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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.


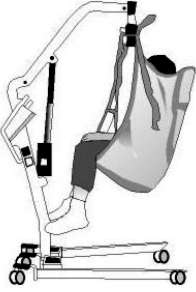
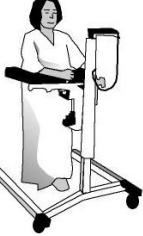
All these, create an unsafe load for nurses to manage capably. Even with assistance from additional staff members, the exposure to the hazard still persists. With the improvement of assistive equipment, such as lift and transfer devices, the risk of


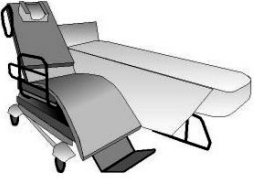




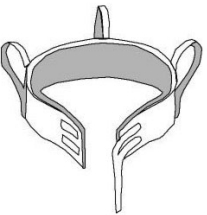
musculoskeletal injuries can be significantly reduced. Examples of this kind of equipment include full-body sling lifts, stand-assist lifts, lateral transfer devices, and friction reducing devices. By using the assistive equipment nurses are relieved of the total effort and risk associated with patient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



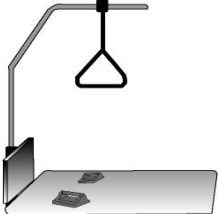




Employers must ensure that:




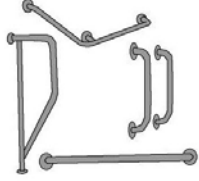
- The assistive equipment and devices are readily available to healthcare personnel, in order to encourage their use
- The equipment is adequate, and located in correct places for the personnel’s and patient’s needs.
- The equipment and devices are maintained in good operational condition (for optimum 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>Transfer from sitting to standing position with powered sit-to-stand or standing assist devices.</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>Patient lifting</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>Ambulation</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>Lateral transfer and repositioning</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>Repositioning in chair</p> <p>This is used for positioning partial- or non-weight-bearing patients that are cooperative.</p>
	<p>Lateral transfer in sitting position.</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>Transfer from sitting to standing position with:</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>Weighing</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>Repositioning</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>Bathtub, Shower, and Toileting Activities</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)