b></li> <li>▪ The assistant places the instrument in a sterile kidney basin or in a designated "safe zone" in the sterile field.</li> <li>▪ The assistant tells the surgeon or nurse that the instrument is in the kidney basin or safe zone.</li> <li>▪ The surgeon or nurse picks up the instrument, uses it, and returns it to the basin or safe zone.</li> </ul>

# SAFETY MANUAL



When giving injections:

- Unexpected patient movement at the time of injection can lead to accidental needle sticks.
- Therefore, always warn patients when you are about to give them an injection.
- To protect patients, always use proper patient preparation when giving an injection, and be sure that you handle IV fluids and multi-dose vials correctly

## HAZARDS IN CENTRAL STERILE SUPPLY DEPARTMENT

1.

### Ethylene Oxide

#### General Properties:

- Ethylene Oxide (ETO) possesses several physical and health hazards that merit special attention.
- ETO is a colorless liquid below 51.7°F, or a gas that has an ether-like odor at concentrations above 700 parts per million (ppm) and is

#### Preventive Precautions

- Substitute other **cold sterilants for ETO**. However, use extreme care when selecting possible substitutes. It is necessary to fully evaluate possible health effects and exposure potentials of alternatives to ETO before making a selection.
  - Use proper ventilation with ETO gas.
    1. Typical operations that could

# SAFETY MANUAL

<p>both flammable and highly reactive.</p> <ul style="list-style-type: none"> <li>▪ The current OSHA Permissible Exposure Limit (PEL) for ETO is 1 ppm for an 8hr time weighted average with a 5ppm excursion level.</li> </ul> <p><b>Potential Hazard:</b></p> <ul style="list-style-type: none"> <li>▪ Staff exposure to ETO. ETO is used within central supply as a sterilants for items that cannot be exposed to steam sterilization.</li> <li>▪ Exposure usually results from improper aeration of the ethylene oxide chamber after the sterilizing process or during off-gassing of sterilized items or poor gas-line connections.</li> <li>▪ It can also occur in outpatient surgery clinics, cardiac catheterization laboratories, operating rooms, dental labs, autopsy labs and other areas.</li> </ul> <p><b>Health Effects:</b></p> <ul style="list-style-type: none"> <li>• In liquid form, Ethylene oxide can cause eye</li> </ul>	<p>cause worker exposure to ETO are removing sterilized items from the ETO sterilizer, moving items from the ETO sterilizer to the aerator unit, and changing bottles of ETO gas. You can control airborne concentrations of ETO most effectively at the source of contamination by enclosing the operation and/or using local exhaust ventilation.</p> <ul style="list-style-type: none"> <li>▪ Reduce exposure to ETO during the sterilization process.             <ol style="list-style-type: none"> <li>1. Do not occupy the sterilizer loading and mechanical rooms while operating the sterilizer unit.</li> <li>2. Operators should crack the door no more than two inches and allow the load to "off gas" before moving to transfer carts. A ventilated exhaust hood should be installed above the sterilizer door.</li> <li>3. Operators should avoid close contact with newly sterilized unaerated loads</li> </ol> </li> <li>▪ Vent ethylene oxide through a non-recycled or dedicated ventilation system.</li> <li>▪ To detect inadequate ventilation and cause automatic shutdown have machine alarms in place. Air pressure in laboratories and isolation rooms should be negative so that contaminated air is drawn through the exhaust vents rather</li> </ul>
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# SAFETY MANUAL

	<p>irritation and injury to the cornea, frostbite, and severe irritation and blistering of the skin upon prolonged or confined contact.</p> <ul style="list-style-type: none"> <li>• Ingesting ETO can cause gastric irritation and liver injury. Acute effects from inhaling ETO vapors include respiratory irritation and lung injury, headache, nausea, vomiting, diarrhea, shortness of breath, and cyanosis.</li> <li>• Exposure has also been associated with the occurrence of cancer, reproductive effects, mutagenic changes, neurotoxicity, and sensitization. Ethylene oxide has been shown to cause cancer in laboratory animals and has been associated with higher incidences of cancer in humans. Adverse reproductive effects and chromosome damage may also occur from ETO exposure.</li> </ul>	<p>than circulating throughout the rest of the building.</p> <ul style="list-style-type: none"> <li>▪ Use appropriate PPE when changing cylinders including butyl apron, gloves, and a canister respirator</li> <li>▪ Use ETO detector systems and room monitors to signal any leakage of gas, and passive dosimeters for personal exposure monitoring.</li> <li>▪ Use specialized gas-line connections to minimize ETO leakage during use and during change out of ETO cylinders</li> <li>▪ Conduct periodic personal monitoring, as well as, monitoring for leaks at gas-line connectors</li> <li>▪ Keep a written log for any detected leak and any service done on an ethylene oxide chamber. Replace sterilizer/aerator door gaskets, valves, and fittings when necessary.</li> </ul>
2	<b>Glutaraldehyde</b>	
	<b>Potential Hazard</b>	<b>Preventive Precautions:</b>

# SAFETY MANUAL

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>▪ Although Glutaraldehyde is available in 50%, 25%, 10% and 2% solutions, most hospitals use 2% Glutaraldehyde solutions buffered to pH 7.5 to 8.5 before use.</li> <li>▪ Glutaraldehyde solutions also contain surfactants to promote wetting and rinsing of surfaces, sodium nitrite to inhibit corrosion, peppermint oil as an odorant, and FD&amp;C yellow and blue dyes to indicate activation of the solution.</li> <li>▪ One disadvantage of buffered Glutaraldehyde solutions is that they are stable for less than 2 weeks, so solutions must be dated and made as needed</li> <li>▪ Another disadvantage is that at 20 degrees C (68°F), a 50% solution of Glutaraldehyde has a vapor pressure of 0.015 mmHg and thus can generate an atmosphere that contains as much as 20 ppm of Glutaraldehyde.</li> </ul> | <ul style="list-style-type: none"> <li>▪ Avoid breathing glutaraldehyde vapors.</li> <li>▪ Use splash-proof safety goggles where there is any possibility of contaminating the eyes with glutaraldehyde.</li> <li>▪ To prevent any possibility of skin use protective clothing</li> <li>▪ If clothing becomes contaminated with Glutaraldehyde, it should be promptly removed and not re worn until the Glutaraldehyde has been removed.</li> <li>▪ The staff that is laundering or cleaning such clothes should be informed of Glutaraldehyde hazardous properties.</li> <li>▪ Skin that becomes contaminated with Glutaraldehyde should be washed immediately or showered.</li> </ul> |
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## Hazard location

- Glutaraldehyde is a newer disinfectant that is especially effective for cold sterilization of instruments; it has recently been used as a substitute for formalde-

# SAFETY MANUAL

hyde during embalming.

- Glutaraldehyde has been used in pulmonary physiology units, at nurses' stations, and in research laboratories.
- As a disinfectant, Glutaraldehyde has been used to clean sputum mouthpieces, suction bottles and tubing, and equipment used for ear, nose, and throat treatment.

## Potential health effects

- Glutaraldehyde may be absorbed into the body by inhalation, ingestion, and skin contact. Extensive skin contact may cause allergic eczema and may also affect the nervous system.
- Contact dermatitis was attributed to the use of Glutaraldehyde, formaldehyde, and chloramines.
- Airborne Glutaraldehyde concentrations are responsible for symptoms of irritation.
- Eye, throat, and lung irritation is also reported.
- Other symptoms, including cough, chest tightness, headache, skin irritation, and asthma-like symptoms, were also reported.

# SAFETY MANUAL

3	<b>Burns and Cuts</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to burns or cuts that can occur from handling or sorting hot sterilized items or sharp instruments when removing them from autoclaves/sterilizers or from steam lines that service the autoclaves.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Establish work practices to prevent hazards such as:               <ol style="list-style-type: none"> <li>1. Do not remove items from sterilizers until cooled.</li> <li>2. Avoid handling sharp ends of instruments.</li> <li>3. Use forceps or other devices to remove sharp instruments from baskets and autoclaves.</li> </ol> </li> <li>▪ Provide appropriate Personal Protective Equipment (PPE).</li> <li>▪ Employers must assess tasks to identify potential worksite hazards and provide and ensure that employees use appropriate personal protective equipment.</li> <li>▪ Employers shall require employees to use appropriate hand protection when hands are exposed to hazards such as cuts or lacerations and thermal burns. Examples of PPE which may be selected include using oven mitts when handling hot items, and steel mesh or Kevlar gloves when handling or sorting sharp instruments</li> </ul>
4	<b>Blood Borne Pathogens</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to BBP and other potentially</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Wear appropriate PPE as required by the</li> </ul>

# SAFETY MANUAL

<p>infectious materials as bloody, contaminated surgical instruments and sharps (e.g., needles, scalpels) are sorted.</p> <ul style="list-style-type: none"> <li>▪ Employee must discard any disposable sharps and recycle reusable instruments/equipment that need to be washed and sterilized before their next use</li> </ul>	<p>Blood borne Pathogens Standard.</p> <ul style="list-style-type: none"> <li>▪ If blood or Other Potentially Infectious Materials exposure is anticipated.</li> <li>▪ The type and amount of PPE depends on the anticipated exposure including             <ol style="list-style-type: none"> <li>1. Gloves must be worn when hand contact with blood, mucous membranes, or non-intact skin is anticipated, or when handling contaminated items or surfaces.</li> <li>2. Wearing thick utility gloves and gowns can offer additional protection to the employee sorting contaminated items</li> <li>3. Utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. However, they must be discarded if they are cracked, peeling, torn, punctured, or exhibits other signs of deterioration or when their ability to function as a barrier is compromised.</li> <li>4. Promote using engineering controls such as safer needle devices to help remove or isolate exposures to blood and blood borne pathogens (e.g., self-sheathing needles, needle less connectors, retractable needles)</li> </ol> </li> <li>▪ Discarding contaminated needles and other sharp instruments immediately or as soon as feasible after use into appropriate containers.</li> </ul>
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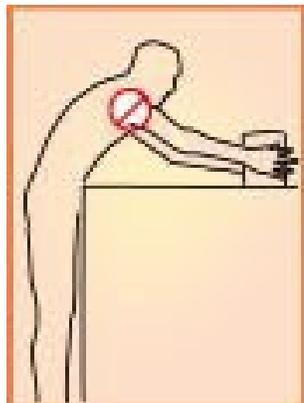
# SAFETY MANUAL

