

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

OCCUPATIONAL HEALTH



OCCUPATIONAL HAZARDS

- a) Physical hazards
- (b) Chemical hazards
- (c) Biological hazards**
- (d) Mechanical hazards
- (e) Psychosocial hazards



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BIOLOGICAL HAZARD (Biohazards)

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□ What is biological hazard?

Biological hazards refer to **organisms** or **organic matters produced** by these organisms that are **harmful** to human health.

These include parasites, viruses, bacteria, fungi and protein

➤ Biological hazards can be broadly **defined as** **Any risk** that comes from the **biosphere**, including plants, animals, and humans.

□ Occupational Biohazards (biohazards) defines as:

“infectious agents or hazardous biological materials that exert harmful effects on workers' health, **either**

❖ **directly** through infection or

❖ **indirectly** through damage to the working environment, and

it can **also** include **medical waste** or samples of a **microorganism**, virus, or **toxin** from a **biological source**.”



- ❑ **Biological hazards** (biohazards) **present** the Occupational Health and Safety (OHS) professional with **complex challenges**.
- ❖ Many and varied biohazards may result from workplace exposure to **organisms, or substances produced by organisms**, that **threaten human** health.
- ❖ Although workers in health and community care, and **agricultural and fishing** occupations **are at particular risk** of exposure to hazardous biological agents,
- ❖ All workplaces **harbour the potential** (possible) **for various** forms of biohazard exposure, **including**
- ❖ **person-to-person** transmission of infectious disease.
- ❑ **Studies on biological** hazards in the workplace **are lacking**; however, [a report by Safe Work Australia](#)



- ❑ A report by Safe Work Australia notes that
 - ❖ **19 % of** surveyed workers reported exposure to biological hazards.
 - ❖ Of those workers, **three quarters(3/4)** reported that they were **exposed to human body fluid** of some kind.
 - ❖ According to the report, there **were two industries** that were, **unsurprisingly, affected more than any other:**
 - (1) Health and community services and
 - (2) Agriculture, forestry, and fishing.

- ❑ In general, there are Three Major of routes of entry for these micro-organisms into human body, through the
 - ❖ **Respiratory system,**
 - ❖ Contact with **body fluids** of the infected or
 - ❖ Contact with **contaminated objects.**

- ❑ The harmful effects to human health are mainly of Three Types.
 1. Infections,
 2. Allergy and
 3. Poisoning.

Is this Worker at Risk?

The short answer to this question is that just about **EVERY WORKER IS AT RISK** of coming into contact with some kind of biological hazard, whether that be human blood, organic matter, or airborne pathogens., though,



- ❖ There are some industries and workers that are
- ❖ routinely exposed to these risks. These include:
- Workers **exposed** to **body fluids**, including healthcare workers, personal service workers, and dental professionals
- Workers in **contact** with **live animals**, including breeders, animal scientists, poultry handlers, farm workers, and laboratory animal workers
- Workers in **contact** with **animal products**, including butchers, farmers, meat packers, and freight(cargo)handlers

industries and workers that are routinely exposed to these risks. Conl..

- Workers exposed **to ticks, fleas, and mites**, including forestry workers, groundskeepers, highway maintenance personnel, and pest control workers
- Workers exposed **to human or animal waste**, including child care workers, laboratory workers, sewer workers, and animal handlers
- Workers exposed **to dust-containing pathogens** (e.g. *rodents, bird roosts, soil in endemic areas*), including building cleaners, construction workers, granary workers, heating and air conditioning workers, gardeners, roofers, demolition (destruction) workers and farm workers



❖ **Classification of Biological hazards into; six categories:**

This method of classifying occupational infections is commonly used because it provides a means to link diseases and occupations

1. Contact with **infected living animals**; *Brucellosis, influenza, leptospirosis; Q fever, plague, rabies*
2. Contact with **contaminated animal products**; *Anthrax, brucellosis, plague, haemorrhagic fever, leptospirosis, Q fever.*
3. **Tick, flea, or mite bite**; *Murine typhus, plague, Scrub typhus*
4. Contact with **human or animal waste**; *HAV Leptospirosis, schistosomiasis,*
5. Contact with **infected patient or blood**; *AIDS, haemorrhagic fever, HBV, HCV, diphtheria, meningococcus.* And
6. **Raising dust containing pathogens**; *leptospirosis*



Preventive and Control Measures

❑ **Elimination** of the source of contamination is fundamental to the prevention and control of biological hazards

❖ **Identifying and Managing Biological Hazards**

❖ **Employers and safety professionals** must take time to identify potential biological hazards and develop a plan to manage them.



