Introduction to occupational medicine

Presented by: Dr. Izadi

Associate professor of Tehran University & Medical Sciences

- History
- Organization
- Hazard

History of Occupational Medicine Period: 1700-1713

Bernardino Ramazzini
the founder
of Occupational Medicine

- **Bernardino Ramazzini (1633-1714)**

  De Morbis Artificum Diatriba

  "Disease of Workers" (1700, 1713) outlined the health hazards of chemicals, dust, metals, and other abrasive agents encountered by workers in 52 occupations.

History of Occupational Medicine Period: 1925-1943

Alice Hamilton (1869-1970)

- "Industrial Poisons" in the United States (1925).
- "Industrial Toxicology" (1934).
- "Exploring the Dangerous Trades" (1943).

History of Occupational Medicine
OSH Act of 1970

Shortly after passage of the OSH Act:

- **Occupational Safety and Health Administration** (OSHA) as a separate agency within the U.S. Department of Labor to administer all aspects of the OSH Act, including standards development and standards enforcement.

History of Occupational Medicine
OSH Act of 1970

The act created the:

National Institute for Occupational Safety and Health (NIOSH) :

- To identify the causes of work-related diseases and injuries.
- To evaluate the hazards of new technologies and work practices.
- To study industrial hygiene and hazard control.
- To make recommendations for occupational safety and health standards.

Introduction to occupational medicine

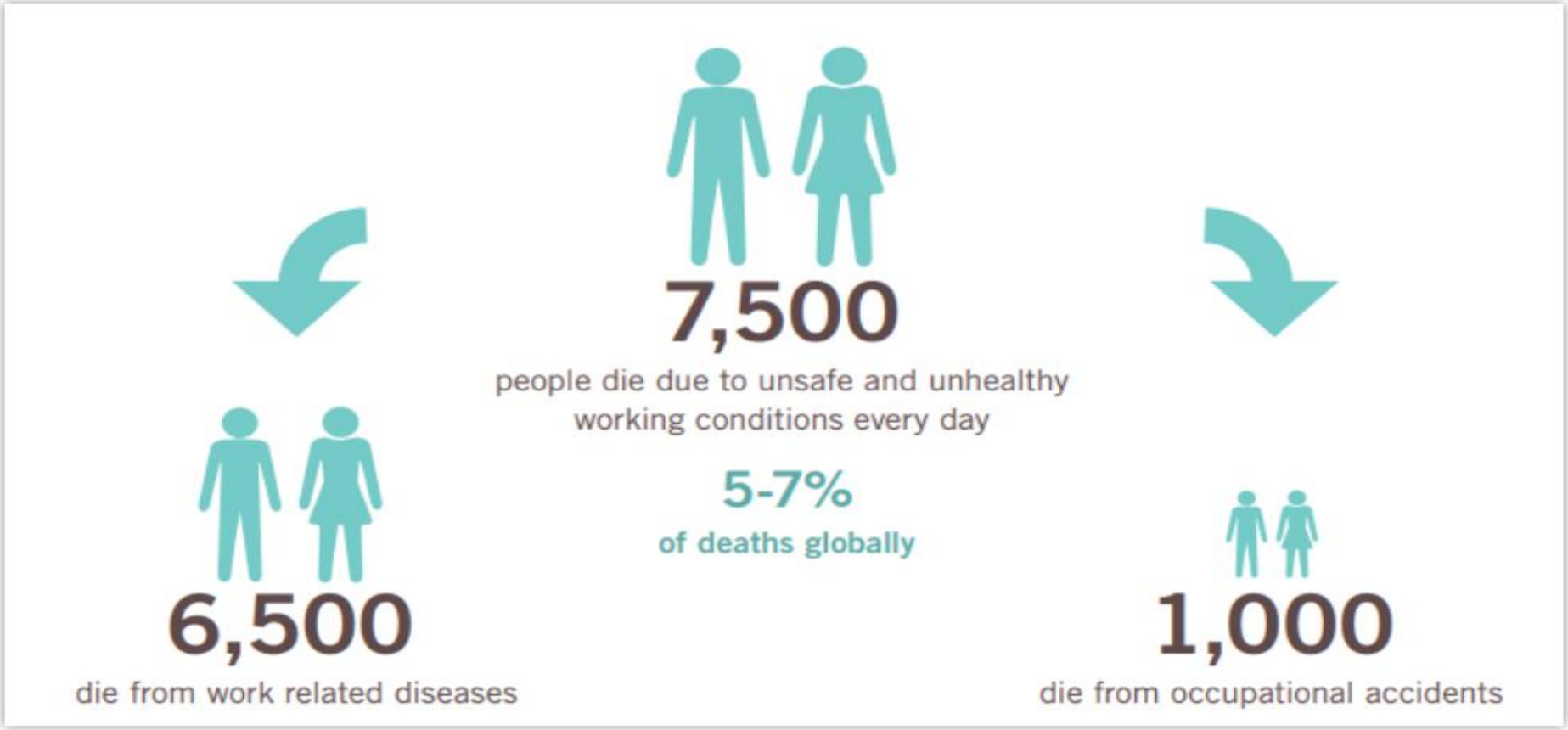
- Risks of work:
- Physical nature of the activities
- Natural &man made hazards

- Identify & modify the adverse effects of these hazards on the health of individuals

