

# Occupational Health

# Definition

## Joint ILO\WHO comm. on OH- 1950

- Health of the workers in all occupation having aim of:
  - Promotion & maintenance of highest degree of physical, mental & social wellbeing.
  - Prevention of departures from health caused by working in their employment from risk
  - Placing maintenance of workers in an occupational environment adopted to his physiological & psychological equipment...

Adoption of work to man & of each  
man to his job

# Ergonomics

- Greek Ergon- Work

Nomos: Law/rule

-fitting the job to worker or fitting the machine to the user

Objective:-

To achieve the optimum mutual adjustment of man & his work, for the improvement of human efficiency & wellbeing.

# Importance

The application of ergonomics has made a significant contribution to reducing industrial accidents & to overall health & efficiency of worker.

- This mutual adaptation

Decrease stress

Lighten the work load

Increase safety awareness

Decrease industrial accidents

This improve the reliability of both man &  
machine

# Subjects included in OH

- Industrial Hygiene
- Industrial Disease
- Industrial Accidents
- Industrial Rehabilitation
- Toxicology
- Occupational Psychology
- Occupational health in agriculture
- Ergonomics

# Occupational Hazards

- Unique to work place
- Have a complex mechanism
- Consistent with nature of work
- Affects the economic status
- Direct cost
- Indirect cost
- Has effects on worker, his family & genetic constitution.



- The occupational diseases results in loss of earning capacity of the workers. This loss varies according to the occupational diseases contracted by the worker. The severity of the disease may result in permanent disability to the worker.

# Classification Of Occupational Hazards

- A) Occupational Injuries following accidents**
- B) Occupational Diseases**

# Occupational Injuries following accidents

- Common Place occurrence
- Attract immediate attention
- Immediate cause effect relationship
- Entitles compensation
- Useful for work modification

# Occupational Disease

“A disease contracted as a result of an exposure to risk factors arising from work activity.”

defined by ILO Code of Practice on  
Recording and Notification of Occupational  
Accidents and Diseases

# Occupational Disease

- Under Section 89 of the Factories Act 1948 where any worker in a factory contracts any diseases specified in the Third schedule (Annexure-I), the manager of the factory shall send a notice thereof to such authorities and in such form and within such time as may be prescribed.
- Also any medical practitioner attending on a person who is or has been employed in a factory and is suffering from diseases specified in the Third Schedule shall without delay send a report in writing to the office of the Chief Inspector of Factories.

## **B) Occupational Diseases**

- Arise comparatively late
- Primarily concerned with individual
- Cause effect relationship- difficult
- Frequent change of job makes Cause effect relationship still difficult
- All those exposed do not get disease
- Efforts for prevention- less appreciated

# Need For Occupational History

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1. Effects of work on health
2. Effects of health on work



# Criteria For Diagnosing Occupational Diseases

1. The Effect-

S\s must fit with Occupational disease

2. The exposure–Intensity & Duration

3. Time sequence-

# Time sequence

- Consideration of latent period between exposure & effect
- Exposure to the agent must precede the occurrence of clinical effects specific for that agent

# Time sequence

## Latent period

- Years- occupational cancers
- Weeks/Months- occupational asthma, contact dermatitis
- Hours/ days- Gas- phosgene, nitrogen
- Immediate- Gases– Hydrogen cyanide, SO<sub>2</sub>, Ammonia, Chlorine

# Host Factors

# Host Factors

- Habits– Smoking, Alcohol...
- Use of Personal Protective measures
- Contract workers
- Migrant\ Illegal workers
- Methods of handling

# Type of work

- Heavy manual work

Increase intake of respiratory contaminant

-Can increase resting minute volume of  
6lit/min by more than 10 fold

# Medico legal problem

1. Occupational disease if diagnose as non occupational disease
2. Non occupational disease if diagnose as occupational disease