❖ When conducting a hazard assessment consider the following questions:

a. Are employees working **around people** who may have an **illness** or **communicable** disease?

b. Is there the possibility for employees to be **exposed to** blood and other **bodily fluids**?

c. Are employees **working with** or **in proximity to animals** or **insects**?



- d. Is the workplace **clear** of **mold** and **fungi**?
- e. Are employees **working** around **hazardous materials** like **sewage**?
- f. Does the workplace have **"sharp"** materials that **must** be **cleaned** regularly and **safety disposed** of?
- g. If there are biological hazards in the workplace, **do** employees have the **right protective equipment** to remain safe?

❖ What to do once the biological hazards have been identified

Once the biological hazards have been identified in the workplace

❖ it is **important** to **eliminate** as much as possible

❖ as well as **reduce their risk** to employees.

❑ By implementing **controls** in the workplace,

✓ the **risk of** biological hazards can be greatly **reduced** and

✓ in some cases, **eliminated**(discarded) **completely**.

□ Two types of controls that can be used to address biological hazards are

- ❖ Administrative and
- ❖ Engineering controls.

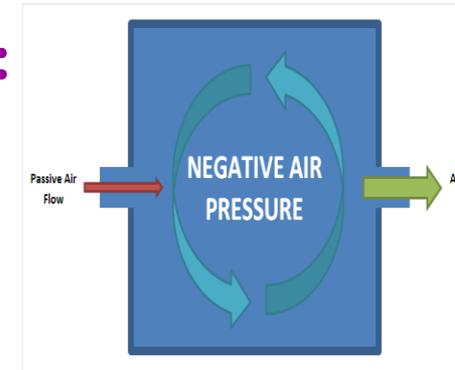


□ **Elimination** of the source of contamination is fundamental to the prevention and control of biological hazards

- ❖ If the biological hazards identified cannot be eliminated,
- ❖ Employers must take steps to reduce risk of exposure to an acceptable level and
- ❖ provide appropriate **personal protective equipment** to workers
 - Engineering Controls
 - Administrative Controls
 - Personal Protective Equipment