International Labor Organization(ILO)
World Day for safety and health at work. June, 2022

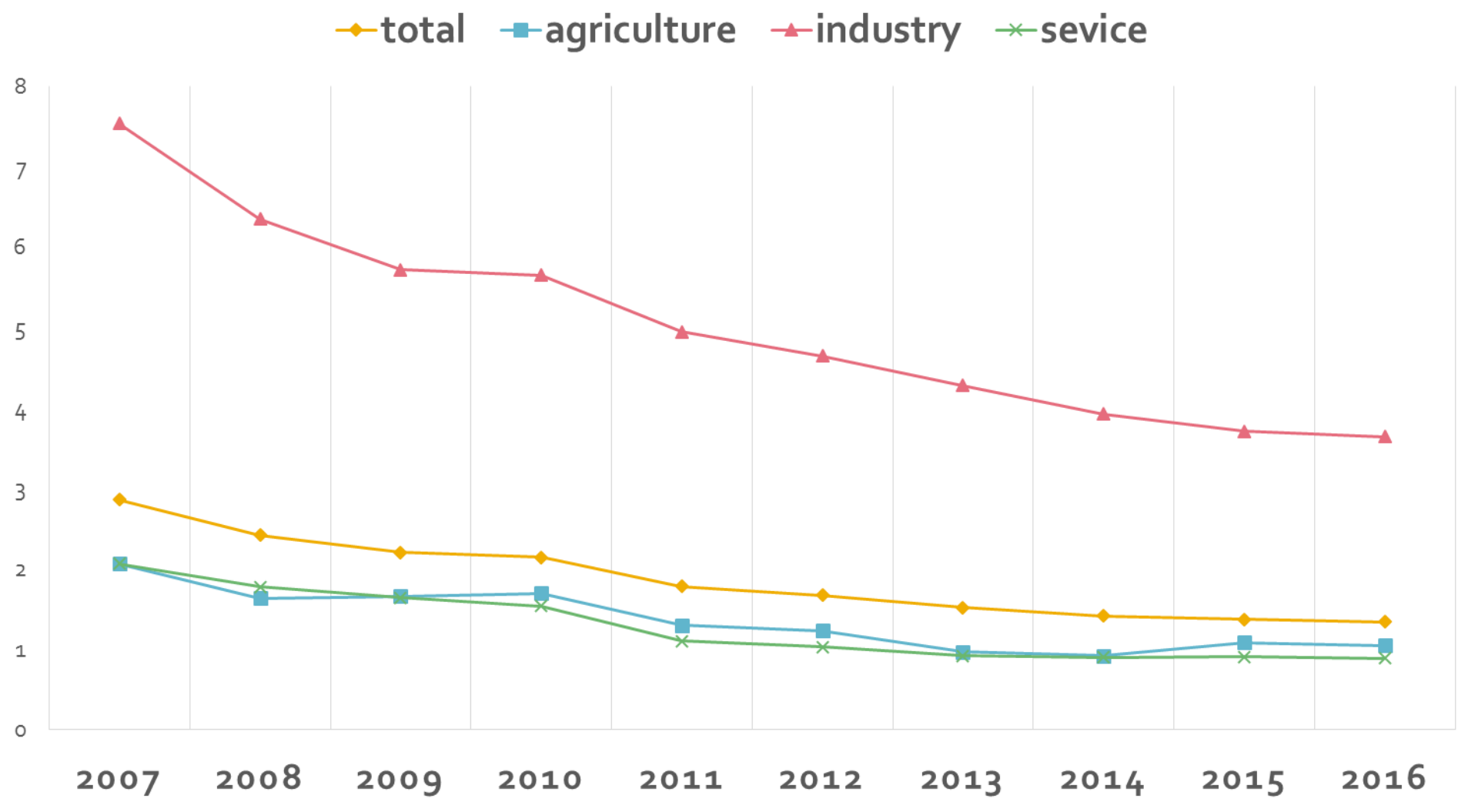
Increase in the number of deaths attributed to work:

2.33 million deaths (2014)..... 2.78 million deaths (2017)



