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# **TRAINING MATERIAL**

## **FOR ASSESSING THE RISK IN**

### **HEALTH SERVICES**



**Coordinator:** Cyprus Workers' Confederation (SEK)  
**Participants:** Department of Labor Inspection (CY)  
Cyprus Safety and Health Association (CY)  
Cyprus Employers & Industrialists Federation (CY)  
Arbeit und Leben (D)  
Odense Techniske Skole (DK)  
Hellenic Institute for Occupational Health and Safety (EL)  
Kauno Kolegija (LT)  
Confederatia National A Sindicatelor Libere din Romania-FRATIA (RO)  
Center for Advanced Technologies, Politechnic University of Bucharest (RO)

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## M10-EN.1 INTRODUCTION

Scope of the present module is the training of the employees in healthcare services on the identification of the main hazards related to their operations and the provision of “Safety Precautions” for the establishment of a safe and healthy work environment.

The module presents the different hazards in the main activities that take place in the healthcare services. At the same time, an effort is made to keep the main categorization of hazards, as follows:

- **Blood, Blood borne Pathogens and Other Potentially Infectious Material (OPIM)** such as Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV)
- **Tuberculosis**
- **Chemical Hazards** such as disinfectants, sterilants, medicines, laboratory reagents, housekeeping/maintenance chemicals, food ingredients and products, pesticides, etc
- **Work related musculoskeletal disorders** (i.e. strain and sprain injuries to back and shoulders areas). These disorders can result from constant lifting and reaching for patients during treatment procedures and transfers
- **Ergonomics** (problems from patient’s handling
- **Latex Allergy**
- **Needle sticks**
- **Slips/Trips/Falls**
- **Work Related Stress** due to the working conditions (specially in the Emergency Department and the Intensive Care Unit)

This module is arranged in such a way that it might be used by a tutor in class and for self-studies by any person interested in the topic. Knowledge obtained during lectures will make the participants aware of the types of hazards that an employee in a typical workplace in healthcare services may encounter, enable to perform risk assessment in a specific job and help understand the principles of risk management.

## **M10-EN.2 ADMINISTRATION**

M10-EN.2.1 Admission and Records

M10-EN.2.2 Computer Workstations - Ergonomics

M10-EN.2.3 Carbonless Paper

M10-EN.2.4 Work related stress and violence

M10-EN.2.5. Hazardous drugs during administration

### **M10-EN.2.1 Admission and Records**

During patients' admission records are taken with their medical background. Keeping records will help to keep trends in illness and injury at work, or develop information regarding the causes and prevention of occupational accidents and diseases.

Personnel at the administration can be exposed to **hazards** such as:

- Work related musculoskeletal disorders (MSDs) from excessive reaching above shoulder height while filing
- Use of carbonless paper
- Workplace stress or violence during admission processes
- Infectious diseases during admission processes (precaution measures when patients with infectious diseases arrive, use of gloves, or masks, etc)

### **M10-EN.2.2 Computer Workstations - Ergonomics**

When a computer is used (e.g. at admittance area, data entry clerk, secretary, etc) intensively for four or more hours per day, musculoskeletal disorders of hand/arm, shoulder, neck, and back, are possible to be developed.

**Employers** can provide the administration employees with:

- Adjustable desk chairs that offer support and are padded, in order to give support to the forearms, legs and low back. Arm rests should allow the elbows to hang normally at the side of the body
- Head sets for answering phones
- Keyboards with mouse support (**M10.2.1.jpg**)

For the prevention of developing MSDs, the personnel working at the administration department can examine their workstation layout and:

- Arrange materials in front of their body, so they can be easily reach them
- Use the adjustable keyboard with mouse support that can be easily reached from a keying position. Wrists must stay straight while typing and wrist pads must be used to rest the wrists on when they are not (**M10.2.2.jpg**)
- Arrange their monitor so that the most frequently viewed area is a little lower than the horizontal eye level, and can be seen without looking up or leaning forward
- Reduce awkward positions by trying to:

- Keep most of their work activities within repetitive access area (**M10.2.3.jpg**)
- Maintain straight wrist postures

### **Safety Precautions**

- Use lower filing cupboards, that can be easily reached while keeping the elbows close to body
- Use powered filing cupboards that adjust to any height
- Use ladders or stools in order to access high files rather than reaching overhead

### **M10-EN.2.3 Carbonless Paper**

Another potential hazard for those working at the administration desks is their exposure to carbonless paper. This kind of paper is used everyday for checks, credit-card receipts and medical forms. When sheets are pressed together, tiny micro granules of dyes and resins are released. These released chemicals can be absorbed through the skin or inhaled from the air, having as a result mild to moderate symptoms of skin irritation and/or irritation of the mucosal membranes of the eyes and upper respiratory tract. These **symptoms** include among others:

- Headaches
- Sinus infections
- Bronchitis
- Eye, and skin irritations
- Shortness of breath and hives
- Allergic contact dermatitis (rarely)

Adequate good industrial hygiene and work practices can reduce or eliminate these symptoms, such as:

- Sufficient ventilation, humidity, and temperature controls
- Appropriate housekeeping (e.g. keeping desks clean and tidy, never leave food on the desks, etc)
- Minimisation of hand-to-mouth and hand-to-eye contact, as well and periodic cleansing of hands

### **M10-EN.2.4 Work related stress**

Health care personnel are exposed to critically ill patients and must deal with emotional life/death situations on a daily basis, increasing their risk for work related stress, and work exhaustion.

In general, the causes of work related stress vary due to the following factors:

- The person itself
  - demographic characteristics (age, sex, nationality, education, work post, etc)
  - personal characteristics (motivation, expectations, self-estimation, etc)
  - previous experiences (professional, private nature)

- Health care facility working environment
  - Working conditions (nature of work, contact with pain, death, etc)
  - Organisation/management (working hours, work load, payment, etc)
  - Colleague relations (communication, problems of cooperation, etc)
- Contact with patients and their relatives

Work related stress can increase a worker's risk for cardiovascular disease, psychological disorders, workplace injury, etc. Early warning signs include headaches, sleep disturbances, difficulty in concentration, job dissatisfaction, and low self-confidence.

At the administration, work related stress occur usually when:

- very seriously injured or critically ill patients arrive
- patients or their relatives react with anger or pain
- small children arrive at the hospital, etc

### **Safety Precautions**

Some general precautions for the health care institution are:

- Workload must be in line with employees' capabilities and resources
- Work must be designed to provide meaning, stimulation, and opportunities for employees to use their skills
- Employees must know exactly their roles and responsibilities
- The stressful aspects of work (e.g. excessive workload, conflicting expectations), must be identified and been reduced or eliminated
- Employees should be given the opportunities to participate in decisions and actions affecting their jobs

**Employers** are required to provide their personnel with:

- Proper education on work related stress management, in order to improve their ability to cope with difficult work situations. Stress management programs can teach employees about the nature and sources of stress, the effects on their health, and personal skills reducing it (e.g. time management or relaxation exercises)
- A consultant to recommend ways to improve working conditions

When it comes to admissions, the employees there can follow the precautions below:

- Be properly trained and prepared on how to react in emergency and stressfully situations, such as heavy injuries, children's admission, etc
- Have two employees working at the same time, in case the one does not feel well with a situation

### **M10-EN.2.5 Hazardous drugs during administration**

Sometimes antiviral drugs are used from the personnel at the administration, for the treatment of infants and young children with lower respiratory syncytial virus (RSV)

infections. These drugs are aerosolized and are usually given to the patient in an oxygen tent or face mask.

### **Safety Precautions**

- Only trained personnel must administer hazardous drugs
- The personnel administering hazardous drugs should wear disposable gowns, latex gloves, and chemical splash goggles or equivalent safety glasses
- Additional precautions can be respirators, adequate ventilation, etc
- Pregnant or breast-feeding personnel are not allowed to come in contact with these drugs

## **M10-EN.3 EMERGENCY DEPARTMENT AND INTENSIVE CARE UNIT**

M10-EN.3.1 Blood, Blood borne Pathogens, Other Potentially Infectious Material (OPIM)

M10-EN.3.2 Tuberculosis

M10-EN.3. 3 Bacteria

M10-EN.3. 4 Hazardous Chemicals

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M10-EN.3. 6 Equipment Hazards

M10-EN.3. 7 Slips/Trips/Falls

M10-EN.3. 8 Working space

M10-EN.3. 9 Working hours

M10-EN.3.10 Workplace Stress

M10-EN.3.12 Workplace Violence

### **M10-EN.3.1 Blood, Blood borne Pathogens, Other Potentially Infectious Material (OPIM)**

Emergency Department (ED) and Intensive Care Unit (ICU) workers are at particular risk from their exposure to blood, OPIM, and blood borne pathogens because of the urgent, life-threatening nature of emergency treatment. Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV), are included in these pathogens.

#### **Safety Precautions**

- Treat all blood and other potentially infectious body fluids as if they are infected and take appropriate precautions to avoid contact with these fluids
- Use proper personal protective equipment (PPE), such as gloves, gowns, and face masks, when dealing with blood or OPIM, or mucous membranes. Wear gloves while performing vascular access procedures, or when handling contaminated items or surfaces (**M10.3.1.jpg**)
- Use thick utility gloves and gowns that offer additional protection when sorting contaminated items. These utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. Nevertheless, discard them if they exhibit any sign of deterioration

**Employers** must provide their personnel with:

- Safer needle devices (e.g. needle-less connectors self-sheathing or retractable needles), in order to avoid any exposure to blood and blood borne pathogens (**M10.3.2.jpg**, **M10.3.3.jpg**)
- Readily accessible hand washing facilities where they can wash their hands immediately or as soon as possible after they remove their gloves (**M10.3.4.jpg**)
- Sharps' containers in close proximity to areas where sharps are used

In addition, employees should adopt the following **practices**:

- Discard any contaminated needle and other sharp instrument immediately or as soon as possible after its use, into appropriate containers
- Never bent, recap or remove contaminated needles and other contaminated sharps

### **M10-EN.3. 2 Tuberculosis**

The personnel at the Emergency Department can be exposed to Tuberculosis (TB) and other infectious agents from the patients in the waiting room and treatment areas.

#### **Safety Precautions**

- Practice early patient screening (e.g. through the completion of a questionnaire) to identify potentially infectious patients, for the prevention of possible exposures
- 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
- Ask patients with a productive cough to wear a mask for the prevention of spreading the infection
- A separated area with separate ventilation must exist for TB patients and especially in facilities where these patients are regularly treated. If this is not possible, TB patients must wear surgical masks and stay in the radiology room the minimum amount of time possible, then be returned without delay to their isolation rooms
- Use biological hazard tags or warning labels on air transport components (e.g. fan, ducts, filters, etc), that may logically contain air infected with TB, to warn their employees or any other person being at this area of possible hazards of contamination
- When a person suspected or confirmed with TB, leaves the area, the sign at the entrance of the room must remain until it is properly ventilated, ensuring that any unprotected employee does not accidentally enter while an infection risk is still present
- Where healthcare facilities serve populations with a high occurrence of TB, the general ventilation, supplement 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 rooms). These engineering approaches include:
  - A single-pass, non-recirculating system exhausting air directly outside
  - A re-circulation system that passes air through High Efficiency Particulate Air filters before re-circulating it to the general ventilation system
  - Use of Upper Air Ultraviolet Germicidal Irradiation, a process that exposes micro-organisms (bacteria, moulds, fungi or viruses) to ultraviolet radiation, in order to break their molecular structure. By breaking their organic molecular bonds the radiation causes them irreparable cellular damage

**Employers** must place warning signs at the waiting rooms (e.g. “If you are coughing you may be asked to wear a mask”). Until the verification testing is negative, the possible infectious patients should be isolated, either to isolation rooms, or to a designated isolation area. A warning sign should exist outside the respiratory isolation room to prevent accidental entry. A signal word (i.e. “STOP”, or “NO ADMITTANCE”) or biological hazard symbol should be presented, and as well as a major message (e.g. “Special respiratory isolation”, “Respiratory isolation”). When respirators need to be used, then the employers must provide the personnel with them and ensure that they use them.

### **M10-EN.3. 3 Bacteria**

#### **Methicillin Resistance Staphylococcus Aureus (MRSA)**

Staphylococcus aureus is a common bacterium found on the skin of healthy people. If staphylococcus enters the body it can cause a minor infection such as boils or pimples or serious infections such as pneumonia or blood infections. The resistant bacteria to methicillin (used for the treatment of staphylococcus) are called Methicillin-resistant Staphylococcus Aureus (MRSA).

This kind of bacteria usually infects elderly or very sick hospital patients. Sometimes, those who have had frequent, long-term or intensive use of antibiotics, those who are using intravenous drugs may be at more risk, as well and those who are immune-suppressed, or with long-term illnesses. The infection can be developed in an open wound such as a bedsore or when there is a tube such as a urinary catheter that enters the body

#### **Potential Hazards**

Exposure of Emergency Department employees to MRSA infections can occur from environmental sources (e.g. homeless patients). Their hands can be contaminated by contact with patients, or surfaces in the workplace, and medical devices that are contaminated with body fluids containing MRSA. If the personnel are infected, they can become carriers who can infect other employees or patients.

#### **Safety Precautions** (in addition to those mentioned in M10-EN.3.1)

- Wash hands immediately after removal of gloves, between patient contacts and between tasks and procedures
- Clean, disinfect and sterilise patient care equipment to limit any transmission of organisms

#### **Employers** should:

- Establish MRSA data and provide treatment information to their employees
- Provide training to their health care personnel for the prevention of MRSA infections

### M10-EN.3. 4 Hazardous Chemicals

Chemicals can be found in many departments of a health care institution, such as:

<b>Types of chemicals</b>	<b>Departments that can be found</b>
Disinfectants	Patient areas
Sterilants	Central supply, surgery rooms, doctors offices
Medicines	Pharmacy, Patient areas
Laboratory reagents	Laboratories
Housekeeping/maintenance chemicals	Hospital- wide
Food ingredients and products	Kitchen, cafeteria
Pesticides	Hospital-wide

The personnel at the Emergency Department can be exposed to hazardous chemicals (e.g. during decontamination of emergency patients after a chemical spill) or exposed to hazardous drugs.

#### **Safety Precautions**

A program must exist for the maximisation of the employee's safety during decontamination of patients, and during administration, disposal, and preparation of hazardous drugs. Engineering controls can be used, such as:

- Splatter guards (Plexiglas barriers), for the prevention of any splashes (M10.3.5.jpg)
- “Automatic sinks” that are sensor-controlled or with foot, knee, elbow in order for the employees to use them without using their hands
- Centrifuge tubes with caps
- Biological safety cabinets

A daily check is essential to ensure that proper air exchange and air flow exist. The employers must keep all the records of maintenance for the ventilation systems, and for the laboratory hoods and other equipment.

Health care personnel often are exposed to hazardous drugs and usually antineoplastic (cancer) drugs, because they neglect to:

- use biological safety cabinets during drugs' preparation
- use appropriate personal protective equipment
- follow the correct practices while preparing or handling these drugs

## **Safety Precautions**

Employers must:

- Assess potential hazards
- Provide proper PPE (gloves and gowns), for the protection against hazardous chemicals and drugs; and for the protection of eye and face whenever splashes, sprays, or aerosols of hazardous drugs may be created resulting in eye, nose, or mouth contamination.
- Ensure that the personnel use the proper PPE.

Protective gowns can be disposable; made of lint-free, low-permeability fabric, with a solid front, long sleeves and tight-fitting elastic or knit cuffs

Change gloves regularly or immediately if they are torn, punctured, or contaminated with a spill. Wash hands prior using gloves, and after their removal

### **M10-EN.3.5 Hazardous drugs during care giving**

Employees can be exposed to hazardous drugs during care giving, while they deal with excreta that may contain high concentrations of hazardous drugs.

## **Safety Precautions**

- Wear appropriate PPE such as gloves, gowns, etc, (especially nurses or housekeepers dealing with body fluids from patients that received hazardous drugs in the last 48 hours)
- Use disposable linen or protective pads for incontinent or vomiting patients
- Discard the gloves after each use and immediately if contaminated. Discard the gowns when leaving the patient-care area and immediately if contaminated
- Wash hands thoroughly after handling hazardous drugs

### **M10-EN.3.6 Latex Allergy**

Due to the fact that gloves, and often latex ones, must be worn frequently in the Emergency Department and in the health care facility in general, health care workers can develop latex allergy. (M10.3.6.jpg, M10.3.7.jpg)

## **Safety Precaution**

In case of latex allergy **employers** must:

- Provide a latex-free work environment, where possible
- Ensure that non-latex gloves and other latex-free products are used (such as hypoallergenic gloves, glove liners, powder-free gloves, etc)
- Choose a low protein, powder-free glove, for reducing any systemic allergic responses, where latex must be used

### **M10-EN.3.7 Equipment Hazards**

Injuries are possible when employees are not properly trained on the use of equipment (e.g. defibrillators). One of the common hazards in a workplace is electricity. In health care facilities a wide variety of electrical equipment is used, very often in hazardous environments, such as: wet or damp locations or adjacent to flammables or combustibles. Electric shock may occur as a result of lack of maintenance or misuse of equipment and/or its controls (**M10.3.8.jpg**). Possible **electrical hazards** include:

- Three-wire (grounded) plugs are attached to two-wire cords that are ungrounded (**M10.3.9.jpg**)
- Ground projections are bent or cut off
- Ungrounded appliances attached to ungrounded multiple-plug “spiders” (**M10.3.10.jpg, M10.3.11.jpg**)
- Extension cords with improper grounding
- Cords moulded to improperly wired plugs

### **Safety Precautions**

- Turn off any equipment before unplugging it
- Do not use electrical equipment when hands, working surface or floor are wet (**M10.3.12.jpg**)
- Do not use any appliance, equipment or wall receptacle that seems damaged (**M10.3.13.jpg**)
- Do not use any device that is combusted until it is inspected
- Use extension cords only temporarily and only in urgent situations
- Use extension cords designed to carry the voltage required
- Report every shock immediately and do not use it unless is inspected

**Employers** are required to:

- Train their personnel properly on electrical safety
- Inspect and monitor regularly the status of equipment in every health care department
- Provide their employees adequate working space and access to equipment

The **employees** must remember to:

- Visually inspect cords, and not use them if they are frayed or damaged. Equipment cords must be grounded and especially the one near sources of water
- Visually inspect the equipment before using it, and if something does not look right, they must call for assistance and not use it
- Use appropriate personal protective equipment and safe work practices for hazards for example: gloves during handling hot items, not opening autoclaves or sterilizers until they are sufficiently cooled

### **M10-EN.3. 8 Slips/Trips/Falls**

Due to the emergency atmosphere (i.e. high traffic and compact treatment spaces) slips, trips, and/or falls are possible. A potential slip and fall hazard might occur, in case of a water spillage on the floor accidentally, electrical cords running across pathways, and/or if emergency equipment or supplies block passageways.

#### **Safety Precautions**

- Coverage of floors with non slippery material
- Keep floors clean and dry in all circumstances
- Keep aisles and passageways clear and in good condition, without obstructions
- Mark mobile equipment with a bright colour, or a tape “X”, for distinguishing it from the floor and make it more visible to employees

#### **Employers must:**

- Provide floor plugs or ceiling plugs for the equipment, in order that power cords do not need to be across pathways
- Give instructions to employees to use the handrail on stairs, to avoid undue speed, and to maintain an unobstructed view of the stairs ahead of them-even if that means asking for help when managing a large load

**Good work practices** recommend that spills must be reported and cleaned up immediately. No skid waxes must be used, as well and surfaces coated with grit or waterproof footwear for decreasing any possible slip/fall hazards.

### **M10-EN.3. 9 Working Space**

Intensive care units and especially the neonatal ones may be designed without walls between patient spaces. This may allow employees to be unknowingly exposed to aerosolized chemicals and x-ray radiation that escape from nearby work areas.

#### **Safety Precautions**

- Adequate ventilation must exist in every room in order for the contaminants to be removed
- Adequate filtering must be installed, where air recirculation is needed
- Warn and remove nearby personnel if procedures such as x-rays will take place
- Administer aerosolized chemicals in such a way to prevent exposure of the personnel or the patients

### **M10-EN.3.10 Working hours**

At the health care sector, the need for 24hour health care is essential. The health care personnel must work on a circular schedule, with a combination of shifts during the day and night. It includes 8hour shifts in morning, afternoon and night. Shifts rotate in such a way to enable the worker to return smoothly back to a daily schedule. Besides the 8hour shifts, other schemes exist such as the 12hour shifts, and those with a decreased weekly schedule.

Despite the type of shift, sleeping time disorders occur, resulting in a disturbance of workers biological rhythms also. Rotating shift system, as well night shifts, have negative results on the health and well-being of health care workers. It affects their sleeping habits, their mental condition; it disturbs their body and has effects on their social life as well.

### **Safety Precautions and good practices**

- The circular schedule must have clockwise direction. For example, an afternoon shift must never follow a morning one
- The maximum number of continuous night shifts must be three. Often this depends on the personal desire of a worker that wants to work more night shifts in a row to get used to them, in contrast with others that can work only for two
- Morning shift must begin after eight o' clock in the morning, in order for the personnel to feel less tired and stressed
- Elasticity must exist on the starting and ending time of shifts
- Night shifts must last less than the others. The workers do not have the ability to work with the same tension during a night shift
- Rotation of shifts must exist, with stability and successively, in order for the personnel to organise their personal and social lives
- 12hour shifts cause less sleeping disorders, both qualitative and quantitative
- Resting days must be two in a row, for resting better. When the resting days are interrupted, workers do not rest enough, resulting their return at work with accumulated tension
- The personnel must be allowed, when possible to choose their shift. If they control at some level their working hours, then the work related problems can also be controlled

### **M10-EN.3.11 Workplace Stress**

Work related stress increases a workers' risk for health problems. All hospital employees are exposed to stress, but not as much as those working in departments such as the Emergency Department of the Intensive Care Unit. Stressors causing work related stress, and exhaustion, can be shift work, long hours, and intense emotional situations, (e.g. the suffering and death of patients). (Link: M10-EN.2.4)

### **M10-EN.3.12 Workplace Violence**

Another frequent problem at the Emergency Department is workplace violence, due to the crowded and emotional situations that can occur with emergencies. In addition, patients being at the ED could be involved with crimes, weapons, or violence from other people that could put ED personnel at an increased risk of workplace violence.

