

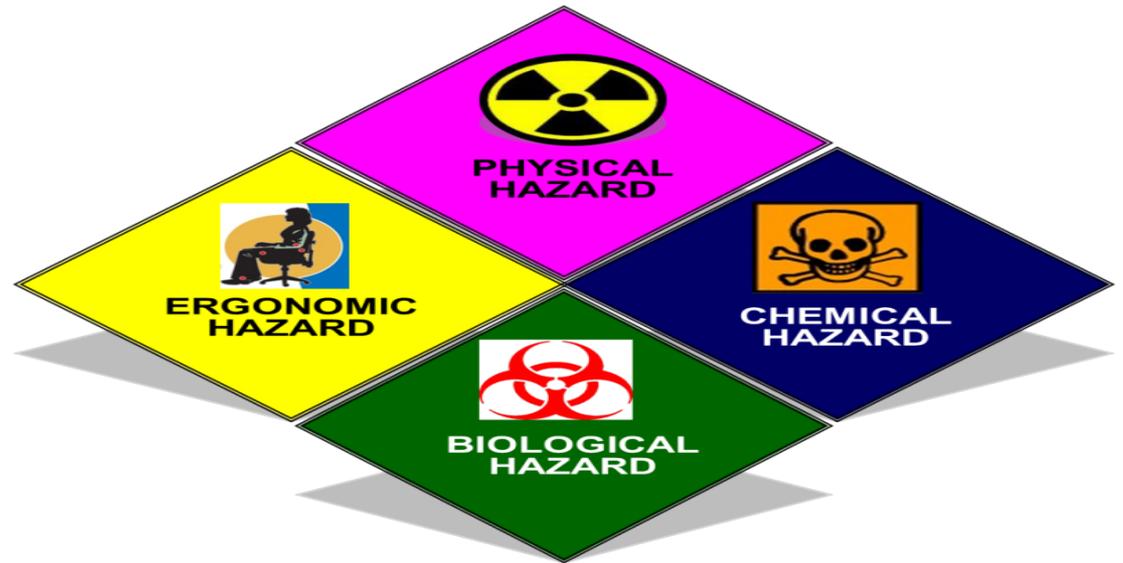
سَلَامٌ عَلَى الرَّحْمَنِ الرَّحِيمِ

OCCUPATIONAL HAZARDS

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



السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ



BIOLOGICAL HAZARD

(Biohazards)

LX

30th April 2025

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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.

- A **Defines Occupational Biohazards** 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.**”
 - ❖ **Two of the most common** (*and easily identifiable*) biohazards are
 - Blood and
 - Body fluids, including *saliva, mucous, urine, & faeces.*
 - ❖ **Other common biohazards include**
 - **Airborne** pathogens (*such as the common cold*),
 - **Wastewater**, and **sewage.**



❖ **Common biological hazards derived from the environment include**

mold and fungi, harmful plants, biting insects, and animal and bird droppings.

❑ **Three Major of routes of entry generally , there are;**

❖ **Respiratory system,**

❖ **Contact with **body fluids** of the infected or**

❖ **Contact with **contaminated objects**.**

❑ **The harmful effects posed to human health by these biological hazards are mainly of Three Types –**

❖ **Infections,**

❖ **Allergy and**

❖ **Poisoning.**



- ❑ **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](#) 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.

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**

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

- Workers in **contact** with **animal products**, including butchers, farmers, meat packers, and freight(_{cargo})handlers
- 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**¹, and **farm workers**

□ Classification of biological hazards at the workplace

❖ Biological hazards can be classified 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, haemorrhagic fever, leptospirosis, Newcastle disease, plague, psittacosis, Q fever*.
3. **Tick, flea, or mite bite**; *Murine typhus, plague, Scrub typhus*
4. Contact with **human or animal waste**; *HAV Leptospirosis, schistosomiasis, Echinococcosis*.
5. Contact with **infected patient or blood**; *AIDS, haemorrhagic fever, Ebola–Marburg virus infection, HBV, HCV, diphtheria, measles, meningococcus*. and
6. **Raising dust containing pathogens**; *leptospirosis Blastomycosis,*

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(look) 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 safely 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

A. Engineering Controls

B. Administrative Controls

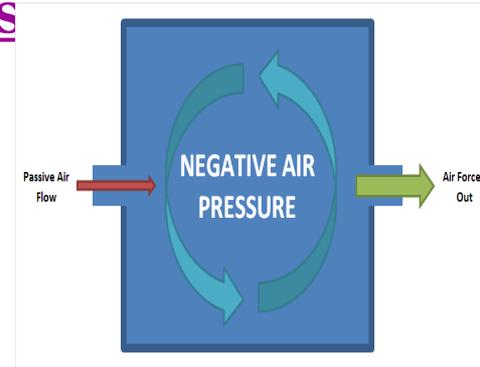
C. Personal Protective Equipment



A. Engineering Controls

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

- ❑ 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
- use of ultraviolet lamps can help contain the spread of
- contaminants



examples of effective options. Engineering Controls Cont. ..

- ✓ 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**.