Frequency of occupational accidents

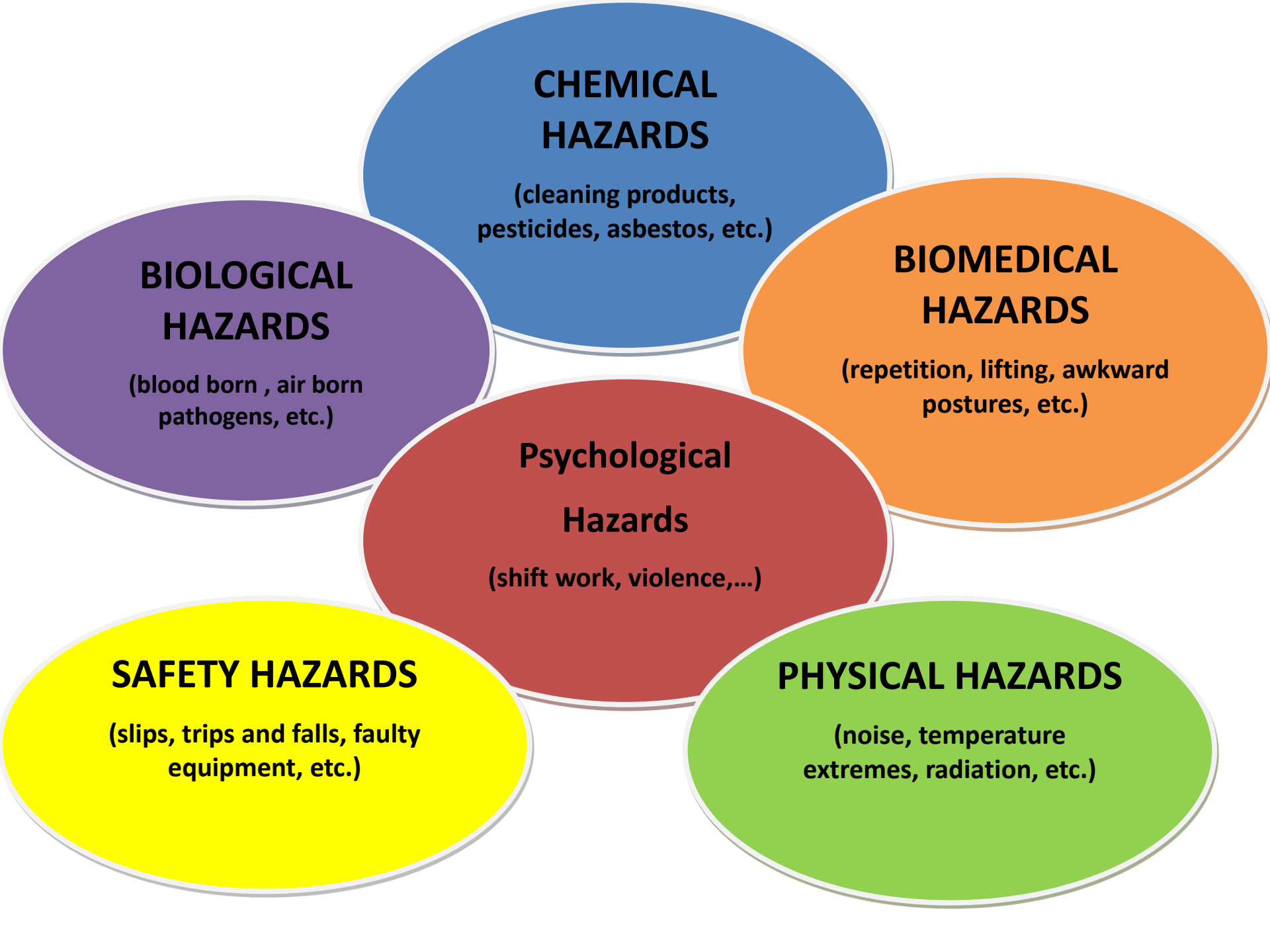
occupational incident rate 2007-2016



Majority categories of occupational illnesses by organ system

- Musculoskeletal disorders
- Respiratory disorders
- Neurologic & psychiatric disorders
- Skin disorders
- Reproductive disorders
- Cardiovascular disorders
- Hematologic disorders
- Hepatic disorders
- Renal disorders

Occupational hazards


CHEMICAL HAZARDS
(cleaning products, pesticides, asbestos, etc.)
BIOLOGICAL HAZARDS
(blood born , air born pathogens, etc.)
BIOMEDICAL HAZARDS
(repetition, lifting, awkward postures, etc.)
Psychological Hazards
(shift work, violence,…)
SAFETY HAZARDS
(slips, trips and falls, faulty equipment, etc.)
PHYSICAL HAZARDS
(noise, temperature extremes, radiation, etc.)

Principles of Occupational Disease

- ***The clinical and pathologic expression of most occupational diseases are indistinguishable from those of non occupational origin***.

- Occupational cancers?
- Asthma, dermatitis?

Principles of Occupational Disease

- ***Many diseases of occupational origin are multifactorial, with non-occupational factors playing a contributing role.***

- Coronary artery disease
- Lung cancer (asbestos, smoke)
- Hepatocellular disease (alcohol, hepatotoxin)

Principles of Occupational Disease

- ***The effects of occupational exposures occur after a biologically predictable latent interval following exposure.***

- Agents or chemicals cause direct & acute injury.
- substances initiate insidious disease processes.

Principles of Occupational Disease

- ***The dose of an exposure to a noxious agent is the strongest predictor of the likelihood and type of effect.***