### **Safety Precautions**

When it comes to workplace violence, preventive measures can be introduced from the employers. These measures can include environmental, work practices and training solutions.

## **Environmental**

**Engineering controls** can also be used, such as:

- Installation of alarm systems, such as panic buttons, hand-held noise devices, and mobile phones. The panic buttons can be hidden in the ED, on personnel, and at the check-in area, that can be pushed for emergency help. These buttons could notify hospital security as well as directly contact the local Police Station
- Limitation of access to the ED and to its personnel by the implementation of:
  - A waiting room area with controlled access to ED. Patients must be let in by a receptionist from a secure door
  - ED exits that exit out only, in order to prevent people from the street to enter into the ED unless they come in through the waiting room area
- Adequate lighting and camera surveillance
- Use of metal detectors
- Control of all access doors
- Installation of locks in the areas where personnel moves, e.g. toilets
- Placement of curved mirrors and adequate lighting
- Provision of well-lit parking lots

## **Work Practices**

- Identification of high-risk patients
- Existence of properly trained staff at all times. The personnel can recognize and diffuse violent situations and patients
- Existence of personnel alert for possible violence or suspicious behaviour that reports any incident
- Adequate personnel, with experienced health workers on each shift
- Use of an escort system, while dealing with a possibly violent person
- Prohibition of employees working alone, especially in emergency departments
- Provision of an easy and effective process to report suspicious behaviour, harassment, threats, or violent assaults to those accountable.
- Supervision of movements of psychiatric clients and patients within the facility

A **security management program** can be established, addressing workplace violence in the ED, and used as part of **good work practices**. This program can include:

- Intervention measures (verbal, social, physical, pharmacological, etc)
- Placement of warning signs of Increasing Anger/Violence (i.e. Pacing and/or restlessness, Clenched fist, Increasingly loud speech, Threats or Cursing, etc)
- Establishment of counselling and treatment for employees experienced workplace violence
- Reconsider prevention policies, reporting procedures, support systems and action plans

- Identify risk factors that can cause or contribute to violence
- Identify early warning signs of escalating behaviour
- Provide workers with tools for diffusing violent situations
- Use incidents to review system and policy failures

**Employers** can provide a "secure" room for patients identified to be violent, with:

- Video camera surveillance
- Visual surveillance (provision of a window )
- Door locks on those patient rooms and locked cabinets
- Beds with tie down straps, furniture and equipment attached to the floor so patients can't throw them at health care workers.

## **M10-EN.4 OPERATING ROOM**

M10-EN.4.1 Blood borne Pathogens

M10-EN.4.2 Hazardous Chemicals

M10-EN.4.3 Waste Anaesthetic Gases

M10-EN.4. 4 Compressed Gases

M10-EN.4. 5 Laser hazards

M10-EN.4. 6 Laser Plume

M10-EN.4.7 Latex Allergy

M10-EN.4.8 Equipment Hazards

M10-EN.4.9 Static or Awkward Postures

M10-EN.4.10 Slips/Trips/Falls

### **M10-EN.4.1 Blood borne Pathogens**

Health care personnel working at the surgical department are exposed blood borne pathogens or OPIM.

#### **Safety Precautions**

- Use appropriate personal protective equipment, (e.g. gloves during hand contact with blood, mucous membranes, OPIM, or when handling contaminated items or surfaces). (Link: M10-EN.3.1)
- Minimise hazards of exposure to blood borne pathogens in the surgery by using:
  - Safer needle or other sharps devices
  - Rounded stitch needles
  - Needle-free intra venous (IV) connectors
  - Proper containerisation of sharps
  - Use hands-free technique, for passing instruments safely between surgeon and assistants. A tray or other means are used to eliminate simultaneous handling of sharp instruments during surgery

### **M10-EN.4.2 Hazardous Chemicals**

In the operating room a variety of hazardous chemicals can be found, such as:

- ethylene oxide, glutaraldehyde and paracetic acid used for sterilization
- Methyl Methacrylate (MMA) (an acrylic cement-like substance used to secure prostheses to bone during orthopaedic surgery)

The personnel of the operating room are exposed to these chemicals, usually during their mixing, preparation, and in the surgery room in general.

Ethylene Oxide is used within health care facilities (outpatient surgery clinics, cardiac catheterization laboratories, operating rooms, autopsy laboratories, etc), as a sterilant

for items that can not be exposed to steam sterilization. Exposure occurs from improper aeration of the ethylene oxide room after the sterilizing process or during off-gassing of sterilized items or poor gas-line connections.

EtO has many effects on health. In liquid form, it can cause eye irritation and cornea injury, frostbite, and severe irritation and blistering of the skin upon prolonged or confined contact. Ingestion of EtO can cause gastric irritation and liver injury. Acute effects from the inhalation of EtO vapours include respiratory irritation and lung injury, headache, nausea, vomiting, diarrhoea, shortness of breath, and cyanosis. Exposure to EtO has also been connected with the occurrence of cancer, reproductive effects, mutagenic changes, neurotoxicity, etc.

### **General Safety Precautions**

- Read and follow carefully the instructions and warnings on labels, (e.g. use gloves during the use of cold sterilant machines for the equipment sterilisation that cannot be autoclaved, never open these machines until they are in a safe to open mode, etc)
- Mix hazardous chemicals used in surgeries, (e.g. Methyl Methacrylate) only in a well ventilated, closed system
- Follow all Material Safety Data Sheet (MSDS) instructions regarding safe handling, storage, and disposal of hazardous chemicals. In addition, consider using less hazardous disinfectants

More specific, for the sterilants used in an operating room, the following **Safety Precautions** are given:

- Avoid close contact with newly sterilized unaerated loads. Aerate them before moving them to transfer carts.
- Use appropriate PPE (gloves, canister respirator, etc) when changing cylinders
- Use EtO detector systems, and room monitors for signalling in case of gas leakage
- Use glutaraldehyde products in well ventilated rooms, and large enough to ensure adequate dilution of vapour
- Store glutaraldehyde products in closed containers and in well ventilated areas
- Use proper PPE, minimising the exposure (i.e. gloves, splash proof goggles or full-face shields)
- Use the local exhaust ventilation, such as a properly functioning fume hood for controlling vapour
- Remember to replace lids after using the product (read the warning signs)

**Employers** should:

- Substitute with other cold sterilants (such as glutaraldehyde, hydrogen peroxide, sodium hypochlorite, etc). An evaluation is essential of possible health effects and exposure potentials of alternatives to EtO before its substitution
- Provide proper and adequate ventilation during work with EtO gas. Airborne concentrations of EtO can be controlled effectively at the source of contamination by enclosing the operation and using local exhaust ventilation

- Install a ventilated exhaust hood above the sterilizer door
- Install machine alarms that cause an automatic shutdown, when the ventilation is inadequate. Air pressure in laboratories and isolation rooms must be negative, making the contaminated air draw through the exhaust vents rather than circulating all over the rest of the workplace
- Conduct periodic personal monitoring, for leaks at gas-line connectors by using passive dosimeters
- Keep a record of detected leaks and services done on an EtO room. Replace sterilizer/aerator door gaskets, valves, and fittings when necessary

### **M10-EN.4.3 Waste Anaesthetic Gases**

Healthcare workers and especially those working at the operating room can be exposed to waste anaesthetic gases in many ways. These gases include nitrous oxide and halogenated agents (vapours of halothane, enflurane, methoxyfluorane, trichloroethylene, and chloroform).

#### **Potential Hazard**

The personnel of the surgical suite can be exposed to these waste gases usually because of the poor work practices (take precautions, using proper PPE, such as masks, etc) or during surgical procedures, during the anesthetization of patients, leaking of gas-line connections, improper or inadequate maintenance of the machine, and/or patient exhalation after the surgical procedure, while in recovery. Health effects of this exposure include nausea, dizziness, headaches, fatigue, irritability, drowsiness, coordination and judgment problems, as well as sterility, miscarriages, birth defects, cancer, liver and kidney diseases.

Waste anaesthetic gases can be considered as anaesthetic gasses and their vapours that leak out and into the surrounding room during medical procedures. Exposure can occur due to:

- Escape of these gases during the initial assembling and checking of the anesthesia system or the scavenging system
- Escaping from around the patient's anaesthesia mask
- Exhalation of the patient (in some cases days after the surgery)
- Leaking of the anaesthesia system
- During the clearing of the system at the end of a medical procedure

Specifically, surgery of the face, throat, and neck can lead to even greater leakage of waste anaesthetic gases, because in these areas it is harder to control containment of the gases.

#### **Safety Precautions**

- Try to prevent any anaesthetic spills, in order to decrease the amount of waste anaesthetic gases in the surgery, and turn off vaporizers of anaesthesia machines when not using them
- Use appropriate anaesthetic gas scavenging systems

- Evacuate properly any waste gas, by collecting and removing them, by detecting and correcting leaks, and effectively ventilating the room

Exposure to waste anaesthetic gases can be controlled through effective waste anaesthetic gas management programs which include:

### **Engineering Controls**

- Use of a well-designed waste anaesthetic gases scavenging system for collecting, removing, and properly disposing of the gases. The personnel must be careful not to discharge gases near the air intake of the room
- Use of proper masks (e.g. scavenging nasal mask). These masks must consist of a cover large enough to capture gases exhaled from the patient's mouth. An inner mask is contained within a larger outer mask. Between the masks, a slight vacuum exists
- Care must be taken, in order to have a proper heating, ventilation, and air conditioning system in the operating room, which contributes to the dilution and removal of waste anaesthetic gases that are not collected by the scavenging system or have escaped from leaks in the anaesthesia equipment
- Use of anaesthetic respirators where appropriate
- The scavenging system of waste anaesthetic gases, the anaesthesia machines, and the ventilation system, must be appropriately inspected and maintained. A daily check must take place, for preventing any leaks
- A regular preventive maintenance should include inspection, cleaning, testing, lubrication, and adjusting of the components of the waste anaesthetic gases scavenging system and the anaesthesia systems. In case of damaged or worn out parts, these should be replaced immediately. Documentation of the maintenance and preventive maintenance programs should be kept. This must include the type of work performed and the date, as well as the name(s) of the trained workers who serviced the equipment.

### **Work Practices**

Employees must use proper anesthetizing techniques, such as:

- Select, fit or position adequately the face masks
- Inflate sufficiently the tracheal tube cuff
- Connect in properly the tubes and fittings for the anaesthesia machine
- Turn the gas off when the mask is removed from the patient's face

Exposure to waste anaesthetic gases can be measured by air monitoring, which can be:

- continuous or periodic but sufficiently measure exposure in the exposed work areas and surrounding areas
- aid in identifying the existence and location of leaked gases and the efficiency of corrective measures

**Employers** should provide their personnel at the operating room with:

- Appropriate PPE, such as face masks, and sufficiently inflated endotracheal tubes
- Room dilution ventilation in order to minimise the concentration of waste anaesthetic gas in the operating room, by changing the indoor air with outdoor air (fresh air) hourly. The air from the operating room must go outside and not in the operating room or other hospital departments. Usually a regular monitoring of these gases must take place, emphasising on peak gas levels in the breathing zone of nursing personnel working very close to the patient's head

**Employers** must also develop and implement a written hazard communication program regarding waste anaesthetic gases. This program should include:

- description of the physical and health hazards of anaesthetic gases in use
- the creation and availability of up to date material safety data sheets on all anaesthetic gases
- use of proper labelling of canisters, tanks, and containers
- a comprehensive employee training and information program

More specific, the training program should list measures the personnel can take for their protection from the hazards of waste anaesthetic gases. The program should include information such as:

- engineering controls
- clearly outline emergency procedures that contain spills
- description of safe work practices and the use of personal protective equipment
- use of continuous monitoring devices

Only properly trained and equipped personnel can clean up or control any spills of anaesthetic gases.

The anaesthesia machine must be regularly inspected and maintained by factory service representatives or other qualified personnel. Prior every day's use, all anaesthesia equipment (connectors, tubing, etc.) must be inspected, and any spills of liquid anaesthetic agents should be cleaned up immediately

#### **M10-EN.4. 4 Compressed Gases**

Compressed gas cylinders contain a huge amount of energy, which, if released inappropriately, can result in serious injuries. Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards. Compressed gases within a healthcare facility exist either in fixed piped gas systems or in individual cylinders of gases. Gases may be:

- Flammable or combustible
- Explosive
- Corrosive
- Poisonous
- Inert

## **Safety Precautions**

Health care workers must be very careful when they handle compressed gases, the cylinders containing them, regulators or valves used to control gas flow, and the piping used to confine gases during flow. Some general precautions are:

- Secure cylinders containing compressed gases, in order to avoid possible falls
- Clearly identify cylinders with the name of the content
- Use hand trucks, carts, etc, when moving cylinders. Never roll or drag them
- Never attempt to repair any damaged cylinder or to force frozen or stuck cylinder valves
- Close off the cylinders when not in use
- Open slowly the cylinder valves. Oxygen cylinders must have the valve opened up all the way because of the high pressure in the cylinder. A back-seating valve exists on the oxygen cylinder, preventing the high-pressure gas from leaking out through the threaded stem
- Do not store cylinders with flammable gases (hydrogen or acetylene) close to open flames, areas where electrical sparks are generated, or where other sources of ignition may be present

Also, “No smoking” signs must be placed in any area where flammable, compressed gases are stored or are in use, in addition to the general “No smoking” policy of the health care facility

## **M10-EN.4. 5 Laser hazards**

Surgeons and their assistants are exposed to lasers used in the operating rooms during removal and cauterization of tissue. Exposure usually occurs from accidental operation and/or when proper controls are not in effect. The high electrical energy used for the generation of the beam is a potential shock hazard. Exposure to direct beam can cause burns to skin and eyes possibly resulting in blindness. Some other potential hazards are electric shock and fire, during the laser use.

## **Safety Precautions**

- Use goggles during laser surgeries for the protection of cornea conjunctive and other ocular tissue. The type of eye protection is determined by the wavelength of the laser output
- Use tightly woven fabrics and opaque gloves for the protection against laser radiation
- Use laboratory jacket or coat for the protection of arms. It is important to use protective clothing during exposure to high radiation levels
- Check lasers, prior every procedure, and during extended procedures (although they are calibrated by the manufacturer)
- Cover laser systems adequately, and especially those with high voltage capacitance. Also, ground them properly
- Cover the windows of the surgery for the protection of the personnel outside

- All operating room doors must have safety interlocks which shutdown the laser system if anyone enters the room
- The laser system must be maintained and checked accordingly with manufacturer's instructions, only by qualified personnel
- Warning signs in areas where exposure to lasers is possible, must be placed

#### **M10-EN.4. 6 Laser Plume**

Lasers are used in surgeries for vaporising, coagulating, and cutting tissue. The vapours, smoke, and particulate debris produced during these surgical procedures are called laser plumes. These plumes may contain:

- Carcinogens, mutagens, irritants, and fine dusts
- Bio-aerosols, viruses, cancer cells, blood fragments, and bacteria spores (depending on the type of the procedure)
- Carbon monoxide, polyaromatic hydrocarbons, and a variety of toxic gases
- Chemicals such as formaldehyde, hydrogen cyanide, acrolein, and benzene

Health care personnel such as surgeons, nurses, anaesthesiologists, and surgical technologists, as well and patients in hospitals and clinics are exposed to the **hazards** caused by laser plumes.

Laser plume exposure can result in health symptoms such as: eye, nose, and throat irritation, nausea, vomiting, nasal congestion, chest tightness, abdominal cramping, general flu-like symptoms, and fatigue. At high concentrations the plume causes visual and upper respiratory tract irritation of the medical personnel, and creates visual problems for the surgeons. It has also, unpleasant odour. It may have mutagenic potential. Mutagens affect offspring through changes in the DNA of paternal spermatogonia or maternal oocytes prior to conception.

#### **Safety Precautions**

Control laser plumes hazards with:

- Proper ventilation (use portable smoke evacuators and room suction systems)
- The use of proper personal protective equipment (masks, goggles, etc)
- **Safe work practices** such as:
  - Keeping the smoke evacuator or room suction hose nozzle inlet very close to the surgical site to effectively capture airborne contaminants
  - Activating the smoke evacuator every time airborne particles are produced during all surgical or other procedures
  - Considering every tube, filter, and absorber as infectious waste and be dispose appropriately
  - Installing new filters and tubing before each procedure
  - Inspecting smoke evacuator systems regularly for the prevention of possible leaks

#### **M10-EN.4.7 Latex Allergy**

Latex allergy can be developed, from the exposure to latex from using products containing latex (gloves, catheters, etc). More information was given in chapter 3.

#### **M10-EN.4.8 Equipment Hazards**

The personnel working at the operating room are often exposed to burns or shocks from equipment that is not well maintained, or because they did not have been trained properly (e.g. on proper use of autoclaves, warming cabinets, defibrillators, etc). (Link: M10-EN.3.6)

#### **M10-EN.4.9 Static or Awkward Postures**

Because operations might be lengthy, surgeons and their assistants can be exposed to:

- Static postures from the continuous standing in one position during the surgeries, causing them muscle fatigue and concentration of blood in the lower extremities
- Awkward postures because they have to tilt their head downwards for long periods of time

#### **Safety Precautions**

**Employers** must ensure that in the operating room:

- Stools are provided (where their use is possible)
- The personnel use shoes with well cushioned insteps and soles
- A foot rest bar or a low stool are provided, so the personnel can continually alter their posture by raising one foot
- The height of work surfaces is adjustable

#### **M10-EN.4.10 Slips/Trips/Falls**

In an operating room, the personnel are usually exposed to trips, and falls, e.g. falling over portable equipment that easily blends into the floor or slipping on debris, (bandages, tubing, blood, intravenous fluids, etc) spilled on the floor. Electrical cords crossing floors can also create a trip hazard. (Link: M10-EN.3.7)

## **M10-EN.5 CLINICAL SERVICES**

### **M10-EN.5.1 PHYSICAL THERAPY DEPARTMENT**

M10-EN.5.1.1 Blood borne Pathogens

M10-EN.5.1.2 Legionnaire's Disease

M10-EN.5.1.3 Hazardous Chemicals

M10-EN.5.1.4 Ergonomics

M10-EN.5.1.5 Equipment Hazards

M10-EN.5.1.6 Slips/Trips/Falls

### **M10-EN.5.2 RADIOLOGY DEPARTMENT**

M10-EN.5.2.1 Blood borne Pathogens

M10-EN.5.2.2 Tuberculosis

M10-EN.5.2.3 Radiation Exposure

M10-EN.5.2.4 Ergonomics

M10-EN.5.2.5 Computer Workstation

M10-EN.5.2.6 Slips/Trips/Falls

M10-EN.5.2.7 Workplace Violence

### **M10-EN.5.3 CHEMOTHERAPY DEPARTMENT**

#### **M10-EN.5.4 NURSING – PATIENT CARE**

M10-EN.5.4.1 Bloodborne pathogens

M10-EN.5.4.2 Sharps and needles

M10-EN.5.4.3 Ergonomics

M10-EN.5.4.4 Work related stress and violence

M10-EN.5.4.5 Working hours

### **M10-EN.5.1 PHYSICAL THERAPY DEPARTMENT**

#### **M10-EN.5.1.1 Blood borne Pathogens**

Employees are exposed to infectious diseases during physical therapy treatment of patients through possible contact with blood or other potentially infectious body fluids (e.g. semen, pleural fluid, pericardial fluid, and any body fluid that is visibly contaminated with blood). (Link: M10-EN.3.1)

#### **M10-EN.5.1.2 Legionnaire's Disease**

Health care workers can be exposed to the Legionnaires' disease from breathing aerosolized water that contains the legionella bacteria. Hazards of breathing contaminated, aerosolized water occur to those working in areas where cooling towers, humidifiers and/or air conditioning systems or domestic hot water systems are used. Also, they can be exposed while working in kitchens, janitorial closets, and

showers, where spray nozzles are used. Legionnaires' disease is most likely to be transmitted via the air from the central ventilation system.

Early symptoms of the disease include slight fever, headache, aching joints and muscles, lack of energy or tiredness, and loss of appetite. Later symptoms might include high fever, cough; difficulty in breathing or shortness of breath, chills, and chest pain. Gastrointestinal symptoms include vomiting, diarrhoea, nausea, and abdominal pain.