A. Engineering Controls

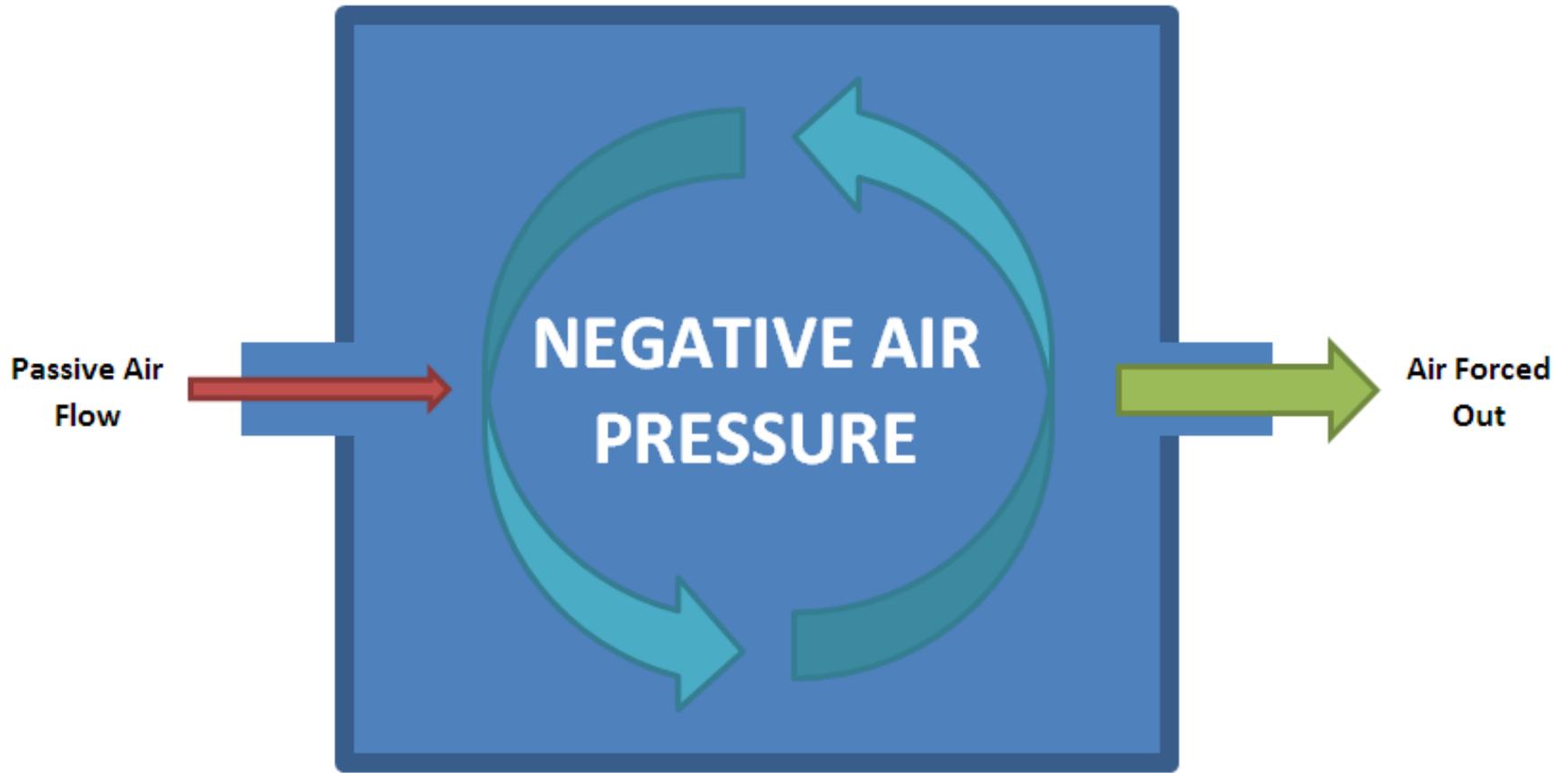
- ❑ Engineering Controls should be **the first line of defence** for protecting workers against biological hazards.
- ❖ **Engineering controls work to reduce the risk** of exposure
- ❖ **through physical means.**
- ❑ While **appropriate** controls **will vary depending** on the specific hazards present in the workplace,
- ❑ **following are examples of effective options:**
 - ✓ **Containment** (keeping under control) laboratories
 - ✓ Microbiological safety cabinets
 - ✓ Proper ventilation
 - ✓ **Partial isolation** of the contamination source,
 - ✓ Installation of **negative** pressure and
 - ✓ **separate ventilation** and air conditioning system



examples of effective options. Engineering Controls Cont. ..

- ✓ Use of **Ultraviolet** lamps can help contain the spread of contaminants
- ✓ Regular **cleaning** of the workplace,
- ✓ Pest prevention/extermination,
- ✓ Requiring that **safety equipment** be used and worn
- ✓ Proper **storage**,
- ✓ Proper **transport**, and
- ✓ Proper **disposal** of biologically **hazardous** materials and items that may **pose a biological** risk.





The internal air is forced out so that a negative air pressure is created pulling air passively into the system from other inlets.

B. Administrative Controls

are the second line of defence.