- Direct acting toxins

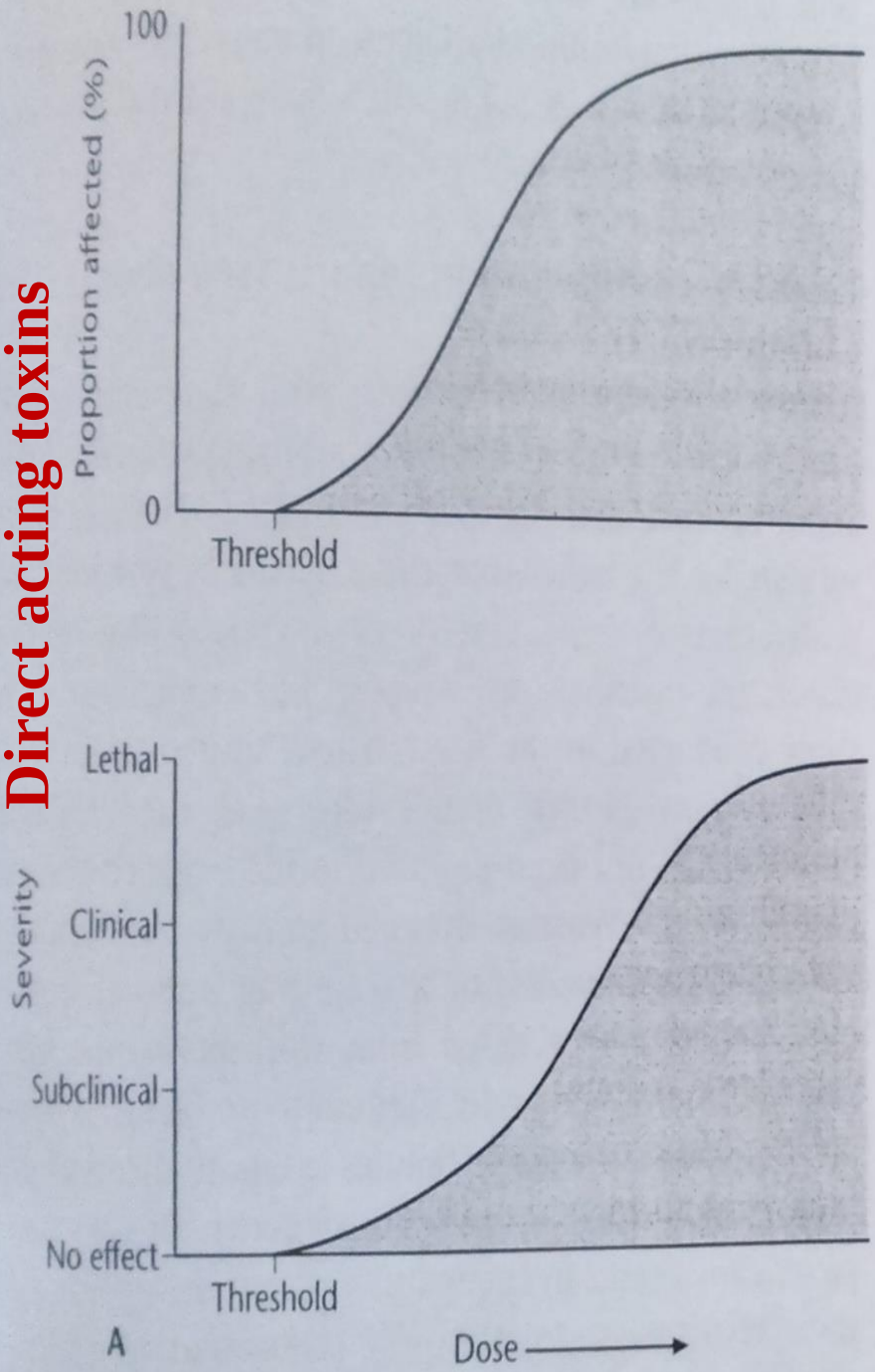
(dose-response dose-effect relationship)

- Indirect acting toxins

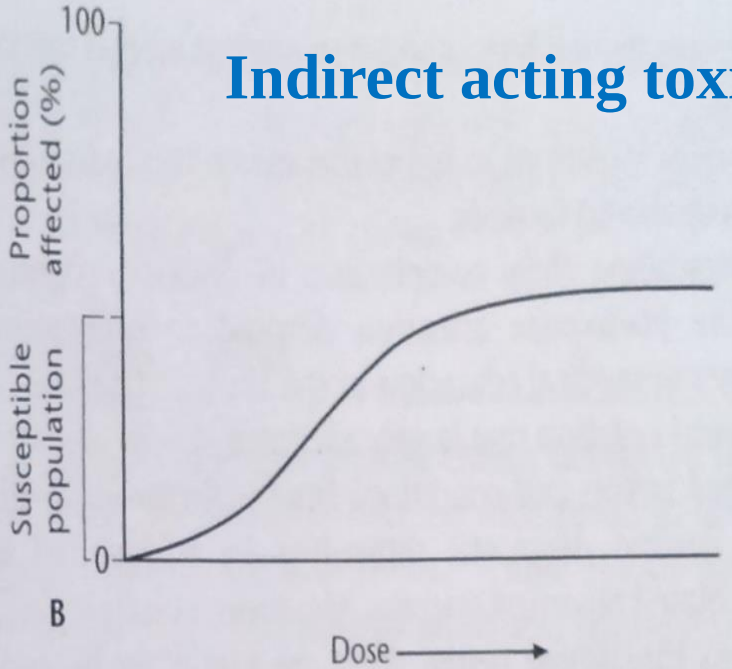
immunologic or hypersensitivity response
(asthma, dermatitis)