### **Safety Precautions**

**Employers** are required to take the following measures:

- For the hot and cold water service:
  - Use water tanks and pipe work designed in such a way so that water is not allowed to stand undisturbed for long periods
  - Cover the water tanks properly, to prevent the entry of dirt, debris and pests, and regularly inspect, clean and disinfect them
  - Avoid water temperatures between 20°C and 45°C by insulating cold water tanks and pipes in warm spaces, and by storing hot water at 60°C and circulating at 50°C
  - For the cooling towers
- Use properly designed cooling towers. Maintain and operate them as well and their associated water systems in an appropriate way.
- Clean and disinfect the systems at least every six months
- Have a regular treatment of water for the prevention of scale, corrosion and microbiological growth
- Where practicable, replace cooling towers with dry cooling systems
- Implement a program for ensuring the reduction of potential work related diseases
- Conduct a risk assessment of potential sources of Legionnaires' disease bacteria
- Develop a management plan for the maintenance and operation of water systems
- Regular inspect every potential sources of the disease (showers, whirlpools, etc)
- Manage correctly possible pathogenic biological agents in cooling towers, hot water, and other aerosolizing water systems, within the workplace

### **M10-EN.5.1.3 Hazardous Chemicals**

Very often physical therapists are exposed to possible hazardous chemicals found and used within the physical therapy area. This exposure is due to the cleaning chemicals, such as glutaraldehyde, used for the disinfection of whirlpools or tubs, or the gel used for ultrasound procedures. Also, hazards occur from the prescription of medications, creams, or ointments that are rubbed on the patient's skin by the therapist during physical therapy treatment.

### **Safety Precautions**

- Wear gloves while applying certain medications to the patients (e.g. if skin contact with the medication is indicated only for the patient)
- Apply the glutaraldehyde with caution, and is preferable a long-handled brush rather than a spray applicator
- Use less-toxic products if possible and available, or use other processes for sterilization. **Employers** should provide the physical therapists with these less-toxic products and make sure they use them
- Adequate ventilation must exist where glutaraldehyde is used, such as whirlpool and x-ray rooms. Rooms must be large enough, ensuring the adequate dilution of vapour, as well
- Follow the existing procedures for the safe administration of medications and creams

### **M10-EN.5.1.4 Ergonomics**

Physical therapists are exposed to potential work related musculoskeletal disorders (i.e. strain and sprain injuries to back and shoulders areas). These disorders can result from constant lifting and reaching for patients during treatment procedures and transfers.

### **Safety Precautions**

It is important that the therapists know how to:

- Evaluate the lift by taking some time to stop and think
- Avoid lifting/reaching or working above shoulder height
- Avoid awkward postures, such as twisting while lifting
- Avoid sitting or standing for long periods of time (have a break in between)
- Instruct the patients in ways to help facilitate the lift procedure
- Lift items close to their body, use smooth and steady lifting motions, and bend their knees, use their arm and leg muscles, and keep their back straight
- Use mechanical aids to lift patients, such as:
  - Mechanical Lift Equipment, for lifting of patients who cannot support their own weight into/out of whirlpools or tubs
  - Sliding Boards. These are slick boards used under patients for helping to reduce friction during transfers (e.g. to and from wheelchairs and treatment tables)

### **Employers must:**

- Deal with ergonomics stressors found in the physical therapy department, and provide engineering controls and work practice techniques, for their minimisation
- Provide adjustable equipment (tubs and therapy tables), in to fit therapists' individual height and comfort levels

- Train the therapists, on how to use proper lifting techniques, using good body mechanics, and ensure that a sufficient number of personnel exist during lifts

### **M10-EN.5.1.5 Equipment Hazards**

Physical Therapists use different types of electrical treatment equipment, such as hydroculator and ultrasound devices, and these can be hazardous, in case that they contact with water. In addition, when the equipment is used improperly, excessive occupational exposure to ultrasound may occur, creating more hazards.

#### **Safety Precautions**

- Visual inspect equipment and particularly cords. Never use any equipment that is frayed or damaged
- Use the handle instead of the head of the ultrasound device, during application of ultrasound and electrical stimulation treatments, in order to avoid excessive exposure of therapist's hands. Wrong technique might result in hand weakness

**Employers** are required to:

- Monitor equipment condition regularly with a health and safety based program
- Properly ground all electrical equipment near sources of water

### **M10-EN.5.1.6 Slips/Trips/Falls**

Physical therapists use several methods of treatment when caring for patients, such as:

- Ice, (e.g. ice machine and ice bags), or moist hot packs, (e.g. packs stored in hot water in a specific machine called hydroculator)
- Whirlpools
- Workout equipment, (e.g. treadmills)

In case that water is spilled on the floor, or if electrical or other cords run across pathways, potential slip and fall hazards arise.

#### **Safety Precautions** (Link: M10-EN.3.7)

Some **good work practices** include the placement of a table to the side of the hydroculator and provision of towels in order to put the hot packs on and to absorb the dripping water from them.

## **M10-EN.5.2 RADIOLOGY DEPARTMENT**

### **M10-EN.5.2.1 Blood borne Pathogens**

Employees can be exposed to blood and Other Potentially Infectious Materials, during the x-ray process. (Link: M10-EN.3.1).

### **M10-EN.5.2.2 Tuberculosis**

The employees working at the Radiology Department can be exposed to patients with tuberculosis (TB) during x-ray procedures. Their exposure may also occur after radiology procedures are completed, from treatment rooms that are not properly

ventilated after being occupied with a patient who has tuberculosis. (Link: M10-EN.3.2)

### **M10-EN.5.2.3 Radiation Exposure**

Personnel can be exposed to radiation from portable and fixed X-ray equipment during diagnostic procedures. Possible hazards may occur from kits containing radioactive isotopes or specimens and excreta of humans and animals who have received radio nucleotides, or from handling radioactive spills. Unprotected employees can be exposed to radiation when they 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.

Potential health effects of radiation exposure can be:

- Body and/or genetic in nature. Large whole-body exposures cause nausea, vomiting, diarrhoea, weakness, and death. Genetic effects may lead to congenital defects in the employee's offspring
- Acute (erythema and dermatitis) or chronic (skin cancer and bone marrow suppression)

### **Safety Precautions**

Employers should implement protective measures at the radiation department, for the ionizing radiation (x-rays and radioisotopes), such as:

- Rooms properly marked should be used for radiation procedures (with the radiation caution symbol and the wording “Caution Radiation Area”) and only authorised personnel can enter
- Nearby workers must be given adequate warning when x-ray using portable units will be taken
- X-ray controls must be in place for the prevention of unintentional activation of the unit
- Where portable x-ray units and radioisotopes are used, only the patient and trained personnel must be allowed in the room
- Every x-ray equipment must be checked before each use, in order to ensure that the secondary radiation cones and filters are in place
- The patients that have received radioactive implants or other therapeutic radiology procedures should be clearly identified. Labels must be placed on their bedding, dressings and wastes

Other means of controls can be:

- Equip X-ray rooms with a barrier wall with a lead plated glass window so technician can step behind barrier wall to take the x-ray, and avoid exposure to radiation
- Use Lead plated glass as a barrier for the protection against radiation exposure when procedures must be done close to the patient
- Use Lead strips for protection from radiation exposure during fluoroscopy procedures

- Wear Lead aprons and gloves for the protection of employees and patients, in the direct x-ray field. Employees must also wear opaque goggles
- Procedures using remote fluoroscopy can be run from controls in an adjacent room, free from radiation exposure
- Keep a separate storage area for radioactive sources. This area should be adequately shielded. Radioactive materials should have document and retain inventories. Only authorized personnel must have access to storage areas
- Keep records of the radiation exposure of all employees for whom personal monitoring is required and inform them for their individual exposure at least once a year. Employers must supply proper personnel monitoring equipment, such as film badges, pocket chambers, pocket dosimeters, or film rings, and require the use of this equipment
- Indicate a specific person that will be responsible for the assurance of proper maintenance of the portable x-ray equipment

#### **M10-EN.5.2.4 Ergonomics**

Employees at the radiology department are exposed to possible work-related MSDs (e.g. strain and sprain injuries to back and shoulder areas), caused by constant lifting and reaching of patients during x-ray procedures and/or transfers. (Link: M10-EN.5.3)

#### **M10-EN.5.2.5 Computer Workstation**

Tasks using a computer (e.g. remote radiology computer workstation, data entry clerk, secretary) intensively for four hours or more per day, can lead to musculoskeletal disorders of the hand/arm, shoulder, neck and back (Link: M10-EN2.2).

#### **M10-EN.5.2.6 Slips/Trips/Falls**

A potential for slips and falls exist in the radiology area, and while using portable X-ray machines if employees slip on fluids spilled on the floor such as blood, vomit, or excreta, or if they trip over x-ray power cords (Link: M10-EN.3.7).

#### **M10-EN.5.2.7 Workplace Violence**

Many radiology patients come from the emergency area and may be confused and violent. Thus, employees can be exposed to potential violence from these patients. (Link: M10-EN.3.11).

### **M10-EN.5.3 CHEMOTHERAPY DEPARTMENT**

Cytotoxic or antineoplastic, anticancer or cancer chemotherapy drugs, include a wide range of chemical compounds. Due to their ability to kill tumour cells by interfering with cell division, they are extensively used on the treatment of cancer, and some have other medical applications as well. Nevertheless, their actions are not precise on tumour cells and normal cells might be damaged. As a result, they can produce significant side effects with their exposure to patients or health care workers involved in preparing and administering them and/or caring for patients undergoing treatment.

These drugs may have cancerous, mutagenic and teratogenic properties. Some cytotoxic drugs can cause skin, eyes and mucous membranes irritation. They are

commonly administered by injection of single doses or by continuous infusion. Some are given orally in tablet, capsule or liquid form.

Preparation of cytotoxic drugs must be done in the pharmacy, and under the direction of a suitably trained and experienced pharmacist. The work area should be clearly designated for drug preparation and only authorised personnel can have access to it.

Suitable containers clearly labelled and reserved only for the use of cytotoxic drug waste, must be available. Sharps containers should be used for the safe disposal of needles and sharps. Excreta from treated patients may contain unchanged cytotoxic drugs or active metabolites. When handling waste, including waste from treated patients, the personnel must wear suitable PPE.

Occupational **exposure** can occur from the:

- Bad practice of dissolution because of:
  - Dissemination through droplets in the air
  - Deposit of the drug to surfaces of the work area
  - Injuries from bad use of used needles or ampoules
  - Direct contact with the skin or mucous membranes (e.g. from a spillage/splashing)
- Bad operation control of the device used for the provision of the drugs
  - Leakage of drug from the infusion device
  - Inhalation of the drug because of a leakage during bolus infusion due to excessive pressure
- Wrong handling of patients (blood, biological excretions)
- Unreasonable staying (food, drink, smoking) at the area of dissolution and drug supply
- Accident during disposal and transportation of wastes (cracking of bags containing wastes, leading to the dissemination of “contaminated” material)

### **Safety Precautions**

Measures can be applied in order to control exposure, such as:

- Use of totally enclosed systems, unless this is not reasonably practicable
- Use of adequate ventilation systems and appropriate organisational measures
- Use of PPE where adequate control of exposure cannot be achieved by other measures alone. The personal protective equipment that should be used at the chemotherapy department, include:
  - Gloves - Where contact with cytotoxic drugs is possible.
  - Eye and face protection due to the risk of splashing exists, if the drugs are handled outside an enclosed system. Face shield or visor, goggles and safety spectacles can be used
  - Respiratory protection – During the preparation of cytotoxic drugs respiratory protective equipment is essential (proper masks, respirators, etc),

because exposure to powders or aerosols is possible. Surgical masks will not protect against the inhalation of fine dust or aerosols

- Protective clothing - Gowns and aprons can help preventing contamination of employees' clothes and subsequently, their skin.
- Use good hygiene practices and the provided welfare facilities (e.g. washing facilities)

**Employers should:**

- Organise work for reducing the quantities of drugs used, the number of employees potentially exposed and their duration of exposure, to the minimum.
- Ensure the safe handling, storage and transport of cytotoxic drugs and waste material containing or contaminated by them
- Train the personnel involved in handling cytotoxic drugs or cleaning areas possible to contamination for the risks and the precautions they must take
- Provide the personnel with appropriate PPE, and ensure that they know how to use it when risks exist for their health and safety that cannot be adequately controlled in other ways. Effective protection will only be obtained if the chosen personal protective equipment is: suitable for the task, suited to the wearer and environment, compatible with other PPE in use, in good condition and worn correctly
- Ensure that their employees who handle cytotoxic drugs are given suitable and sufficient information, instruction and training relevant to their work. By these, the employees can be aware of the risks of working with cytotoxic drugs and take the appropriate precautions when handling them.

## **M10-EN.5.4 NURSING – PATIENT CARE**

### **M10-EN.5.4.1 Bloodborne pathogens** (Link: M10-EN.3.1)

#### **M10-EN.5.4.2 Sharps and needles**

Nurses are exposed to deadly bloodborne pathogens, primarily through needlestick and sharps injuries. (M10.5.1.jpg, M10.5.2 .jpg)

The risk of injury depends on the design of the device a nurse will use. The majority of injuries occur due to blood-filled, hollow-bore needles.

In case of an injury, the nurse should:

- Wash the wound with soap and water
- Inform the supervisor
- Identify the source (the patient)
- Get post-exposure prophylaxis
- Have follow-up tests

Needlestick injuries can be prevented by using of safe needle devices, in combination with proper education and training of the nurses, and as well work practice controls.

**Employers** must introduce at the health care facility the following needlestick prevention program, which includes:

- Commitment by the employer to reduce bloodborne exposures, by purchasing and implementing safe devices
- Assess the hazards and use of data to identify highest risk products and procedures
- Identify and eliminate the barriers of reporting injuries
- Direct involvement of the health care personnel in the evaluation, selection, and implementation of safer needle devices

The safety devices must have the following characteristics:

- be needleless
- have the safety feature built into the device
- work passively
- The user clearly understands whether the safety feature has been activated. The safety feature must also remain protective through disposal.
- Perform reliably with all needle sizes (in case needles are used)
- To be practical and easy to use
- To be safe and effective in patient care

### **M10-EN.5.4.3 Ergonomics**

Nurses are responsible for patient handling, such as:

- Lifting
- Repositioning
- Transferring

### **Manual Patient Handling**

The manual patient handling refers to lifting, transferring and repositioning the patients without using assistive devices. These tasks increase the risk for musculoskeletal disorders. This risk can occur due to factors such as weight of load, patient characteristics, awkward posture and/or positioning, and the environment. During patient handling, the following problems arise:

- Patients' bodies have an asymmetric distribution of weight, and they do not possess available and stable areas to grip. The latter makes difficult any attempt to hold a patient's weight close to the nurse's own body.
- Sometimes patients are agitated, combative, non-responsive, or deny assisting the nurse.
- The structural physical environment of the health care facility may require awkward positions and postures.


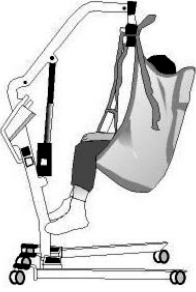
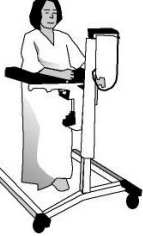
All these, create an unsafe load for nurses to manage capably. Even with assistance from additional staff members, the exposure to the hazard still persists. With the improvement of assistive equipment, such as lift and transfer devices, the risk of


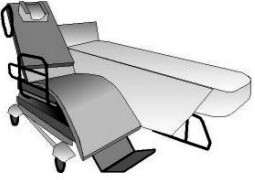




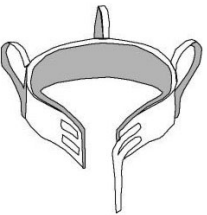
musculoskeletal injuries can be significantly reduced. Examples of this kind of equipment include full-body sling lifts, stand-assist lifts, lateral transfer devices, and friction reducing devices. By using the assistive equipment nurses are relieved of the total effort and risk associated with patient handling duties.



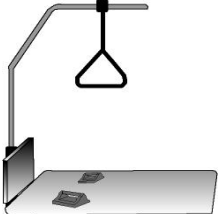




**Employers** must ensure that:



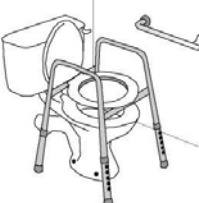
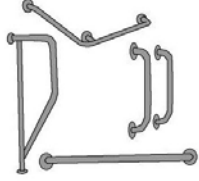
- The assistive equipment and devices are readily available to healthcare personnel, in order to encourage their use
- The equipment is adequate, and located in correct places for the personnel’s and patient’s needs.
- The equipment and devices are maintained in good operational condition (for optimum utility).
- Adequate space exists within patient care settings for the better use of patient handling equipment and/or devices.
- Nurses are be encouraged to participate in effectively implementing requirements for safe patient handling and feel free to report any incident of work-related injury.

Examples of assistive equipment are given below:

	<p><b>Transfer from sitting to standing position with powered sit-to-stand or standing assist devices.</b></p> <p>This equipment is used for the transfer of patients that are partially dependent, have some weight-bearing capacity, are cooperative, can sit up on the edge of the bed with or without assistance, and are able to bend hips, knees, and ankles. Also it aid transfers from bed to chair (wheel chair, Geri or cardiac chair), or chair to bed, or for bathing and toileting. It can also be used for repositioning where space or storage is limited.</p>
	<p><b>Patient lifting</b></p> <p>This kind of equipment is used for lifting patients who are totally dependent, are partial- or non-weight bearing, are very heavy, or have other physical limitations. It is very helpful for transfers from bed to chair (e.g. wheel chair), chair or floor to bed, for bathing and toileting, or after a patient fall.</p>
	<p><b>Ambulation</b></p> <p>It is usually used for those patients that are weight bearing and cooperative and who need extra security and assistance when walking. It increases resident safety during walking and reduces risk of falls. The device supports patients as they walk.</p>

	<p><b>Lateral transfer and repositioning</b></p> <p>a) This equipment is used for reducing friction force when transferring of a partial- or non-weight bearing patients between two horizontal surfaces such as a bed to a stretcher while lying on their back or when repositioning patient in bed.</p>
	<p>b) A convertible wheelchair is used when patients are partial- or non-weight bearing. It eliminates the need to perform lift transfer in and out of wheelchairs. Can also be used to assist patients who are partially weight bearing from a sit-to-stand position. Beds that convert to chairs can aid repositioning patients who are totally dependent, non-weight bearing, very heavy, or have other physical limitations.</p>
	<p><b>Repositioning in chair</b></p> <p>This is used for positioning partial- or non-weight-bearing patients that are cooperative.</p>
	<p><b>Lateral transfer in sitting position.</b></p> <p>These can be transfer boards (wooden or plastic), used for transferring (sliding) patients who have good sitting balance and are cooperative from one level surface to another, e.g. from bed to wheelchair, wheelchair to car seat or toilet.</p>
	<p><b>Transfer from sitting to standing position with:</b></p> <p>a) Lift cushions and chairs, in case of patients tat are weight-bearing and cooperative but need assistance when standing and ambulating. Also they can be used, when independent patients need an extra boost to stand.</p>
	<p>b) Stand-assist devices can be fixed to bed or chair or be free-standing, used for transferring patients that are weight-bearing and cooperative and can pull themselves up from sitting to standing position.</p>
	<p>c) Gait belts/transfer belts with handles used for transferring patients who are partially dependent, have some weight-bearing capacity, and are cooperative. Transfers such as bed to chair, chair to chair, or chair to car; when repositioning patients in chairs; supporting patients during ambulation; and in some cases when guiding and controlling falls or assisting a patient after a fall.</p>

	<p><b>Weighing</b></p> <p>These scales with ramp to accommodate wheelchairs; portable powered lift devices with built-in scales; beds with built-in scales, are used to reduce the need for additional transfer of partial or non-weight-bearing or totally dependent patients to weighing device.</p>
	<p><b>Repositioning</b></p> <p>a) Electric powered height adjustable bed can be used for all activities involving patient care, transfer, repositioning in bed, etc., to reduce nurses bending when interacting with patient.</p>
	<p>b) Trapeze bar; hand blocks and push up bars attached to the bed frame used for the reposition of patients that have the ability to assist the healthcare personnel during the activity, i.e., patients with upper body strength and use of extremities, who are cooperative and can follow instructions.</p>
	<p>c) Pelvic lift devices (hip lifters) used for assisting patients who also are cooperative and can sit up to a position on a special bed pan.</p>
	<p><b>Bathtub, Shower, and Toileting Activities</b></p> <p>a) Height adjustable bathtub and easy-entry bathtubs, used for bathing patients who sit directly in the bathtub, or to assist ambulatory residents climb more easily into a low tub, or easy-access tub. Also used for bathing patients in portable-powered or ceiling mounted lift device using appropriate bathing sling.</p>
	<p>b) Height adjustable shower gurney or lift bath cart with waterproof top, used for bathing non-weight bearing patients who are unable to sit up.</p>
	<p>c) Built-in or fixed bath lifts for bathing patients who are partially weight bearing, have good sitting balance, can use upper extremities (have upper body strength), are cooperative, and can follow instructions. It is very useful in small bathrooms where space is limited.</p>

	<p>d) Shower and toileting chairs, used for patients who are partially dependent, have some weight bearing capacity, can sit up unaided, and are able to bend hips, knees, and ankles.</p>
	<p>e) Bath boards and transfer benches, used with patients that are partially weight bearing, have good sitting balance, can use upper extremities (have upper body strength), are cooperative and can follow instructions.</p>
	<p>f) Toilet seat risers used for toileting partially weight-bearing patients who can sit up unaided, use upper extremities (have upper body strength), are able to bend hips, knees, and ankles, and are cooperative. Independent patients can also use these devices.</p>
	<p>h) Grab bars and stand assists; can be fixed or mobile. These can be used when toileting, bathing, and/ or showering patients who need extra support and security. The patients must be partially weight bearing, able to use upper extremities (have upper body strength), and be cooperative</p>

Long-handled or extended shower heads or brushes can be used for personal hygiene. They can reduce the amount of bending, reaching, and twisting required by the healthcare personnel when washing feet, legs, and trunk of patients.

#### **M10-EN.5.4.4 Work related stress and violence**

Employers must implement preventive measures for work related stress and/ or violence. (Link: M10-EN.2.4 and M10-EN.3.11).