		<ul style="list-style-type: none"> <li>▪ Sharps containers need to be available, and in close proximity to areas where sharps may be used</li> <li>▪ Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed.</li> <li>▪ Employers must provide readily accessible hand washing facilities and ensure that employees wash their hands immediately or as soon as feasible after removing gloves.</li> </ul>
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5	<b>Musculoskeletal Diseases</b>	
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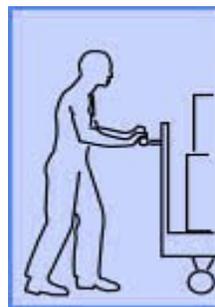
	<b>Potential Hazard</b>	<b>Possible Solutions</b>
	<ul style="list-style-type: none"> <li>▪ Employee exposure to MSD from repetitive, prolonged, reaching, when sorting sterilized packages or lifting above shoulder height to reach high shelves of equipment or when pushing and pulling heavy carts full of dirty or clean items.</li> <li>▪ Static postures may occur from continuously standing in one position while sorting instruments.</li> <li>▪ Contact trauma to forearm area can occur if employee rests wrists on hard sharp counter surfaces when sorting.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Redesign workstations so packaging and equipment can be reached while maintaining the elbows in close to the body.</li> <li>▪ Use carts with large, low rolling, low resistance wheels that can easily roll over mixed flooring as well as gaps between elevators and hallways.</li> <li>▪ Minimize prolonged overhead activity (e.g., lower stacking shelves to shoulder height).</li> <li>▪ Use height-adjustable work surfaces or lift tables to minimize head tilt.</li> <li>▪ Rotate workers through repetitive tasks.</li> <li>▪ Pad the edge of work surfaces which come into contact with the elbow or forearm which could cause contact trauma.</li> </ul>

# SAFETY MANUAL



Reaching/Lifting

- Provide sit/stand stools at work stations.
- Use anti-fatigue mats.
- Use shoes with well-cushioned insteps and soles where floor mats cannot be used.
- Provide a foot rest bar so employees can continually alter their posture by raising one foot



Well Maintained Cart



Padded Work Surfaces



Sit/Stand Stool

6	<b>Hazardous Chemicals</b>	
	<b>Potential Hazard</b>	<b>Possible Solutions</b>

# SAFETY MANUAL

	<ul style="list-style-type: none"> <li>▪ Employee exposure to hazardous chemicals that may be used in the initial washing process of dirty instruments.</li> <li>▪ Unlabeled chemicals and untrained employees.</li> <li>▪ Not using appropriate personal protective equipment when handling hazardous chemicals which may be found in soaps, disinfectants, cleaners, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Provide appropriate PPE:</b> (e.g., gloves, goggles, splash aprons) when handling hazardous dishwashing detergents and chemicals.</li> <li>▪ <b>Medical Services and First Aid:</b> Where the eyes or body of any person may be exposed to injurious corrosive materials, provide suitable facilities for quick drenching or flushing the eyes and body within the work area for immediate emergency use</li> <li>▪ Use dishwashing machines that automate the dispensing of washing chemicals to minimize employee exposure to chemicals. Workers must still be cautious and use appropriate PPE (e.g., goggles, and/or gloves) when changing out the containers of detergent.</li> </ul>
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7	<b>Slips/Trips/Falls</b>
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	<b>Potential Hazard</b>	<b>Preventive Precautions</b>
	<ul style="list-style-type: none"> <li>▪ Employee exposure to slippery floors from steam and washing processes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Keep floors clean and dry. In addition to being a slip hazard, continually wet surfaces promote the growth of mold, fungi, and bacteria which can cause infections.</li> <li>▪ Keep aisles and passageways clear and in good repair, with no obstruction across or in aisles that could create a hazard.</li> <li>▪ Provide floor plugs or ceiling plugs for equipment, so power cords need not run across pathways.</li> </ul>

# SAFETY MANUAL

8	<b>Latex Allergy</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to latex and latex allergy from wearing gloves when handling and sorting contaminated, bloody equipment, or when handling sterile equipment.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Employers must provide appropriate gloves when exposure to blood or other potentially infectious materials exists</li> <li>▪ Make alternatives readily accessible to those employees who are allergic to the gloves normally provided</li> </ul> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 20px;">             Latex Free Nitrile Glove           </div> </div>
9	<b>Asbestos handling</b>	
	<p>Asbestos refers to a group of impure magnesium silicate minerals that occur in fibrous form. Asbestos is defined to be chrysotile, crocidolite, and fibrous cummingtonite-grunerite including amosite, fibrous tremolite, fibrous actinolite, and fibrous anthophyllite.</p> <p>Hazard Location</p> <ul style="list-style-type: none"> <li>▪ Hospitals use asbestos for many purposes, including the noncombustible, non-conducting, or chemically resistant materials required for fireproof clothing, curtains, and roofing.</li> <li>▪ Significant asbestos exposures can occur when insulation in old buildings is removed during renovation.</li> </ul>	<p><b>Preventive Precautions</b></p> <p>Exposure Control Methods</p> <ul style="list-style-type: none"> <li>▪ Removal and encapsulation: Whenever asbestos fibers are exposed, they present a hazard that can be eliminated by removing or encapsulating (covering) them so that they will not be released.</li> <li>▪ Asbestos must only be removed by fully trained personnel using methods and protective equipment.</li> <li>▪ Protective equipment must be used at the time of handling the asbestos</li> <li>▪ Work practices: Only staff</li> </ul>

# SAFETY MANUAL

- Maintenance personnel in most hospitals do not know and often are not trained in the proper methods of performing repairs on systems that contain asbestos.
- They frequently perform spot repairs without protecting themselves, patients, or staff from exposure. Asbestos is also used to make heat-resistant protective gloves for central supply and laboratories.
- With time, these gloves may become worn and disintegrate, releasing fibers into the air.

## Potential Health Effects

- Asbestos causes asbestosis (a fibrosis or scarring of the lung tissue) and cancer. These diseases may develop 15 to 30 years after the first exposure.
- The only hospital staff most likely to encounter enough asbestos to produce asbestosis is engineers who work in furnace rooms where boilers are lined with asbestos, and maintenance staff who frequently repair old piping or do minor renovation.
- These staff must take special care to protect them and to ensure that asbestos is not spread throughout the facility when they perform tasks involving this substance.
- Inhaling asbestos, even in small amounts, may result in lung cancer, gastrointestinal cancer, or mesothelioma (a cancer of the lung and abdomen lining).
- Because there is no know safe level of asbestos exposure, any hospital staff

fully trained in asbestos handling should be allowed in areas where asbestos is exposed.

The hospital will maintain the following:

- Reports of each asbestos use or exposure (a log of all jobs in which personnel are exposed)
- Work practices for handling asbestos, such as wet handling, development of cleanup protocols, use of plastic sheeting to seal off work areas, and bagging of removed insulation during routine operations, maintenance, and repair
- Asbestos waste collection, labeling, and disposal
- Respiratory protective equipment (types of respirators, maintenance, training programs, use, and recordkeeping)
- Dressing rooms and special clothing
- Recordkeeping and maintenance of records.
- Training

# SAFETY MANUAL

	<p>who is exposed to moderate or high concentrations of asbestos for even a relatively short time may be at increased risk of developing asbestos-related diseases.</p> <ul style="list-style-type: none"> <li>▪ All asbestos-exposed staff have a higher risk of lung cancer than non-exposed staff, but exposed staff who smoke cigarettes have a markedly greater risk of lung cancer than non-smoking exposed staff</li> </ul>	
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## Hazards In Intensive Care Units

1	<b>Infections due to Blood and Body Fluids</b>
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	<b>Potential Hazard</b>	<b>Preventive Precautions</b>
	<ul style="list-style-type: none"> <li>▪ ICU workers are particularly at risk for exposure to blood, OPIM, and blood borne pathogens because of the immediate, life-threatening nature of treatment.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide Engineering and Work Practice Controls</li> <li>▪ Engineering and work practice controls must be the primary means to eliminate or minimize exposure to blood borne pathogens.</li> <li>▪ Where engineering controls will reduce employee exposure either by removing, eliminating, or isolating the hazard, they must be used,</li> <li>▪ Wear appropriate personal protective equipment (PPE), (e.g., gloves, gowns, face masks), when anticipating blood or potentially infectious material.</li> <li>▪ Discard contaminated needles and other sharp instruments immediately or as soon as feasible after use into appropriate container.</li> <li>▪ Provide in their exposure control plan documentation of consideration and implementation of appropriate commercially available and effective engineering controls designed to</li> </ul>

# SAFETY MANUAL

		<p>eliminate or minimize exposure to blood and potentially infectious material.</p> <ul style="list-style-type: none"> <li>Practice Universal Precautions: Treat all blood and other potentially infectious body fluids as if they are infected and take appropriate precautions to avoid contact with these materials.\</li> </ul>
2	<b>Working Space</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Intensive care units (ICU's), particularly neonatal ICU's, may be designed without walls between patient spaces.</li> <li>This may allow employees to be unknowingly exposed to aerosolized chemicals and x-ray radiation that escape from neighboring areas.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>All rooms should have adequate ventilation to remove contaminants.</li> <li>If air recirculation is required, then adequate filtering should be installed.</li> <li>Staff in adjoining patient spaces may need to be warned and removed if procedures such as x-rays are occurring.</li> <li>Aerosolized chemicals should be administered in such a fashion as not to expose staff or patients in the area to the hazard.</li> </ul>
3	<b>Slips/Trips/Falls</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Because of the emergency atmosphere, (i.e., high traffic and compact treatment spaces) for ICU areas,</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>Provide safe clean-up of spills and keep walkways free of obstruction.</li> </ul>

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	<p>slips/trips/falls may be a specific concern.</p> <ul style="list-style-type: none"> <li>There is a potential slip and fall hazard if water or other fluid is spilled on the floor, electrical cords run across pathways, or if emergency equipment or supplies block passage and passageways.</li> </ul>	
4	<b>Latex Allergy</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Gloves must be worn frequently in the ICU, because of possible <u>occupational exposure</u> to blood and potentially infectious material.</li> <li>This exposure can potentially lead to latex allergy.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>Employees must use appropriate gloves when exposure to blood or other potentially infectious materials exists.</li> </ul>
5	<b>Equipment Hazards</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Injury may occur to employees from improper training or use of equipment, e.g., defibrillators.</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>A program that routinely monitors the status of equipment and proper training of employees to use equipment safely.</li> </ul>
6	<b>Workplace Violence</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Workplace violence is an issue in ICU's because of</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>Trained staff to recognize and diffuse violent situations and patients.</li> </ul>