- Carcinogens

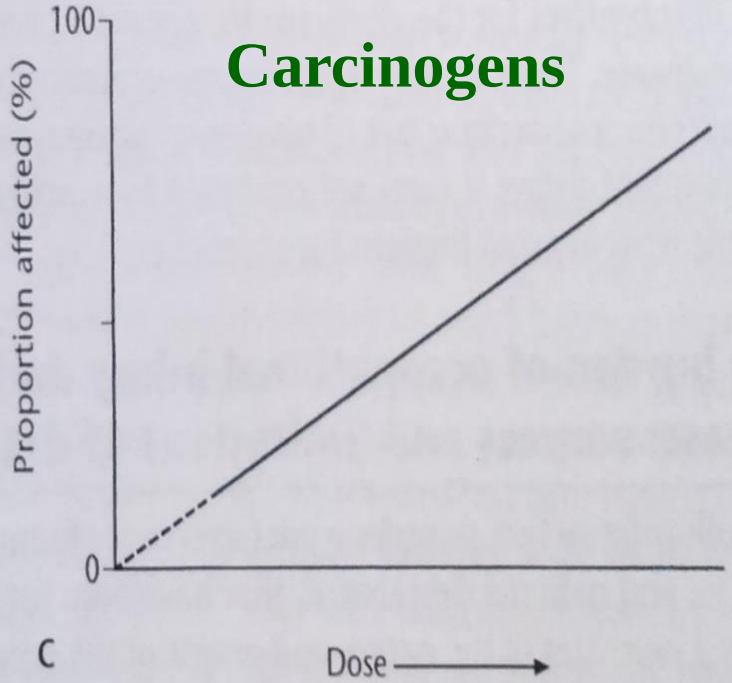
Direct acting toxins



Indirect acting toxins



Carcinogens



Principles of Occupational Disease

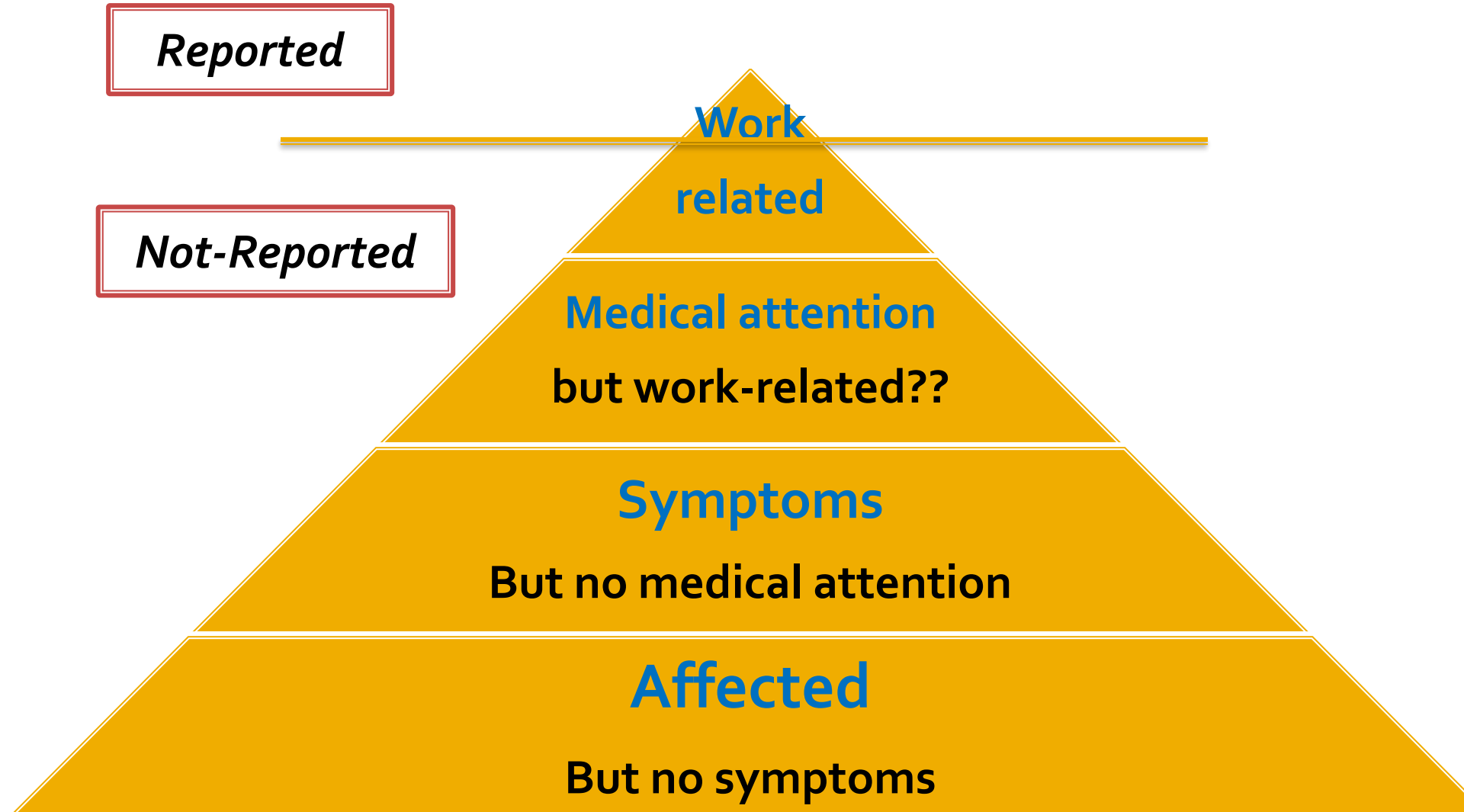
- ***People differ substantially in their responses to noxious exposures.***