The most common characteristics of victims and perpetrators are:

- Victims are often untrained staff nurses or newly hired nurses
- Perpetrator are often people with a history of violent behaviour and been diagnosed with psychosis, substance use disorders, or dementia.

#### **M10-EN.5.4.5 Working hours (Link: M10-EN.3.9)**

## **M10-EN.6 LABORATORY – MORGUE**

### **M10-EN.6.1 LABORATORY**

M10-EN.6.1.1 Blood borne Pathogens

M10-EN.6.1.2 Tuberculosis (TB)

M10-EN.6.1.3 Hazardous Chemicals

M10-EN.6.1.6 Ergonomics

M10-EN.6.1.7 Needle Stick or Sharps Injuries

M10-EN.6.1.8 Latex Allergy

M10-EN.6.1.9 Slips/Trips/Falls

M10-EN.6.1.10 Work Practices and Behaviours

M10-EN.6.2 MORGUE

### **M10-EN.6.1 LABORATORY**

#### **M10-EN.6.1.1 Blood borne Pathogens**

Laboratory employees are exposed to blood borne pathogens during the handling of contaminated samples such as blood, body fluids.

#### **Safety Precautions**

- Wear appropriate PPE. Gloves are essential because of the possible hand contact with blood, mucous membranes, OPIM, or non-intact skin, or during the handling of contaminated items or surfaces (**M10.6.1.jpg**)
- Use of biological safety cabinets or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing, respirators, centrifuge safety cups, sealed centrifuge rotors, etc
- Use appropriate sinks for washing hands and a readily available eye wash facility. The sinks must be foot, elbow, or automatically operated and must be located near the exit door of the laboratory

#### **M10-EN.6.1.2 Tuberculosis (TB)**

Laboratory employees can be exposed to Tuberculosis from their work with specimens such as acid fast bacilli smears. Other fluids that may be possible sources of TB are sputum, cerebrospinal fluid urine, and fluids collected from gastric or bronchial lavage.

#### **Safety Precautions**

- Treat all cultures or specimens that are possible to contain TB bacilli in such a way to ensure the containment of the organism
- Use biological safety cabinets during work with infectious materials with a possibility of aerosolizing

- Control access to the laboratory and waiting room, as well and have sealed windows
- Have a directional airflow, in order to prevent recirculation of laboratory exhaust air. A filtration of exhaust air must exist, before its discharge outside

### M10-EN.6.1.3 Hazardous Chemicals

Hazardous chemicals can be found in many departments of a health care facility, not only in the laboratory department. The types of these chemicals are given below:

All laboratory personnel must be provided with proper training, warning labels and access to Material Safety Data Sheets (MSDSs) for every chemical they use.

<b>Chemical</b>	<b>Use</b>	<b>Acute effects</b>	<b>Chronic effects</b>
<b>Formaldehyde</b>	As a fixative. Found usually in laboratories and morgues	Irritation of eyes and the respiratory system (from liquid and vapour forms).  Ingestion of large amounts can cause severe abdominal pains, nausea, vomiting and possible loss of consciousness.	Inhalation of vapour (high concentration) for long periods can cause laryngitis, bronchitis, bronchial pneumonia.  Conjunctivitis can occur from prolonged exposure. Formaldehyde is a suspected carcinogen
<b>Toluene and Xylene,</b>	As solvents for fixing tissue specimens and rinsing stains in histology, haematology, microbiology, and cytology laboratories.	Eye and respiratory irritation (from the liquid and vapour forms). Severe abdominal pains, nausea, vomiting.  Ingestion of large quantities might cause loss of consciousness.	High concentration of vapour inhaled for long periods can cause laryngitis, bronchitis or bronchial pneumonia. Prolonged exposure can cause conjunctivitis
<b>Acryl Amide</b>	Acryl amide is a resin, found in research laboratories, used to make gels for biochemical separations.	Irritation of the eyes and the skin	Disorders of the central nervous system.  It is a suspected carcinogen/mutagen
<p><b>Safety Precautions</b></p> <p>Employers must provide appropriate PPE, such as gloves, masks, goggles, etc, as well and eyewash facilities within the immediate work area for emergency use.</p>			

#### **10-EN.6.1.4 Ergonomics**

Laboratory personnel are exposed to static postures because of the extended periods of sitting or standing, or repetitive motions while sorting samples.

##### **Safety Precautions**

- Use of automated tract delivery systems for specimen processing to minimize employee's reaching and repetitive motions
- Use of supportive comfortable chairs with foot rests
- Rotate tasks for minimising the amount of time spent on them

#### **M10-EN.6.1.5 Needle Stick or Sharps Injuries**

In a laboratory, employees can be exposed to blood borne pathogens from needle stick injuries or cuts from sharp objects when working with specimens, centrifuge tubes or overfilled sharps containers.

##### **Safety Precautions**

- Use safer needle devices to avoid the possibility of injury due to needle sticks
- Use needles and syringes with extreme caution. A needle must never be bent, sheared, replaced in the sheath or guard, or removed from the syringe following use. The needle and syringe must be correctly placed in a puncture-resistant container and autoclaved or decontaminated before reuse or disposal
- Use hypodermic needles and syringes only for parenteral injection and aspiration of diaphragm bottles
- Use needle-locking syringes or disposable syringe-needle units for the injection or aspiration of other potentially infectious materials
- Discard contaminated sharps immediately or as soon as possible into appropriate containers and replace these containers on a regular basis, to avoid overfilling (M10.6.2.jpg)

#### **M10-EN.6.1.6 Latex Allergy**

Laboratory employees must wear protective gloves; therefore they are exposed to latex allergies. More information was given in previous chapters.

#### **M10-EN.6.1.7 Slips/Trips/Falls**

In a laboratory the personnel is often exposed to trips and falls if fluids or samples fall to the floor (Link: M10-EN.3.7).

#### **M10-EN.6.1.8 Work Practices and Behaviours**

Very often poor work practices and behaviours can cause the exposure of laboratory personnel to hazardous chemicals and diseases, (e.g. scratching nose or chewing pencils or pens during work with hazardous samples).

### **Safety Precautions**

- Use double glove so that the outer glove can be removed if the employee needs, for example, to answer a phone and then replaced with a new glove when ready to return back to work
- Never use mouth pipetting/suctioning of blood or other potentially infectious materials
- Never eat, drink, smoke, apply cosmetics or handle contact lenses in laboratories
- Never store food or drink in refrigerators, freezers, shelves, cabinets or on countertops where blood or OPIM are present

### **M10-EN.6.2 MORGUE**

Those working in the morgue, are exposed to infectious diseases and agents, (e.g. staphylococcus, tuberculosis, HIV, etc), and chemicals such as formaldehyde, because of their contact with cadavers.

### **Safety Precautions**

- Wear appropriate PPE, such as gloves, goggles, gowns, etc. In case of possible blood exposure, additional PPE may be required, especially during autopsies. This additional protective equipment can be surgical caps or hoods and/or shoe covers or boots (when gross contamination is possible)
- Use shields or splatters' guards (such as Plexiglas); if splash hazards are possible to happen

Employers should:

- Provide appropriate ventilation systems (e.g. downdraft tables that capture the air around the cadaver)
- Install local vacuum systems for power saws should be placed in the morgue

## **M10-EN.7 PHARMACY**

M10-EN.7.1 Introduction

M10-EN.7. 2 Handling hazardous chemicals and drugs

M10-EN.7.3 Storage of hazardous drugs

M10-EN.7.4 Disposal of hazardous drugs

M10-EN.7.5 Latex Allergy

M10-EN.7.6 Ergonomics

M10-EN.7.7 Workplace Violence

### **M10-EN.7.1 Introduction**

The health care personnel that are not aware of proper work practices and controls may be exposed to hazardous drugs through the skin, mouth, or by inhalation. This can occur during transfer of hazardous drugs from one container to another, reconstitution or manipulation of them, withdrawal of needles from drug ampoules or expulsion of air from a drug-filled syringe.

### **M10-EN.7. 2 Handling hazardous chemicals and drugs**

Potential hazards occur from the exposure to hazardous drugs because of improper:

- Handling practices
- Needle or sharps handling and disposal
- Labelling of hazardous drugs

#### **Safety Precautions**

- Only pharmacists with proper PPE must prepare hazardous drugs and not nurses or physicians
- Perform any drug preparation process in biological safety cabinets with hood. These cabinets should be equipped with covered needle containers for needle disposal and covered waste container for excess fluids disposal
- Handle sharps with caution. All syringes and needles used in the course of preparation must be placed in specific containers for sharps, for disposal without being crushed, clipped or capped
- Label all syringes and intravenous bags containing hazardous drugs. An example of warning label is: “Special Handling/Disposal Precautions”

#### **Employers should:**

- Inform and train the personnel involved in any part of the handling of hazardous drugs (physicians, nurses, pharmacists, housekeepers, employees involved in receiving, transport or storage) on how to recognise the hazards caused by drugs in their work areas

- Provide warning labels and access to Material Safety Data Sheets. It is important for the personnel to know about any operation or procedures in the pharmacy area where drugs are present

### **M10-EN.7.3 Storage of hazardous drugs**

Employees are often exposed to hazardous drugs during their storage.

#### **Safety Precautions**

- Use bins or shelves for the storage of hazardous drugs designed for the prevention of breakage and limitation of contamination in case of leakage. Bins must have barrier fronts, or other design features reducing the chance of drug containers falling to the floor
- When hazardous drugs need refrigeration, store them separately from non-hazardous drugs, in individual bins to prevent any breakage and leakage  
**(M10.7.1.jpg)**

Employers must ensure that access to any area used for preparation and storage of hazardous drugs is limited and that only authorized personnel can enter. They should place proper signs to restrict entry. Also, warning labels must be placed on every container, shelf, and bin, used for the storage of hazardous drugs.

### **M10-EN.7.4 Disposal of hazardous drugs**

Employees can be exposed to hazardous drugs during bagging and labelling, and/or during the disposal of hazardous waste into containers. The final disposal of this kind of wastes can be done either at an incinerator or a licensed sanitary landfill for toxic wastes, as appropriate.

#### **Safety Precautions**

- Only trained and protected employees must handle the disposal containers (that are labelled, sealed and covered)
- The bags used for the disposal of materials containing hazardous drugs must be labelled properly (i.e. “Hazardous drug-related wastes”) and coloured differently from other hospital garbage bags. They must also be thick, and leak-proof

### **M10-EN.7.5 Latex Allergy**

Due to the exposure to latex in products (such as gloves), some employees might develop latex allergy. This can result to contact dermatitis and allergic contact sensitivity. (Link: M10-EN.3.5)

### **M10-EN.7.6 Ergonomics**

Pharmacists are often exposed to Musculoskeletal Disorders (such as Carpel Tunnel Syndrome, Tendonitis, etc) due to activities involving repetitive tasks, forceful exertions, awkward postures or contact stress (e.g. opening/closing bottle lids, or typing on the computer).

**Safety Precautions:**

- Use assisting devices, that eliminate the need to do the task, (e.g. devices designed to open bottle lids for pharmacists, etc)
- Redesign processes, for example rotate repetitive tasks with those that do not require high repetition
- Use ergonomically comfortable workstations (e.g. wrist pads, adjustable padded chairs, keyboard tray, and monitors at an adjustable height, etc) (Link: M10-EN.2.2) (M10.7.2.jpg)

**M10-EN.7.7 Workplace Violence**

Pharmacists can be exposed to workplace violence, because at a pharmacy drugs and money are available, making them possible robbery targets.

**Safety Precautions:**

Employers must establish and maintain a violence prevention program as part of their workplace safety and health program, which can include:

- Installation of Plexiglas in the payment window in the pharmacy area
- Provision of better visibility and lighting in the pharmacy area
- Personnel training for recognition and management of hostile/assaulting behaviour
- Implementation of security devices (i.e. panic buttons, beepers, surveillance cameras, alarm systems, two-way mirrors, card-key access systems, and security guards)

## **M10-EN.8 CENTRAL SUPPLY DEPARTMENT**

M10-EN.8.1 Blood borne Pathogens

M10-EN.8.2 Hazardous Chemicals

M10-EN.8.3 Exposure to Ethylene Oxide Gas (EtO)

M10-EN.8.4 Mercury Exposure

M10-EN.8.5 Glutaraldehyde

M10-EN.8.6 Latex Allergy

M10-EN.8.7 Burns and Cuts

M10-EN.8.8 Ergonomics

M10-EN.8.9 Slips/Trips/Falls

### **M10-EN.8.1 Blood borne Pathogens**

Employees can be exposed to blood borne pathogens and OPIM as bloody, contaminated surgical instruments and sharps (i.e. needles, scalpels) are sorted. Employees must discard any disposable sharps and recycle reusable instruments or equipment needing to be washed and sterilized before their next use. (Link: M10-EN.3.1)

### **M10-EN.8.2 Hazardous Chemicals**

Employees can be exposed to hazardous chemicals used in the initial washing process of dirty instruments or equipment. Other potential hazards can occur when chemicals are unlabelled and employees are not trained, as well and when employees do not use the appropriate PPE while handling hazardous chemicals found in soaps, disinfectants, cleaners, etc.

#### **Safety Precautions**

**Employers** can provide their employees with:

- Appropriate PPE (e.g. gloves, goggles, splash aprons) while handling hazardous dishwashing detergents and chemicals; and ensure they use them
- Proper training and information on hazardous chemicals
- Proper warning labels
- Suitable first aid facilities for quick drenching or flushing the eyes and body within the workplace for immediate emergency use
- Automatic dishwashers in order to minimise exposure to cleaning chemicals. Still, they must be cautious and use proper PPE (e.g. goggles, and/or gloves) when changing out the containers of detergent

### **M10-EN.8.3 Exposure to Ethylene Oxide Gas (EtO)**

Ethylene Oxide is used within central supply as a sterilant for items that can not be exposed to steam sterilization. Exposure occurs from improper aeration of the ethylene oxide room after the sterilizing process or during off-gassing of sterilized items or poor gas-line connections. (Link: M10-EN.4.2)

#### **M10-EN.8.4 Mercury Exposure**

Exposure of employees to mercury occurs mainly from accidental spills during sterilization and centrifugation of thermometers in central supply areas. Exposure happens either through inhalation or skin contact. If spills are not promptly cleaned up, mercury may accumulate on surfaces, vaporize and then be inhaled by unaware employees.

#### **Safety Precautions**

Employers must be aware and:

- Replace glass thermometers and sphygmomanometers for preventing the spills
- Properly train employees to be aware of the procedures followed when a spill occurs (clean up, etc), and they must follow these policies correctly, (e.g. isolation of the contaminated area, etc)
- Have spill kits available, for the clean up of small spills

#### **M10-EN.8.5 Glutaraldehyde**

Employees can also be exposed to glutaraldehyde, another substance of products used for the cold sterilisation of instruments or other items in central supply. (Link: M10-EN.4.2)

#### **M10-EN.8.6 Latex Allergy**

Employees are exposed to latex allergy when wearing gloves while handling and sorting contaminated, bloody equipment, or while handling sterile equipment. (Link: M10-EN.3.5)

#### **M10-EN.8.7 Burns and Cuts**

Employees can be exposed to burns or cuts while handling or sorting hot sterilized items or sharp instruments, and when removing them from autoclaves/sterilizers or from steam lines that service the autoclaves (hands are especially exposed to these hazards).

**Good work practices** can be established for the prevention of hazards, such as:

- Leave items in the sterilizers until they are cooled
- Avoid handling sharp ends of instruments
- Use forceps or other devices for removing sharp instruments from baskets and autoclaves

Employers are required to assess the tasks and identify any potential workplace hazards and provide employees with proper PPE and ensure they use it, especially hand protection.

#### **M10-EN.8.8 Ergonomics**

Ergonomics is the science of adjusting the work to the employee. When an inequality exists between the physical requirements of work and the physical capacity of worker, work-related MSD can occur. Exposure to MSD can be done through repetitive,

prolonged, reaching, while sorting sterilized packages or lifting above shoulder height to reach high shelves of equipment or when pushing/pulling heavy carts full of dirty or clean items. Static postures may occur from continuously standing in one position while sorting instruments. Contact trauma to forearm area can happen if the employee rests wrists on hard sharp counter surfaces during sorting.

### **Safety precautions**

- Redesign workstations so that packaging and equipment can be reached and keep elbows close to the body
- Pad the edge of work surfaces which come into contact with the elbow or forearm
- Keep any prolonged overhead activity (e.g. lower stacking shelves to shoulder height), to minimum
- Rotate repetitive tasks

### **Employers must provide:**

- carts with large, low rolling, low resistance wheels that can easily roll over mixed flooring and gaps between elevators and passageways
- height adjustable workstations or tables minimising head tilt
- anti-fatigue mats and shoes with well-cushioned insoles and soles where floor mats cannot be used
- sit/stand stools at work stations and foot rest bar

### **M10-EN.8.9 Slips/Trips/Falls**

Slippery floors due to steam and washing processes are potential hazards for the employees of those work areas. (Link: M10-EN.3.7)

## **M10-EN.9 DIETARY DEPARTMENT**

M10-EN.9.1 Food Borne Diseases

M10-EN.9.2 Infectious Materials in isolation rooms

M10-EN.9.3 Hazardous Chemicals

M10-EN.9.4 Ergonomics

M10-EN.9.5 Kitchen Equipment

M10-EN.9.6 Machine Guarding

M10-EN.9.7 Electrical Safety

M10-EN.9.8 Fire Safety

M10-EN.9.9 Heat stress

M10-EN.9.10 Slips/Trips/Falls

### **M10-EN.9.1 Food Borne Diseases**

The consumption of contaminated food is dangerous for all the employees at a health care institution. In the dietary department, where the food service is provided; handling, processing, preparation and storage of food must be done in such a way for the protection against any possible contamination. Nevertheless, dietary personnel may develop food borne diseases from eating or handling contaminated food. Food borne diseases (including intoxications and infections), are illnesses occurred due to the consumption of contaminated food. Contamination can be a result of toxins and bacterial growth that can happen before the consumption of food, or after the food ingestion, and are caused by organisms such as Escherichia coli (E-coli), Salmonella, Staphylococcus Aurous, etc.

### **Safety Precautions and Good Practices**

**Employers** must give instructions on effective hand washing techniques, good personal hygiene, and safe food handling/preparation. For example:

- Wash hands carefully before preparing food (**M10.9.1.jpg, M10.9.2.jpg**)
- Wash hands, utensils, and kitchen surfaces with hot soapy water after they touch raw meat or poultry
- Cook beef and beef products thoroughly, especially hamburger
- Cook poultry and eggs thoroughly
- Eat cooked food promptly and refrigerate leftovers within 2 hours after cooking
- Wash fruits and vegetables thoroughly, especially those that will be eaten raw
- Drink only pasteurized milk and juices and treated surface water
- Wash hands carefully after using the bathroom, changing infant diapers

### **M10-EN.9.2 Infectious Materials in isolation rooms**

Employees may be exposed to respiratory hazards, blood or OPIM, if they are required to take dietary trays to patients in isolation rooms. Exposure can also occur while handling bagged contaminated food trays that have come from isolation rooms, to the kitchen for their sterilisation.

#### **Safety Precautions**

- Treat all human blood and OPIM, as if they were infectious for HIV and HBV or other blood borne pathogens
- Use proper PPE such as gloves, masks, and gowns
- Use specific bags properly labelled, to transfer contaminated trays from isolation rooms.
- Use only plastic and disposable trays in isolation rooms
- Employees must have appropriate education and training on how to:
  - safely enter and exit isolation rooms, and
  - handle food trays coming from these rooms

### **M10-EN.9.3 Hazardous Chemicals**

In the kitchen area, exposure, especially to hazardous chemicals, such as ammonia, chlorine solutions, caustic solutions, pesticides, disinfectants, and hazardous drugs, is possible. Ammonia is most frequently used as a cleaning agent, and chlorine solutions as disinfectants in dishwashing. They can cause skin, eye, and nose irritations. Drain, oven, and grill cleaners can be caustic solutions causing skin burns and eye and skin irritations.

#### **Safety Precautions**

- Avoid mixing chlorine and ammonia solutions (deadly chlorine gas is released)
- Use dishwashers with automated detergent dispensers, to avoid contact with dishwashing detergents.
- Be cautious and use proper PPE while changing the detergent containers

**Employers** should provide:

- Proper training, warning labels, and access to Material Safety Data Sheets for chemical hazards
- Proper PPE (e.g. gloves, goggles, etc) when handling hazardous detergents and chemicals

### **M10-EN.9.4 Ergonomics**

Dietary personnel have to perform several tasks as part of their daily duties. These activities, if they occur repeatedly, with sufficient duration, and magnitude, may create a musculoskeletal disorder, for example:

#### **Reaching/lifting movements**

Elevated and extended reaches for supplies or heavy containers, can cause back and shoulder injury resulting in muscle strain, bursitis, tendonitis, and rotator cuff injuries. When employees repeatedly lift their arms or repeatedly reach can irritate their tendons of their shoulder leading to tendonitis. Injuries can result from the supporting or lifting of a load with the arm elevated or extended. These injuries can be muscle strain or rotator cuff tears. Working with the arms in an elevated posture, or behind the back, can lead to impingement injuries (e.g. Thoracic Outlet Syndrome). (M10.9.3.jpg, M10.9.4.jpg)

### **Repetitive motions**

Rapid hand and wrist movements, resulted from frequent cutting, chopping, or scooping may lead to hand disorders such as tendonitis, carpal tunnel syndrome, and tenosynovitis. When employees perform intensive hand tasks with a bent wrist, an extensive stress is created on the tendons and their sheaths as they are bent across the harder bones and ligaments which make up the outside structure of the wrist. When finger activations are repeated in these postures can create wear and tear on the tendon and the sheath. Prolonged forceful finger exertions in these postures can stretch and fray the tendon and create contact trauma to the sheath. This wear and tear, fraying, or contact trauma can create irritation and swelling which may lead to hand disorders.

