SPILL MANAGEMENT

In a hospital, hazardous substances such as body fluids, drugs, cleaning fluids and other chemicals are in very close proximity to hundreds of people each day. Thus in hospital spillage of blood, body fluids or chemicals can occur at any time due to broken or faulty equipment or human error. Any such spill poses risk to the staff, visitors and patients who are extremely susceptible to infection.

It is therefore essential for the hospital to have the right material and well trained staff to deal with any spill immediately.

SPILL MANAGEMENT OF BLOOD AND BODY FLUIDS

Small volumes of spill (few drops):

- Wear workman's gloves and other PPE appropriate to the task
- When sharps are involved use forceps to pick up sharps, and discard these items in a puncture-resistant container
- Wipe the spill with a newspaper moistened with hypochlorite solution (1% dilution containing minimum 500ppm chlorine). Discard the paper as infected waste
- Repeat until all visible soiling is removed
- Wipe the area with a cloth mop moistened with 1% hypochlorite solution and allow drying naturally
- All contaminated items used in the clean-up should be placed in a bio-hazardous bag for disposal.

Large spills (>10ml):

- Confine the contaminated area
- Wear workman's gloves and other PPE appropriate to the task
- Cover the spill with newspaper or appropriate absorbent material to prevent from spreading
- Flood the spill with 10% hypochlorite solution. While flooding the spill with 10% hypochlorite solution it is to be ensured that both the spill and absorbent material is thoroughly wet
- Alternatively, chlorine granules can be sprinkled on the spill first and then the paper put over it
- Wait for five minutes.
- Remove and discard the paper as infected waste
- Wipe the area with paper moistened with 10% hypochlorite again if required until all visible soiling is cleaned
- Wipe the area once with 10% hypochlorite and a cloth mop and allow drying naturally
- All contaminated items used in the clean-up should be placed in a bio-hazardous bag for disposal.

SPILL KIT

Blood and body fluid spill kit contents:

- *Workman's gloves x 2 pairs*
- *Apron*
- *Mask*
- *Shoe over or plastic bag to cover the shoes*
- *Absorbent material like newspaper or blotting paper*
- *Waste collection bag*

Cleaning equipment – bucket, mop, cloths, and hypochlorite solution can be obtained from housekeeping and must be washed and disinfected appropriately after use.

If chlorine solution is not prepared fresh daily, it can be stored at room temperature for up to 30 days in a capped, opaque plastic bottle with a 50% reduction in chlorine concentration after 30 days of storage (e.g., 1000 ppm chlorine [approximately a 1:50 dilution] at day 0 decreases to 500 ppm chlorine by day 30).

All the spill kits must be readily available with all departments especially where risk of spill is more, like laboratory, sample collection room, wards etc.

Spill kit must be immediately replenished after use and stored at the original location after every use.

DISPLAY OF SPILL MANAGEMENT PROTOCOLS

Spill management protocols need to be displayed at prominent locations in the hospital. Displayed protocols serve as a ready reference for the staff for management of spills.

TRAINING OF STAFF ON SPILL MANAGEMENT

All the staff in hospitals need to be trained in spill management protocols of the hospital. Staff must be trained by performing mock drills for spill management. Training must also be done for chemical spill management.

CHEMICAL SPILL MANAGEMENT

SPILL PREVENTION

Chemical spills can be prevented in the workplace by:

- Ensuring appropriate chemical containers are used with seals that are in good condition (i.e. glass containers for corrosive chemicals)
- Ensuring all chemicals are stored appropriately
- Provision of locked cupboards and storage areas
- Provision of drip trays or purpose built chemical storage cupboards/cabinets with inbuilt spill retention
- Storage of chemicals as per their respective Material Safety Data Sheets (MSDSs)
- Ensuring appropriate equipment and procedures are in place for chemical spill management
- For chemical spill management it is to be ensured by the hospital that it maintains and reviews the relevant MSDSs to ensure appropriate risk controls are in place for accidental spill. MSDSs should be no more than five years old from date of issue.

CHEMICAL SPILL KIT

Spill kits needs to be provided and be readily accessible in relevant locations at the hospital. A chemical spill kit should include the following items:

Absorbents:

- *Universal Spill Absorbent:* 1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate and sand. This all-purpose absorbent is good for most chemical spills including solvents, bases and acids (with the exception of hydrofluoric acid)
- *Absorbent pads and rolls:* 'HazMat' absorbent pads
- *Acid Spill Neutraliser:* Sodium bicarbonate, sodium carbonate or calcium carbonate
- *Alkali (Base) Neutraliser:* Sodium bisulphate, boric acid or oxalic acid
- *Solvents/Organic Liquid Absorbent:* Inert absorbents such as clay and sand
- PPE

- Hand protection: Chemical resistant safety gloves (i.e. nitrile gloves)
- Eye protection: Safety goggles
- Body protection: Laboratory coat/Corrosive apron
- Foot protection: Enclosed footwear, shoe covers
- Respiratory protection: Dust mask/Respirator (All personnel should be properly fit tested before using a respirator)

Clean-up material for spills can be obtained from housekeeping; including:

- Brooms, plastic dustpan and square mouth shovel to sweep up the absorbent material
- Paper towels for minor spills
- Plastic tongs/scoops to pick up contaminated absorbent material
- A chemical resistant bin with a close fitting lid to hold the volume of spill and absorbent residues prior to disposal
- Heavy duty plastic bags for wrapping contaminated PPE.