- Genetic differences in metabolism
- Age, gender or size
- Coexisting morbid conditions
- Co-exposures to environmental substances
- Complex behavioral factors

Under recognition of occupational diseases

- Inadequate knowledge
- Latency of chronic disease
- Multifactorial causation
- Individual susceptibility
- The absence of pathognomonic findings

The iceberg of occupational diseases



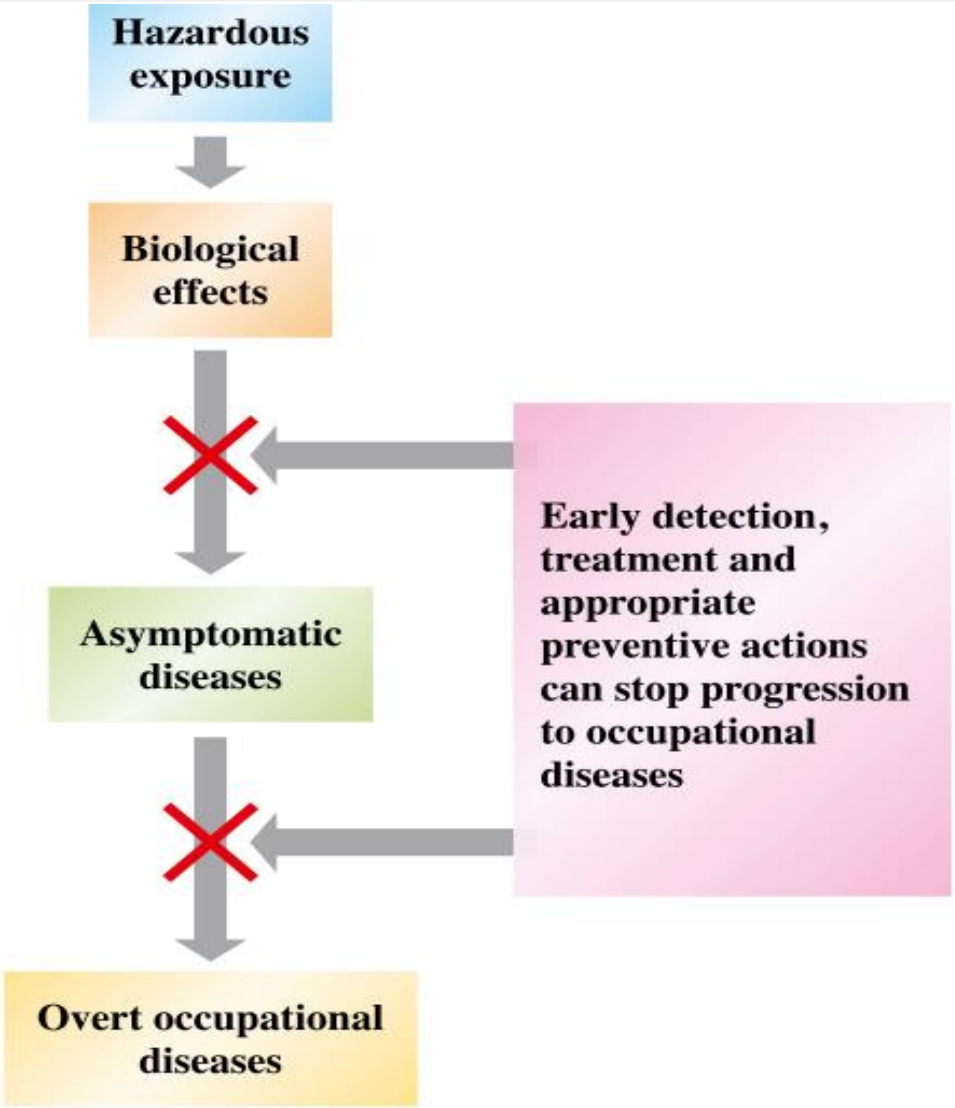
Health surveillance

- monitoring the health status of persons to determine departures from normal health