- ❖ One of the key methods of risk control in this category is
- ❖ safe operating procedures.
- ❖ Reduce risk by changing work processes and activities to make them more safe
- ❖ Employers must mention in detail the procedures and processes that should be followed in order to protect workers from biological hazard risks
- ❖ Examples of effective ways to use administrative controls to manage biological hazards include:
- ❖ Comprehensive employee
- ✓ education and training to work safely around them
- ✓ Adequate supervision
- ✓ limiting exposure to potential biological safety hazards and



✓ **Monitoring** exposure

✓ **immunizations** providing immunization programs

✓ **Generous sick leave policies** (*to discourage sick employees from coming to work*)

❑ **Once administrative** and engineering controls have been implemented

❖ it is important to **REVISE** all the **safety strategy**

➤ at least **once a year** and

➤ **every time the workplace conditions change.**

❖ For some workplaces, the **changing** of the **seasons can** affect these controls so

❖ it is **important** to **Regularly Monitor The Biological Conditions** that the **employees are exposed to**

C. Personal Protective Equipment

Personal protective equipment (**PPE**)

- **is the last line** of defence against hazards
- though it plays a critical role.
- ❖ If the contact with biological hazards cannot be prevented
- the employees **must use personal protective equipment**
- and **adhere** strictly to the practice of **personal hygiene**.
- ❖ The **PPE** includes; *masks, gloves, protective clothing, eye shields, face shields & shoe covers*

A. Engineering Controls
B. Administrative Controls
C. Personal Protective Equipment



❑ Surgical masks

Surgical mask generally consists of three layers of non-woven غير المنسوجة fabrics.

- ❖ It provides a **barrier** protection against **large** respiratory droplets;
- ❖ **N95** or higher level respirators

This type of **N95** ,respirator **filters out particulates** and **liquid droplets in small particle size**, therefore providing protection from inhaling aerosols and microorganisms that are airborne.



Protective clothing

includes protective overall (with attached hood), gown, apron, head and shoe covers;

- Protective clothing should be **waterproof or impermeable** 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, thus reducing the chance of spreading of pathogen and cross-infection;

- Protective clothing is **disposable** in most cases

- though some can be **reused after sterilization**;

- Protective clothing **should fit the wearer** and **should not hamper** (obstruct) 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"** warning and label.

- **Seal** the bag and **place it in designated location** for special disposal





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.
- ❖ also **protect open wounds** from contamination by pathogen;
- ❖ Most gloves are **disposable after** use;



□ 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*
 - ❖ Both face shields and goggles/glasses should be
 - ❖ **cleaned with liquid soap** regularly.
 - ❖ If contaminated by blood, they should **be soaked in 1:49 diluted liquid bleach and then rinsed with clean water.**
 - ❖ **Place them in plastic bags** after wiping dry and store them in a cabinet;
 - ❖ **Check them regularly.**
 - ❖ **Replace them** if out of shape, cracked, scratched or fogged



❑ **Shoe covers** prevent pathogens **from being carried outside** the workplace;

- Shoe covers are usually **disposable** after use;
- **Boot covers offer** further protection.

*Cover the boots with the **trousers of protective** clothing to prevent contaminants from getting into the boots;*

- **Shoe covers** should be **water resistant** and **skid proof**

❖ **All personal protective equipment requires**

- **correct selection** and use, as well as
- **proper maintenance** and **storage**.

❖ **Re-useable protective equipment** should be

- **cleaned** and **sterilized** thoroughly before they are used again.

❖ **Damaged items** should be **replaced immediately**.



❑ 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** (building) and
- ✓ **thorough cleaning** of any **residual toxic** substances, to ensure that employees would not be harmed through exposure in the risk area
- ❖ There are many kinds of sterilizing and antiseptic agents
- ❖ Effective sterilization depends on the
- ❖ strain and **amount** of microorganisms, **properties** of the organisms
 - i. **level of organic material** present,
 - ii. **duration**,
 - iii. **temperature** and
 - iv. **concentration** of the sterilizing agent



Sterilization must be carried out by following strictly safety guidelines and taking personal protection to safeguard the health and safety of employees.

❑ 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

- ❖ Hands must be washed thoroughly after taking off any personal protective equipment

☐ Hazard Control Plan

- ❖ Employers should have a written plan to
 - identify,
 - control, and
 - manage the biological hazards present in their workplaces.
- ❖ The **plan** should be **easily accessible** to employees and
- ❖ Outline
- ❖ **what the hazards** are,
 - the **procedures** and **processes** that should be used to control or manage them, and
- ❖ **training** employees require.
- ❖ It should also clearly **articulate emergency** procedures in case of exposure.
- ❖ **biological hazard control plans** should be reviewed and
- ❖ updated regularly – **at least once per year**.

Thank You!