SPILL RESPONSE

Dangerous goods or hazardous substance spills should be cleaned up immediately, taking appropriate precautions for hazards of the material.

STEP 1 - Assess Safety and Stop the Source of the Spill

Limit access to the immediate area where the spill has occurred and ensure that only personnel with appropriate training and equipment deal with the spill.

This may involve righting an overturned container or placing the source (e.g. cracked container) in a larger container to contain the spill.

STEP 2 - Review Safety Precautions and Risk Controls

Review relevant MSDS for the spilt chemical (MSDS should be located where the chemicals are used and stored). The MSDS will have specific instructions on how to deal with chemical spills as well as first aid information.

STEP 3 - Clean up the Spill

Using appropriate PPE promptly cover the spill with absorbent material taking care not to spread the spill further.

Using a dust pan, collect the absorbent material/waste and place into a thick walled, puncture-proof chemical resistant bag/bin which is suitably labelled.

STEP 4 - Notify the Appropriate Authority

Spill of dangerous chemicals should be reported to the appropriate authority.

STEP 5 - Restock the Chemical Spill Kit

Restock the spill kit and return it to its designated storage location.

Note:

The chemicals should be treated as per manufacturer's instructions before disposing off the same into municipal drainage system

SPECIFIC GUIDANCE FOR CHEMICAL SPILL MANAGEMENT

Neutralising Acid Spills

Acid spills can be neutralised with sodium bicarbonate, sodium carbonate, or calcium carbonate.

Process

- Contain the liquid first
- Sprinkle powder over the spill slowly, starting from the outside
- Acid is neutralised if effervescence ceases in the presence of excess bicarbonate
- Avoid breathing in the fine powder and the gas evolved (carbon dioxide).

Neutralising Alkali Spills

Alkali spills can be neutralised with sodium bisulphite, boric acid or oxalic acid. Many alkalis can result in serious burns to skin and eyes, so it is necessary to proceed with extreme caution.

Process

- Ensure that there is adequate ventilation
- Eliminate all sources of ignition as neutralisation of alkali can produce heat. This includes removing all combustible materials that are close to the spill
- Right any overturned containers where the spill originated or stop leak at source only if safe to do so
- Avoid handling fluid even with nitrile gloves
- Liberally apply the alkali neutraliser around the perimeter of the spill to limit the extent of spreading and continue sprinkling it towards the centre. This should be done until the entire spill is covered and there is no free liquid or liquid migration. The neutralisation reactions should occur 1-5 minutes after application
- Stand clear as splattering of reaction products might occur. The heat and vigour of the reaction will depend on the type and concentration of the alkali being neutralised
- The alkali will be neutralised when the reaction has stopped and there is no more fizzing from the liquid.

Caution

- Neutralised alkalis may produce heat. Wait until mixtures have cooled before sweeping up spilled material
- Avoid handling spilled material until absorption is complete
- Use non-metal, non-sparking tools such as a broom, scoop or scraper to clean up neutralised spill. Take care not to overly disturb the neutralised spill.

Solid Spills

Process

- Sweep solid material into a plastic dust pan and place in a sealed container. Care should be taken so as to minimise dust or the contaminated powder becoming airborne
- Use of a dust mask is advisable
- Wipe the area down with a wet paper towel and dispose off the used paper towel in a strong polyethylene bag. Seal the bag and ensure all waste is collected for proper disposal.

Liquid Spills (Other than flammable liquids)

Process

- Spread absorbent pads over the spill starting with the edges first. This will help to contain the spill to a smaller area. Enough pads should be used to completely cover the liquid
- Pick up the contaminated pads with tongs or a scoop and place into a chemical resistant bin
- If the chemical is water soluble, wipe the area down with a paper towel, followed by wet mop and detergent
- Appropriately dispose off used paper towel.

Flammable Liquid Spills

Process

- Control all sources of ignition - turn off all electrical and heat generating equipment
- Spread the absorbent pads over the spill starting from the edge. Allow the pads to completely soak up the liquid
- Pick up the contaminated pads with tongs or scoop and minimise direct contact
- Place the waste into the chemical resistant bin
- Wipe the area down with a paper towel and copious amounts of water
- Dispose off paper towel into a chemical resistant bin and seal the bin so it is airtight
- Never use wet vacuum cleaner on flammable solvents.

ISOLATION AND BARRIER NURSING

Isolation for the control of infection is used to prevent infected patients from infecting others (source isolation), and/or prevent susceptible patients, with weak immune system, from being infected (protective isolation).

Isolation and barrier nursing is needed to be followed by the hospital to prevent the spread of infections to other patients or to the medical staff from the patients carrying infections.

Barrier nursing is a set of stringent infection control techniques used in nursing. The aim of barrier nursing is to protect medical staff against infection by patients, particularly those with highly infectious diseases.

Isolation is defined as the voluntary or compulsory separation and confinement of those known or suspected to be infected with a contagious disease agent (whether ill or not) to prevent further infections. (In this form of isolation, transmission-based precautions are imposed)

The minimum requirements that hospitals need to fulfil with regard to isolation and barrier nursing are listed as follows:

SINGLE ROOM

Single rooms reduce the risk of transmission of infection from one patient to others, and direct or indirect contact transmission.

Single room should have following facilities:

- Hand washing facilities
- Attached toilet and bathroom facilities