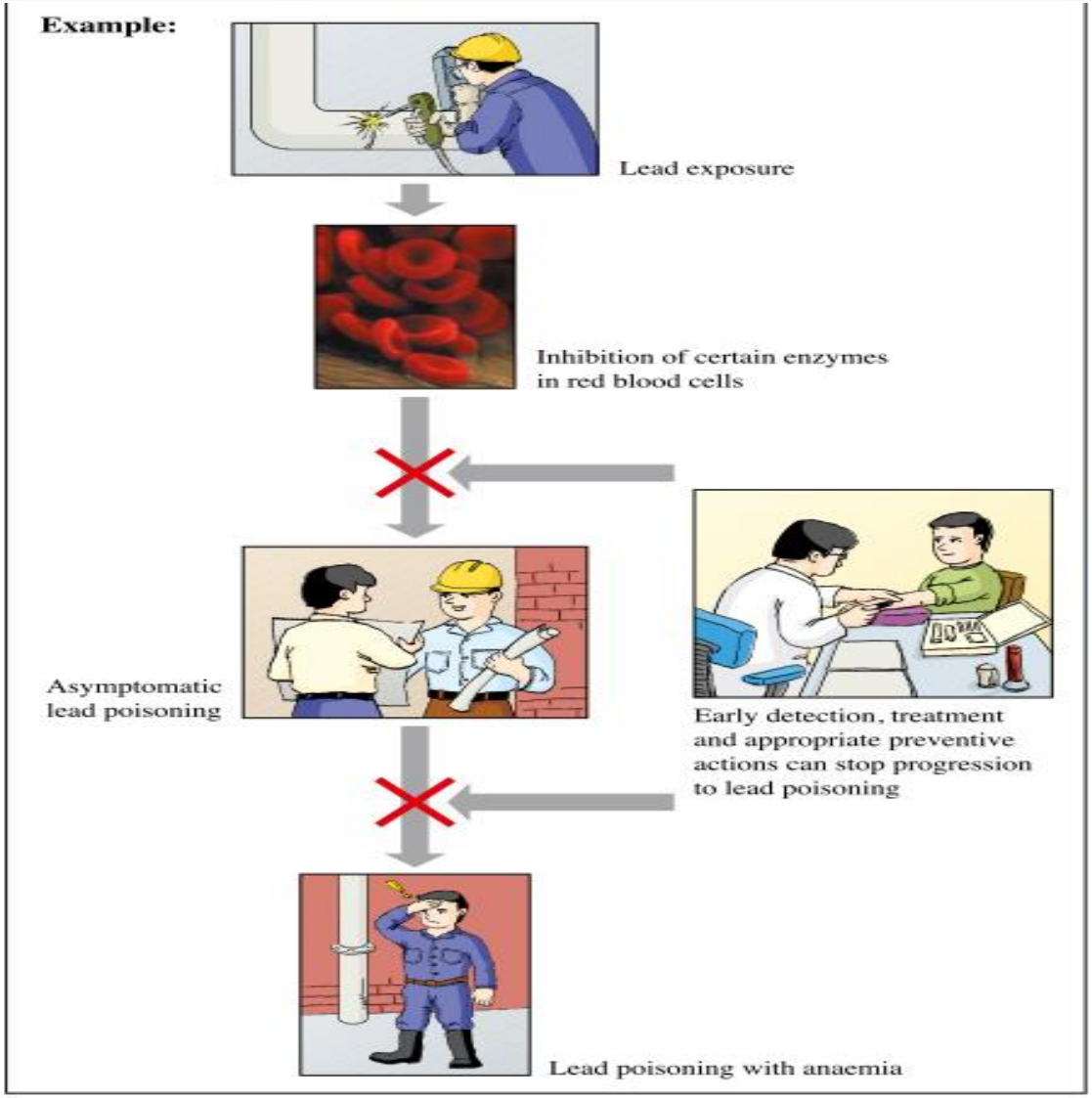
- Identify:
- potential problem areas
- effectiveness of existing preventive strategies

Medical examination

Objectives of Medical Examinations



Example


Example:
Lead exposure
Inhibition of certain enzymes in red blood cells
Asymptomatic lead poisoning
Early detection, treatment and appropriate preventive actions can stop progression to lead poisoning
Lead poisoning with anaemia

Objectives of Medical Examinations

- Effectiveness of existing preventive strategies:
- index cases of over-exposure
- early diseases in medical examinations

- protect other workers from being affected by the health hazards.

Objectives of Medical Examinations

- Medical examination is a good opportunity for doctors to educate workers of the health risks of exposure to specific hazards.

- Advice about necessary preventive measures to minimize the risks of occupational diseases.

Pre-employment Medical Examinations

- To provide base-line health data
- To ensure medical fitness for work

Periodic Medical Examinations

- Detect susceptible workers for whom corrective actions are required before they develop overt occupational diseases.
- The frequency of periodic medical examinations depends on the nature of the occupational hazards.

Other examinatins

- Return to work
- Work related disease
- Off work

Medical Examination Requirements

- Detailed occupational & medical history
- Physical examination
- Laboratory & radiological investigation
- Lung function test
- Audiometric test

Results of Medical Examinations

1. He is medically **fit for working** in particular occupation.

2. He is medically fit for working in particular occupation but need to take certain **protective measures.**

3. He should refrain from working in the particular occupation **temporarily.**

4. He should refrain from working in the particular occupation **permanently.**

PREVENTION IS BETTER THAN CURE!