### **Safety Precautions**

- Place work in front of you rather than having to reach above or behind to get supplies, in order to avoid as much as possible awkward postures
- Try to keep wrist in a neutral (handshake) position
- Use mechanical aids to reduce the need to lift. Use a spring device to automatically lift a load (e.g. use automatic plate and cup riser dispensers)
- Use mechanical aids for chopping, dicing or mixing foods (e.g. food processors, mixers). Use properly designed tools, such as kitchen scoops or knives that allow the wrist to remain straight

**Employers** are required to:

- Assess workplace for ergonomic stressors, identify them, and decrease them
- Redesign tasks allowing elbows to remain close to employees' body (e.g. turning boxes over on side allowing easier access),
- Reduce repeated motions, forceful hand exertions, and prolonged bending (M10.9.5.jpg), by:
  - Rotating workers through repetitive tasks
  - Using mechanical aids for chopping, dicing or mixing foods (e.g., food processors, mixers)
  - Selecting and using properly designed tools. For example, kitchen scoops or knives allowing the wrist to remain straight
  - Ensuring that the personnel maintain a neutral (handshake) wrist position
- Provide appropriate training on the use of proper lifting techniques

- Provide height adjustable workstations appropriate for the task being performed (e.g. lower countertops, or height adjustable countertops or stands)
- Provide food carts with wheels that are large, low rolling, low resistance that can roll easily over mixed flooring, as well as gaps between lifts and passageways

### **M10-EN.9.5 Kitchen Equipment**

Kitchen equipment encloses several hazards such as: hot surfaces that can cause burns; cuts and lacerations from the use of sharp objects; becoming caught in walk-in freezers; electrical shocks from contact with frayed electrical cords, and amputations from unguarded equipment.

#### **Safety Precautions and Good Work Practices**

- Handle, use and store knives and other sharps with caution. Cutlery should be kept sharpened and in good condition, due to the fact that dull knives tend to slip and may cause injuries. The direction of the cut should always be away from the body (M10.9.6.jpg)
- Turn the handles of cooking utensils away from the front of the cooker
- A designated storage area must exist for keeping knives, saws, and cleavers when these are not in use. The blades must not be stored with the cutting edge exposed. Knife holders should be installed on work tables for the prevention of an employee's injury. Knives and other sharp objects should not be put into sinks between periods of use. Newly purchased knives must be equipped with blade guards and knuckle guards for the protection of the hand from slipping onto the blade
- Hold the cover for deflecting the steam from their face, when they uncover a container of steaming materials
- Use proper PPE, such as gloves (e.g. for the protection of cuts, burns, etc), gowns (e.g. protecting from splashes of hot liquids), etc

**Employers** are required to:

- Provide training to the employees on how to avoid steam burns while working with hot equipment or substances.
- Provide appropriate PPE, e.g. hand protection while exposure of hands to hazards such as cuts, lacerations, and thermal burns. PPE can also be oven mitts while handling hot items, and steel mesh gloves while cutting
- Install a panic bar at walk-in freezers, or other means of exit on the inside of freezers to prevent trapping employees inside

### **M10-EN.9.6 Machine Guarding**

Kitchen equipment can pose a hazard to kitchen personnel from being caught in or by rotating blades. Various hazards exist, such as amputations, strangulations, burns, cuts, broken bones, and other injuries. It is essential that these machines have guards in place for the protection of the employee from reaching in, or being pulled into, these machines.

## **Safety Precautions**

- Use tamps or push sticks or other hand tools when feeding or removing food from grinders, slicers, or choppers
- Isolate hazards (e.g. put barrier guards (**M10.9.7.jpg**) over a mixer when it is in use for preventing strangulation or amputation)
- Provide machine guards to protect machine's operator and/or other employees near the machine from hazards. Meat slicers, these must be properly guarded and operated only by a person trained in safe work practices to avoid cuts and amputations (**M10.9.8.jpg**)
- Place guard on continuous feed dishwashers to prevent any accidental scalding of employees by steam and hot water, and possible nip-point injuries from rollers and conveyors

Other methods of machine guarding include:

- Two-handed tripping devices
- Electronic safety devices

## **M10-EN.9.7 Electrical Safety**

A possible electrical hazard in the dietary department is electrocution or shock due to unsafe work practices, faulty electrical equipment, or wiring.

## **Safety Precautions and Good Practices**

- Use properly grounded electrical equipment near sources of water
- Do not plug or unplug energized equipment with wet hands.
- Tag out every damaged receptacles and portable electrical equipment and remove from service
- Report any damage on any electrical equipment in use
- Ensure that every damaged receptacles and portable electrical equipment is repaired prior to its placement back into service.

## **M10-EN.9.8 Fire Safety**

Potential source of fire is the heat from equipment such as burners, ovens, and grills, because of:

- Poor housekeeping
- Grease traps that are not emptied (possible grease fires)
- Dirty ducts (possible flue fires)
- Inappropriate storage of flammable items
- Faulty or worn electrical cords

## **Safety Precautions**

- Keep grill and grill duct work free from flammable residues and properly maintain them
- Store flammable items away from heat producing equipment
- Routinely empty the grease traps

Employers are required to provide their personnel with:

- Training on how to handle with safety the equipment in the dietary department
- Adequate number of portable fire extinguishers
- An emergency action plan so they will know how to act in case of an emergency, and a fire prevention plan

### **M10-EN.9.9 Heat stress**

Heat related health mild effects on health care workers include increased fatigue, discomfort and incapability to concentrate. More intense effects can occur, such as heat stroke, exhaustion, cramps and fainting. The most common departments in a hospital for high-temperatures are the boiler room, the kitchen and laundry, but if the building is old, then inadequate ventilation and cooling systems can create a heat hazards during summer time in every department. In addition, heat exposure can cause many problems where the temperatures are higher and health care personnel have to wear personal protective equipments such as gowns, masks, caps and gloves.

### **Safety Precautions**

**Employers** should be aware of engineering and work practice controls such as:

- Having general ventilation and local exhaust ventilation at points of high heat production
- Provide employees and supervisors, with education and training on the detection of early signs of heat-related illness
- Provide protective clothing and equipment, as well shields in case of radiant heat
- Provide large quantities of drinking water
- Place cooling fans and air conditioning in a high temperature area
- Rotate work and breaks. Prefer frequent short breaks in cool areas, allowing employees' body to cool down
- Consider the employee's physical condition and recognize that older or obese workers and personnel on some types of medication are at greater risk.
- Encourage employees to perform the heaviest work in the coolest part of the day.
- Encourage employees to wear light, loose-fitting, breathable (like cotton) clothing.
- Encourage employees to avoid using caffeine and alcoholic beverages while working in hot environments. These beverages make the body lose water and increase the risk for heat illnesses.
- Alternate work and rest periods. Encourage frequent short breaks in cool areas to allow your body to cool down.

- Monitor temperatures, humidity and workers' responses to heat at least hourly.
- Supervisors should be able to detect early signs of heat-related illness and permit workers to interrupt their work if they are extremely uncomfortable.
- Educate employees to recognize the need to replace fluids and salt lost through perspiration.

First aid employees must be available; in order to recognize and treat heat related illnesses. By identifying the first signs of heat exhaustion, (e.g. dizziness, light-headedness, weakness, blurred vision, nausea), the first aid employees must take immediate action to lower the employee's body temperature, preventing the progression of symptoms, such as removing the employees who are suffering from heat exhaustion from the hot environment and instantly give them cold water to drink. If they do not feel better in a while, then emergency help should be asked. The employees responsible for the first aid must also know how to recognize the signs of heat stroke that can be fatal. These symptoms include severe headache, mental confusion, loss of consciousness, flushed face, and hot, dry skin, without sweating. In case that an employee has stopped sweating, medical attention must be asked immediately. If an employee shows signs of possible heat stroke, professional medical treatment must be obtained immediately

In any case, temperatures should be monitored, as well the humidity and employees' responses to heat at least every hour. It is recommended that employees to be adapted, or gradually introduced to the hot environment, because their body gradually builds up a tolerance to high temperatures. This process can take up to two weeks.

Supervisors must be able to detect early signs of heat-related illness and permit workers to have a break if they are extremely uncomfortable. The employee's physical condition must be considered, understand that older or overweight personnel are at greater risk, as well and those on some types of medication.

### **M10-EN.9.10 Slips/Trips/Falls**

Employees working at the dietary department are exposed to wet kitchen floors or spills and clutter, which can lead to slips, trips, falls, and other possible injuries.

#### **Safety Precautions**

- Keep floors and passageways clean, dry, clear and in good condition. Have in mind that continually wet surfaces promote the growth of mould, fungi, and bacteria which can cause infections
- Employers should place floor plugs or ceiling plugs for the equipment used in the dietary department, so that power cords do not run across pathways

## **M10-EN.10 ENGINEERING**

M10-EN.10.1 Legionnaires' disease

M10-EN.10.2 Hazardous Chemicals

M10-EN.10.3 Mercury Spills

M10-EN.10.4 Asbestos Exposure

M10-EN.10.5 Welding Fumes

M10-EN.10.6 Fire Safety

M10-EN.10.7 Machine Guarding

M10-EN.10.8 Electrical Safety

M10-EN.10.9 Lockout/Tag out

M10-EN.10.10 Noise

### **M10-EN.10.1 Legionnaires' disease**

Health care workers can be exposed to the Legionnaires' disease from breathing aerosolized water that contains the legionella bacteria. Hazards of breathing contaminated, aerosolized water occur to those working in areas where cooling towers, humidifiers and/or air conditioning systems or domestic hot water systems are used. Also, they can be exposed while working in kitchens, janitorial closets, and showers, where spray nozzles are used. (Link: M10-EN.5.1.2)

### **M10-EN.10.2 Hazardous Chemicals**

Employees can be exposed to hazardous chemicals from cleaning and maintenance work. Exposure can occur from paints, adhesives, and pesticides, solvents used for maintenance; waste anaesthetic gases and ethylene oxide during ventilation or exhaust systems repair and removal of these gases.

#### **Safety Precautions**

**Employers** have to:

- Inform their employees about the hazards and the identities of the chemicals they are exposed to while working
- Provide them with protective measures for the prevention of adverse effects.
- Install special ventilation and air monitoring practices, because paints, adhesives, solvents, and cleaners are can give off toxic vapours

### **M10-EN.10.3 Mercury Spills**

Exposure to mercury occurs from accidental spills during repair of broken thermometers, sphygmomanometers, barometers, and gauges.

#### **Safety Precautions**

A health and safety program must exist, providing quick, safe, clean-up of spills by workers trained in proper procedures. Any potential spill can be prevented by replacing outdated glass thermometers, and sphygmomanometers.

#### **M10-EN.10.4 Asbestos Exposure**

Asbestos is a mineral-based material that is widely used. It is resistant to heat and corrosive chemicals. Asbestos appears as a whitish, fibrous material which may release airborne fibres, that can cause health damage, may be too small to see with the naked eye. If inhaled, these fibres can cause:

- asbestosis (scarring of the lungs resulting in loss of lung function that often progresses to disability and to death)
- mesothelioma (cancer affecting the membranes lining of the lungs and abdomen)
- lung cancer and cancers of the oesophagus, stomach, colon, and rectum

Asbestos is commonly found in old buildings, can be found in many items such as:

- boiler insulation
- pipe insulation
- cooling towers
- floor tile/ceiling tile
- electrical wiring insulation
- wall board or stucco compounds

#### **Potential Hazard**

Maintenance workers and engineers can be exposed to asbestos without knowing it, from many possible areas and sources. Exposure can occur during their work in furnace rooms where boilers are insulated with asbestos, or while repairing old piping or while doing minor renovations. Asbestos exposures can also occur when insulation in old buildings is removed during renovations. Asbestos exposure is often associated with areas or items that might not be expected to contain asbestos. Very often, maintenance personnel are unaware and untrained to handle these hazards.

#### **Safety Precautions**

**Employers** are required to:

- Place signs at entrances to mechanical rooms/areas containing asbestos where employees may enter
- Follow any permissible exposure limits that exist
- Provide an asbestos awareness training course to those performing housekeeping activities in an area containing asbestos
- Provide appropriate respirators, protective clothing, exposure monitoring, hygiene facilities and practices, warning signs, labelling, record keeping, and regular medical examinations

It is very important that only fully trained personnel can remove asbestos using proper methods and PPE. When asbestos fibres are exposed, they present a hazard and should be removed or encapsulated in such a way that they will not be released

### **M10-EN.10.5 Welding Fumes**

Maintenance employees are exposed to welding hazards and fumes when they repair equipment. Welding fumes contain particulate matter and gases and can be hazardous for workers especially if welding is done in confined spaces. It is also possible to cause flash burns to skin and eyes. Numerous health hazards exist, associated with exposure to fumes, gases and ionizing radiation formed or released during welding, cutting and brazing, including heavy metal poisoning, lung cancer, metal fume fever, flash burns, etc. These risks vary depending upon the type of welding materials and welding surfaces.

#### **Safety Precautions**

Employers must provide their employees with proper protective eyewear and clothing. When maintenance in confined spaces, local exhaust or general ventilating systems shall be provided and arranged to keep the amount of toxic fumes, gases, or dusts in low concentrations.

### **M10-EN.10.6 Fire Safety**

Potential **fire hazards** for employees in engineering:

- Heat-producing equipment
- Storage of flammable chemicals
- Faulty electrical wiring

(Link: M10-EN.9.8.)

### **M10-EN.10.7 Machine Guarding**

Maintenance employees can be exposed to possible amputations and strangulations during maintenance, if no machine guards exist.

#### **Safety Precautions**

- Use two-handed tripping devices
- Use electronic safety devices

Employers must place machine guards on equipment (provide barrier guards over dangerous equipment for preventing hazards of strangulation or amputations).

### **M10-EN.10.8 Electrical Safety** (Link: M10-EN.3.6)

Possible electric shock and contact with electrical hazards can occur from:

- Maintenance equipment and machinery
- Using damaged receptacles and connectors
- Ungrounded electrical service near sources of water

### **M10-EN.10.9 Lockout/Tag out**

Employees can be injured during the service or maintenance of machines or equipment from an unexpected release of hazardous energy.

#### **Safety Precautions**

Turn off and disconnect from energy source machines or equipment prior performing service or maintenance on them, as well locked out /tagged out the energy-isolating device properly. Relieve or control any stored energy.

### **M10-EN.10.10 Noise**

The noisiest departments in a health care facility are food service areas, laundries and engineering areas (where the boiler room is included).

Noise effects are:

- High blood pressure and decreased circulation in hands and feet (because of the blood vessel constriction)
- Headaches
- Increased irritability
- Difficult communication between co-workers
- Reduced work ability
- Increased difficulty to perform tasks requiring alertness, concentration and attention to detail

#### **Safety Precautions**

Employers can introduce a program decreasing noise in the health care facility, as well used for hearing conservation. This program can include:

- Regular measurement of noise
- Hearing test for new employees, and annual audiometric testing for all employees
- Isolation of noisy equipment, installation of protective shields and acoustic ceilings and carpets. Provision as well of proper PPE (for hearing protection)
- Limitation to employees' exposure time to excessive noise

## **M10-EN.11 HOUSEKEEPING**

M10-EN.11.1 Contaminated work environment

M10-EN.11.1.1 Hazardous Chemicals

M10-EN.11.1.2 Appropriate disinfectants

M10-EN.11.1.3 Contaminated Equipment

M10-EN.11.2 Sharps and Containers

M10-EN.11.3 Medical Waste

M10-EN.11.4 Latex Allergy

M10-EN.11.5 Slips/Trips/Falls

### **M10-EN.11.1 Contaminated work environment**

Housekeeping personnel can be exposed to blood or Other Potentially Infectious Materials (OPIM) through contaminated work environments. (M10.11.1.jpg, M10.11.2.jpg)

#### **Safety Precautions**

Work environment must be kept clean and sanitary preventing contact with blood or other potentially infectious materials.

**Employers** must implement a proper written procedure for cleaning and methods of decontamination, based on the:

- Location within the workplace
- Tasks or procedures to be performed in the workplace
- Type of surfaces to be cleaned

#### **M10-EN.11.1.1 Hazardous Chemicals**

Employees can be exposed to the following potential hazards:

- Cleaning chemicals found and used in the housekeeping processes
- Soaps and detergents causing allergic reactions and dermatitis
- Broken skin from soap or detergent irritation can help an infection or injury to occur, if exposed to chemical or biological hazards

#### **Safety Precautions**

- Never mix cleaning solutions containing ammonia and chlorine because this will form a deadly gas
- Be aware of the hazardous chemicals you are exposed to. These chemicals are usually found in soaps, disinfectants, pesticides, and must be clearly labelled as hazardous
- Use appropriate PPE (e.g. gloves, goggles, splash aprons) when handling hazardous dishwashing detergents and chemicals

In cases where the eyes or body of any person at the work are may be exposed to injurious corrosive materials, suitable facilities must exist, in order to drench or flush of the eyes and body immediately

### **M10-EN.11.1.2 Appropriate disinfectants**

Housekeeping personnel can also be exposed to blood or OPIM if they do not use an appropriate or approved disinfectant.

#### **Safety Precautions**

Use appropriate disinfectants (Link: M10-EN.4.2)

Use disinfectants according to the manufacturer's instructions

**Employers** are required to place labels giving instructions about:

- Using personal protection devices when performing a task
- Cleaning blood thoroughly before applying the disinfectant
- Discarding infectious wastes according with the existing regulations
- Keeping surface wet with the disinfectant for an appropriate time when dealing with HIV-1 and HBV

### **M10-EN.11.1.3 Contaminated Equipment**

Potential hazards can occur from the exposure of employees to blood or OPIM through their contact with contaminated:

- Equipment and working surfaces (**M10.11.3.jpg**)
- Protective coverings
- Reusable containers
- Glassware

#### **Safety Precautions**

- Clean and decontaminate all the equipment, environmental and working surfaces after contact with blood or OPIM
- Clean with soap and water solution before its decontamination, equipment that is contaminated at a great extend, because some anti-microbial products will not work in the presence of blood, interfering with the sterilizing process
- Remove protective coverings (i.e. plastic wrap or aluminium foil) and replace as soon as possible, when they become visibly contaminated, or at the end of a work shift if they may have become contaminated during the shift
- Inspect and decontaminate any bin, bucket can, and/or similar receptacles intended for reuse, and that are possible to be contaminated with blood or OPIM frequently. Also, clean and decontaminate them immediately or as soon as possible upon visible contamination
- Never pick up glassware that is broken and possible to be contaminated, with hands. Use instead mechanical means, such as brush and dustpan, tongs or forceps, etc

**Employers** should place proper labels or tags on contaminated equipment (such as IV poles), for the identification of the portions of the equipment that are contaminated

### **M10-EN.11.2 Sharps and Containers**

Housekeeping personnel can be exposed to contaminated sharps and containers from:

- Their lack of training in proper procedures and poor handling practices
- Sharps that are not discarded properly, left in bedding and sent to laundry accidentally
- Inappropriate handling or disposal of sharps containers, such as allowing the overfilling of containers, or transport them incorrectly

### **Safety Precautions**

Employers should implement work practice and engineering controls for the prevention of their personnel exposure to sharps. These can be:

- **Handling sharps** – correct disposal of sharps immediately or as soon as possible into proper containers
- **Handling sharps' containers** – the containers used for the disposal of the contaminated sharps must be closable, puncture resistant, and leak-proof. They must have the label of biohazard symbol or be colour coded accordingly. Replacement of containers must be regular, to avoid overfilling
- **Disposal of Sharps Containers** - employees must be trained in proper handling/disposal of sharps and containers, such as:
  - Close contaminated sharps' containers prior their removal or replacement to prevent spillage of their contents during handling/storage/transport or shipping
  - If leakage is possible, place them in a secondary container
- **Reusable sharps containers** – this type of containers must never be opened, emptied or cleaned manually or in any other manner that would expose employees to the risk of transdermal injury.

### **M10-EN.11.3 Medical Waste**

Clinical/medical waste is defined (Controlled Waste Regulations, 1992) as any waste which consists wholly or partly of: human or animal tissue; blood or bodily fluids, excretions; drugs or other pharmaceutical products; swabs or dressings; or syringes, needles or other sharp instruments: which unless rendered safe may prove hazardous to any person coming into contact with it. It also includes any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practice, investigation, treatment, care, teaching or research, or the collection of blood for transfusion, that the waste may cause infection to any person coming into contact with it.

Medical waste can be separated in five groups (Health Services Advisory Committee in Safe disposal of clinical waste (1999), as following:

Group A	<ul style="list-style-type: none"> <li>– Identifiable human tissue, blood, animal carcasses and tissue from veterinary centres, hospitals or laboratories.</li> <li>– Soiled surgical dressings, swabs and other soiled waste.</li> <li>– Other waste materials, for example from infectious diseases cases, excluding any in Groups B-E.</li> </ul>
Group B	Discarded syringe needles, cartridges, broken glass and other contaminated disposable sharp instruments or items.
Group C	Microbiological cultures and potentially infected waste from pathology departments (laboratory and post mortem rooms) and other clinical or research laboratories.
Group D	Drugs or other pharmaceutical products.
Group E	Items used to dispose of urine, faeces and other bodily secretions or excretions which do not fall within Group A. This includes disposable bedpan liners, incontinence pads, stoma bags and urine containers.