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	<p>the crowded, emotional situations that can occur with critical patients.</p>	<ul style="list-style-type: none"> <li>▪ Be alert for potential violence and suspicious behavior and report it.</li> <li>▪ Provide intervention measures including verbal, social, physical, and pharmacological interventions.</li> <li>▪ Warning Signs of Increasing Anger/Violence include:             <ol style="list-style-type: none"> <li>1. Pacing and/or restlessness</li> <li>2. Clenched fist</li> <li>3. Increasingly loud speech</li> <li>4. Excessive insistence</li> <li>5. Threats</li> <li>6. Cursing</li> </ol> </li> </ul>
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7	<b>Work-Place Stress</b>
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	<b>Potential Hazard</b>	<b>Possible Solutions</b>
	<ul style="list-style-type: none"> <li>▪ All hospital employees are exposed to stress, but employees who work in some areas such as the ICU, or the Emergency Department must deal with additional stress.</li> <li>▪ They are exposed to critically ill patients and must deal with emotional life/death situations on a daily basis, increasing their risk for workplace stress, and job burnout.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Educate employees and management about job stress.</li> <li>▪ Address work-related stressors, such as inadequate work space, unreasonable work load, lack of readily available resources, inadequate and unsafe equipment.</li> <li>▪ Stress management programs teach workers about the nature and sources of stress, the effects of stress on health, and personal skills to reduce stress-for example, time management or relaxation exercises.</li> <li>▪ Organizational Change Programs change hospital policies and procedures to reduce organizational sources of stress.</li> <li>▪ It involves the identification of stressful aspects of work (e.g.,</li> </ul>

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		<p>excessive workload, conflicting expectations) and the design of strategies to reduce or eliminate the identified stressors.</p> <ul style="list-style-type: none"> <li>▪ Ensure that the workload is in line with workers' capabilities and resources.</li> <li>▪ Design jobs to provide meaning, stimulation, and opportunities for workers to use their skills.</li> <li>▪ Clearly define workers' roles and responsibilities.</li> <li>▪ Give workers opportunities to participate in decisions and actions affecting their jobs.</li> </ul>
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8	<b>Methicillin Resistant Staph Aureus (MRSA)</b>
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	<b>Potential Hazard</b>	<b>Possible Solutions</b>
	<ul style="list-style-type: none"> <li>▪ Exposure of staff to Nosocomial infections such as MRSA from body fluid exposure. This is especially common in the ICU area, where employees must care for patients who have open and healing wounds from recent surgery.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Practice Standard Precautions</li> <li>▪ Follow the guidelines mentioned in the MGH policy for MRSA in case of an outbreak.</li> </ul>

<b>HAZARDS IN DIALYSIS UNITS</b>
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1	<b>Infection due to handling of Blood and potentially infectious material</b>
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# SAFETY MANUAL



<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ ICU workers are particularly at risk for exposure to blood, OPIM, and blood borne pathogens because of the immediate, life-threatening nature of treatment.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Provide Engineering and Work Practice Controls</li> <li>▪ Engineering and work practice controls must be the primary means to eliminate or minimize exposure to blood borne pathogens.</li> <li>▪ Where engineering controls will reduce employee exposure either by removing, eliminating, or isolating the hazard, they must be used,</li> <li>▪ Ensure employees wear appropriate personal protective equipment (PPE), (e.g., gloves, gowns, face masks), when anticipating blood or potentially infectious material.</li> <li>▪ Ensure employees discard contaminated needles and other sharp instruments immediately or as soon as feasible after use into appropriate container.</li> <li>▪ Provide in their exposure control plan documentation of consideration and implementation of appropriate commercially available and effective engineering controls designed to eliminate or minimize exposure to blood and potentially infectious material.</li> <li>▪ Practice Universal Precautions: Treat all blood and other potentially infectious body fluids as if they are infected and take appropriate precautions to avoid contact with these materials.</li> </ul>
2	<b>Formaldehyde</b>

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<b>Potential Hazard</b>	<b>Preventive Precautions</b>
<p>Formaldehyde is a potential occupational carcinogen.</p> <p>Formaldehyde is used for cold sterilization of some instruments, but it is not used as a general disinfectant because it is very caustic.</p> <p>Hazard location</p> <ul style="list-style-type: none"> <li>▪ Formaldehyde may be encountered in the laboratory as a tissue preservative, in central supply as a sterilant, and in the dialysis unit as a sterilant.</li> <li>▪ Formaldehyde is often combined with methanol and water to make formalin.</li> </ul> <p>Potential Health Effects</p> <p>Acute effects</p> <ul style="list-style-type: none"> <li>▪ Formalin solutions splashed in the eyes may cause severe injury and corneal damage.</li> <li>▪ Low ambient concentrations of formaldehyde 0.1 to 5 ppm, may cause burning and tearing of the eyes and irritation of the upper respiratory tract.</li> <li>▪ Higher concentrations, 10 to 20 ppm, may cause coughing, chest tightness, increased heart rate, and a sensation of</li> </ul>	<p>Phenols may be substituted for formaldehyde in some cases, and dilute bleach solutions can be used to disinfect the exteriors of dialyzers. Other cold sterilant such as Glutaraldehyde are also available. These substitutes should be used with caution.</p> <p>Engineering controls</p> <p>The following engineering controls are recommended to minimize formaldehyde exposure:</p> <ul style="list-style-type: none"> <li>▪ Local exhaust ventilation should be installed over work stations using formalin or specimens preserved in formalin.</li> <li>▪ Small quantities of formaldehyde should be purchased in plastic containers for ease of handling and safety.</li> <li>▪ Traps should be placed in floor drains.</li> <li>▪ Spill-absorbent bags should be available for emergencies.</li> <li>▪ Engineering controls in hemodialysis units should include (1) isolating the main system from personnel and patients in case of inadvertent spills of (2) disconnecting the dialyzers before the sterilization process is completed. Also, formaldehyde vapors should be prevented from entering the room from the drains</li> </ul>

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	<p>pressure in the head.</p> <ul style="list-style-type: none"> <li>Exposures of 50 to 100 ppm may cause pulmonary edema, pneumonitis, and death</li> </ul> <p>Chronic effects</p> <ul style="list-style-type: none"> <li>Repeated exposure to formaldehyde may cause some persons to become sensitized. Sensitization may occur days, weeks or months after the first exposure.</li> <li>Sensitized individuals will experience eye or upper respiratory irritation or an asthmatic reaction at levels of exposure that are too low to cause symptoms in most people.</li> <li>Reactions may be quite severe with swelling itching, wheezing, and chest tightness</li> <li>Dermatitis, including red, sore, cracking, and blistered skin, is also a common problem with formaldehyde exposure.</li> <li>Repeated exposure may make the fingernails soft and brown.</li> <li>Respiratory irritation, eye irritation, and dermatological problems were the primary health problems associated with formaldehyde exposure.</li> </ul>	<p>serving the main system and the dialysis consoles. The air should be regularly monitored for formaldehyde, and in-service education should be conducted periodically on the effects of formaldehyde.</p> <p>Protective equipment</p> <ul style="list-style-type: none"> <li>Skin and eye contact with formaldehyde should be avoided.</li> <li>Goggles face shields, aprons, NIOSH certified positive-pressure air-supplied respirators, and boots should be used in situation where formaldehyde spills and splashes are likely.</li> <li>Appropriate protective gloves should be used whenever hand contact is possible; latex examination gloves are too fragile.</li> </ul> <p>Medical monitoring</p> <ul style="list-style-type: none"> <li>Pre-employment baseline data should be recorded for the respiratory tract, liver, and skin condition of any staff who will be exposed to formaldehyde.</li> <li>Thereafter, periodic monitoring should be conducted to detect symptoms of pulmonary or skin sensitization or effects on the liver.</li> </ul>

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		<ul style="list-style-type: none"> <li>▪</li> </ul>
3	<b>Fire Safety</b>	
	<p><b>Potential Hazard</b></p> <p>Possible fires from heat producing equipment such as burners, ovens, and grills due to:</p> <ul style="list-style-type: none"> <li>• Poor housekeeping.</li> <li>• Un-emptied grease traps (possible grease fires).</li> <li>• Dirty ducts (possible flue fires).</li> <li>• Improper storage of flammable items.</li> <li>• <u>Faulty or frayed electrical cords.</u></li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Provide appropriate and effective employee training for safe handling of equipment.</li> <li>▪ Keep grill and grill duct work free from flammable residues and properly maintained.</li> <li>▪ Keep flammable items must be stored away from heat producing equipment.</li> </ul> <div style="display: flex; flex-direction: column; align-items: center;">   </div> <ul style="list-style-type: none"> <li>▪ It is recommended that grease traps be routinely emptied.</li> </ul>

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		<ul style="list-style-type: none"> <li>▪ Dry Chemical Fire Extinguishers should be present.</li> <li>▪ Provide an emergency action plan, and a fire prevention plan.</li> <li>▪ <b>Emergency Action Plan (EAP):</b> <ol style="list-style-type: none"> <li>1. If fire extinguishers are required or provided in your workplace, and if anyone will be evacuating during a fire or other emergency.</li> <li>2. <u>Am I required to have an emergency action plan?</u></li> <li>3. <u>Should employees fight or flee a fire?</u></li> </ol> </li> <li>▪ <b>Fire Prevention Plan:</b> <ol style="list-style-type: none"> <li>1. The purpose of a fire prevention plan is to prevent a fire from occurring in the workplace.</li> </ol> </li> </ul>
4	<b>Hazardous Chemicals in Kitchen</b>	
	<p><b>Potential Hazard</b></p> <p>Employee exposure to possibly hazardous chemicals, such as pesticides, disinfectants, and hazardous drugs in the workplace for example:</p> <ul style="list-style-type: none"> <li>▪ Ammonia, used as a cleaning agent, and chlorine solutions used as disinfectants in dishwashing, can cause</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Provide for worker training, warning labels, and access to Material Safety Data Sheets (MSDS)</li> <li>▪ Provide appropriate PPE (e.g., gloves, goggles, splash aprons) when handling hazardous detergents and chemicals.</li> <li>▪ Medical Services and First Aid: Where the eyes or body of any person may be exposed to corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided</li> </ul>

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	<p>skin, eye, and nose irritations. (Avoid mixing chlorine and ammonia solutions because a chemical reaction may occur and deadly chlorine gas may be released)</p> <ul style="list-style-type: none"> <li>▪ Drain cleaners, oven cleaners, and grill cleaners can be caustic solutions that can cause skin burns and eye and skin irritations.</li> </ul>	<p>within the work area for immediate emergency use.</p> <ul style="list-style-type: none"> <li>▪ To avoid employee contact with dishwashing detergents, good work practice recommends using dishwashing machines with automated detergent dispensers.</li> <li>▪ Workers must still be cautious and use appropriate PPE (e.g., goggles, and/or gloves) when changing out the containers of detergent.</li> </ul>
5	<b>Equipment Hazard</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Commercial dough mixers and other kitchen equipment pose a hazard to workers from being caught in or by rotating blades and can present various hazards to the employee such as amputations, strangulations, burns, cuts, broken bones, and other injuries.</li> <li>▪ These machines must have guards in place to protect the worker from reaching in, or being pulled into, these hazards.</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>▪ Machine guards are provided to protect the operator and other employees in the machine area from hazards.</li> <li>• Meat slicers must be properly guarded and operated by workers trained in safe work practices to avoid cuts and amputations.</li> <li>▪ Use Tamps or push sticks or other hand tools to feed or remove food from grinders, slicers, or choppers.</li> <li>▪ Continuous feed dishwashers should be properly guarded to prevent accidental scalding of workers by steam and hot water, and possible</li> </ul>