Levels of Prevention

- Primary Prevention
- Secondary Prevention
- Tertiary Prevention

Industrial or Occupational Hygiene

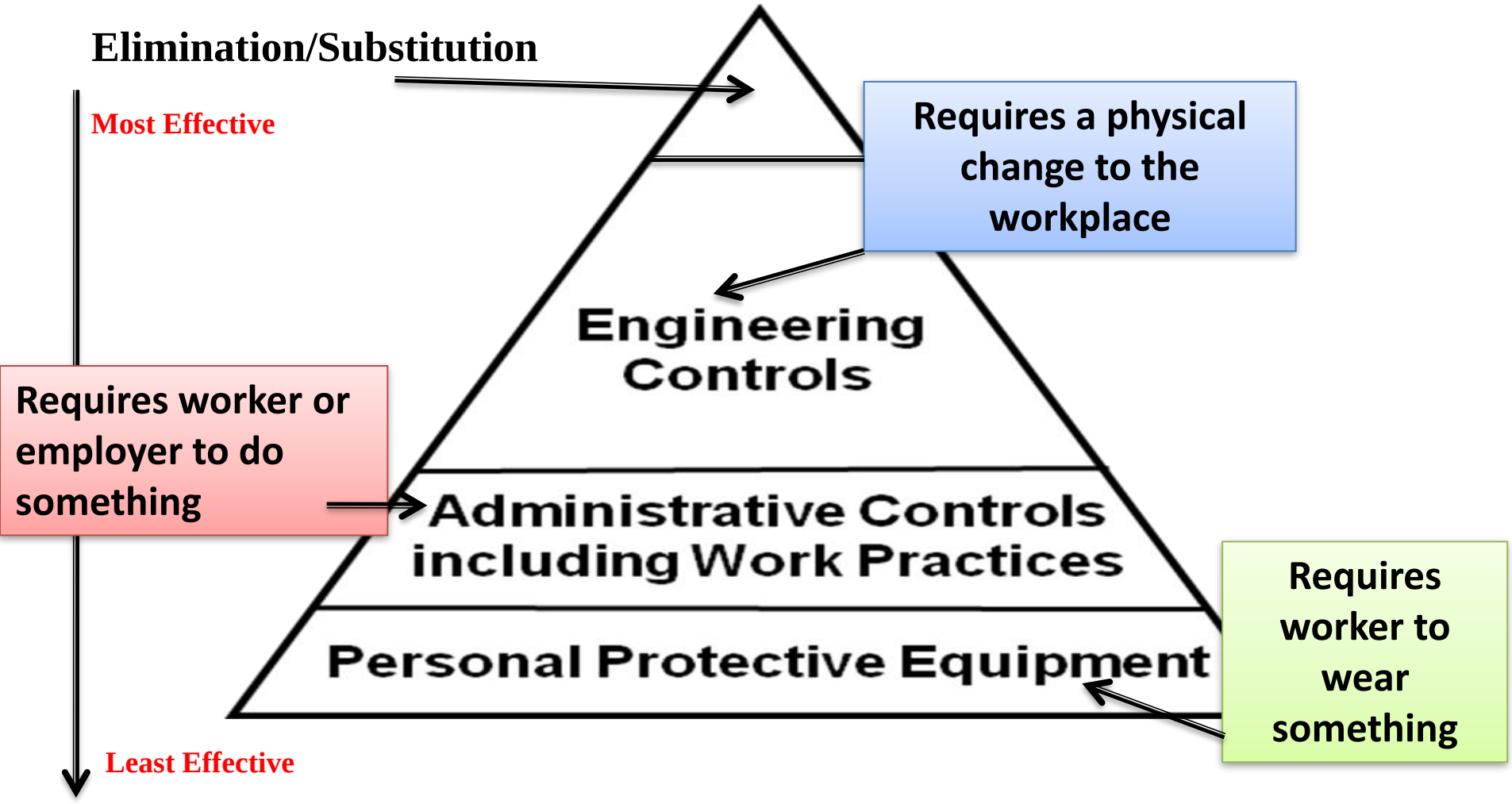
INSPECTIONS

O.M	O.H
Worker	Workplace

- **Recognition**
- **Evaluation**
- **Control**

Of Health Hazards arising in or from the Workplace

Primary prevention



CONTROL

- *Elimination*- the ultimate form of control. (process, substance, activity)

- Examples:
  - Combustible to non-combustible material
  - Eliminate material handling
  - Remove sharp edges, protruding objects

CONTROL

- *Substitution*- Can we substitute a chemical or activity for a less hazardous one?

- Ask a series of "Can We" questions:

Have a toxic substance supplied in a different form?

Have a toxic substance supplied in a lower concentration? (59% vs 85%)

Engineering control

CONTROL AT THE SOURCE!
Limits the hazard but doesn't entirely remove it.

Proper equipment

Other Examples:
Mechanical Guards
Wet Methods for Dust
Enclosures/Isolation
Dilution Ventilation

Re-designed Tools

Local Exhaust

Administrative controls

Aimed at **Reducing Employee Exposure** to Hazards but Not Removing Them!

- Changes in work procedures such as:
  - Written safety policies/rules
  - Schedule changes, such as:
    - Lengthened or Additional Rest Breaks
    - Job Rotation
    - Adjusting the Work Pace
- Training with the goal of reducing the duration, frequency and severity of exposure to hazards

Secondary Prevention

- Screening for Occupational Disease Under the OSHA Standards.
- Screening at-risk Workers who are not Covered by Standard-mandated Examination.

Tertiary Prevention

- Prevent Disability
- Prevent Further Progression

CONTROLS, continued..

- *Personal Protective Equipment:*

- Only effective when all other options are not satisfactory or practical.

- Or in normally hazardous operations such as welding, spraying or confined space.

- Or in emergency situations or confined space entry when hazards are unknown.

Personal Protective Equipment

Control of LAST RESORT!

- Special Clothing
- Eye Protection
- Hearing Protection
- Respiratory Protection

CONTROL IS AT THE WORKER!

PPE, Continued

- We shouldn't confuse the role of PPE as a control measure.

" PPE is the Last Line of Defense"

SUMMARY

1. Recognize that a hazard exists.
2. Make an objective or scientific evaluation.
   (do we need to control it)
3. Implement a control strategy:
   a. Elimination
   b. Substitution
   c. Administration

THE END