

Health and safety

Health and safety issues in any work environment are very important. It is the responsibility of all Heads of Department to ensure that injury or sickness, due to working conditions, is kept to a minimum. Injury or sickness may increase absenteeism of staff members and reduce efficiency. Staff must not put patients, colleagues or self at risk.

X-ray departments should be prepared for emergencies such as fire, major disaster or any life threatening situation. Radiography involves working with:

- Machinery.
- Electricity.
- Hazardous chemicals.
- Radiation.
- Patients.

Fire and major disaster plans should be in place. Cardiac arrest training should be given.

The first thing to consider is making the work environment as safe as possible, by minimising the risk of problems arising. To achieve this, ensure that:

- Regular maintenance inspections are carried out.
- Safety procedures are followed.
- Adequate staff instruction is given.
- Safety equipment is readily available.

Machinery

Regularly inspect all machinery. Do not attempt to repair anything you do not understand. Call an X-ray engineer if you are unable to fix the problem.

Take care with all moving parts, to minimise the risk of:

- Trapping fingers.
- Loose parts falling off onto staff or patient.
- Equipment moving unexpectedly and striking staff or patient.
- Staff or patient striking head on overhead equipment.

Electricity

Consult a qualified electrician or X-ray engineer. Regularly inspect all electrical equipment, cables and con-

nections. **Do not attempt to repair anything you do not understand.**

When carrying out any simple maintenance, repair, or cleaning of electrical equipment:

- Switch off and disconnect before starting.
- Do not tamper with anything you do not fully understand.
- Unless you are qualified, restrict your actions to replacing light bulbs, simple electrical parts, tightening connections, replacing fuses and inspecting cables.
- Ensure that all parts are correctly and safely installed or adjusted.
- Ensure that all protective panels are replaced.
- Never use excessive amounts of water when cleaning electrical equipment.
- Report all faults to your immediate senior or through the recognised channel.
- Ensure that other members of staff are aware of any problem.

Fire

Adequate fire fighting equipment, instructions, and evacuation procedures must be in place at all times.

Equipment

- Fire extinguishers.
 - Suitable for electrical fires, near electrical equipment and switchboards.
 - General purpose in all other areas.
- Smoke detectors in all rooms.
- Hoses in central areas.
- Fire alarms easily accessible.
- Regular maintenance of alarms and equipment.
- Illuminated EXIT signs in all public area.
- Emergency exit doors not locked or blocked.

Fire fighting instructions

- Readily available.
- Staff training.
- Annual refresher courses.

Evacuation procedure

- Instructions readily available.
- Clearly defined evacuation routes.
- Recognised assembly points.
- Responsibilities clearly defined.
- Staff training.

Hazardous chemicals (laws and regulations to be followed)

Developer and fixer are hazardous chemicals and should be handled with care. Display manufacturer's instructions for mixing, care and first aid treatment, in a prominent place in the area in which the chemicals are to be used.

The risks involved are:

- Inhaling fumes or powders.
- Swallowing.
- Contact with the skin or eyes.

When mixing solutions:

- Work in a well-ventilated room.
- Avoid skin or eye contact with chemicals.
- Wear a mask, goggles, rubber gloves and a plastic apron.
- Avoid splashes.
- Wash all equipment used after mixing.
- Clean up any spills or splashes.

When processing films:

- Avoid skin or eye contact with chemicals.
- Ensure that the darkroom is adequately ventilated.
- Minimise splashes.
- Clean up any splashes as soon as possible.
- Replace any tank lids when finished.

Disposal of empty chemical bottles

- Should not be used as drinking water containers.
- Puncture and place in a sealed plastic bag before disposal.

Disposal of exhausted chemistry. Things NOT to do.

- Do not flush into common drains or simply throw away. The chemicals may get into the local water supply or contaminate crops.
- Do not flush into a septic tank system. The chemicals will kill the "good" bacteria and stop the breakdown of solid matter.

Disposal of exhausted chemistry. Helpful suggestions.

- Ideally use a silver recovery unit and dispose of the chemistry through a recognised hazardous chemicals agency.

- Select a suitable site where the chemicals can be buried and are not likely to get into the local water supply or in any way affect humans, animals or crops.
- Further refinements of the "bury method" is to use a sand trap first, then bury the residual sand or use an evaporative trench lined with sand and bury the sand when the water has evaporated.
- Local soil, terrain and weather conditions should be considered.

First aid treatment

- Follow manufacture's recommendations.
- Skin contact.
 - Wash thoroughly in water immediately.
- Eye contact.
 - Wash eye thoroughly, immediately.
 - Darkrooms should be equipped with emergency eye wash kits.
- Inhaled
 - Move out into fresh air immediately.
 - Seek medical advice.
- Swallowed
 - Wash mouth and lips in clean water.
 - Seek medical advice immediately.

Radiation

Follow national laws and regulations.

- Use an ongoing personal monitoring system.
- Do not produce x-radiation unnecessarily.
- Requests for X-ray examinations should be justified.
- Avoid the use of X-ray examinations on pregnant women wherever possible, especially in the first trimester.
- Keep clear of the primary radiation beam.
- Keep clear of any scattered radiation.
- Collimate the beam as much as practicable.
- Minimise repeat films.
- Use lead rubber shielding whenever possible, especially of radiosensitive organs.
- Make sure that all items of lead rubber are in good condition and effective.
- Make sure that shielding to the control panel is effective.
- Make sure that X-ray room walls effectively protect people in adjacent areas.
- Close door to X-ray room when exposing.
- Standard radiation warning symbols must be placed on the doors of all X-ray rooms.
- Illuminated signs should be placed at the entrance to all X-ray rooms where prolonged X-ray

exposures are made, warning when X-rays are being used. e.g. screening rooms.

- Make sure that all unnecessary personnel are clear of the radiation area when exposing.
- Make sure that X-ray equipment is working properly and is safe, by carrying out regular quality control checks.
- X-ray equipment should be switched off when not in use and any safety lock keys removed.
- Use correct filtration of the X-ray beam.
- Special care must be taken when using mobile/portable X-ray units, in ward or operating theatre situations.
- Apply the ALARA or ALARP Principle when exposing anyone to radiation.

ALARA principle

When exposing anyone to ionizing radiation the dose should be kept

As Low As Reasonably Achievable

An extension of this principle is the

ALARP principle

When exposing anyone to ionizing radiation the dose should be kept

As Low As Reasonably Practicable

The inference here is that there may be other important factors which may limit the dose reduction.

Working with the patient

Moving and handling:

- Use recognised moving/handling techniques to reduce the risk of back injury.

- Use appropriate moving/handling aids when necessary and when available.
- Encourage patients to move themselves where possible.

Cross infection:

- Be aware of any indications that the patient may be infectious.
- Follow infection control procedures.
- Have gowns, gloves and masks readily available and ensure that they are worn when necessary.
- Disinfect all equipment used, immediately after use, not forgetting cassettes.
- Where possible wrap cassette in towel or cloth before using, with an infectious patient.
- Wash hands before and after each contact.

Disaster

A disaster is any major catastrophic event, earth quake, major accident involving many people, civil disturbance or war. A hospital must have an established disaster plan that will allow it to cope with this type of event. An X-ray department must have its own emergency plan that will fit in with the overall hospital plan.

Designing a plan:

- Become familiar with the hospital plan.
- Design an X-ray department plan that is compatible with that of the hospital.
- Determine:
 - Individual responsibilities.
 - Staff call-out procedure.
 - Organisation.
 - Amount of stock to hold.

Notes