

Lecture: Occupational Health, Medical Surveillance, and Biosecurity

.Introduction

Occupational health, medical surveillance, and biosecurity are essential elements of a safe working environment—especially in laboratories, healthcare settings, agriculture, industry, and any field involving exposure to biological, chemical, or physical hazards.

This lecture explores their concepts, goals, regulatory frameworks, and practical implementation.

.Occupational Health

Occupational Health is a multidisciplinary field focused on:

Protecting workers from hazards in the workplace

Preventing work-related injuries and illnesses

Promoting physical, mental, and social well-being

Ensuring that work environments are safe and healthy

Key Objectives

Hazard Identification and Control

Biological hazards: pathogens, allergens

Chemical hazards: solvents, toxic agents

Physical hazards: noise, radiation, heat

Ergonomic hazards: repetitive tasks, poor workstation design

.Prevention of Occupational Injuries and Illnesses

Safety training

Engineering controls

Personal Protective Equipment (PPE)

Promotion of worker health and capacity

- Vaccination programs
- Mental health support
- Lifestyle and wellness initiatives

- Components of Occupational Health Programs
- Workplace hazard assessments
- Risk management
- Employee education and training
- Injury and illness reporting systems
- Emergency preparedness

Medical Surveillance

Medical surveillance is a systematic program of medical examinations and tests designed to detect early signs of work-related health problems.

It is **proactive**—aimed at identifying exposures and preventing disease before it becomes severe.

Why Medical Surveillance Matters

- Detects early signs of occupational illnesses
- Ensures workers are medically fit for specific job tasks
- Evaluates effectiveness of control measures
- Provides data to improve workplace safety policies

Types of Medical Surveillance

- Pre-placement (baseline) examination

Conducted before employment

Establish health baseline

Determine fitness for duty

Periodic examinations

Based on exposure risks

E.g., annual, semiannual

Post-exposure examinations

After accidental exposure to chemicals, biological agents, radiation

.Return-to-work assessments

After illness or injury

Common Medical Surveillance Tests

Respiratory function tests

Audiometry (hearing tests)

Blood lead levels

TB screening

Hepatitis B immunity testing (for healthcare workers)

Vision screening

Ethical Considerations

Confidentiality of medical records

Voluntary vs mandatory testing

Informed consent

Non-discrimination

.Biosecurity

Biosecurity refers to measures that prevent the loss, theft, misuse, or intentional release of biological agents and technologies that could harm humans, animals, plants, or the environment.

It is different from biosafety:

Biosafety = protection from accidental exposure

Biosecurity = protection from intentional misuse

Importance of Biosecurity

With increasing biotechnology capabilities—genetic engineering, synthetic biology—biosecurity ensures biological agents are stored, transported, and used safely and responsibly.

Elements of Biosecurity Programs

Secure storage of pathogens

Documentation of transfers

Restricted access

Access Control

Identification systems

Biometric access

Visitor management