Pneumoconiosis

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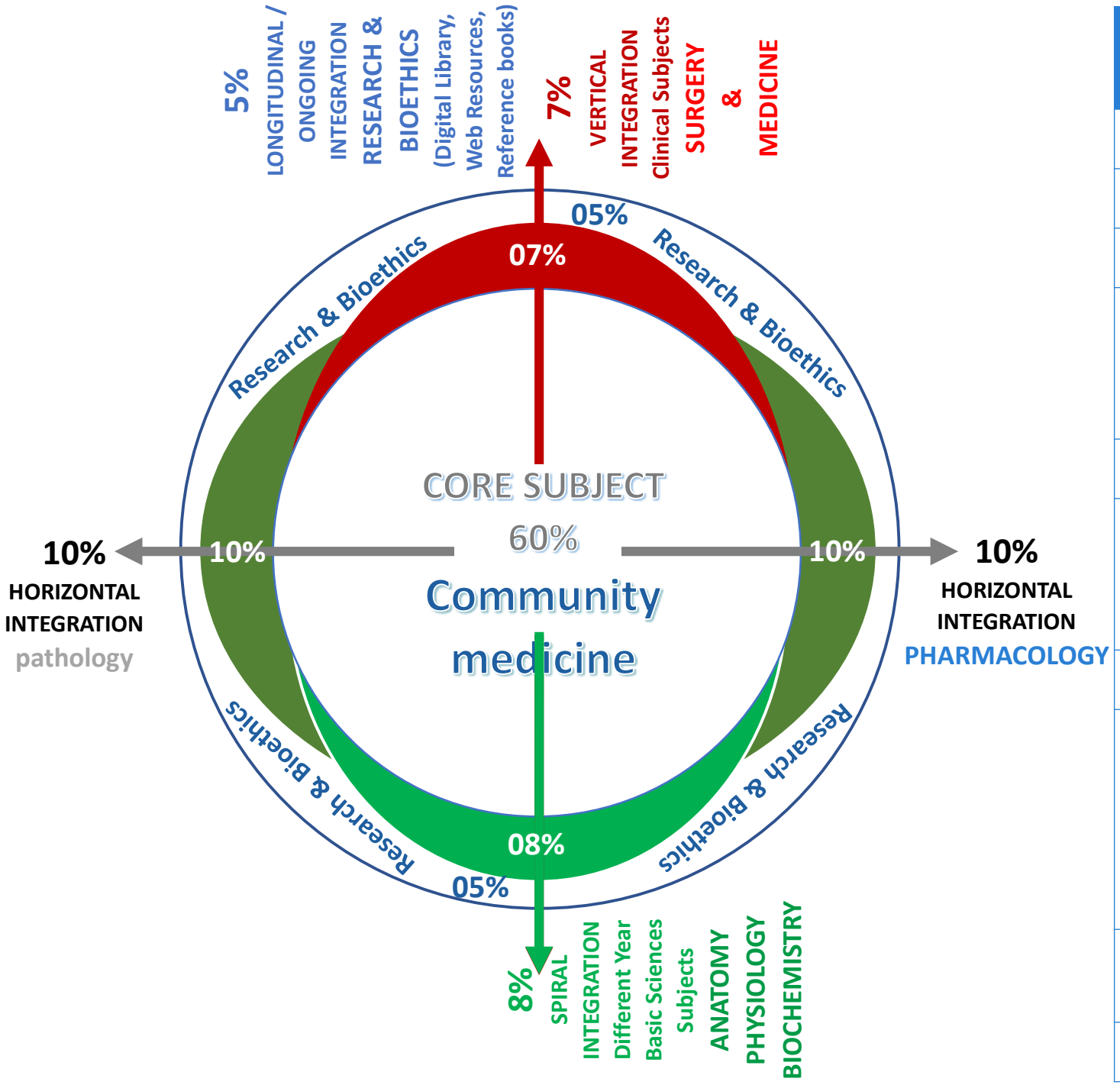
Vision & Mission of RMU

Vision

Highly recognized and accredited center of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.