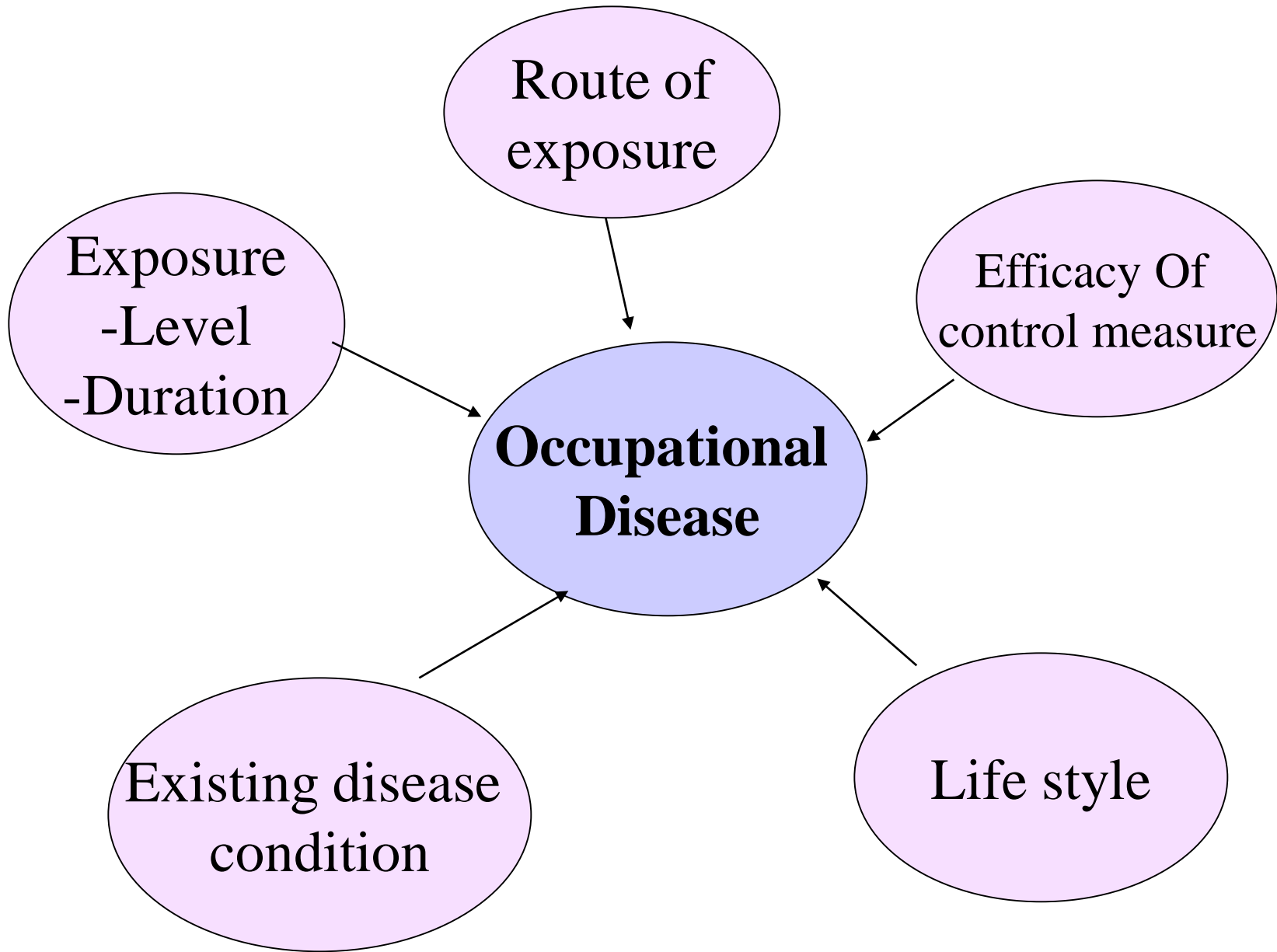
- Workman compensation act
- Mine act
- Indian factory act
- Employees State Insurance Corporation (ESIC) Act 1948.

# **Fitness for work-**

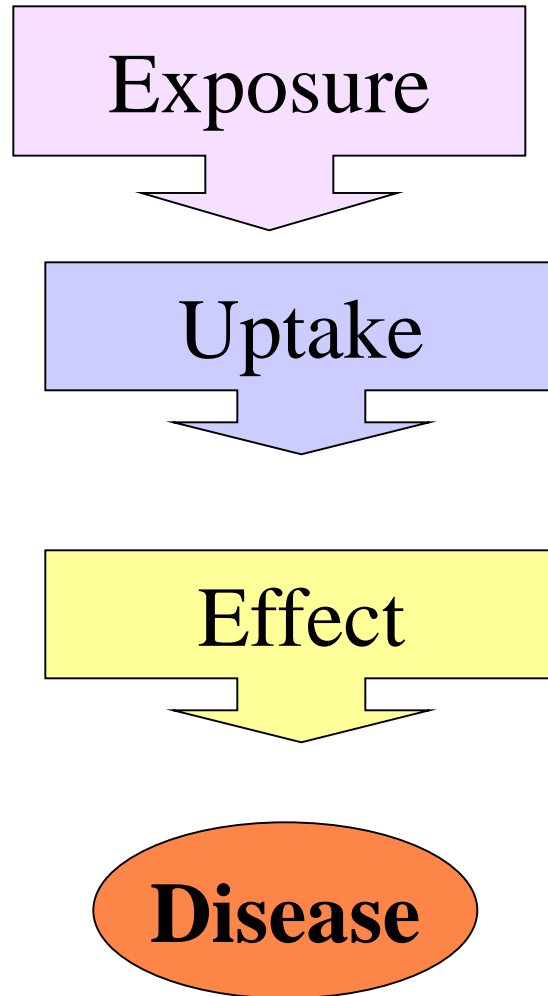
-Pre-placement examination

-After sickness

Aim- to make sure that individual is fit to perform the task effectively without risk to his own/ others.