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		<p>nip-point injuries from rollers and conveyors.</p> <ul style="list-style-type: none"> <li>▪ Machine guarding can be accomplished by isolating hazards (e.g., providing barrier guards over a mixer when it is in use to prevent strangulation or amputations). Other methods of machine guarding include: Two-handed tripping devices.</li> <li>▪ Electronic safety devices</li> </ul>
6	<b>Slips/Trips/Falls</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to wet kitchen floors or spills and clutter can lead to slips, trips, falls, and other possible injuries.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Floors shall be kept clean and dry.</li> <li>▪ In addition to being a slip hazard, continually wet surfaces promote the growth of mold, fungi, and bacteria which can cause infections.</li> <li>▪ Keep aisles and passageways clear and in good repair, with no obstruction across or in aisles that could create a hazard.</li> <li>▪ Provide floor plugs or ceiling plugs for equipment, so power cords do not run across pathways.</li> </ul>
7	<b>Electrical Safety</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Electrocution or shock from unsafe work practices, faulty electrical equipment, or wiring</li> </ul>	<p><b>Preventive Precautions</b></p> <p>Employers must:</p> <ul style="list-style-type: none"> <li>▪ Ensure that all electrical service near sources of water is properly grounded</li> <li>▪ <u>Grounding requirements for equipment connected by cord and plug.</u></li> </ul>

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		<ul style="list-style-type: none"> <li>▪ Ensure electrical equipment will be free from recognized hazards</li> <li>▪ Tag out and remove from service all damaged receptacles and portable electrical equipment.</li> <li>▪ Repair all damaged receptacles and portable electrical equipment before placing them back into service.</li> <li>▪ Ensure that employees are trained to not plug or unplug energized equipment when their hands are wet.</li> <li>▪ Employers should use <u>ground-fault circuit interrupters (GFCIs)</u> on all 120-volt, single-phase, 15- and 20-ampere receptacles.</li> </ul>
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8	<b>Infectious Materials in Isolation Rooms</b>
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	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Dietary employees may be exposed to respiratory hazards, blood or OPIM, if they are required to take dietary trays to patients in isolation rooms. Exposure to infectious materials may also occur when handling <i>red bagged</i> contaminated food trays that have come from isolation rooms, to the kitchen to be sterilized.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Establish Universal Precautions</li> <li>▪ Universal Precautions: An approach to infection control which treats all human blood and other potentially infectious materials (OPIM), as if they were infectious for HIV and HBV or other bloodborne pathogens.</li> <li>▪ Treat all blood and other potentially infectious materials with appropriate precautions such as: Use gloves, masks, and gowns if blood or OPIM exposure is anticipated.</li> <li>▪ Use engineering and work practice controls to limit exposure.</li> <li>▪ Educate and train all exposed employees to safely enter and exit isolation rooms and to safely handle</li> </ul>
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		<p>food trays coming from isolation rooms.</p> <ul style="list-style-type: none"> <li>▪ Encourage staff to <i>special bag</i> contaminated trays coming from isolation rooms and label the bag with what precautions are necessary to safely handle the contents (e.g., use universal precautions).</li> <li>▪ Use only disposable trays and plastic ware in isolation rooms.</li> </ul>
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## HAZARDS IN EMERGENCY DEPARTMENT

1	<b>Blood Borne Infections</b>
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	<b>Potential Hazard</b>	<b>Preventive Precautions</b>
	<ul style="list-style-type: none"> <li>▪ ED workers are particularly at risk for exposure to blood, OPIM, and bloodborne pathogens because of the immediate, life-threatening nature of treatment.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide Engineering and Work Practice Controls</li> <li>▪ Engineering and work practice controls must be the primary means to eliminate or minimize exposure to blood borne pathogens.</li> <li>▪ Where engineering controls will reduce employee exposure either by removing, eliminating, or isolating the hazard, they must be used,</li> <li>▪ Wear appropriate personal protective equipment (PPE), (e.g., gloves, gowns, face masks), when anticipating blood or potentially infectious material.</li> <li>▪ Discard contaminated needles and other sharp instruments immediately or as soon as feasible after use into appropriate container.</li> <li>▪ Provide in their exposure control plan documentation of consideration and implementation of appropriate commercially available and effective engineering controls designed to eliminate or minimize exposure to blood and potentially infectious</li> </ul>

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		<p>material.</p> <ul style="list-style-type: none"> <li>▪ Practice Universal Precautions: Treat all blood and other potentially infectious body fluids as if they are infected and take appropriate precautions to avoid contact with these materials.</li> </ul>
2	<b>Chemicals used in ED</b>	
	<p><b>Potential Hazard</b></p> <p>Employee exposure to hazardous chemicals (e.g., while decontaminating ED patients after a chemical spill) or exposure to hazardous drugs (e.g., during administration).</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ A program in place to maximize employee safety during decontamination of patients.</li> <li>▪ A program in place to maximize employee safety during administration, disposal, and preparation of hazardous drugs.</li> </ul>
3.	<b>Slips/Trips/Falls</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Because of the emergency atmosphere, (i.e., high traffic and compact treatment spaces) slips/trips/falls may be a specific concern for ED areas.</li> <li>▪ There is a potential slip and fall hazard if water is spilled on the floor accidentally, electrical cords run across pathways, and/or if emergency equipment or supplies block passageways.</li> </ul>	<p><b>Preventive Precautions:</b></p> <ul style="list-style-type: none"> <li>▪ Provide safe clean-up of spills, and keep walkways free of obstruction.</li> <li>▪ Keep floors clean and dry</li> <li>▪ Keep access to exits clear and unobstructed at all times</li> <li>▪ Exit Routes, Emergency Action Plans, and Fire Prevention Plans</li> </ul>
4.	<b>Latex Allergy</b>	

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	<b>Potential Hazard</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Gloves must be worn frequently in the ED, because of <u>occupational exposure</u> to blood and OPIM, creating a potential for employees to develop latex allergy from wearing latex gloves.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Employers must provide appropriate gloves when exposure to blood or other potentially infectious materials</li> <li>▪ Alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided</li> </ul>
5.	<b>Equipment Hazards</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Injury may occur to employees from improper training or use of equipment (e.g., defibrillators).</li> <li>▪ Electric shock may also occur as a result of lack of maintenance or misuse of equipment and/or its controls.</li> <li>▪ Oxygen-enriched atmospheres and water may contribute to hazardous conditions.</li> </ul>	<p><b>Preventive Precautions</b></p> <p>A program that routinely monitors the status of equipment and proper training of employees to use equipment safely.</p>
6.	<b>Workplace Violence</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Workplace violence is an issue in EDs because of the crowded and emotional situations that can occur with emergencies. In</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Good work practice recommends a security management program that addresses workplace violence in the ED.</li> <li>▪ Trained staff to recognize and diffuse violent situations and patients.</li> </ul>

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<p>addition, ED patients could be involved with crimes, weapons, or violence from other people that could put the ED employee at an increased risk of workplace violence</p>	<ul style="list-style-type: none"> <li>▪ Be alert for potential violence and suspicious behavior and report it.</li> <li>▪ Provide intervention measures including verbal, social, physical, and pharmacological interventions.</li> <li>▪ Warning Signs of Increasing Anger/Violence include:             <ol style="list-style-type: none"> <li>1. Pacing and/or restlessness</li> <li>2. Clenched fist</li> <li>3. Increasingly loud speech</li> <li>4. Excessive insistence</li> <li>5. Threats</li> <li>6. Cursing</li> </ol> </li> <li>▪ Adequate staffing levels, with experienced clinicians on each shift.</li> <li>▪ Counseling and treatment for employees who have experienced workplace violence.</li> <li>▪ The use of appropriate engineering controls to provide security such as:             <ol style="list-style-type: none"> <li>1. Install concealed panic buttons in the ED, on staff, and at the check-in area, that can be pushed for emergency help. These buttons could notify hospital security as well as directly reach the local Police Department.</li> <li>2. Improve lighting and video surveillance.</li> <li>3. Use an escort</li> </ol> </li> <li>▪ Limit access to ED area and personnel, by implementing</li> <li>▪ A waiting room area with controlled access to ED area. Patients must be buzzed in by receptionist from a secure door</li> <li>▪ ED exits that exit out only, so people off the streets can't access the ED unless they enter through the waiting room area.</li> </ul>
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		<ul style="list-style-type: none"> <li>▪ The use of metal detectors</li> <li>▪ Provide a "secure" room for patients identified to be violent. This room could include controls such as:             <ol style="list-style-type: none"> <li>1. Video camera surveillance</li> <li>2. Visual surveillance: provide a window</li> <li>3. Door locks on patient rooms</li> <li>4. Bed with tie down straps</li> <li>5. Locked cabinets</li> </ol> </li> <li>▪ Attach furniture and equipment to the floor so patients can't throw them at employees.</li> </ul>
7.	<b>Tuberculosis</b>	
	<p><b>Potential Hazard</b></p> <p>Exposure to Tuberculosis and other infectious agents from patients in waiting room and treatment areas. Staff may be treating an emergency and be unaware of other pre-existing infectious conditions</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Provide and practice early <u>patient screening</u> in the ED to identify potentially infectious patients, and provide isolation to prevent employee exposures.</li> <li>▪ ED employees should treat patients as having suspected infectious TB if they have both a persistent cough lasting at least three weeks, and at least two of the following additional symptoms: bloody sputum, night sweats, weight loss, fever, and anorexia.</li> <li>▪ Provide engineering, work practice, and administrative procedures to reduce the risk of exposure. For example: Patients with a productive cough could</li> </ul>