The healthcare personnel, (doctors, nurses, waste disposal workers) may be at risk from contact with clinical waste. When broken skin, or eyes, nose and mouth come into contact with this waste, lot of infections can occur. Therefore, the personnel must always consider all clinical wastes as infectious. Diseases that may be transmitted by medical waste are some forms of Hepatitis, E. coli infection, Tuberculosis, etc, in addition to digestive problems such as diarrhoea.

### **Safety Precautions**

- Provision of information and training on the hazards to health and associated risks posed by medical waste to employees and others who may come into contact with it
- Provision of appropriate training to the healthcare personnel on the use of personal protective equipment (PPE), why to use it, in addition to the safe handling and disposal of medical waste. The PPE can be:
  - Gloves (latex, or nitrile), where staff are likely to come into contact with medical waste. Hands must be washed thoroughly with warm water and soap after the gloves are removed
  - Gowns, lab coats or aprons must be provided and worn when there is a likelihood of clothing becoming soiled.
  - Protective barriers (e.g. waterproof dressings) in order to reduce the risk of exposure to potentially infectious material through contact with broken skin or mucous membranes.
  - Protective mask
- All those been at risk must be instructed on who to report to if they are exposed and where to obtain immediate treatment

- The personnel must wash their hand frequently in order to prevent the spread of infectious diseases in the facility
- Waste must be disposed in puncture resistant containers lined with leak-proof plastic bags marked as biological waste
- The personnel that handles medical waste must wear puncture resistant gloves and handle all contaminated wastes carefully avoiding direct contact
- Only the outsides of the container must be held when handling and never reach in
- Containers must never be loaded beyond their capacity, and contents must never be compacted. Medical waste must never be mixed with other domestic or workplace garbage
- Sharps must be handled with care and treated like they are infectious materials

### **Good Practice**

- All waste should be separated by the healthcare personnel into three categories (M10.11.4.jpg):
  - general health care waste (e.g. paper and packaging, drinks containers, glass, food residues, dead flowers, intravenous (IV) bottles, hand towels and tissues not contaminated with body fluids)
  - potentially infectious (or hazardous) health care waste (all waste items contaminated, or suspected of being contaminated, with body fluids such as bandages and gauze, swabs)
  - used sharps (including broken glass), put into rigid containers (if possible yellow too)
- Use of different colours for general and potentially infectious wastes, such as black for general waste and yellow for potentially infectious wastes. Ultimately all bags, containers, bag holders and trolleys can be either black or yellow reinforcing the separation of these two types of waste. Once separated, the two waste streams should be handled and disposed of separately and not mixed.
- The healthcare personnel must never place loose sharp items (e.g. needles and blades) in plastic bags or similar containers that can be easily punctured
- Healthcare personnel must cover all waste bins and avoid using open containers and wastebaskets
- Yellow and black waste bags must be placed in separate places, away from patient areas and usually at the nurses' station or room and (if one exists) possibly in a treatment room. Sharps containers should also be in these locations and not in the patients' areas where they could be interfered with.
- Medical waste must be regularly removed, usually once a day, and preferably at least once per working shift. Also, separate schedules and separate collection times must exist for black bags and yellow bags/sharps containers.
- The bags or sharps container must never be more than three quarters full when they are replaced, in order to reduce the risk of plastic bags splitting open and of an injury from a protruding sharp item in sharps containers
- All bags with medical waste must be sealed and labelled (M10.11.5.jpg)

- A waste management system must exist, as well as an infection control or hygiene committee and specialist infection control personnel. In addition, a person must be responsible in every department, in order to ensure good waste management procedures at every stage from generation to final disposal.
- Healthcare personnel must use a waste segregation system and dispose of waste properly, since it is part of the continuing need to maintain good hygiene within hospitals to control infection
- Training must exist for every new member of the personnel, concerning his/her responsibilities regarding the achievement of good waste management in their department.
- Good waste segregation and hygienic practices need constant reinforcement. The personnel can be reminded in many ways, such as short refresher training courses in the department, posters and signs, hygiene inspections, etc

### **Storage**

Because of the increased production of medical waste in healthcare facilities, bags can be filled reasonably quickly. Therefore the use of rigid containers (such as a two-wheeled 240-litre container with a lid), is widely recommended for temporary storage within or near to the facility, away from patient areas. Sealed and labelled yellow bags containing waste are placed in this container and then removed by cleaning or housekeeping personnel. By using this rigid container as a temporary storage point, filled waste bags do not being piled on the floor where they could be knocked and split open. One yellow temporary storage container should be available to every medical department for potentially infectious waste. Also, a separate rigid container, preferably black, can be used as a temporary storage point for general waste (**M10.11.6.jpg**).

Some hospitals do not use temporary storage. Instead, the personnel transport sealed bags of waste directly from a medical area to a central storage point outside the facility (**M10.11.7.jpg**). In this case, trolleys can be used for general waste and potentially infectious waste. Yellow and black bags must never be put in the same trolley. Furthermore, the central storage containers for black bags should be black or at least clearly marked “for general waste only”, and those for yellow bags should be yellow or at least clearly marked “for infectious waste only”.

The waste packaged in yellow bags that has been disinfected, is no longer regarded as highly infectious and can therefore leave the facility with other yellow-bagged waste, stored and transported. Yellow bags containing non-disinfected highly infectious waste must be collected quickly from a temporary storage area connected to the infected patient area and carried in a trolley to a secure central storage area.

### **M10-EN.11.4 Latex Allergy**

Employees can be exposed to latex allergy from wearing latex gloves, during housekeeping processes. Alternatives must be provided as well, to those allergic to latex (Link: M10-EN.3.5).

### **M10-EN.11.5 Slips/Trips/Falls**

Potential hazards during the housekeeping process can be the exposure of the personnel, to wet floors, with probable slips, trips, and falls

#### **Safety Precautions**

- Keep floors in a clean and dry condition, with provision of mats where practicable
- Follow housekeeping procedures such as cleaning one side of a passageway at a time, providing good lighting for all halls and stairwells can help reduce accidents

#### **Employers should:**

- Implement a program in order to provide safe, immediate, clean-up of floor spills
- Eliminate uneven floor surfaces
- Provide warning signs for wet floor areas

## **M10-EN.12 LAUNDRY**

M10-EN.12.1 Contaminated Laundry

M10-EN.12.2 Hazardous Chemicals

M10-EN.12.3 Sharps Handling

M10-EN.12.4 Latex Allergy

M10-EN.12.5 Noise

M10-EN.12.6 Fire Safety

M10-EN.12.7 Heat Stress

M10-EN.12.8 Ergonomics

M10-EN.12.9 Slip/Trips/Falls

### **M10-EN.12.1 Contaminated Laundry**

Contaminated Laundry can be defined, as the laundry, which has been soiled with blood or other potentially infectious material or may contain sharps.

#### **Potential Hazard**

Laundry employees can be exposed to blood or other potentially infectious materials through contaminated laundry that was improperly labelled, or handled.

#### **Safety Precautions**

- Try to handle this kind of laundry as little as possible with minimal agitation
- Bag contaminated laundry at the location of use. Do not sort or rinse laundry at the location where it was used. Use labelled bags (with the biohazard symbol) for transferring laundry
- Place and transport the wet contaminated laundry that presents a likelihood of soak-through of or leakage from the bag/container; in colour-coded bags/containers that prevent soak-through and/or leakage of fluids to the exterior
- Never hold the contaminated laundry bags close to your body or squeeze them while transportation, to avoid any punctures from improperly discarded syringes
- Use the normal laundry cycles in accordance with the recommendations of washer and detergent manufacturer
- Wear appropriate PPE (such as gloves, gowns, face shields, masks, etc) while handling and/or sorting contaminated laundry
- Use thick utility gloves while sorting contaminated laundry
- The bags used for the bagging process must be melted away. They can be thrown directly into washers without unload or remove contaminated laundry from them

### **M10-EN.12.2 Hazardous Chemicals**

Those working at the laundry department are exposed to hazardous cleaning chemicals found and used during the laundry or housekeeping process. Exposure can occur due to:

- Chemicals that are not labelled
- Soaps and detergents that can cause allergic reactions and sometimes dermatitis
- Splattering while pouring from larger containers to smaller ones

If an employee has broken skin from soap or detergent irritation, this may provide an avenue for infection or injury if exposed to chemical hazards. (Link M10-EN.3.4)

### **M10-EN.12.3 Sharps Handling**

It is possible that laundry departments allow the employees to rinse contaminated laundry (i.e. laundry contaminated with blood or OPIM or that might contain sharps), in specified dirty utility rooms, instead of simply containerizing it and then transporting it to the laundry. In these cases, the personnel can be exposed to blood borne pathogens from the contaminated laundry containing sharps. (Link M10-EN6.1.5).

### **M10-EN.12.4 Latex Allergy**

Exposure of employees to latex allergy from wearing latex gloves, while handling or sorting contaminated laundry. (Link: M10-EN.3.5)

### **M10-EN.12.5 Noise**

Laundry employees are exposed to high noise levels because of loud machinery used in the laundry area. This can lead to induced hearing loss, hearing impairment, hypertension, elevated blood pressure levels and other health hazards. (M10.12.1.jpg)

**Employers** are required to:

- Identify every hazards occurring from noise exposure through a safety and health program
- Introduce means of control and protection of employees' hearing. For example use of less noisy machinery, sound insulating equipment, appropriate PPE (earplugs, earmuffs, etc)

### **Safety Precautions**

**Engineering** and **work practice controls** that aid the decrease of occupational noise exposure levels include:

- Reduction of the amount of sound energy released by the noise source (laundry machines)
- Diversion of the flow of sound energy away from the worker (use of protective shields or barrier)
- Protection of the receiver from the sound energy reaching him/her (e.g. use of PPE, such as ear muffs)

- Proper maintenance of equipment, equipment replacements
- Revision of the operating procedures, equipment redesign, enclosures
- Acoustical shields and barriers
- Personal protective equipment for ear protection (earmuffs, earplugs, earphones, etc) for the elimination or decrease of noise exposure

### **M10-EN.12.6 Fire Safety**

In the work area of laundry, fire hazard is increased, because of lint build-up on ceilings and other surfaces such as heat producing equipment.

Employers must ensure that all **Safety Precautions** are taken, such as:

- Control of any accumulation of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency
- Provide suitable storage containers for flammable substances, ventilation systems to dilute or remove flammable gas, extraction systems to remove combustible materials, and equipment selected not to be a source of ignition are key elements for the elimination of fire
- Provide employees with training on fire hazards of the materials and processes to which they are exposed
- Regular and proper maintenance of systems installed on heat producing equipment, for the prevention of accidental ignition of combustible materials
- Provide at least two exits or means of egress exist, in case of emergency. These exits must be clearly marked, and access to them must remain clear of any obstruction at all times.
- Establishing means of detecting and giving warning in case of fire
- Provide fire-fighting equipment. This emergency fire equipment must be readily accessible and in good working condition

Portable fire extinguishers divide into five categories according to the extinguishing medium they contain:

- carbon dioxide
- powder
- foam
- water
- vaporizing liquids, including halons

Fire extinguishers should usually be located in conspicuous positions on escape routes, preferably near exit doors. The location of the extinguishers should be indicated by signs and, where appropriate, directional arrows. Where possible, fire extinguishers must hang on wall brackets. Where this is impracticable, extinguishers can stand on a suitable base-plate and not on the floor. Fire hose cabinets can be used for the storing, and the protection of hose reels and fire extinguishers. The most useful form of fire-fighting equipment for general fire risks is the water-type extinguisher or hose reel.

### **M10-EN.12.7 Heat Stress**

Employees are exposed to excessive heat in the laundry area. This can result in heat exhaustion and heat stroke. When they work in high temperatures, their body circulates great amounts of blood to their skin trying to eliminate heat through perspiration. As a result, less blood is circulated to the body's vital organs including brain. Heat exhaustion can lead to dizziness, blurred vision, nausea, and eventual collapse. If not treated promptly, by lowering body's temperature, it can lead to a possible brain damage.

Heat stroke is much more serious than heat exhaustion. During heat stroke the body stops sweating, something that makes it impossible to disperse heat. By this, the body temperature may rise to a dangerously high level in a short time causing death.

#### **Potential Hazard**

Laundry employees can be exposed to excessive heat. This may lead to heat exhaustion, heat stroke, and possible death. (M10.12.2.jpg, M10.12.3.jpg)

#### **Safety Precautions**

In addition with the precautions from the employer (Link: M10-EN.9.9), the **employees** are encouraged to:

- Perform the heaviest work in the coolest part of the day
- Understand the danger of using drugs, including therapeutic ones, and alcohol in hot work environments, and avoid their use. These beverages make the body lose water and increase the risk for heat illnesses
- Know how to recognize the need to replace fluids and salt lost through perspiration

### **M10-EN.12.8 Ergonomics**

Employers must address the ergonomic stressors that can occur with lifting, reaching, rinsing, and transporting wet heavy laundry. The use of a lift or transfer device for the lifting of these materials is recommended. Unnecessary reaching/pushing and/or lifting wet heavy laundry can result in work related musculoskeletal disorders such as strains and wrenches of the back or shoulder area.

#### **Safety Precautions**

An assessment should take place at he laundry area in order to identify the ergonomic stressors and find ways for their decrease, such as:

Using proper lifting techniques:

- Avoid lifting bulky or awkwardly weighted objects
- Avoid lifting/reaching or working above shoulder height
- Avoid awkward postures, such as twisting while lifting
- Lift items close to the body
- Limit the weight of the item to be lifted
  - Use well maintained carts (M10.12.4.jpg - M10.12.6.jpg)

- Use mechanical aids such as platforms lifting wet heavy laundry, and keeping it at a comfortable uniform work level; and washers that automatically dump their loads into baskets (see also previous chapters) (**M10.12.7.jpg**)

#### **M10-EN.12.9 Slip/Trips/Falls**

Laundry personnel are exposed to slips/trips/falls from the wet floors found in the laundry area. (Link: M10-EN.3.7)

## **M10-EN.13 HELIPORT**

### M10-EN.13.1 Introduction

#### M10-EN.13.1.1 Noise/Communication

#### M10-EN.13.1.2 Ergonomics

#### M10-EN.13.1.3 Equipment Hazards

#### M10-EN.13.1.4 Helipad

#### M10-EN.13.1.5 Fuels

### **M10-EN.13.1 Introduction**

Health care personnel charged of moving the patients from and to the heliport area has to face several hazards, such as noise, difficulty on communicating with each other, condition of the helipad, ergonomics, equipment, fuels.

#### **M10-EN.13.1.1 Noise/Communication**

Exposure to noise at the heliport area is responsible for potential hearing loss, hearing impairment, high blood pressure levels and other health hazards due to their exposure to the loud sounds of the operating helicopter. High noise levels pose an additional threat to employees if they are unable to communicate or warn each other of possible dangers or situations.

**Safety Precautions** require that **employers** must:

- Implement a health and safety program that identifies and addresses the hazards from noise exposure
- Provide appropriate equipment for the protection of the personnel's hearing (earplugs, earmuffs, etc)
- Ensure that employees use aviation helmets including particular hearing protection and specific communication systems in order to communicate through the helmets

#### **M10-EN.13.1.2 Ergonomics**

Musculoskeletal disorders can occur from lifting and/or lifting and twisting patients while they are moved to and from helicopter to carts or gurneys.

**Safety Precautions**

- Use ergonomic equipment for the minimisation of lifting and/or twisting
- Use a portable and adjustable stretcher inside helicopter in order to avoid employees twisting and minimize lifting
- Use a cart that drives patient to emergency department so that the personnel will not have to carry the patient by hand (**M10.13.1.jpg - M10.13.3.jpg**)

#### **M10-EN.13.1.3 Equipment Hazards**

When a hospital has a heliport, employees working there can be exposed to equipment hazards associated with helicopters. These can be the tail rotor and the main rotor

system (helicopter blades). These blades can injure or cause death of unaware or uneducated personnel. Hats, loose clothing, gloves etc, can be sucked into the engine air intake fans and cause the helicopter to malfunction and potentially crash.

### **Safety Precautions**

- Only fully trained personnel in helicopter equipment hazards may have access in helicopter area. Avoid the tail rotor and the helicopter blade area
- No Cardio-Pulmonary Resuscitation (CPR) should be done to patients on transport carts while the carts are under the helicopter blade. This may elevate height of the personnel to the extent of being hit by the helicopter blades

### **M10-EN.13.1.4 Helipad**

Elevated winds produced by the helicopter blades can throw loose items or garbage etc, on the employees and injure them.

### **Safety precautions**

- Maintain good housekeeping in all helicopter loading and unloading areas
- Clean and keep helipad area free from garbage, litter, or other debris
- Properly secure items (e.g. loose clothing, hats, gloves, scarves), prior the entrance at the helipad area
- Use appropriate eye and face protection

### **M10-EN.13.1.5 Fuels**

Exposure to fuelling hazards is possible at the heliport area. These hazards can be fire or explosions occurring from a spark or match in the helipad area.

### **Safety Precautions**

- Do not smoke at heliport area
- Place proper signs
- Attach a grounding cable to the helicopter during fuelling, to prevent sparks

## M10-EN.14 SOCIAL SERVICES AND HOME CARE SERVICES

Social workers work with a variety of kinds of people. They usually work in community health centres, schools, hospitals, day care facilities, public and private child welfare organisations, etc. Very often, social workers visit homes for inspections of home conditions, or interviews.

The most common hazards a social worker might face are work related stress and violence.

- Social workers help their clients to solve problems on the most personal level, something that makes them very vulnerable
- The clients do not always want to see a social worker (i.e. a child welfare where parental abilities are being evaluated)
- Language barriers might exist, affecting the easy of communication

Therefore, for the prevention of stress or violence at work, proper training, and modification of the work environment, as well good communication system are essential. Especially those working in hospitals, they are vulnerable to exposure to infectious diseases.

Home care workers provide services depending on the needs of the clients that are being served. These can be: “basic activities of daily living”, (e.g. bathing, dressing, toileting, transferring, feeding), and “instrumental activities of daily living” (i.e. housekeeping, shopping, food preparation and serving, etc). Home care workers may give injections, dispense medications and provide treatments such as passive exercise and massage as prescribed by the client’s doctor. The most important service is that of companionship and assisting the client to participate in recreational activities.

The most common **hazards** home care workers have to face are:

- Working alone without assistance
- Sometimes lack of education or training or supervision
- Back pain and musculoskeletal injuries (during lifting, transferring clients, etc)
- Violence
- Infectious diseases
- Household chemicals and detergents
- Sexual harassment
- Work related stress

Possible solutions can be the proper training and education of home care workers on recognizing and avoiding any hazards, on lifting and handling the clients, as well regular meetings with supervisors.

Both Social Services and Home Care Services can be analysed further and in more detail, but they are beyond of the scope of this module.