4th Year community medicine LGIS (≈30 slides)	
Core Subject – 60% (≈ 18-20 slides)	
Community medicine (≈ 18-20 slides)	
Horizontal Integration – 20% (≈ 5-6 slides)	
Same Year Subjects	• Pharmacology (10%) (≈ 2-3 slides) • Pathology (10%) (≈ 2-3 slides)
Vertical Integration – 07% (≈ 2-3 slides)	
Clinical Subjects	• Medicine (3-5%) (≈ 1-2 slides) • Surgery (3-5%) (≈ 1-2 slides)
Spiral Integration – 08% (≈ 2-3 slides)	
Different Year Basic Sciences Subjects	• Anatomy (1-3%) (≈ 1-2 slides) • Physiology (1-3%) (≈ 1-2 slides) • Biochemistry (1-3%) (≈ 1-2 slides)
Longitudinal / Ongoing Integration – 05% (≈ 1-2 slides)	
Research & Bioethics (≈ 1-2 slides)	

Learning outcomes

At the end of session students should be able to:

1. Define Pneumoconiosis
2. Enumerate important diseases grouped under pneumoconiosis
3. Recommend occupation , clinical features of Silicosis, Asbestosis, anthracosis, byssinosis

Sequence of Lecture

Learning Objectives	(1 slide)
Core Subject	(10 slides)
Vertical integration+ horizontal integration (5 slide) (2 slide)	
Bioethics +artificial intelligence +research (1 slide) (1 slide) (1 slide)	
End of lecture assessment	(1 slide)

Pneumoconiosis

Core Concept

group of fibrotic lung diseases which result from inhalation of Dust.

- **Chemical composition (Organic / Inorganic)**
- **Fineness or Size**
- **Concentration in air**
- **Period of exposure**
- **Health status of the person exposed**

As there is no known cure to Pneumoconiosis , hence prevention has high significance

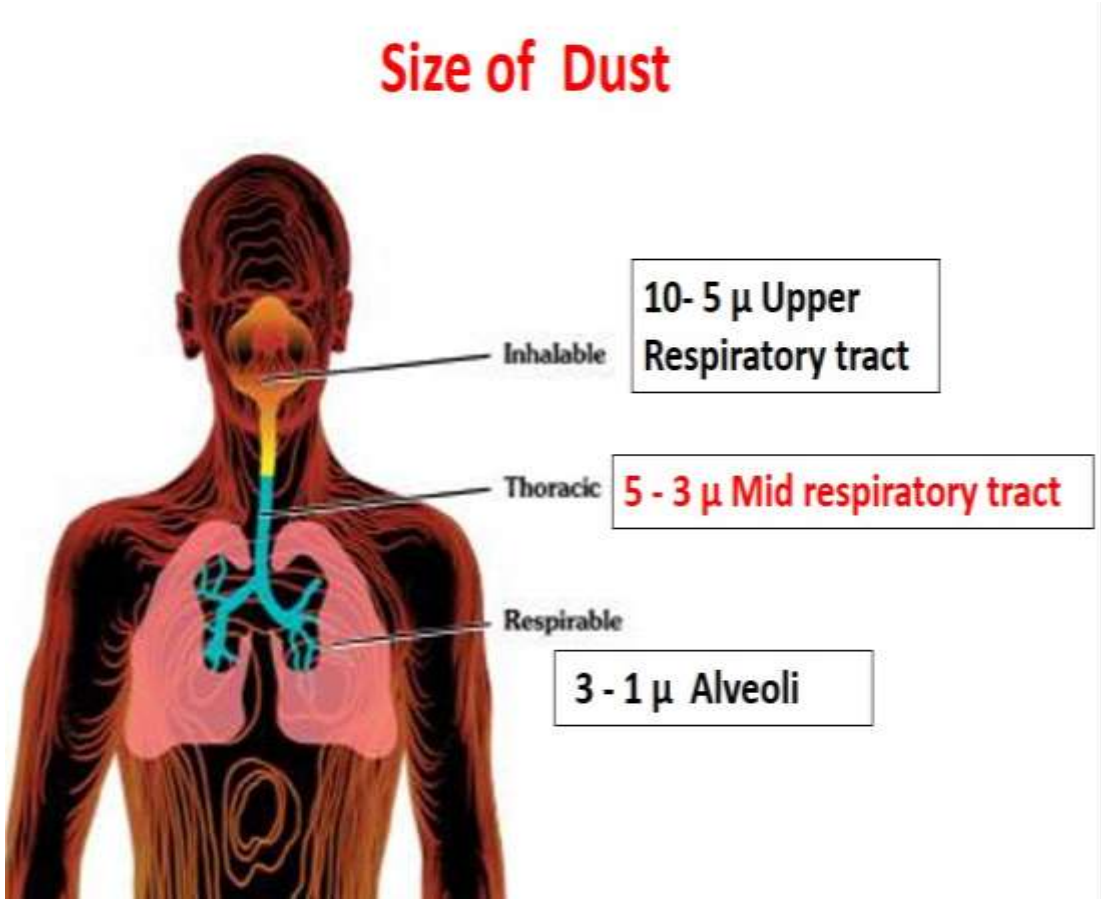
Pneumoconiosis (contd.)