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	<p>be asked to wear a mask to prevent the spread of infection.</p> <ul style="list-style-type: none"> <li>▪ Post waiting rooms signs that state, "If you are coughing you may be asked to wear a mask."</li> <li>▪ Isolate patient until verification testing is negative.</li> <li>▪ Some EDs provide an isolation room to safely isolate potentially infectious patients.</li> <li>▪ Others can designate an isolation area for infectious patients.</li> <li>▪ Isolation rooms must be respiratory acid-fast bacilli (AFB) rooms that are maintained under negative pressure.</li> <li>▪ Isolation refers to a negative-pressure room or an area that exhausts room air directly outside or through HEPA filters if re-circulation is unavoidable.</li> <li>▪ Protect employees from exposure to the exhaled air of an individual with suspected or confirmed TB</li> <li>▪ Isolate patients who have suspected or confirmed TB.</li> <li>▪ Post a warning sign outside the ED respiratory isolation room to prevent accidental entry.</li> <li>▪ Requires that that a signal word (i.e. "STOP", "HALT", or "NO ADMITTANCE") or biological hazard symbol be presented as well as a major message (e.g., "Special respiratory isolation," "Respiratory isolation," or "AFB isolation"). An example of a description of necessary precautions is "Respirators must be donned before entering."</li> <li>▪ Employers must provide suitable respirators when such equipment is</li> </ul>
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		<p>necessary to protect the health of the employee.</p> <ul style="list-style-type: none"> <li>▪ The minimally acceptable level of respiratory protection for TB is the Type N95 Respirator.</li> <li>▪ Establish and maintain a respiratory protective program.</li> <li>▪ <b>Worker education:</b> OSHA requires worker education and training to ensure employee knowledge of TB including: signs, symptoms, transmission, controls, and post-exposure protocols.</li> </ul>
8.	<b>Workplace Stress</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Studies suggest work stress may increase a person's risk for cardiovascular disease, psychological disorders, workplace injury, and other health problems. Early warning signs may include headaches, sleep disturbances, difficulty concentrating, job dissatisfaction, and low morale</li> <li>▪ All hospital employees, especially ED employees, are exposed to many stressors at work that can cause workplace stress, and burnout, due to factors such as shift work, long hours, fatigue, and intense emotional situations, (e.g., the suffering and death of</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Educate employees and management about job stress.</li> <li>▪ Establish programs to address workplace stress, such as: Employee Assistance Programs (EAP) or Organizational Change Programs.</li> <li>▪ <b>An Employee Assistance Program (EAP)</b> can improve the ability of workers to cope with difficult work situations. Stress management programs teach workers about the nature and sources of stress, the effects of stress on health, and personal skills to reduce stress (e.g., time management or relaxation exercises).</li> <li>▪ EAPs also provide individual counseling for employees for both work and personal problems.</li> <li>▪ <b>Organizational Change Programs</b> change hospital policies and procedures to reduce organizational</li> </ul>

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	patients).	<p>sources of stress.</p> <ul style="list-style-type: none"> <li>▪ This approach is the most direct way to reduce stress at work. It involves the identification of stressful aspects of work (e.g., excessive workload, conflicting expectations) and the design of strategies to reduce or eliminate the identified stressors.</li> <li>▪ Ensure that the workload is in line with workers' capabilities and resources.</li> <li>▪ Design jobs to provide meaning, stimulation, and opportunities for workers to use their skills.</li> <li>▪ Clearly define workers' roles and responsibilities.</li> <li>▪ Give workers opportunities to participate in decisions and actions affecting their jobs.</li> </ul>
9.	<b>Methicillin Resistance Staph Aureus (MRSA)</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure of ED staff to MRSA infections from environmental sources (e.g., homeless patients or IV drug abuse patients). Staff can become infected and then become carriers who can infect other staff members or patients. As MRSA becomes more resistant to antibiotics such as methicillin and potentially vancomycin, it will become more difficult to treat.</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>▪ Hospitals in different geographical locations will need to establish their own local MRSA data and provide treatment information to clinicians.</li> <li>▪ Recommendations for vancomycin use as initial empiric therapy for suspected staphylococcal infection for health-care workers exposed to MRSA.</li> <li>▪ Practice <u>Universal Precautions</u> to help protect employees from infection.</li> <li>▪ The CDC's recommendations for preventing transmission of MRSA in hospitals consist of <u>Standard Precautions</u>, which should be used for all patient care. In addition the CDC recommends <u>Contact Precautions</u> in</li> </ul>

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		special cases, when the facility (based on national or local regulations) deems the multi-drug-resistant microorganism to be of special clinical and epidemiological significant.
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1 0.	<b>Terrorism</b>
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	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure of ED staff and other hospitals workers to patients exposed to biological agents, chemical agents, and mass casualties as a result of terrorist attacks or events.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Provide and plan for emergency response for health care employers and emergency responders.</li> </ul>
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## HAZARDS IN LABORATORY

1.	<b>Blood Borne Infections</b>
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	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure of employees to blood borne pathogens while handling contaminated lab samples such as blood or other body fluids (i.e., cerebrospinal fluid, and semen).</li> <li>▪ These pathogens include, but are not limited to, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV). Hepatitis B can survive in dried blood specimens for several days.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Gloves must be worn when hand contact with blood, mucous membranes, OPIM, or non-intact skin is anticipated, or when handling contaminated items or surface.</li> <li>▪ Goggles</li> <li>▪ Mask.</li> <li>▪ Hepatitis B vaccination under the supervision of a licensed physician at no cost to all employees who have occupational exposure to blood or OPIM.</li> </ul>
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2.	<b>Tuberculosis</b>	
	<p><b>Potential Hazard</b></p> <p>Exposure of laboratory employees to TB from working with specimens (e.g., acid fast bacilli smears), that may contain tuberculosis. Other fluids that may be potential sources of TB are sputum, cerebrospinal fluid urine, and fluids collected from gastric or bronchial lavage.</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Bio safety Level: In order for a laboratory to handle TB sputum and TB materials, the laboratory must operate at a <u>bio safety level of 2+ or 3.</u></li> <li>▪ Controlled access, anterooms, sealed windows, directional airflow, preventing recirculation of laboratory exhaust air, filtration of exhaust air before discharge to the outside, and thimble exhaust connections for biological safety.</li> <li>▪ The use of biological safety cabinets whenever working with infectious materials that have a chance of aerosolizing. Processes that can expose employees to aerosolized materials include:             <ol style="list-style-type: none"> <li>1. Pouring liquid cultures</li> <li>2. Using fixed-volume automatic pipettors</li> <li>3. Mixing liquid cultures with a pipette</li> <li>4. Preparing specimens and culture smears</li> </ol> </li> <li>▪ Dropping and spilling tubes containing suspensions of bacilli.</li> </ul>

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3.	<b>Laboratory Chemicals</b>	
	<p><b>Potential Hazard</b></p> <p>Staff exposure to hazardous laboratory chemicals.</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ a written Chemical Hygiene Plan.</li> </ul>
4.	<b>Toluene, Xylene, or Acryl Amide Exposure</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Toluene and Xylene are solvents used to fix tissue specimens and rinse stains.</li> <li>▪ They are primarily found in the histology, hematology, microbiology, and cytology laboratories.</li> </ul> <p><b>Health Effects:</b></p> <p><b>Toluene and Xylene Exposure:</b></p> <p><b>Acute:</b> Eye and respiratory irritation can result form exposure to the liquid and vapor forms. Severe abdominal pains, nausea, vomiting and possible loss of consciousness could occur, if ingested in large amounts.</p> <p><b>Chronic:</b> High concentration of vapor inhaled for long periods</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Protective clothing should be worn to prevent any possibility of skin contact</li> <li>▪ In the event of a spill or leak, persons not wearing protective equipment and clothing should be restricted from contaminated areas until cleanup has been completed.</li> </ul>

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	<p>can cause laryngitis, bronchitis or bronchial pneumonia. Prolonged exposure may cause conjunctivitis. Nasal tumors have been reported in animals.</p> <ul style="list-style-type: none"> <li>▪ <b>Acryl Amide Exposure:</b></li> </ul> <p><b>Acute:</b> Eye and skin irritation.</p> <p><b>Chronic:</b> Central nervous system disorders, i.e., poly neuropathy. Acryl amide is a suspected carcinogen, and mutagen.</p>	
5.	<b>Needle Stick or Sharps Injuries</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to blood borne pathogens from needle stick injuries or cuts from sharp objects when working with specimens, centrifuge tubes or overfilled sharps containers.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Do not allow sharps containers to overfill</li> <li>▪ Discard contaminated sharps immediately or as soon as feasible into appropriate containers.</li> <li>▪ Only needle-locking syringes or disposable syringe-needle units (i.e., the needle is integral to the syringe) shall be used for the injection or aspiration of other potentially infectious materials.</li> <li>▪ Extreme caution shall be used when handling needles and syringes. A needle shall not be bent, sheared, replaced in the sheath or guard, or removed from the syringe following use.</li> <li>▪ The needle and syringe shall be promptly placed in a puncture-</li> </ul>

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		resistant container and autoclaved or decontaminated before reuse or disposal.
6.	<b>Formaldehyde</b>	
	<p><b>Potential Hazard</b></p> <p>Formaldehyde is a potential occupational carcinogen.</p> <p>Formaldehyde is used for cold sterilization of some instruments, but it is not used as a general disinfectant because it is very caustic.</p> <p>Hazard location</p> <ul style="list-style-type: none"> <li>▪ Formaldehyde may be encountered in the laboratory as a tissue preservative, in central supply as a sterilant, and in the dialysis unit as a sterilant.</li> <li>▪ Formaldehyde is often combined with methanol and water to make formalin.</li> </ul> <p>Potential Health Effects</p> <p>Acute effects</p> <ul style="list-style-type: none"> <li>▪ Formalin solutions splashed in the eyes may cause severe injury and corneal damage.</li> <li>▪ Low ambient concentrations of formaldehyde 0.1 to 5</li> </ul>	<p><b>Preventive Precautions</b></p> <p>Phenols may be substituted for formaldehyde in some cases, and dilute bleach solutions can be used to disinfect the exteriors of dialyzers. Other cold sterilants such as Glutaraldehyde are also available. These substitutes should be used with caution.</p> <p>Engineering controls</p> <p>The following engineering controls are recommended to minimize formaldehyde exposure:</p> <ul style="list-style-type: none"> <li>▪ Local exhaust ventilation should be installed over work stations using formalin or specimens preserved in formalin.</li> <li>▪ Small quantities of formaldehyde should be purchased in plastic containers for ease of handling and safety.</li> <li>▪ Traps should be placed in floor drains.</li> <li>▪ Spill-absorbent bags should be available for emergencies.</li> <li>▪ Engineering controls in hemodialysis units should include (1) isolating the main system from personnel and patients in case of inadvertent spills of (2) disconnecting the dialyzers before</li> </ul>