**M10-EN.15 Risk Assessment Forms**

Hazard		Who (type of worker)	Harm	Required Safety Measures
Source	Hazard description			
<b>Ergonomics</b>				
Handling, transferring or repositioning of patients	<ul style="list-style-type: none"> <li>- Repetitive movements</li> <li>- Pushing chairs or gurneys across elevation changes or up ramps</li> <li>- Lifting heavy objects (e.g. manually lifting immobile patients)</li> <li>- Overexertion; trying to prevent a patient from falling</li> <li>- Picking patient up from floor or bed</li> <li>- Multiple lifts per shift (more than 20)</li> <li>- Lifting alone, no available personnel to help</li> <li>- Lifting un-cooperative, confused patients</li> </ul>	Healthcare personnel, nurses	<ul style="list-style-type: none"> <li>- Injuries</li> <li>- Musculoskeletal disorders (MSDs)</li> </ul>	<ul style="list-style-type: none"> <li>- Never transfer patients/residents when off balance</li> <li>- Lift loads close to the body.</li> <li>- Never lift alone, particularly fallen patients/residents, use team lifts or use mechanical assistance.</li> <li>- Limit the number of allowed lifts per worker per day.</li> <li>- Avoid heavy lifting especially with spine rotated.</li> <li>- Have training in when and how to use mechanical assistance, and in ergonomic hazards and controls</li> <li>- Use proper mechanical assistance</li> </ul>

	<ul style="list-style-type: none"> <li>- Lifting patients that cannot support their own weight</li> <li>- Distance to be moved, and from the patient</li> <li>- Ineffective training in body mechanics and proper lifting techniques</li> </ul>			
Awkward Postures	<ul style="list-style-type: none"> <li>- Reaching across beds to lift patients</li> <li>- Twisting while lifting</li> <li>- Bending over to lift</li> <li>- Lateral or side bending</li> <li>- Back hyperextension or flexion</li> <li>- Reaching forward or twisting to support a patient from behind for assisting in walking</li> </ul>	Healthcare personnel	<ul style="list-style-type: none"> <li>- Back injuries</li> <li>- Musculoskeletal disorders (MSDs)</li> </ul>	<ul style="list-style-type: none"> <li>- Avoid awkward postures while lifting or moving patients</li> <li>- Educate and train employees about safer lifting techniques</li> <li>- Use assistance devices or other equipment whenever possible</li> <li>- Team lifting based on assessment</li> </ul>

	<ul style="list-style-type: none"> <li>- Excessive reaching above shoulder height while filing</li> <li>- Awkward postures</li> </ul>	Administration personnel	Musculoskeletal disorders (MSDs)	<ul style="list-style-type: none"> <li>- Use adjustable desk with arm rests</li> <li>- Use head sets for answering phones</li> <li>- Use keyboards with mouse support</li> <li>- Arrange materials in front of your body, so they can be easily reached</li> <li>- Arrange the monitor so that the most frequently viewed area is a little lower than the horizontal eye level, and can be seen without looking up or leaning forward</li> <li>- Keep most of work activities within repetitive access area</li> <li>- Maintain straight wrist postures</li> <li>- Use lower filing cupboards, close to body</li> <li>- Use powered filing cupboards that adjust to any height</li> <li>- Use ladders or stools in order to access high files rather than reaching overhead</li> </ul>
	<ul style="list-style-type: none"> <li>- Static postures from the continuous standing in one position during the surgeries, causing muscle fatigue and concentration of blood in the lower extremities</li> <li>- Awkward postures because</li> </ul>	Personnel at the operating room, surgeons	Musculoskeletal disorders (MSDs)	<ul style="list-style-type: none"> <li>- Use appropriate stools</li> <li>- Use shoes with well cushioned insteps and soles</li> <li>- Use a foot rest bar or a low stool</li> <li>- Have work surfaces with adjustable height</li> <li>- Pad the edge of work surfaces which come into contact with the elbow or forearm</li> </ul>

	surgeons have to tilt their head downwards for long periods of time			<ul style="list-style-type: none"> <li>– Keep any prolonged overhead activity (e.g. lower stacking shelves to shoulder height), to minimum</li> <li>– Rotate repetitive tasks</li> </ul>
<b>Carbonless Paper</b>				
	Contact with carbonless paper during admissions	Administration personnel	<ul style="list-style-type: none"> <li>– Headaches</li> <li>– Sinus infections</li> <li>– Bronchitis</li> <li>– Eye, and skin irritations</li> <li>– Shortness of breath and hives</li> <li>– Allergic contact dermatitis (rarely)</li> </ul>	<ul style="list-style-type: none"> <li>– Use adequate good industrial hygiene and work practices</li> <li>– Use sufficient ventilation, humidity, and temperature controls</li> <li>– Do appropriate housekeeping (e.g. keeping desks clean and tidy, never leave food on the desks, etc)</li> <li>– Minimise hand-to-mouth and hand-to-eye contact,</li> <li>– Clean hands periodically</li> </ul>
<b>Work related stress</b>				
	<ul style="list-style-type: none"> <li>– Patients that are critically ill</li> <li>– Emergency situations</li> <li>– Stressful situations</li> </ul>	Healthcare personnel	<ul style="list-style-type: none"> <li>– Cardiovascular disease</li> <li>– Psychological disorders</li> <li>– Workplace injury</li> <li>– Headaches</li> <li>– Sleep disturbances</li> <li>– Difficulty in concentration</li> <li>– Job dissatisfaction</li> </ul>	<ul style="list-style-type: none"> <li>– Arrange workload in line with employees' capabilities and resources</li> <li>– Design work to provide meaning, stimulation, and opportunities for employees to use their skills</li> <li>– Know exactly your roles and responsibilities</li> <li>– Identify and reduce or eliminate the stressful aspects of work (e.g. excessive workload, conflicting expectations)</li> <li>– Employees should participate in decisions and</li> </ul>

			- Low self-confidence	actions affecting their jobs
<b>Workplace Violence</b>				
Violent situations	<ul style="list-style-type: none"> <li>- Crowded and emotional situations in emergencies</li> <li>- Patients being at the Emergency Department could be involved with crimes, weapons, or violence from other people that could put ED personnel at an increased risk of workplace violence</li> </ul>	Healthcare personnel at the Emergency Department	Injuries	<ul style="list-style-type: none"> <li>- Installation of alarm systems (i.e. panic buttons, hand-held noise devices, and mobile phones)</li> <li>- Limit the access to the ED and to its personnel</li> <li>- Have a waiting room area with controlled access to ED</li> <li>- ED exits must exit out only</li> <li>- Control all access doors</li> <li>- Install locks in the areas where personnel moves, e.g. toilets</li> <li>- Place curved mirrors and adequate lighting and camera surveillance</li> <li>- Properly trained staff must exist at all times, to recognize and diffuse violent situations and patients</li> <li>- Be alert for possible violence or suspicious behaviour and report any incident</li> <li>- Use of an escort system, while dealing with a possibly violent person</li> <li>- Never work alone, especially in emergency departments</li> <li>- Supervise movements of psychiatric clients and patients within the facility</li> <li>- Identify risk factors that can cause or contribute to</li> </ul>

				<p>violence</p> <ul style="list-style-type: none"> <li>– Identify early warning signs of escalating behaviour</li> <li>– Have available tools for diffusing violent situations</li> </ul>
<b>Blood, Blood borne Pathogens, Other Potentially Infectious Material (OPIM)</b>				
Blood borne pathogens	Contact with infected patients or materials	Healthcare personnel, Laboratory personnel	Infections	<ul style="list-style-type: none"> <li>– Treat all blood and other potentially infectious body fluids as if they are infected and take appropriate precautions to avoid contact with these fluids</li> <li>– Use proper personal protective equipment (PPE), (gloves, gowns, and face masks)</li> <li>– Use thick utility gloves and gowns when sorting contaminated items</li> <li>– Use safer needle devices (e.g. needle-less connectors self-sheathing or retractable needles),</li> <li>– Have readily accessible hand washing facilities</li> <li>– Have sharps’ containers in close proximity to areas where sharps are used</li> <li>– Discard any contaminated needle and other sharp instrument immediately or as soon as possible after its use, into appropriate containers</li> <li>– Never bent, recap or remove contaminated needles and other contaminated sharps</li> <li>– Use biological safety cabinets or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing, respirators, centrifuge safety cups, sealed</li> </ul>

				<p>centrifuge rotors, etc</p> <ul style="list-style-type: none"> <li>- Use appropriate sinks for washing hands and a readily available eye wash facility. The sinks must be foot, elbow, or automatically operated and must be located near the exit door of the laboratory</li> </ul>
Tuberculosis	Contact with patients having TB	Healthcare personnel	Tuberculosis	<ul style="list-style-type: none"> <li>- Practice early patient screening to identify potentially infectious patients, for the prevention of possible exposures</li> <li>- 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>- Ask patients with a productive cough to wear a mask for the prevention of spreading the infection</li> <li>- Have a separated area with separate ventilation TB patients and especially in facilities where these patients are regularly treated</li> <li>- Give surgical masks to TB patients</li> <li>- Use biological hazard tags or warning labels on air transport components (e.g. fan, ducts, filters, etc), that may logically contain air infected with TB</li> <li>- Place a sign at the entrance of a room, when a person suspected or confirmed with TB, leaves the area, until it is well ventilated</li> <li>- Treat all cultures or specimens that are possible to contain TB bacilli in such a way to ensure the</li> </ul>

				<p>containment of the organism</p> <ul style="list-style-type: none"> <li>- Use biological safety cabinets during work with infectious materials with a possibility of aerosolizing</li> <li>- Control access to the laboratory and waiting room</li> <li>- Have proper ventilation system</li> </ul>
<p>Methicillin Resistance Staphylococcus Aureus (MRSA)</p>	<ul style="list-style-type: none"> <li>- Exposure due to environmental sources (e.g. homeless patients)</li> <li>- Contact with patients, surfaces, or medical devices contaminated with body fluids containing MRSA</li> </ul>	<p>Healthcare personnel</p>	<p>Infection with MRSA</p>	<ul style="list-style-type: none"> <li>- Wash hands immediately after removal of gloves, between patient contacts and between tasks and procedures</li> <li>- Clean, disinfect and sterilise patient care equipment to limit any transmission of organisms</li> <li>- Provide training to the personnel for the prevention of MRSA infections</li> </ul>
<p>Legionnaire's Disease</p>	<ul style="list-style-type: none"> <li>- Exposure from breathing aerosolized water containing the legionella bacteria.</li> <li>- Breathing of contaminated, aerosolized water</li> <li>- Transmission via the air from the central ventilation system</li> </ul>	<p>Healthcare personnel, Kitchen personnel, Janitors</p>	<p>Early symptoms:</p> <ul style="list-style-type: none"> <li>- Slight fever</li> <li>- Headache</li> <li>- Aching joints and muscles</li> <li>- Lack of energy or tiredness</li> <li>- Loss of appetite</li> </ul> <p>Later symptoms:</p> <ul style="list-style-type: none"> <li>- High fever</li> <li>- Cough</li> </ul>	<ul style="list-style-type: none"> <li>- Use water tanks and pipe work designed in such a way so that water is not allowed to stand undisturbed for long periods</li> <li>- Cover the water tanks properly, to prevent the entry of dirt, debris and pests, and regularly inspect, clean and disinfect them</li> <li>- Avoid water temperatures between 20°C and 45°C by insulating cold water tanks and pipes in warm spaces, and by storing hot water at 60°C and circulating at 50°C</li> <li>- Use properly designed cooling towers. Maintain and operate them as well and their associated water systems in an appropriate way.</li> </ul>

			<ul style="list-style-type: none"> <li>- Difficulty in breathing or shortness of breath</li> <li>- Chills</li> <li>- Chest pain</li> <li>- Gastrointestinal symptoms (vomiting, diarrhoea, nausea, and abdominal pain)</li> </ul>	<ul style="list-style-type: none"> <li>- Clean and disinfect the systems at least every six months</li> <li>- Have a regular treatment of water for the prevention of scale, corrosion and microbiological growth</li> <li>- Where practicable, replace cooling towers with dry cooling systems</li> <li>- Implement a program for ensuring the reduction of potential work related diseases</li> <li>- Conduct a risk assessment of potential sources of Legionnaires' disease bacteria</li> <li>- Develop a management plan for the maintenance and operation of water systems</li> <li>- Regular inspect every potential sources of the disease (showers, whirlpools, etc)</li> <li>- Manage correctly possible pathogenic biological agents in cooling towers, hot water, and other aerosolizing water systems, within the workplace</li> </ul>
Food Borne Diseases	Eating or handling contaminated food	Kitchen personnel	Intoxications and infections from bacteria such as Escherichia coli (E-coli), Salmonella, Staphylococcus Aurous, etc.	<ul style="list-style-type: none"> <li>- Wash hands carefully before food preparation</li> <li>- Wash hands, utensils, and kitchen surfaces with hot soapy water after touching raw meat or poultry</li> <li>- Cook beef and beef products (hamburgers), poultry and eggs thoroughly</li> <li>- Eat cooked food promptly and refrigerate leftovers within 2 hours after cooking</li> <li>- Wash fruits and vegetables thoroughly, especially</li> </ul>

				<p>those that will be eaten raw</p> <ul style="list-style-type: none"> <li>– Drink only pasteurized milk and juices and treated surface water</li> <li>– Wash hands carefully after using the bathroom, changing infant diapers</li> </ul>
<b>Hazardous drugs or chemicals</b>				
Hazardous drugs	Exposure through the skin, mouth, or by inhalation	Healthcare personnel	<ul style="list-style-type: none"> <li>– Skin, eye, and nose irritations</li> <li>– Skin burns</li> </ul>	<ul style="list-style-type: none"> <li>– Only trained personnel must administer hazardous drugs</li> <li>– Do not allow pregnant or breast-feeding personnel to come in contact with these drugs</li> <li>– Wear appropriate PPE such as gloves, gowns, etc, (especially nurses or housekeepers dealing with body fluids from patients that received hazardous drugs in the last 48 hours)</li> <li>– Discard the gloves after each use and immediately if contaminated. Discard the gowns when leaving the patient-care area and immediately if contaminated</li> <li>– Use disposable linen or protective pads for incontinent or vomiting patients</li> <li>– Wash hands thoroughly after handling hazardous drugs</li> <li>– Use bins or shelves for the storage of hazardous drugs designed for the prevention of breakage and limitation of contamination in case of leakage. Bins must have barrier fronts, or other design features reducing the chance of drug containers falling to the</li> </ul>

				<p>floor</p> <ul style="list-style-type: none"> <li>– When hazardous drugs need refrigeration, store them separately from non-hazardous drugs, in individual bins to prevent any breakage and leakage</li> </ul>
Hazardous chemicals	Contact with hazardous chemicals	Healthcare personnel	<ul style="list-style-type: none"> <li>– Skin, eye, and nose irritations</li> <li>– Skin burns</li> </ul>	<ul style="list-style-type: none"> <li>– Use splatter guards (Plexiglas barriers), for the prevention of any splashes</li> <li>– Use “Automatic sinks” sensor-controlled or with foot, knee, elbow in order to use them without using your hands</li> <li>– Use centrifuge tubes with caps</li> <li>– Use biological safety cabinets</li> <li>– Use appropriate personal protective equipment</li> <li>– Appropriate PPE (e.g. gloves, goggles, splash aprons)</li> <li>– Ask for proper training and information on hazardous chemicals</li> <li>– Place proper warning labels</li> <li>– Have suitable first aid facilities for quick drenching or flushing the eyes and body within the workplace for immediate emergency use</li> <li>– Use automatic dishwashers in order to minimise exposure to cleaning chemicals.</li> </ul>
Mercury Exposure	Exposure from accidental spills during sterilization and centrifugation of	Healthcare personnel	<ul style="list-style-type: none"> <li>– Organic forms of mercury can cause damage to the brain and the nervous</li> </ul>	<ul style="list-style-type: none"> <li>– Replace glass thermometers and sphygmomanometers for preventing the spills</li> </ul>

	<p>thermometers in central supply areas.</p> <p>Exposure happens either through inhalation or skin contact. If spills are not promptly cleaned up, mercury may accumulate on surfaces, vaporize and then be inhaled by unaware employees.</p> <p>Both the organic and the inorganic forms of mercury are primarily neurotoxins.</p>		<p>system</p> <ul style="list-style-type: none"> <li>- Inorganic forms primarily affect the kidney</li> </ul>	<ul style="list-style-type: none"> <li>- Properly train employees to be aware of the procedures followed when a spill occurs (clean up, etc), and they must follow these policies correctly, (e.g. isolation of the contaminated area, etc)</li> <li>- Have spill kits available, for the clean up of small spills</li> </ul>
<ul style="list-style-type: none"> <li>- Ethylene oxide, glutaraldehyde and paracetic acid used for sterilization</li> <li>- Methyl Methacrylate (MMA)</li> </ul>	<ul style="list-style-type: none"> <li>- Contact with the skin, eyes</li> <li>- Accidental ingestion</li> </ul>	Healthcare personnel	<ul style="list-style-type: none"> <li>- Eye irritation and cornea injury</li> <li>- Frostbite, severe irritation and blistering of the skin</li> <li>- Ingestion of EtO can cause gastric irritation and liver injury</li> </ul> <p>Acute effects from the inhalation:</p> <ul style="list-style-type: none"> <li>- Respiratory irritation</li> <li>- Lung injury</li> <li>- Headache,</li> <li>- Nausea,</li> <li>- Vomiting</li> </ul>	<ul style="list-style-type: none"> <li>- Avoid close contact with newly sterilized unaerated loads. Aerate them before moving them to transfer carts.</li> <li>- Use appropriate PPE (gloves, canister respirator, etc) when changing cylinders</li> <li>- Use EtO detector systems, and room monitors for signalling in case of gas leakage</li> <li>- Use glutaraldehyde products in well ventilated rooms, and large enough to ensure adequate dilution of vapour</li> <li>- Store in closed containers and in well ventilated areas</li> <li>- Use the local exhaust ventilation, such as a properly functioning fume hood for controlling vapour</li> <li>- Remember to replace lids after using the product</li> </ul>

			<ul style="list-style-type: none"> <li>- Diarrhoea</li> <li>- Shortness of breath</li> <li>- Cyanosis</li> <li>- Cancer</li> <li>- Reproductive effects</li> <li>- Mutagenic changes</li> <li>- Neurotoxicity</li> </ul>	<p>(read the warning signs)</p> <ul style="list-style-type: none"> <li>- Substitute with other cold sterilants (such as glutaraldehyde, hydrogen peroxide, sodium hypochlorite, etc).</li> <li>- Install a ventilated exhaust hood above the sterilizer door</li> <li>- Install machine alarms that cause an automatic shutdown, when the ventilation is inadequate.</li> <li>- Conduct periodic personal monitoring, for leaks at gas-line connectors by using passive dosimeters</li> <li>- Keep a record of detected leaks and services done on an EtO room.</li> <li>- Replace sterilizer/aerator door gaskets, valves, and fittings when necessary</li> <li>- Mix hazardous chemicals used in surgeries, (e.g. Methyl Methacrylate) only in a well ventilated, closed system</li> </ul>
Waste Anaesthetic Gases	<ul style="list-style-type: none"> <li>- Exposure because of poor work practices during surgical procedures, anesthetization of patients, leaking of gas-line connections, improper or inadequate maintenance of the machine, and/or patient exhalation after the surgical procedure, while</li> </ul>	Healthcare personnel	<ul style="list-style-type: none"> <li>- Nausea, dizziness, drowsiness</li> <li>- Headaches</li> <li>- Fatigue</li> <li>- Irritability</li> <li>- Coordination and judgment problems</li> <li>- Sterility, miscarriages,</li> </ul>	<ul style="list-style-type: none"> <li>- Try to prevent any anaesthetic spills, in order to decrease the amount of waste anaesthetic gases in the surgery, and turn off vaporizers of anaesthesia machines when not using them</li> <li>- Use appropriate anaesthetic gas scavenging systems</li> <li>- Evacuate properly any waste gas, by collecting and removing them, by detecting and correcting leaks, and effectively ventilating the room</li> <li>- Use of a well-designed waste anaesthetic gases</li> </ul>

	<p>in recovery</p> <ul style="list-style-type: none"> <li>– Escape of these gases during the initial assembling and checking of the anaesthesia system or the scavenging system</li> <li>– Escaping from around the patient's anaesthesia mask</li> <li>– During the clearing of the system at the end of a medical procedure</li> </ul>		<p>birth defects,</p> <ul style="list-style-type: none"> <li>– Cancer, liver and kidney diseases</li> </ul>	<p>scavenging system for collecting, removing, and properly disposing of the gases.</p> <ul style="list-style-type: none"> <li>– Do not discharge gases near the air intake of the room</li> <li>– Use proper masks (e.g. scavenging nasal mask)</li> <li>– Have a proper heating, ventilation, and air conditioning system in the operating room</li> <li>– Use anaesthetic respirators where appropriate</li> <li>– Inspect and maintain properly the scavenging system of waste anaesthetic gases, the anaesthesia machines, and the ventilation system, A daily check must take place, for preventing any leaks</li> <li>– Select, fit or position adequately the face masks</li> <li>– Inflate sufficiently the tracheal tube cuff</li> <li>– Connect in properly the tubes and fittings for the anaesthesia machine</li> <li>– Turn the gas off when the mask is removed from the patient's face</li> <li>– Use appropriate PPE, such as face masks, and sufficiently inflated endotracheal tubes</li> <li>– Take a comprehensive training and information program</li> </ul>
Compressed Gases	Depending on the particular gas, there is a potential for simultaneous exposure to both	Healthcare personnel	<ul style="list-style-type: none"> <li>– Injuries</li> <li>– Burns</li> </ul>	<ul style="list-style-type: none"> <li>– Secure cylinders containing compressed gases, in order to avoid possible falls</li> <li>– Clearly identify cylinders with the name of the</li> </ul>

	mechanical and chemical hazards		<ul style="list-style-type: none"> <li>– Fire</li> <li>– Explosion</li> <li>– Corrosion</li> <li>– Skin irritations</li> </ul>	<p>content</p> <ul style="list-style-type: none"> <li>– Use hand trucks, carts, etc, when moving cylinders. Never roll or drag them</li> <li>– Never attempt to repair any damaged cylinder or to force frozen or stuck cylinder valves</li> <li>– Close off the cylinders when not in use</li> <li>– Do not store cylinders with flammable gases (hydrogen or acetylene) close to open flames, areas where electrical sparks are generated, or where other sources of ignition may be present</li> </ul>
<b>Laser hazards</b>				
	Exposure to lasers used in the operating rooms during removal and cauterization of tissue, from accidental operation and/or when proper controls are not in effect.	Healthcare personnel, Surgeons, nurses	<ul style="list-style-type: none"> <li>– Burns to skin and eyes possibly resulting in blindness</li> <li>– Electric shock</li> <li>– Fire</li> </ul>	<ul style="list-style-type: none"> <li>– Use goggles during laser surgeries for the protection of cornea conjunctive and other ocular tissue.</li> <li>– Use tightly woven fabrics and opaque gloves for the protection against laser radiation</li> <li>– Use laboratory jacket or coat for the protection of arms. It is important to use protective clothing during exposure to high radiation levels</li> <li>– Check lasers, prior every procedure, and during extended procedures</li> <li>– Cover laser systems adequately, and especially those with high voltage capacitance. Also, ground them properly</li> <li>– Cover the windows of the surgery for the protection of the personnel outside</li> </ul>

				<ul style="list-style-type: none"> <li>- Have safety interlocks which shutdown the laser system if anyone enters the surgery</li> <li>- Maintain and check the laser system accordingly with manufacturer's instructions, only by qualified personnel</li> <li>- Place warning signs</li> </ul>
Laser Plume	The vapours, smoke, and particulate debris produced during laser surgical procedures are called laser plumes	Surgeons and assistans	<ul style="list-style-type: none"> <li>- Eye, nose, and throat irritation</li> <li>- Nausea</li> <li>- Vomiting</li> <li>- Nasal congestion</li> <li>- Chest tightness</li> <li>- Abdominal cramping</li> <li>- General flu-like symptoms</li> <li>- Fatigue</li> <li>- At high concentrations:</li> <li>- Visual and upper respiratory tract irritation</li> <li>- Visual problems for the surgeons</li> <li>- It may have mutagenic potential</li> </ul>	<ul style="list-style-type: none"> <li>- Have proper ventilation (use portable smoke evacuators and room suction systems)</li> <li>- Use of proper personal protective equipment (masks, goggles, etc)</li> <li>- Keep the smoke evacuator or room suction hose nozzle inlet very close to the surgical site to effectively capture airborne contaminants</li> <li>- Activate the smoke evacuator every time airborne particles are produced during all surgical or other procedures</li> <li>- Consider every tube, filter, and absorber as infectious waste and be dispose appropriately</li> <li>- Install new filters and tubing before each procedure</li> <li>- Inspect smoke evacuator systems regularly for the prevention of possible leaks</li> </ul>