Core Concept

Dust particle >10 µ settle down on earth rapidly

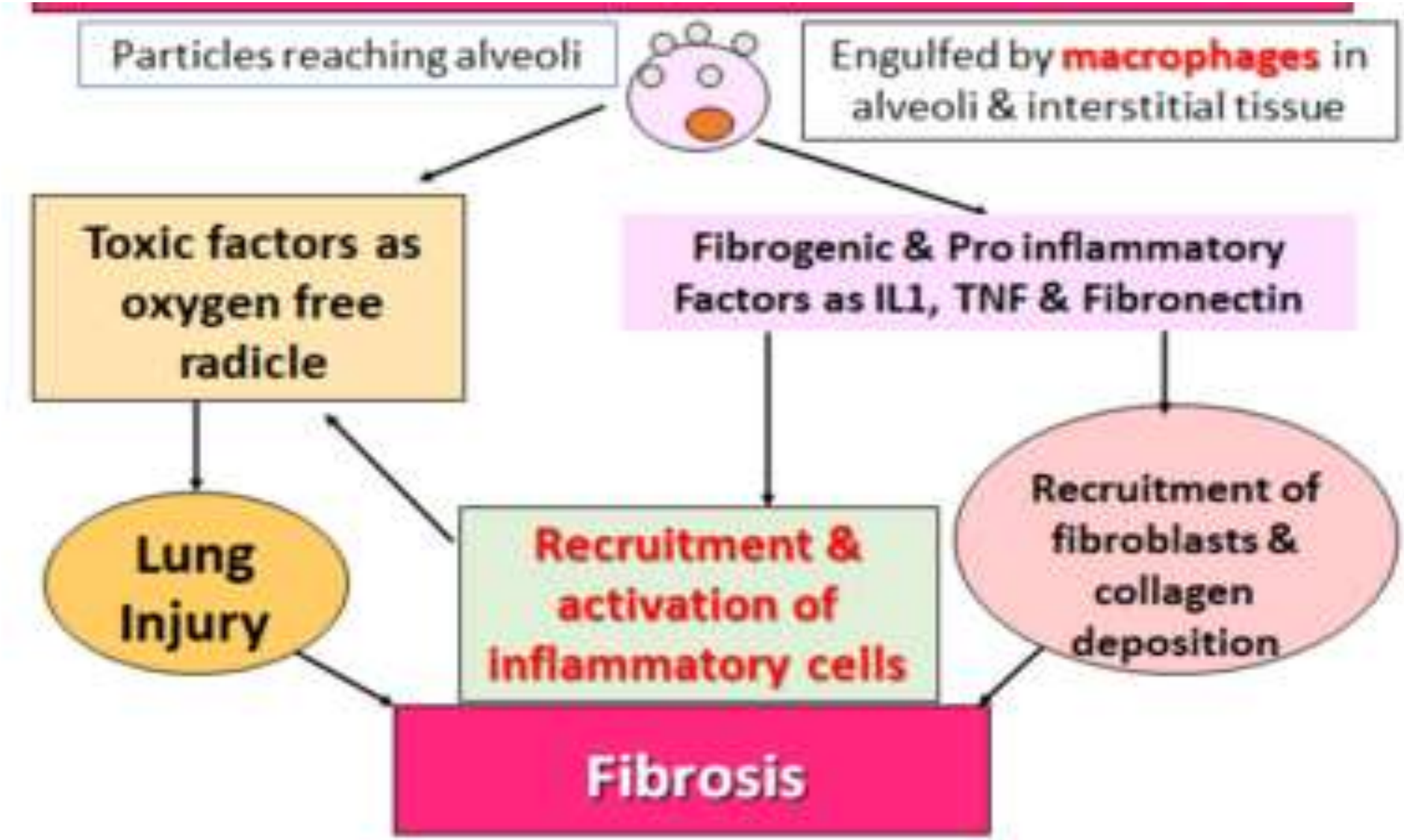
Soluble & insoluble Dust

Organic & inorganic Dust



horizontal Integration

Pathogenesis of pneumoconiosis



Core Concept

Classification Of Pneumoconiosis

Type of Dust	Disease
Mineral or inorganic dust	
Coal dust	Anthracosis
Silica	Silicosis
Asbestos	Asbestosis, cancer lung
Iron	Siderosis
Organic Dust (Hypersensitivity Pneumoconiosis)	
Sugarcane fiber	Bagossosis
Cotton dust	Byssinosis
Tobacco	Tobacossis
Hay or grain dust	Farmers' lung

Silicosis

Core subject & Vertical Integration

Caused by inhalation of dust containing Silica or Silicon-di-Oxide. (exposure few months to 6 years).

