



Al-Mustaqbal University
Radiological Techniques
Department



Biological Radiation hazards

First Lecture

Third Stage

By
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Introduction

Biological hazards refer to organisms or organic matters produced by these organisms that are harmful to human health. These include parasites, viruses, and bacteria. In general, there are three major of routes of entry for these micro-organisms into our body, i.e. through the respiratory system, transmission through contact with body fluids of the infected or contact with contaminated objects.

Occupations and workplaces where people may come into contact with biological hazards

Medical staff, cleaning staff and laboratory technicians in the medical profession

- Healthcare services
- Cleaning services and property management
- Employees in environmental hygiene services

Preventive and control measures

Elimination of the source of contamination is fundamental to the prevention and control of biological hazards. If the contact with biological hazards cannot be prevented, the employees must use personal protective equipment. The personal protective equipment includes masks, gloves, protective clothing, eye shields, face shields and shoes covers.

Respiratory protection

Using the appropriate respiratory protective equipment is important for the securing an adequate protection from biological hazards. Common protective equipment includes:

- Surgical masks – Surgical mask generally consists of three layers of non-woven fabrics. It provides a barrier protection against large respiratory droplets
- N95 or higher level respirators – This type of respirator filters out particulates and liquid droplets in small particle size, therefore providing protection from microorganisms that are airborne.
- Air- supplying respirators. Clean air is supplied by air compressor or high-pressure cylinder through a hose.

Points to note about wearing a surgical mask:

- The mask fits snugly over the face
- The coloured side of the mask faces outwards, with the metallic strip uppermost
- The strings or elastic bands are positioned properly to keep the mask firmly in place
- The mask covers the nose, mouth and chin
- Press the metallic strip on both sides of the bridge of the nose to keep the mask snugly over the face
- Try not to touch the mask once it is worn over the face. If it is necessary to handle the mask, hands must be washed before and after touching the mask.
- Under normal circumstances, a surgical mask should be changed daily. Replace the mask immediately if it is damaged or soiled

Points to note about wearing a N95 mask:

N95 masks are for use in high-risk medical departments such as casualty department, intensive care units, radiology departments (Chest X-Ray examination units) and physiotherapy departments (chest physiotherapy treatment units). Medical personnel

that have to take care of highrisk patients or handle high-risk treatment procedures may choose N95 or higher protection level respirators.

- If required to wear N-95 mask, the face-piece must be of proper fit. Compare the size of different brands to find a suitable one.
- To reuse a N95 mask, it should be kept in a paper bag properly before using it again.
- If the N95 mask is soiled or damaged, replace it immediately.
- N95 mask should never be shared with anybody or brought outside the hospital.
- N95 masks should not be used by persons suffering from respiratory diseases, such as asthma and emphysema
- having difficulty in breathing or feeling dizzy after wearing it

Protective clothing

- Protective clothing includes protective coverall gown, apron, head and shoe covers
- Protective clothing should be waterproof or impervious to liquids to protect the body from contamination by blood, droplets or other body fluids and prevent these contaminants from getting into the body through open wounds or contaminating the worker's own clothing.
- Protective clothing should fit the wearer and should not hamper movement
- Protective clothing should be checked before use and replaced if damaged
- Biologically contaminated protective clothing should be disposed of in specially designed rubbish bag marked with "biological hazard"

Goggles/Face shields

- Safety goggles/glasses and face shields can protect the eyes from contacting pathogen-carrying blood, droplets or other body fluids which may then enter the body through the mucosa
- Glasses without side shields can only protect the front from liquid splash
- If necessary, face shield should be used to protect the whole face
- Check them regularly. Replace them if out of shape, cracked, scratched or fogged

Gloves

- Gloves protect the hands from contacting blood, droplets, body fluids and other body tissue of the infected, or pathogen-contaminated objects and can avoid infection when touching the eyes, mouth or nose afterwards. Gloves can also protect open wounds from contamination by pathogen
- Most gloves are disposable after use
- Check whether the material used for the gloves is resistant to chemicals.
- Gloves should fit the hands snugly but they should not hamper movement
- Two pairs of gloves might be worn in handling highly hazardous substances
- Wash hands thoroughly before and after use
- Contaminated gloves should be disposed of in special rubbish bag marked with "Biological hazard"

Shoes covers

- Shoes covers prevent pathogens from being carried outside the workplace
- Shoes covers are usually disposable after use
- Shoes covers should be water resistant and skid proof

Sterilization

Sterilization is the process using ultra heat or high pressure to eliminate bacteria, or using biocide to eliminate microorganisms, including spores in bacteria. A complete sterilization process should include disinfecting the contaminated premises and thorough cleaning of any residual toxic substances, to ensure that employees would not be harmed through exposure in the risk area

Personal hygiene

Washing hands with liquid soap is the simplest and most basic method to avoid infection. However, it is often neglected. Wash hands before and after work. Also wash hands immediately before and after wearing protective clothing, uniforms or gloves to reduce the possibility of infection.