<b>Radiation Exposure</b>				
	Exposure during diagnostic procedures	Healthcare personnel	<p>Body and/or genetic in nature:</p> <ul style="list-style-type: none"> <li>– Large whole-body exposures cause nausea, vomiting, diarrhoea, weakness, and death.</li> <li>– Genetic effects may lead to congenital defects in the employee's offspring</li> <li>– Acute (erythema and dermatitis)</li> <li>– Chronic (skin cancer and bone marrow suppression)</li> </ul>	<ul style="list-style-type: none"> <li>– Mark rooms that are used for radiation procedures properly (with the radiation caution symbol and the wording “Caution Radiation Area’) and only authorised personnel can enter</li> <li>– Nearby workers must be given adequate warning when x-ray using portable units will be taken</li> <li>– X-ray controls must be in place for the prevention of unintentional activation of the unit</li> <li>– Where portable x-ray units and radioisotopes are used, only the patient and trained personnel must be allowed in the room</li> <li>– Check every x-ray equipment before each use, in order to ensure that the secondary radiation cones and filters are in place</li> <li>– Clearly identify the patients that have received radioactive implants or other therapeutic radiology procedures. Place labels on their bedding, dressings and wastes</li> <li>– Equip X-ray rooms with a barrier wall with a lead plated glass window so technician can step behind barrier wall to take the x-ray, and avoid exposure to radiation</li> <li>– Use Lead plated glass as a barrier for the protection against radiation exposure when procedures must be done close to the patient</li> </ul>

				<ul style="list-style-type: none"> <li>– Use Lead strips for protection from radiation exposure during fluoroscopy procedures</li> <li>– Wear Lead aprons and gloves for the protection of employees and patients, in the direct x-ray field. Employees must also wear opaque goggles</li> <li>– Procedures using remote fluoroscopy can be run from controls in an adjacent room, free from radiation exposure</li> <li>– Keep a separate storage area for radioactive sources. This area should be adequately shielded. Radioactive materials should have document and retain inventories. Only authorized personnel must have access to storage areas</li> <li>– Keep records of the radiation exposure of all employees for whom personal monitoring is required and inform them for their individual exposure at least once a year</li> <li>– Indicate a specific person that will be responsible for the assurance of proper maintenance of the portable x-ray equipment</li> </ul>
Chemotherapy drugs	<ul style="list-style-type: none"> <li>– Exposure due to bad practice of dissolution</li> <li>– Injuries from bad use of used needles or ampoules</li> <li>– Direct contact with the skin or mucous membranes (e.g. from a spillage/splashing)</li> </ul>	Healthcare personnel at the chemotherapy department	<ul style="list-style-type: none"> <li>– Cancerous, mutagenic and teratogenic effects</li> <li>– Skin, eyes and mucous membranes irritation</li> </ul>	<ul style="list-style-type: none"> <li>– Use totally enclosed systems, unless this is not reasonably practicable</li> <li>– Use adequate ventilation systems and appropriate organisational measures</li> <li>– Use PPE (gloves, goggles, respiratory protection, clothing) where adequate control of exposure cannot be achieved by other measures alone</li> </ul>

	<ul style="list-style-type: none"> <li>– Bad operation control of the device used for the provision of the drugs</li> <li>– Leakage of drug from the infusion device</li> <li>– Wrong handling of patients (blood, biological excretions)</li> <li>– Unreasonable staying (food, drink, smoking) at the area of dissolution and drug supply</li> <li>– Accident during disposal and transportation of wastes</li> </ul>			<ul style="list-style-type: none"> <li>– Use good hygiene practices and the provided welfare facilities (e.g. washing facilities)</li> <li>– Organise work to reduce the quantities of drugs used, the number of employees potentially exposed and their duration of exposure, to the minimum.</li> <li>– Ensure the safe handling, storage and transport of cytotoxic drugs and waste material containing or contaminated by them</li> <li>– Train the personnel involved in handling cytotoxic drugs or cleaning areas possible to contamination for the risks and the precautions they must take</li> </ul>
<b>Contaminated Equipment</b>				
	<p>Contact with contaminated:</p> <ul style="list-style-type: none"> <li>– Equipment and working surfaces</li> <li>– Protective coverings</li> <li>– Reusable containers</li> <li>– Glassware</li> </ul>	Healthcare personnel	Infections	<ul style="list-style-type: none"> <li>– Clean and decontaminate all the equipment, environmental and working surfaces after contact with blood or OPIM</li> <li>– Clean with soap and water solution before its decontamination, equipment that is contaminated at a great extent, because some anti-microbial products will not work in the presence of blood, interfering with the sterilizing process</li> <li>– Remove protective coverings (i.e. plastic wrap or aluminium foil) and replace as soon as possible, when they become visibly contaminated, or at the</li> </ul>

				<p>end of a work shift if they may have become contaminated during the shift</p> <ul style="list-style-type: none"> <li>– Inspect and decontaminate any bin, bucket can, and/or similar receptacles intended for reuse, frequently.</li> <li>– Never pick up glassware that is broken and possible to be contaminated, with hands. Use instead mechanical means, such as brush and dustpan, tongs or forceps, etc</li> <li>– Place proper labels or tags on contaminated equipment (such as IV poles), identifying the portions of the equipment that are contaminated</li> </ul>
<b>Contaminated Laundry</b>				
	<p>Exposure to blood or other potentially infectious materials through contaminated laundry that was improperly labelled, or handled.</p>	<p>Laundry personnel</p>	<p>Infections</p>	<ul style="list-style-type: none"> <li>– Handle this kind of laundry as little as possible with minimal agitation</li> <li>– Bag contaminated laundry at the location of use</li> <li>– Do not sort or rinse laundry at the location where it was used</li> <li>– Use labelled bags (with the biohazard symbol) for transferring laundry</li> <li>– Place and transport the wet contaminated laundry that presents a likelihood of soak-through of or leakage from the bag/container; in colour-coded bags/containers that prevent soak-through and/or leakage of fluids to the exterior</li> <li>– Never hold the contaminated laundry bags close to</li> </ul>

				<p>your body or squeeze them while transportation, to avoid any punctures from improperly discarded syringes</p> <ul style="list-style-type: none"> <li>– Use the normal laundry cycles in accordance with the recommendations of washer and detergent manufacturer</li> <li>– Wear appropriate PPE (such as gloves, gowns, face shields, masks, etc) while handling and/or sorting contaminated laundry</li> <li>– Use thick utility gloves while sorting contaminated laundry</li> <li>– The bags used for the bagging process must be melted away. They can be thrown directly into washers without unload or remove contaminated laundry from them</li> </ul>
<b>Medical Waste</b>				
	Contact with clinical waste	Healthcare personnel (doctors, nurses, waste disposal workers)	<ul style="list-style-type: none"> <li>– Infections</li> <li>– Diseases (Hepatitis, E. coli infection, Tuberculosis, etc)</li> <li>– Digestive problems (diarrhoea)</li> </ul>	<ul style="list-style-type: none"> <li>– Always consider all clinical wastes as infectious</li> <li>– Provide information and training on the hazards to health and associated risks posed by medical waste</li> <li>– Use personal protective equipment (PPE)</li> <li>– Handle and dispose medical waste safely</li> <li>– In case of exposure, report the incident and obtain immediate treatment</li> <li>– Wash your hands frequently</li> <li>– Dispose waste in puncture resistant containers lined</li> </ul>

				<p>with leak-proof plastic bags marked as biological waste</p> <ul style="list-style-type: none"> <li>– When handling medical waste wear puncture resistant gloves and handle all contaminated wastes carefully avoiding direct contact</li> <li>– Hold only the outsides of the container when handling and never reach in</li> <li>– Do not load containers beyond their capacity, and contents must never be compacted</li> <li>– Do not mix medical waste with other domestic or workplace garbage</li> <li>– Handle sharps with care and treat them like they are infectious materials</li> <li>– Separate all waste into three categories <ul style="list-style-type: none"> <li>○ general health care waste (e.g. paper and packaging, drinks containers)</li> <li>○ potentially infectious (or hazardous) health care waste (all waste items contaminated, or suspected of being contaminated, with body fluids such as bandages and gauze, swabs)</li> <li>○ used sharps (including broken glass), put into rigid containers (if possible yellow too)</li> </ul> </li> <li>– Use different colours for general and potentially infectious wastes, such as black for general waste and yellow for potentially infectious wastes.</li> <li>– Never place loose sharp items (e.g. needles and blades) in plastic bags or similar containers that can</li> </ul>
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				<p>be easily punctured</p> <ul style="list-style-type: none"> <li>– Cover all waste bins and avoid using open containers and wastebaskets</li> <li>– Remove regularly medical waste preferably at least once per working shift</li> <li>– Seal and label all bags with medical waste</li> <li>– Enforce a waste management system and an infection control or hygiene committee, as well and specialist infection control personnel</li> </ul>
<b>Asbestos</b>				
	<p>Inhalation of airborne fibres during work in furnace rooms where boilers are insulated with asbestos, or while repairing old piping or while doing minor renovations.</p> <p>Asbestos exposures can also occur when insulation in old buildings is removed during renovations.</p>	<p>Maintenance workers and engineers</p>	<ul style="list-style-type: none"> <li>– asbestosis (scarring of the lungs resulting in loss of lung function that often progresses to disability and to death)</li> <li>– mesothelioma (cancer affecting the membranes lining of the lungs and abdomen)</li> <li>– lung cancer and cancers of the oesophagus, stomach, colon, and rectum</li> </ul>	<ul style="list-style-type: none"> <li>– Place signs at entrances to mechanical rooms/areas containing asbestos where employees may enter</li> <li>– Follow any permissible exposure limits that exist</li> <li>– Provide an asbestos awareness training course to those performing housekeeping activities in an area containing asbestos</li> <li>– Provide appropriate respirators, protective clothing, exposure monitoring, hygiene facilities and practices, warning signs, labelling, record keeping, and regular medical examinations</li> <li>– Only fully trained personnel can remove asbestos using proper methods and PPE</li> </ul>
<b>Noise</b>				

	Exposure to high levels of noise	Healthcare personnel at food service areas, laundries and engineering areas (where the boiler room is included)	<ul style="list-style-type: none"> <li>– High blood pressure and decreased circulation in hands and feet</li> <li>– Headaches</li> <li>– Increased irritability</li> <li>– Difficult communication between co-workers</li> <li>– Reduced work ability</li> <li>– Increased difficulty to perform tasks requiring alertness, concentration and attention to detail</li> </ul>	<ul style="list-style-type: none"> <li>– Introduce a program for the decrease of noise in the health care facility</li> <li>– Regular measure noise at the facility</li> <li>– Have a hearing test for new employees, and annual audiometric testing for all employees</li> <li>– Isolate noisy equipment</li> <li>– Install protective shields and acoustic ceilings and carpets</li> <li>– Use proper PPE (for hearing protection)</li> <li>– Limit the employees’ exposure time to excessive noise</li> </ul>
<b>Latex Allergy</b>				
	Contact with hands	Healthcare personnel	Allergies Skin irritation	<ul style="list-style-type: none"> <li>– Use non-latex gloves and other latex-free products (such as hypoallergenic gloves, glove liners, powder-free gloves, etc)</li> <li>– Choose and use a low protein, powder-free glove, for reducing any systemic allergic responses</li> </ul>
<b>Electricity</b>				

<p>Electrical circuits</p>	<ul style="list-style-type: none"> <li>- Contact with live parts</li> <li>- Faulty electrical equipment/machinery or wiring.</li> <li>- Damaged receptacles and connectors.</li> <li>- Wear and tear on electrical equipment or tools can result in insulation breaks, short-circuits and exposed wires</li> <li>- Three-wire (grounded) plugs are attached to two-wire cords that are ungrounded</li> <li>- Ground projections are bent or cut off</li> <li>- Cords moulded to improperly wired plugs</li> </ul>	<p>Healthcare personnel using electrical equipment</p>	<ul style="list-style-type: none"> <li>- Electrocution or electric shock</li> <li>- Fire and explosion</li> <li>- Burns</li> <li>- Death</li> </ul>	<ul style="list-style-type: none"> <li>- Use appropriate electrical equipment with circuit protection</li> <li>- Use equipment in accordance with any instructions of the manufacturer</li> <li>- Ground properly all electrical service near sources of water</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>- Train the personnel not to plug or unplug energized equipment with wet hands</li> <li>- Use safeguards for personnel protection and electrical protective equipment</li> <li>- Maintain regularly the electrical equipment</li> <li>- Install a residual current device for each electrical socket</li> <li>- Turn off any equipment before unplugging it</li> <li>- Do not use electrical equipment when hands, working surface or floor are wet</li> <li>- Do not use any appliance, equipment or wall receptacle that seems damaged</li> <li>- Replace cracked or worn extension cords and while disconnecting pull the plug and not the cord</li> <li>- Visually inspect cords and electrical equipment, and do not use them if they are frayed or damaged</li> <li>- Use safe practices when handling electrical equipment</li> </ul>
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	Overloading of circuits	Healthcare personnel	<ul style="list-style-type: none"> <li>– Reduced performance equipment</li> <li>– Overheating of electrical equipment – Possible fire</li> <li>– Explosions</li> <li>– Injuries and burns</li> </ul>	<ul style="list-style-type: none"> <li>– Do not create an “octopus” on a single wall outlet</li> <li>– Do not use looped or coiled cords</li> <li>– Select appropriate size of the cord to satisfy the needs of the equipment</li> <li>– Use extension cords designed to carry the voltage required</li> </ul>
Extension cords	Trips and falls	Healthcare personnel, patients and visitors	Injuries from the trips and falls due to the cords	<ul style="list-style-type: none"> <li>– Use extension cords only temporarily and only in urgent situations</li> <li>– Do not leave extension cords to hung from counters</li> <li>– Do not place extension cords along rooms and corridors</li> </ul>
<b>Kitchen Equipment</b>				
	<ul style="list-style-type: none"> <li>– Contact with hot surfaces</li> <li>– Accidents because of sharp objects, frayed electrical cords, unguarded equipment</li> </ul>	Kitchen personnel	<ul style="list-style-type: none"> <li>– Injuries</li> <li>– Burns</li> <li>– Cuts and lacerations</li> <li>– Electrical shocks</li> <li>– Amputations, strangulations</li> </ul>	<ul style="list-style-type: none"> <li>– Handle, use and store knives and other sharps with caution.</li> <li>– Keep cutlery sharpened and in good condition</li> <li>– When cutting, the direction of the cut should always be away from the body</li> <li>– Turn the handles of cooking utensils away from the front of the cooker</li> <li>– Have a designated storage area for keeping knives, saws, and cleavers when these are not in use.</li> <li>– Do not store blades with the cutting edge exposed</li> </ul>

				<ul style="list-style-type: none"> <li>– Install knife holders on work tables</li> <li>– Never put knives and other sharp objects into sinks between periods of use.</li> <li>– Hold the cover for deflecting the steam from their face, when they uncover a container of steaming materials</li> <li>– Use proper PPE, such as gloves (e.g. for the protection of cuts, burns, etc), gowns (e.g. protecting from splashes of hot liquids)</li> <li>– Use tamps or push sticks or other hand tools when feeding or removing food from grinders, slicers, or choppers</li> <li>– Isolate hazards (e.g. put barrier guards over a mixer when it is in use for preventing strangulation or amputation)</li> <li>– Provide machine guards to protect machine's operator and/or other employees near the machine from hazards.</li> <li>– Meat slicers, must be properly guarded and operated only by a person trained in safe work practices to avoid cuts and amputations</li> <li>– Place guard on continuous feed dishwashers to prevent any accidental scalding of employees by steam and hot water, and possible nip-point injuries from rollers and conveyors</li> </ul>
<b>Fire Safety</b>				

	<p>Potential source of fire is the heat from equipment such as burners, ovens, and grills, because of:</p> <ul style="list-style-type: none"> <li>- Poor housekeeping</li> <li>- Grease traps that are not emptied (possible grease fires)</li> <li>- Dirty ducts (possible flue fires)</li> <li>- Inappropriate storage of flammable items</li> <li>- Faulty or worn electrical cords</li> </ul>	<p>Kitchen personnel</p>	<ul style="list-style-type: none"> <li>- Injuries</li> <li>- Burns</li> <li>- Death</li> </ul>	<ul style="list-style-type: none"> <li>- Keep grill and grill duct work free from flammable residues and properly maintain them</li> <li>- Store flammable items away from heat producing equipment</li> <li>- Routinely empty the grease traps</li> <li>- Have a training on how to handle with safety the equipment in the dietary department</li> <li>- Have adequate number of portable fire extinguishers</li> <li>- Know the emergency action plan and the fire prevention plan in order to know how to act in case of an emergency</li> </ul>
		<p>Healthcare personnel</p>	<ul style="list-style-type: none"> <li>- Injuries</li> <li>- Burns</li> <li>- Death</li> </ul>	<ul style="list-style-type: none"> <li>- Control any accumulation of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency</li> <li>- Use suitable storage containers for flammable substances, ventilation systems to dilute or remove flammable gas, extraction systems to remove combustible materials, and equipment selected not to be a source of ignition are key elements for the elimination of fire</li> <li>- Have a training on fire hazards of the materials and processes to which your are exposed</li> <li>- Maintain regularly and properly the systems</li> </ul>

				<p>installed on heat producing equipment, for the prevention of accidental ignition of combustible materials</p> <ul style="list-style-type: none"> <li>– Provide at least two exits or means of egress exist, in case of emergency. These exits must be clearly marked, and access to them must remain clear of any obstruction at all times.</li> <li>– Establishing means of detecting and giving warning in case of fire</li> <li>– Know hoe to use the fire-fighting equipment, that must be readily accessible and in good working condition</li> </ul>
<b>Heat stress</b>	<p>Work in high temperatures such as in boiler room, kitchen and laundry department</p> <p>If the building is old, then inadequate ventilation and cooling systems can create a heat hazards during summer time in every department</p>	Laundry and kitchen personnel	<ul style="list-style-type: none"> <li>– Discomfort</li> <li>– Increased fatigue</li> <li>– Incapability to concentrate</li> <li>– Heat stroke</li> <li>– Exhaustion</li> <li>– Cramps</li> <li>– Fainting</li> </ul>	<ul style="list-style-type: none"> <li>– Have general ventilation and local exhaust ventilation at points of high heat production</li> <li>– Have proper education and training on the detection of early signs of heat-related illness</li> <li>– Use protective clothing and equipment, as well shields in case of radiant heat</li> <li>– Drink large quantities of drinking water</li> <li>– Use cooling fans and air conditioning in a high temperature area</li> <li>– Rotate work and breaks. Prefer frequent short breaks in cool areas, allowing employees' body to cool down</li> <li>– Perform the heaviest work in the coolest part of the day</li> </ul>

				<ul style="list-style-type: none"> <li>- Wear light, loose-fitting, breathable (like cotton) clothing</li> <li>- Avoid using caffeine and alcoholic beverages while working in hot environments</li> <li>- Alternate work and rest periods. Take frequent short breaks in cool areas to allow your body to cool down</li> <li>- Monitor temperatures, humidity and workers' responses to heat at least hourly.</li> <li>- Supervisors should be able to detect early signs of heat-related illness and permit workers to interrupt their work if they are extremely uncomfortable.</li> <li>- Educate employees to recognize the need to replace fluids and salt lost through perspiration.</li> <li>- First aid employees must be available;</li> </ul>
<b>Slips/Trips/Falls</b>				
	A potential slip and fall hazard might occur, in case of a water spillage on the floor accidentally	Healthcare personnel, patients and visitors	Injuries from the slips and falls	<ul style="list-style-type: none"> <li>- Use floors with non slippery material</li> <li>- Keep floors clean and dry in all circumstances</li> <li>- Keep aisles and passageways clear and in good condition, without obstructions</li> <li>- Mark mobile equipment with a bright colour, or a tape "X", for distinguishing it from the floor and make it more visible to employees</li> <li>- Use the handrail on stairs, to avoid undue speed</li> <li>- Report and clean spills immediately</li> </ul>

Equipment hazards associated with helicopters	<p>Exposure to tail rotor and the main rotor system (helicopter blades).</p> <p>Hats, loose clothing, gloves etc, can be sucked into the engine air intake fans and cause the helicopter to malfunction and potentially crash.</p>	Personnel working at the heliport area	<p>Injuries</p> <p>Death</p>	<ul style="list-style-type: none"> <li>- Only fully trained personnel in helicopter equipment hazards can have access in helicopter area. Avoid the tail rotor and the helicopter blade area</li> <li>- Never Do Cardio-Pulmonary Resuscitation (CPR) to patients on transport carts while the carts are under the helicopter blade. This may elevate height of the personnel to the extent of being hit by the helicopter blades</li> </ul>
<b>Fuels</b>	Exposure to fuelling hazards such as fire or explosions occurring from a spark or match in the helipad area.	Personnel working at the heliport area	<ul style="list-style-type: none"> <li>- Injuries</li> <li>- Burns</li> </ul>	<ul style="list-style-type: none"> <li>- Do not smoke at heliport area</li> <li>- Place proper signs</li> <li>- Attach a grounding cable to the helicopter during fuelling, to prevent sparks</li> </ul>

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## M10-EN.17 EVALUATION TEST

Please perform your risk assessment for the situations described in the following real-life photos