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<p>ppm, may cause burning and tearing of the eyes and irritation of the upper respiratory tract.</p> <ul style="list-style-type: none"> <li>▪ Higher concentrations, 10 to 20 ppm, may cause coughing, chest tightness, increased heart rate, and a sensation of pressure in the head.</li> <li>▪ Exposures of 50 to 100 ppm may cause pulmonary edema, pneumonitis, and death</li> </ul> <p>Chronic effects</p> <ul style="list-style-type: none"> <li>▪ Repeated exposure to formaldehyde may cause some persons to become sensitized. Sensitization may occur days, weeks or months after the first exposure.</li> <li>▪ Sensitized individuals will experience eye or upper respiratory irritation or an asthmatic reaction at levels of exposure that are too low to cause symptoms in most people.</li> <li>▪ Reactions may be quite severe with swelling itching, wheezing, and chest tightness</li> <li>▪ Dermatitis, including red, sore, cracking, and blistered skin, is also a common problem with formaldehyde exposure.</li> <li>▪ Repeated exposure may</li> </ul>	<p>the sterilization process is completed. Also, formaldehyde vapors should be prevented from entering the room from the drains serving the main system and the dialysis consoles. The air should be regularly monitored for formaldehyde, and in-service education should be conducted periodically on the effects of formaldehyde.</p> <p>Protective equipment</p> <ul style="list-style-type: none"> <li>▪ Skin and eye contact with formaldehyde should be avoided.</li> <li>▪ Goggles face shields, aprons, NIOSH certified positive-pressure air-supplied respirators, and boots should be used in situation where formaldehyde spills and splashes are likely.</li> <li>▪ Appropriate protective gloves should be used whenever hand contact is possible; latex examination gloves are too fragile.</li> </ul> <p>Medical monitoring</p> <ul style="list-style-type: none"> <li>▪ Pre-employment baseline data should be recorded for the respiratory tract, liver, and skin condition of any staff that will be exposed to formaldehyde.</li> <li>▪ Thereafter, periodic monitoring should be conducted to detect symptoms of pulmonary or skin sensitization or effects on the liver.</li> </ul>
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	<p>make the fingernails soft and brown.</p> <ul style="list-style-type: none"> <li>▪ Respiratory irritation, eye irritation, and dermatological problems were the primary health problems associated with formaldehyde exposure.</li> </ul>	
7.	<b>Work Practices and Behaviors</b>	
	<p><b>Potential Hazards</b></p> <ul style="list-style-type: none"> <li>▪ Poor work practices and behaviors can cause worker exposure to hazardous chemicals and diseases, (e.g., scratching nose or chewing pencils or pens when working with hazardous samples).</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Careful monitoring of work behaviors and habits to prevent exposures.</li> <li>▪ Some employees routinely double glove so that the outer glove can be removed if the employee needs to scratch or answer a phone and then replaced with a new glove when ready to go back to work.</li> <li>▪ No Mouth pipetting/suctioning of blood or other potentially infectious materials is allowed.</li> <li>▪ No Eating, drinking, smoking, applying cosmetics or lip balm, or handling contact lenses is allowed in work areas where there is a reasonable likelihood of occupational exposure to blood borne pathogens.</li> <li>▪ No storage of food or drink in refrigerators, freezers, shelves, cabinets or on countertops or bench tops where blood or other potentially infectious materials are present.</li> </ul>

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8.	<b>Engineering Controls</b>	
	<b>Potential Hazards</b>  Staff exposure to infectious materials/organisms.	<b>Preventive Precautions</b>  <b>Use engineering controls such as:</b> <ul style="list-style-type: none"><li>▪ Splatter guards: to prevent splashing from reaching employee, (e.g., plexiglass barriers).</li></ul>  <ul style="list-style-type: none"><li>▪ Sensor-controlled "automatic sinks" or foot, knee, or elbow controls are available on sinks to operate hand-washing facilities without using hands.</li></ul>  <ul style="list-style-type: none"><li>▪ Centrifuge tubes with caps</li><li>▪ Biological Safety Cabinets</li><li>▪ Check daily for proper air exchange</li></ul>

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		<p>and air flow.</p> <ul style="list-style-type: none"> <li>Keep maintenance records for ventilation systems and other equipment.</li> <li>Maintenance records for laboratory hoods and other equipment.</li> </ul>
9.	<b>Morgue</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Employee exposure to infectious diseases and agents, (e.g., staph, strep, TB, HIV, HBV), and chemicals such as <u>Formaldehyde</u> from contact with cadavers.</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>Use <u>Universal Precautions</u> as required.</li> <li>Wear appropriate PPE .e.g., gloves, goggles, gowns.</li> <li>Surgical caps or hoods and/or shoe covers or boots shall be worn in instances when gross contamination can reasonably be anticipated.</li> </ul> <p><b>Engineering Controls</b></p> <ol style="list-style-type: none"> <li>Provide appropriate ventilation systems (e.g., downdraft tables that capture the air around the cadaver).</li> <li>Place local vacuum systems for power saws in the morgue. Shields should be in place when significant splash hazards are anticipated.</li> <li>Use splatter guards (e.g., plexiglass), to prevent splashes from reaching employee.</li> </ol>
10	<b>Latex Allergy</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>Exposure of employees to latex allergy from wearing latex gloves.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>Employers must provide appropriate gloves when exposure to blood or other potentially infectious materials</li> </ul>

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		<p>(OPIM) exists.</p> <ul style="list-style-type: none"> <li>▪ Alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.</li> <li>▪ Among the alternatives are synthetic, low-protein, and powder-free gloves. Powder-free gloves may reduce systemic allergic responses.</li> <li>▪ Eliminate the unnecessary use of latex gloves when no risk of exposure to <u>Blood or Other Potentially Infectious Materials</u> (OPIM) exists.</li> </ul>
11	<b>Slips/Trips/Falls</b>	
	<p><b>Potential Hazard</b></p> <p>Staff exposure to trips and falls if fluids or samples fall to the floor.</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Walking/Working Surfaces Standard requires.</li> <li>▪ All places of employment shall be kept clean and orderly and in a sanitary condition.</li> <li>▪ Good work practice recommends rapid cleanup of spills.</li> </ul>
12	<b>Ergonomics</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Employee exposure to static postures from long periods of sitting or standing, or repetitive motions if sorting samples.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Install automated tract delivery systems for specimen processing to minimize employee reaching and repetitive motions.</li> <li>▪ Provide supportive comfortable chairs that include foot rests.</li> <li>▪ Rotate tasks or minimize the amount of time spent at these tasks.</li> </ul>

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## HAZARDS IN PHARMACY

1.	<b>Hazard Communication Standard</b>	
	<p><b>Potential Hazard</b></p> <p>Exposure to hazardous chemicals and drugs due to untrained or unaware workers:</p> <ul style="list-style-type: none"> <li>▪ Personnel who are not aware of proper work practices and controls may be exposed to hazardous drugs through the skin, mouth, or by inhalation.</li> <li>▪ The <u>OSHA Technical Manual</u> provides guidance regarding the adverse health effects from hazardous drugs, ranging from nausea, and dizziness, to adverse pregnancy outcomes.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Implement a written program which meets the requirements of the <u>Hazard Communication Standard</u> for employees handling or otherwise exposed to chemicals, including drugs that represent a health hazard to employees.</li> <li>▪ The written program must provide for worker training, warning labels, and access to Material Safety Data Sheets (MSDSs).</li> <li>▪ Employees must be informed of the requirements of the Hazard Communication Standard including:             <ol style="list-style-type: none"> <li>1. Any operation/procedure in their work area where drugs that present a hazard are present.</li> <li>2. The location and availability of the written hazard communication program.</li> <li>3. Any operations or procedure in their work area where other HD's are present.</li> <li>4. The location and availability of any other plan regarding HD's.</li> </ol> </li> <li>▪ The HCS only applies to pharmaceuticals that the drug manufacturer has determined to be hazardous and that are known to be present in the workplace in such a manner that employees are exposed under normal conditions of use.</li> <li>▪ There are exemptions to the standard such as:</li> </ul>

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		<ol style="list-style-type: none"> <li>1. Drugs that are in solid, final form for direct administration to the patient, e.g., tablets, or pills.</li> <li>2. Final form exemption would also apply to tablets or pills that are occasionally crushed, if the pill or tablet is not designed to be dissolved or crushed prior to administration.</li> <li>3. <u>Consumer products</u> that are subjected to the labeling requirements of the terms as defined in the Consumer Product Safety Act.</li> <li>4. Chemicals with any of the following characteristics are considered hazardous: carcinogenic, corrosive, toxic or highly toxic, irritating, sensitizing, or target organ effecting.</li> <li>5. Both human and animal data are to be used in this determination.             <ul style="list-style-type: none"> <li>▪ Provide readily available <u>Material Safety Data Sheets (MSDSs)</u> for all hazardous chemicals, including hazardous drugs.</li> <li>▪ All personnel involved in any aspect of the handling of covered hazardous drugs (physicians, nurses, pharmacists, housekeepers, employees involved in receiving, transport or storage) must receive information and training to apprise them of the hazards presented by hazardous drugs in the work area, including the following:                 <ol style="list-style-type: none"> <li>1. Methods and observations that may be used to detect the presence or release of an HCS-covered hazardous drug in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of covered HD's being released, etc.).</li> </ol> </li> </ul> </li> </ol>
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	<ol style="list-style-type: none"> <li>2. The physical and health hazards of the covered HD are in the work area.</li> <li>3. The measures employees can take to protect themselves from these hazards. This includes specific procedures that the employer has implemented to protect the employees from exposure to such drugs, such as identification of covered drugs and those to be handled as hazardous, appropriate work practices, emergency procedures (for spills or employee exposure).</li> <li>4. Personal protective equipment and the details of the hazard communication program developed by the employer, including an explanation of the labeling system and the MSDS, and how employees can obtain and use the appropriate hazard information.</li> <li>5. The Hazard Communication Standard requires that drugs posing a health hazard (with the exception of those in solid, final form for direct administration to the patient, i.e., tablets, or pills), be included on the list of hazardous chemicals to which employees are exposed.</li> <li>6. Any workplace exposure record created in connection with HD handling shall be kept, transferred, and made available for at least 30 years and medical records shall be kept for the duration of employment plus 30 years in accordance with the Access to Employee Exposure and Medical Records Standard.             <ul style="list-style-type: none"> <li>▪ Develop, implement and maintain a written hazardous drug safety and health plan to protect those employees who</li> </ul> </li> </ol>
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		<p>handle or are otherwise exposed to drugs that pose a health hazard to them</p> <ul style="list-style-type: none"> <li>▪ Nursing stations on floors where hazardous drugs will be administered should have spill and emergency skin and eye decontamination kits available and relevant MSDSs for guidance.</li> <li>▪ A list of drugs covered by hazardous drug policies and information on spill and emergency contact procedures should be posted or easily available to employees.</li> </ul>
2.	<b>Hazardous Drugs during Preparation</b>	
	<p>Some examples of Antineoplastic (cancer) drugs, include, Vincristine, Dacarbazine, Mitomycin, Cytosine Arabinoside, and Fluorouracil</p> <p><b>Potential Hazard</b></p> <p>Exposure to hazardous drugs during <i>preparation</i> due to ineffective engineering/work practice controls and PPE:</p> <ol style="list-style-type: none"> <li>1. Not using recommended Biological Safety Cabinets</li> <li>2. Not using appropriate PPE</li> <li>3. Hazardous handling practices</li> <li>4. Improper practices during drug preparation</li> </ol>	<p><b>Preventive Precautions:</b></p> <ul style="list-style-type: none"> <li>▪ <b>PPE:</b> requires the employer to assess potential hazards and then select and ensure the use of appropriate PPE to protect employees from hazardous chemicals, including hazardous drugs as defined by the <u>Hazard Communication Standard</u>.</li> <li>▪ <b>Eye and Face Protection:</b> requires the use of chemical-barrier face and eye protection whenever splashes, sprays, or aerosols of HD's may be generated that could result in eye, nose, or mouth contamination.</li> </ul> <p><b>Other Recommended Good Work Practice:</b></p> <ul style="list-style-type: none"> <li>▪ <b>Biological Safety Cabinets:</b> Approved Biological Safety Cabinets (BSC) should be used when preparing hazardous medications.</li> </ul>