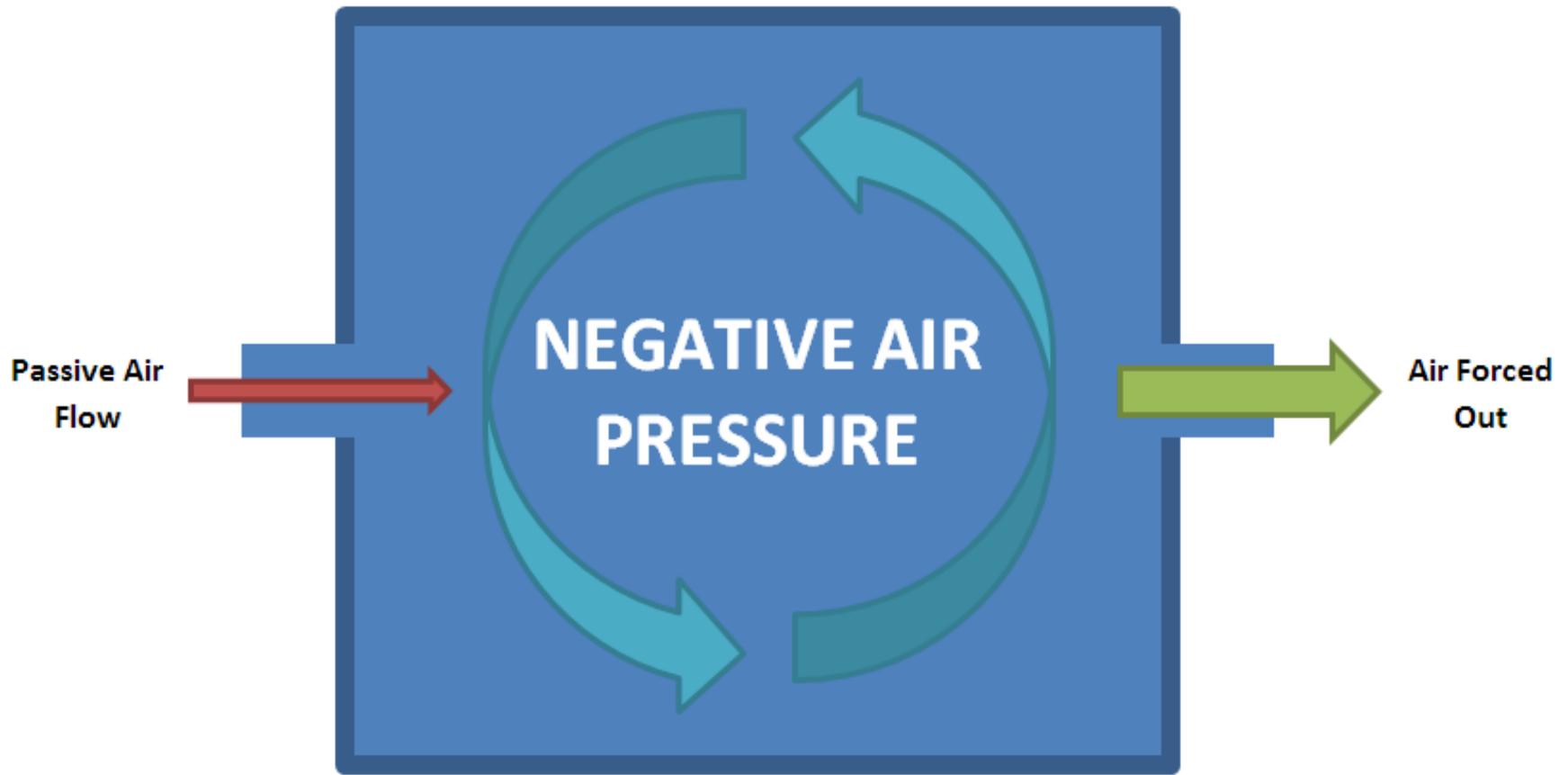
B. Administrative Controls

are the second line of defence.

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

- ❖ 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



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

❖ 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 and **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**



C. Personal Protective Equipment

Personal protective equipment (PPE)

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



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- **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 personal protective equipment includes **masks, gloves, protective clothing, eye shields,** face shields and shoe covers

- ❑ Common protective equipment includes:

- ❑ **Surgical masks** : Surgical mask generally consists of three layers of non-woven غير المنسوجة fabrics.



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- It provides a **barrier** protection against **large** respiratory droplets;

N95 or higher level respirators



❑ 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 coverall (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**

- ❖ **Can avoid infection** when touching the **eyes, mouth or nose**

- ❖ also **protect open wounds** from contact

- ❖ Most gloves are **disposable after** use;



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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 **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,

- the most common ones being
- ✓ liquid bleach and
- ✓ rubbing alcohol.



❑ Effective sterilization

depends on

- i. the strain and **amount** of microorganisms,
- ii. the **level of organic material** present,
- iii. the **properties** of the organisms to be eliminated, and
- iv. the **duration**,
- v. **temperature** and
- vi. **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!