1. Stone crushing & Mining
2. Masonry, Tunneling
3. Foundry, Ceramic, pottery & Brick making
4. Sand blasting for metal polishing and grinding.

Pathophysiology: particle ingested by phagocytes , block lymph's channels leads to Dense Nodular Fibrosis

Silico-tuberculosis , more prone to pulmonary TB ???

Vertical Integration

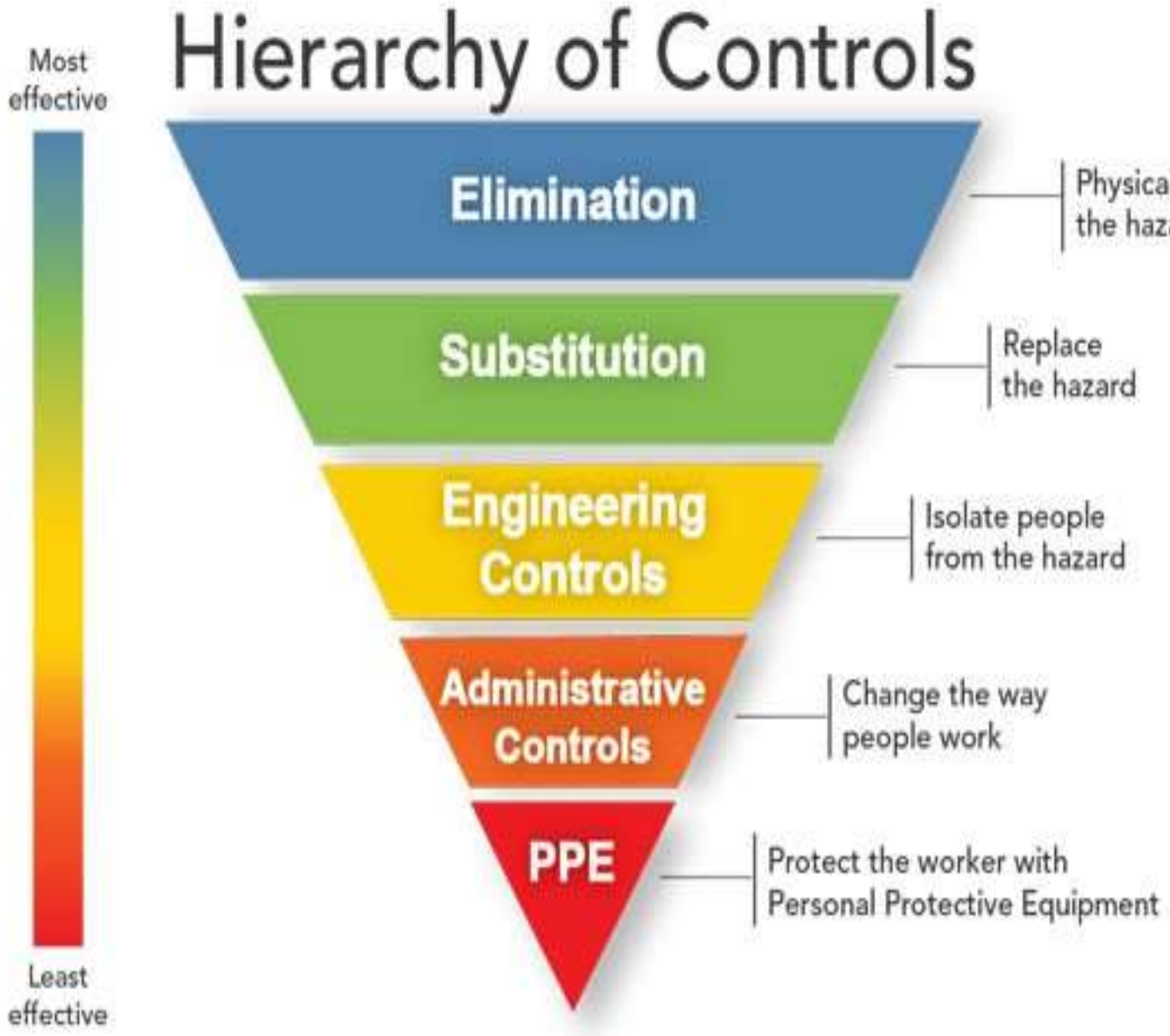
Silicosis

Clinical Notes:

- insidious onset, cough, dyspnea on exertion, pain in chest..
- Impairment of “Total Lungs Capacity” with advanced disease
- CXR: **Snowstorm appearance**
- No effective treatment

Core Concept

Prevention & Control of Silicosis by OSHA



Vertical Integration

Anthracosis
Coal worker's pneumoconiosis (CWP)

Two phases of disease:

- **Simple Pneumoconiosis:** develops after 12Y work, little ventilatory impairment.
- **Progressive Massive Fibrosis** : associated with sever respiratory disability.

Occupations:

- Underground miners and coal sorters
- Coal trimmers, Loading coal in ship holds and trains

Asbestosis

Core Concept

A **compound of Silica** with bases like Mg, Fe, Ca.

- **Types:**
  - Chrysolite (90% of world asbestos)
  - Amphibole
- **Occupation:**
  - Asbestos Mines & mills,
  - Thermal insulations Manufacturing,
  - Electric repair work, Gaskets manufacturing ,
  - Cement, brake lining, roof tiles, fireproof textile

Vertical Integration

Clinical Picture Of Asbestosis

Disease appears generally after 5-10Y of exposure

Fibrosis is

Due to mechanical irritation

Diffuse, Peri- bronchial

Clinically :

•1. Dyspnea

2. clubbing of fingers, cyanosis

3. Sputum may show asbestos-bodies (asbestos fiber coated with fibrin)

4. CXR show ground glass shadows in lower 2/3rd of lungs fields.

Core Concept

Prevention & Control of Asbestosis

- Use of safer types of asbestos
- Substitution to other types of insulants like glass fiber, mineral wool, plastic foams etc
- Rigorous dust control
- Periodic: clinical, radiologic monitoring of workers
- Continuing research

Core Concept

Byssinosis

Cause:

- Inhalation of cotton fibre dust

Symptoms:

- Chronic cough, progressive dyspnea
- Chronic bronchitis, emphysema

Core Concept

Prevention of bagassosis

Dust control

- Exhaust ventilation, wet process

Personal protection

- Masks, respirators with mechanical filters

Medical control

- Periodic medical examination

Bagasse control

- Keep moisture content above 20 %
- Spraying the bagasse with 2% propionic acid

Silicosis & New Industries

research

Silicosis still occurs in new industries such as the manufacturing of denim jeans and the processing of artificial stones (AS). Sandblasting is involved in the process of manufacturing denim jeans, where the high pressure results in high concentrations of RCS.AS have become popular in recent decades because of their increasing affordability

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8078400/

Artificial Intelligence in the Future of Work

- Computer vision has been shown to be useful in:
  - monitoring safety compliance
  - tracking workers in a particular area
  - examining safety conditions on a particular job site.
  - improve training and assist in reducing the impact of hazards in the workplace
  - process and analyze human language

https://blogs.cdc.gov/niosh-science-blog/2021/05/24/ai-future-of-work/

Family medicine

Role of family physician in occupational health

Improving	Improving the recognition of occupational disease
Preventing	Preventing progressive illness & disability of their own patients
Contributing	Contributing to the protection of other workers similarly exposed

7 ethical principles for occupational health

Promote	Safe and Healthy Workplace Environment
Uphold	Ethical Standards
Avoid	Discrimination
Maintain	Professional Competence
Protect	Patient Confidentiality
Advise and Report about	the health and health risk of the employer
Address	Conflict

https://acoem.org/acoem/media/PDF-Library/About_ACOEM/Code-of-Ethics-Condensed-Version.pdf

END OF LECTURE ASSESSMENT (EOLA)

A pottery industry worker visited his family physician with complaint of dyspnea. Physician advised chest x ray that showed ground glass appearance in the lung lobe.The likely condition which resulted in tuberculosis was:

a) Anthracosis

b) Asbestosis

c) Bagassosis

d) Silicosis

e) Byssinosis

Thank you

Suggested readings

- Parks Textbook of Preventive and Social Medicine. 23rd ed. Occupational health
- Occupational Safety & Health administration of America
- International Labor Organization (ILO)
- Pakistan Social Security Institutions