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- Class II, type B, or Class III BSCs that vent to the outside are recommended.
- The BSC should also contain: Covered needle containers for needle disposal and covered waste container for excess fluids disposal.
- Personal Protective Equipment (PPE)
- The thickness of the gloves used in handling hazardous drugs is more important than the type of material. The best results have been seen with latex gloves.
- Double gloving is recommended because all gloves are permeable to some extent, and their permeability increases with time.
- When double gloving, one glove should be placed under the gown cuff and one over. The glove-gown interface should be such that no skin on the arm or wrist is exposed.
- To limit transfer of contamination from the BSC into the work area, the outer gloves should be removed after each task or batch, and should be placed in "zipper" - closure plastic bags or other sealable containers for disposal.
- Gloves should be changed regularly (hourly) or immediately if they are torn, punctured, or contaminated with a spill.
- Thicker, longer, latex gloves that cover the gown cuff are recommend with minimal or no powder since the powder may absorb contamination.
- The worker should wear a protective disposable gown made of lint-free, low-permeability fabric, with a solid front,

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		<p>long sleeves and tight-fitting elastic or knit cuffs.</p> <ul style="list-style-type: none"> <li>▪ <b>Hand washing:</b> Hands should be washed before gloves are put on, and after they are removed</li> <li>▪ <b>Restricted Activities:</b> Smoking, drinking, applying cosmetics, or eating where hazardous drugs are prepared, stored, or used, increases the chance of exposure, and should be prohibited.</li> </ul>
3.	<b>Hazards due to Improper Handling Practices</b>	
	<p><b>Potential Hazard</b></p> <p>Exposure to hazardous drugs (HDs) through improper:</p> <ul style="list-style-type: none"> <li>▪ Handling practices</li> <li>▪ Needle and sharp handling and disposal.</li> <li>▪ Priming of IV lines and Labeling</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Hazardous Drugs should be prepared by pharmacists, not by nurses or physicians without proper PPE and engineering controls.</li> <li>▪ The risk of exposure to hazardous drugs through inhalation or direct skin contact, is present in procedures such as:             <ol style="list-style-type: none"> <li>1. Transferring hazardous drugs from one container to another, reconstituting or manipulating them.</li> <li>2. Withdrawal of needles from drug vials.</li> <li>3. Expulsion of air from a drug-filled syringe.</li> </ol> </li> <li>▪ Expelling air from syringes should be done in the biological safety cabinet, not by the health care worker giving the injection.</li> <li>▪ <b>Sharps Handling:</b> All syringes and needles used in the course of preparation be placed in "sharps" containers for disposal without being crushed, clipped or capped.</li> <li>▪ <b>Priming of tubing for hazardous drugs:</b></li> </ul>

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		<p>The drug administration sets be attached and primed within the BSC prior to addition of the drug. This eliminates the need to prime the set in a less well-controlled environment. It also states that the priming should be done with non-drug containing solution or that a back-flow closed system be used.</p> <ul style="list-style-type: none"> <li>▪ <b>Labeling Practices:</b> In addition to standard pharmacy labeling practices, all syringes and IV bags containing hazardous drugs should be labeled with a warning label such as: <b>Special Handling/Disposal Precautions.</b></li> </ul>
4.	<b>Hazards during Administration</b>	
	<p>Ribavirin an antiviral drug used to treat some infants and young children with lower respiratory syncytial virus (RSV) infections. This drug is aerosolized to a respirable size of approximately 1.3 microns and is usually administered to the patient in an oxygen tent or face mask. This is when exposure can occur.</p> <p><b>Potential Hazard</b></p> <p>Exposure of administering personnel to hazardous drugs during administration including <i>aerosolized</i> drugs, (e.g., Ribavirin).</p>	<p><b>Possible Solutions:</b></p> <p>Good work practice recommends:</p> <ul style="list-style-type: none"> <li>▪ Personnel <b>administering</b> Hazardous Drugs wear gowns, latex gloves, and chemical splash goggles or equivalent safety glasses.</li> <li>▪ When administering <b>aerosolized drugs</b> additional precautions may be necessary to protect the employee from exposure such as:             <ol style="list-style-type: none"> <li>1. Wearing respirators.</li> <li>2. The use of treatment booths with local exhaust ventilation systems, or isolation rooms with separate HEPA filtered ventilation systems.</li> <li>3. Only those trained to administer hazardous drugs should be allowed to perform this function.</li> <li>4. Disposable gloves and gowns should</li> </ol> </li> </ul>

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		<p>be worn. The glove and gown cuffs should be worn in a manner that produces a tight fit (e.g., loose glove tucked under gown cuff; tight glove fitted over gown cuff).</p> <ol style="list-style-type: none"> <li>5. Intravenous containers designed with venting tubes should not be used.</li> <li>6. The use of plastic backed absorbent liners under I.V. tubing during administration of hazardous drugs to absorb any leakage and prevent the solution from spilling onto patient skin.</li> <li>7. Work at waist level, if possible; avoid working above the head or reaching up for connections or ports.</li> <li>8. Until the reproductive risks associated with handling Hazardous Drugs have been substantiated, staffs who are pregnant or breast-feeding should avoid contact with these drugs.</li> </ol>
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5.	<b>Hazardous Drugs During Care Giving</b>
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<p><b>Potential Hazard</b></p> <p>Exposure to Hazardous Drugs during care giving:</p> <ul style="list-style-type: none"> <li>▪ When dealing with excreta that may contain high concentrates of hazardous drugs.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Special precautions need to be taken by personnel while caring for the patient who has been taking hazardous drugs.</li> <li>▪ If personnel are unable to differentiate between body fluid types, care should be given in accordance with the Blood borne Pathogens Standard.</li> <li>▪ Universal precautions must be observed to prevent contact with blood or other potentially infectious materials.</li> </ul>
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		<ul style="list-style-type: none"> <li>▪ Personnel (nursing, housekeeping) dealing with excreta, primarily urine, from patients who have received Hazardous Drugs in the last 48 hours, should wear PPE, gloves, and gowns.</li> <li>▪ Gloves be discarded after each use and immediately if contaminated.</li> <li>▪ Gowns should be discarded on leaving the patient-care area and immediately if contaminated.</li> <li>▪ Hands must be washed thoroughly after hazardous drugs are handled.</li> <li>▪ Disposable linen or protective pads should be used for incontinent or vomiting patients.</li> <li>▪ Contaminated non-disposable linen or protective pads require pre-washing.</li> </ul>
6.	<b>Disposal of Hazardous Drugs</b>	
	<p><b>Potential Hazard</b></p> <p>Exposure to Hazardous Drugs during disposal:</p> <ul style="list-style-type: none"> <li>▪ Bagging and Labeling</li> <li>▪ Hazardous waste disposal and containers</li> </ul>	<p><b>Preventive Precautions</b></p> <p><b>Bagging and labeling</b></p> <ul style="list-style-type: none"> <li>▪ Bags containing materials contaminated with hazardous drugs covered under the <u>Hazard Communication Standard</u>, must be labeled.</li> </ul> <p><b>Other Recommended Good Practices:</b></p> <ul style="list-style-type: none"> <li>▪ Thick, leak-proof plastic bags, colored differently from other hospital trash bags, should be used for routine collection of discarded gloves, gowns and other disposable material, and labeled as <b>Hazardous Drug-related wastes</b>.</li> <li>▪ Waste bag should be kept inside a covered waste container clearly labeled "Hazardous Drug WASTE ONLY." At least</li> </ul>

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		<p>one such receptacle should be located in every area where the drugs are prepared or administered.</p> <ul style="list-style-type: none"> <li>▪ Waste should not be moved from one area to another. The bag should be sealed when filled and the covered waste container taped.</li> <li>▪ Labeling needle containers and breakable items of hazardous waste as <b>Hazardous Drug waste only.</b></li> <li>▪ The use of properly labeled, sealed and covered disposal containers, handled by trained and protected personnel, as required under the Blood borne Pathogens Standard if such items are contaminated with blood or other potentially infectious materials.</li> <li>▪ Hazardous drug-related wastes should be disposed as per state and local regulations for hazardous waste.</li> <li>▪ This disposal can occur at either an incinerator or a licensed sanitary landfill for toxic wastes, as appropriate.</li> <li>▪ While awaiting removal, the waste should be held in a secure area in covered, labeled drums with plastic liners.</li> </ul>
7.	<b>Hazardous Drugs During Storage</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure to hazardous drugs during storage.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ <b>Storage of Hazardous Drugs:</b> Access to areas where Hazardous Drugs are prepared and stored is limited to authorized personnel only, with signs</li> </ul>

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		<p>restricting entry.</p> <ul style="list-style-type: none"> <li>▪ <b>Storage Area for Hazardous Drugs:</b> Bins or shelves where Hazardous Drugs are stored should be designed to prevent breakage and to limit contamination in the event of leakage, with bins with barrier fronts, or other design features that reduce the chance of drug containers falling to the floor.</li> <li>▪ Warning labels should be applied to all HD containers, shelves, and bins, where these containers are stored.</li> <li>▪ Hazardous drugs requiring refrigeration be stored separately from non-hazardous drugs in individual bins designed to prevent breakage and contain leakage.</li> </ul>
8.	<b>Latex Allergy</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Some employees develop latex allergy from exposure to latex in products like latex gloves.</li> <li>▪ This can cause reactions from irritant contact dermatitis and allergic contact sensitivity to immediate possible life threatening sensitivity.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Blood borne Pathogen Standard states: The employer shall ensure that appropriate personal protective equipment in the appropriate sizes is readily accessible at the worksite or is issued to employees.</li> <li>▪ Hypoallergenic gloves, glove liners, powder less gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided</li> <li>▪ Please note that hypoallergenic gloves, glove liners, or powder less gloves are not to be assumed to be non-latex or latex free.</li> <li>▪ Research indicates the thickness of the gloves used in handling hazardous drugs</li> </ul>