# Role of laboratory techniques



# Occupational Hazards

1. Physical Hazards
2. Chemical hazards
3. Biological hazards
4. Mechanical hazards
5. Psychological hazards

# Physical Hazards

- Heat & cold
- Light
- Noise
- Vibration
- Ultraviolet Radiation
- Ionizing Radiation

# Chemical Hazards

# Route of exposure

- Local action
- Ingestion
- Inhalation



# Local action

- Primary contact irritant- Insecticide, alkali

# Ingestion

- Lead, mercury....
- Swallowed in a minute amount through contaminated hands, food & cigarrate

# Inhalation

1. Dusts
2. Gases
3. Metals & other compounds

# Dusts

- It is finally divided solid particles with the size ranging from 0.1 to 150 microns. They are released into environment during the process of crushing, grinding, abrading, loading, unloading operations.
- Industry:- mine, foundry quarry, pottery, textile, wood or stone working industry

# PNEUMOCONIOSIS

It is a lung disease caused by inhalation of dust within the size range of 0.5 to 3 micron, as result of occupational exposure

Many substances can cause pneumoconiosis including asbestos, talc, kaolinite and other metal compounds.

# PNEUMOCONIOSIS

- It gradually cripple a man by reducing working capacity due to lung fibrosis & other complications

# *Classification*

- **ICD-10 J60.-J65.**
- The term "pneumonoultramicroscopicsilicovolcanoconiosis" was coined in 1935 as the putative longest word in the English language, but means exactly the same as pneumoconiosis.

# Factors affecting Pneumoconiosis

- **Agent**
- **Host**
- **Environment**



# Agent= Dust

- Type
- Chemical composition-Ability to produce fibrosis
- Size (Fineness)

# Dusts Types

- Organic & Inorganic
- Soluble & insoluble

# Organic & inorganic Dust

- **Organic dust exposure** - Cotton, Jute, Cane fibre
- **Inorganic dust exposure** - Silica, mica, coal

## Soluble & insoluble:-

- **Soluble** dust dissolves slowly, enter the systemic circulation & eliminated by body metabolism
- **Insoluble** dust remains permanently in lung & cause pneumoconiosis.
- E.g. Silica- Silicosis, Asbestos-Asbestosis

# Chemical composition

## Ability to produce fibrosis-

- The most important pathogenic feature of inhaled dusts
- The small amounts of silica or asbestos may produce extensive fibrosis, but coal and iron are weakly fibrogenic.

# Size of dust particle:

They are often irregular.

- Size is expressed by aerodynamic particle diameter, a parameter that describes the way the particle moves in air.
- The aerodynamic particle diameter determines where the inhaled dusts deposit in the lung, the most dangerous being those that reach the peripheral part of the lung, the smallest bronchioles and the acini.
- -

# Size of dust particle:

- The dust particles larger than 10 micron settle down from air rapidly, if inhaled they are filtered by the nasopharynx and never reach the lower respiratory tract.
- -The particles smaller than 5 micron remain suspended in the air, directly inhaled into the lungs & are retained there. This fraction of dust is called **respirable dust**, which is mainly responsible for pneumoconiosis.
- The particles smaller than 2 micron terminate in the acinus, the minute ones behave as a gas and are exhaled.

## Size of dust particle:

- Most particles 2 micron to 10 micron in diameter deposit on the bronchi and bronchioles and are removed by the mucociliary apparatus.
- The alveolar macrophages (constitute the primary defence mechanism of the alveolar space), which ingest the inhaled particles through phagocytosis,



- Most of these particles ascend to the mucociliary area and are expectorated or swallowed.
- Others migrate into the interstitium of the lung and then into the lymphatics.

- Other particles are not phagocytosed but enter epithelial cells and migrate through them, presumably passively, into the interstitium.

# Factors affecting Pneumoconiosis

- **Agent**
- **Host-**
- **Environment-**

Actual concentration of dust/cmm air

Ventilation, over crowding,

# PATHOLOGY

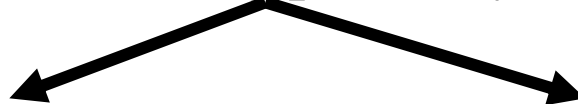
- Dust inhalation (The particle size 3-5 microns )



phagocytosed by macrophages



toxic or immune reactions  
of the lung parenchyma



Acute condition

filling of the alveoli by fluid

**-Emphysema**

Chronic reaction

**-pulmonary fibrosis**

- Cellular mediators:-A large number of cellular mediators such as cytokines, antioxidants and growth factors have been implicated in the pathogenesis of chronic inflammatory and fibrotic diseases.

# Immunology:-

- Several inorganic dust like asbestos or silica disrupts regulation of fibroblast proliferation by macrophage results in pulmonary fibrosis