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		<p>is more important than the type of material used.</p> <ul style="list-style-type: none"> <li>▪ Non latex gloves and other latex free products are available.</li> <li>▪ If latex is used, choose a low protein, powder free glove. (Powder free gloves seem to reduce systemic allergic responses.)</li> </ul>
9.	<b>Ergonomics</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Pharmacists may be exposed to Musculoskeletal Disorders (MSDs) such as Carpel Tunnel Syndrome, Tendonitis, and Tenosynovitis from activities that involve repetitive tasks, forceful exertions, awkward postures or contact stress (e.g., opening/closing bottle lids, or computer tasks such as typing).</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Use assistive devices, to eliminate the need to do the task, (e.g., use devices designed to open bottle lids for Pharmacist).</li> <li>▪ Modification of pharmacy tasks to decrease incidence of work-related musculoskeletal disorders.</li> <li>▪ Redesign the process to incorporate variation into the task (e.g., alternate repetitive tasks with those that do not require high repetition).</li> <li>▪ Provide ergonomically comfortable work stations including, wrist pads, adjustable padded chairs, and keyboard tray, and monitors at a comfortable height.</li> </ul>
10	<b>Workplace Violence</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Pharmacists may be exposed to workplace violence due to the availability of drugs and money in the pharmacy area, making them</li> </ul>	<p><b>Possible Solutions:</b></p> <ul style="list-style-type: none"> <li>▪ Installing plexi-glass in the payment window in the pharmacy area.</li> <li>▪ Providing better visibility and lighting in the pharmacy area.</li> <li>▪ Providing training for staff in recognizing and managing hostile and assaultive</li> </ul>

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	possible robbery targets	<p>behavior.</p> <ul style="list-style-type: none"> <li>▪ Implementing security devices such as panic buttons, beepers, surveillance cameras, alarm systems, two-way mirrors, card-key access systems, and security guards.</li> </ul>
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## HAZARDS IN RADIOLOGY

1.	<b>Tuberculosis</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure of radiology staff to patients with tuberculosis during x-ray procedures.</li> <li>▪ Exposure may also occur after radiology procedures are completed, from treatment rooms not properly ventilated after being occupied with a patient who has TB.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Facilities in which TB patients are frequently treated should have an area in the radiology department that is ventilated separately for TB patients.</li> <li>▪ If this is not possible, TB patients should wear surgical masks and should stay in the radiology suite the minimum amount of time possible, then be returned promptly to their isolation rooms.</li> <li>▪ Healthcare facilities serving populations that have a high prevalence of TB may need to supplement the general ventilation or use additional engineering approaches in general-use areas where TB patients are likely to go (e.g., waiting-room areas, emergency departments, and radiology suites). Engineering approaches include:             <ol style="list-style-type: none"> <li>1. A single-pass, non-re circulating system that exhausts air directly to the outside.</li> <li>2. A re-circulation system that passes air through HEPA (High Efficiency</li> </ol> </li> </ul>

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		<p>Particulate Air) filters before re-circulating it to the general ventilation system.</p> <p>3. Upper Air Ultraviolet Germicidal Irradiation (UGVI) may be used in such areas.</p> <p>▪ <b>Signs and Tags:</b></p> <p>1. Employees should receive adequate information about the hazards of TB through the use of labels and signs</p> <p>2. Isolation rooms or areas, such as radiology examination rooms where procedures or services are being performed on an individual with suspected or confirmed infectious TB. <b>The signs could bear a "STOP" sign and the legend "No admittance without wearing a type N95 or more protective respirator."</b></p> <p>3. Employers should use biological hazard tags on air transport components (e.g., fans, ducts, filters), that may reasonably contain air infected with tuberculosis to warn employees, temporary employees, or contractors of possible hazards of contamination.</p> <p>4. Contaminated air ducts leading from this area should have a warning label posted on them. The warning labels on these air systems could be labeled with, <b>"Contaminated Air-Respiratory Protection Required."</b></p>
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		<ol style="list-style-type: none"> <li>5. After the area is vacated by an individual with suspected or confirmed infectious TB, the sign shall remain posted at the entrance, until the room or area has been ventilated according to CDC recommendations for removal efficiency of 99.9%.</li> <li>6. Guidelines regarding the length of time for such sanitation of the room air based upon the air exchanges per hour. Requiring that the sign remain posted until the room or area is adequately ventilated will assure that unprotected employees do not inadvertently enter while an infection risk is still present.</li> </ol>
2.	<b>Ergonomics</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure of radiology staff to possible work-related musculoskeletal disorders (MSDs) (e.g., strain and sprain injuries to back and shoulder areas) from constant lifting and reaching for patients during x-ray procedures and/or transfers.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Employers should assess the radiology area for ergonomic stressors and identify and address ways to decrease stressors such as:             <ol style="list-style-type: none"> <li>1. Train employees in proper lifting techniques</li> <li>2. Lift items close to the body.</li> <li>3. Avoid awkward postures, such as twisting while lifting.</li> <li>4. Avoid lifting/reaching or working above shoulder height.</li> </ol> </li> <li>▪ Use mechanical aids to reduce the need to lift.</li> <li>▪ Provide sufficient staff to handle lifts.</li> <li>▪ Instruct the patient in ways to help facilitate the lift and procedure.</li> </ul>
3.	<b>Radiation Exposure</b>	

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<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Staff exposure to radiation from portable and fixed X-ray machines as they are used for diagnostic procedures. Potential health effects of radiation exposure are somatic (body) and/or genetic (offspring) in nature:               <ol style="list-style-type: none"> <li>1. <b>Acute:</b> Erythema and dermatitis. Large whole-body exposures cause nausea, vomiting, diarrhea, weakness, and death.</li> <li>2. <b>Chronic:</b> Skin cancer and bone marrow suppression. Genetic effects may lead to congenital defects in the employee's offspring.</li> </ol> </li> <li>▪ Radiation exposure occurs when unprotected employees are near a machine in operation. The degree of exposure depends on the amount of radiation, the duration of exposure, the distance from the source and the type of shielding in place.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ <b>Film Badge:</b> Passive dosimeter for personal exposure monitoring should be worn whenever working with x-ray equipment, radioactive patients or radioactive materials. Depending on the work situation, body badges may be worn at collar level, chest level or waist level.</li> <li>▪ <b>Double-Badging:</b> Personnel who work in high-dose fluoroscopy settings may be asked to wear two badges for additional monitoring.</li> <li>▪ <b>Ring badges:</b> (used for measuring beta and gamma doses to the hand) should be worn on the hand which is closest to the radiation source.</li> <li>▪ X-ray rooms that are equipped with a barrier wall with a lead plated glass window so technician can step behind barrier wall to take the x-ray, and avoid radiation exposure.</li> <li>▪ Lead plated glass is also used as a barrier to protect against radiation exposure when procedures must be done close to the patient.</li> <li>▪ Lead strips provide some protection from radiation exposure for employee running fluoroscopy procedures.</li> <li>▪ Lead aprons and lead gloves offer some protection for employees and patients and should be worn in the direct x-ray field. Opaque goggles are to be worn in the direct x-ray field.</li> <li>▪ Some procedures like those that use remote fluoroscopy can be run from controls in an adjacent room, free from</li> </ul>

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	<p>radiation exposure.</p> <ul style="list-style-type: none"><li>▪ A specific person should have the responsibility for assuring proper maintenance of the portable x-ray machines.</li><li>▪ Kits containing radioactive isotopes or specimens and excreta of humans and animals who have received radio nucleotides may pose a hazard.</li><li>▪ Exposure may also result from handling of radioactive spills.</li><li>▪ There should be a separate storage area for radioactive sources. This area should be adequately shielded.</li><li>▪ Document and retain inventories of radioactive materials. Only authorized personnel should have access to storage areas.</li><li>▪ Every employer shall supply appropriate personnel monitoring equipment, such as film badges, pocket chambers, pocket dosimeters, or film rings, and shall require the use of such equipment</li><li>▪ Employers shall maintain records of the radiation exposure of all employees for whom personnel monitoring is required.</li><li>▪ At the request of a former employee an employer shall furnish to the employee a report of the employee's exposure to radiation records</li><li>▪ Such report shall be furnished within 30 days from the time the request is made.</li><li>▪ The report shall also include the results of any calculations and analysis of radioactive material deposited in the body of the employee.</li><li>▪ The report shall be in writing and contain the following statement: "You should preserve this report for future reference"</li></ul>
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		<ul style="list-style-type: none"> <li>▪ Each radiation area shall be conspicuously posted with a sign or signs bearing the <u>radiation caution symbol</u>, with the wording "Caution Radiation Area".</li> </ul>
4.	<b>Slips/Trips/Falls</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ There is a potential for slips and falls in the radiology area, and when using portable X-ray machines if employees slip on fluids spilled on the floor such as blood, vomit, or excreta, or trip over x-ray power cords.</li> </ul>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Requires floors be kept clean and dry.</li> <li>▪ Aisles and passageways shall be kept clear and in good repairs, with no obstruction across or in aisles that could create a hazard</li> <li>▪ Provide floor plugs for equipment, so power cords need not run across pathways.</li> <li>▪ Good work practice recommends:               <ol style="list-style-type: none"> <li>1. Spills reported and cleaned up immediately.</li> <li>2. The use of no skid waxes and surfaces coated with grit or waterproof footwear to help decrease slip/fall hazards.</li> </ol> </li> </ul>
5.	<b>Blood Borne Infections</b>	
	<p><b>Potential Hazard</b></p> <p>Exposure of staff to blood and Other Potentially Infectious Materials, (OPIM) (e.g., excreta, vomit, sputum), during the x-ray process. Definition for OPIM is found in</p>	<p><b>Preventive Precautions</b></p> <ul style="list-style-type: none"> <li>▪ Implement Universal Precautions according to the Blood borne Pathogens Standard</li> <li>▪ Treat all blood and OPIM with appropriate precautions such as:               <ol style="list-style-type: none"> <li>1. Use gloves, masks, and gowns if</li> </ol> </li> </ul>

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	<p>1910.1030(b).</p>	<p>blood or OPIM exposure is anticipated.</p> <p>2. Use engineering and work practice controls to limit exposure.</p> <ul style="list-style-type: none"> <li>▪ Provide appropriate Personal Protective Equipment (PPE) such as gloves or gowns.</li> <li>▪ Gloves must be worn when hand contact with blood, mucous membranes, OPIM, or non-intact skin is anticipated, and when performing vascular access procedures, or when handling contaminated items or surfaces.</li> </ul>
6.	<b>Workplace Violence</b>	
	<p><b>Potential Hazard</b></p> <ul style="list-style-type: none"> <li>▪ Exposure of employee to potential violence from uncooperative, disoriented, or combative patients. Many radiology patients come from the emergency area and may be confused and violent.</li> </ul>	<p><b>Possible Solutions</b></p> <ul style="list-style-type: none"> <li>▪ Have a plan in place to deal with difficult patients.</li> <li>▪ Provide training to staff to identify, recognize, and diffuse potentially violent situations and patients.</li> <li>▪ Be alert for potential violence and suspicious behavior and report it.</li> <li>▪ Provide adequate staffing levels, with experienced clinicians on each shift.</li> <li>▪ Use appropriate engineering controls to provide security such as:             <ol style="list-style-type: none"> <li>1. Install concealed panic buttons-in the x-ray area, that can be pushed for emergency help.</li> <li>2. Improve lighting and video</li> </ol> </li> </ul>

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		<p>surveillance.</p> <ol style="list-style-type: none"><li>3. Use an escort or buddy system, when taking a possibly violent person to radiology.</li></ol>
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