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TUBERCULOSIS
PROJECT
SOUTH AFRICA



health

Department:
Health
REPUBLIC OF SOUTH AFRICA

Introduction of Tuberculosis, History and Transmission

URC

Learning outcomes

- Identify the historical landmarks in the development of TB as a communicable disease.
- Explain how TB can be transmitted
- Describe how an infection with the TB bacilli can progress to TB the disease
- Discuss the risk factors that can influence the natural occurrence of TB

Why do we need to stop TB



3000 bacilli hang
in the air -
for up to 5 hours

Why we need to stop TB

- 1/3 of the worlds population is infected
- 3 million deaths annually
- 5 deaths per minute
- 8-10 million new cases per year
- SA one of the highest TB rates per 100 000 of the population.
- TB in SA currently a health crisis

Why is TB/DR-TB increasing in South Africa

- Increase in population
- Socio-economic conditions (poverty, overcrowding, unemployment, migration, alcoholism)
- Poorly managed TB control programs
- Stigma associated with TB and HIV
- Intersectoral collaboration ?

Discovery of the TB germ



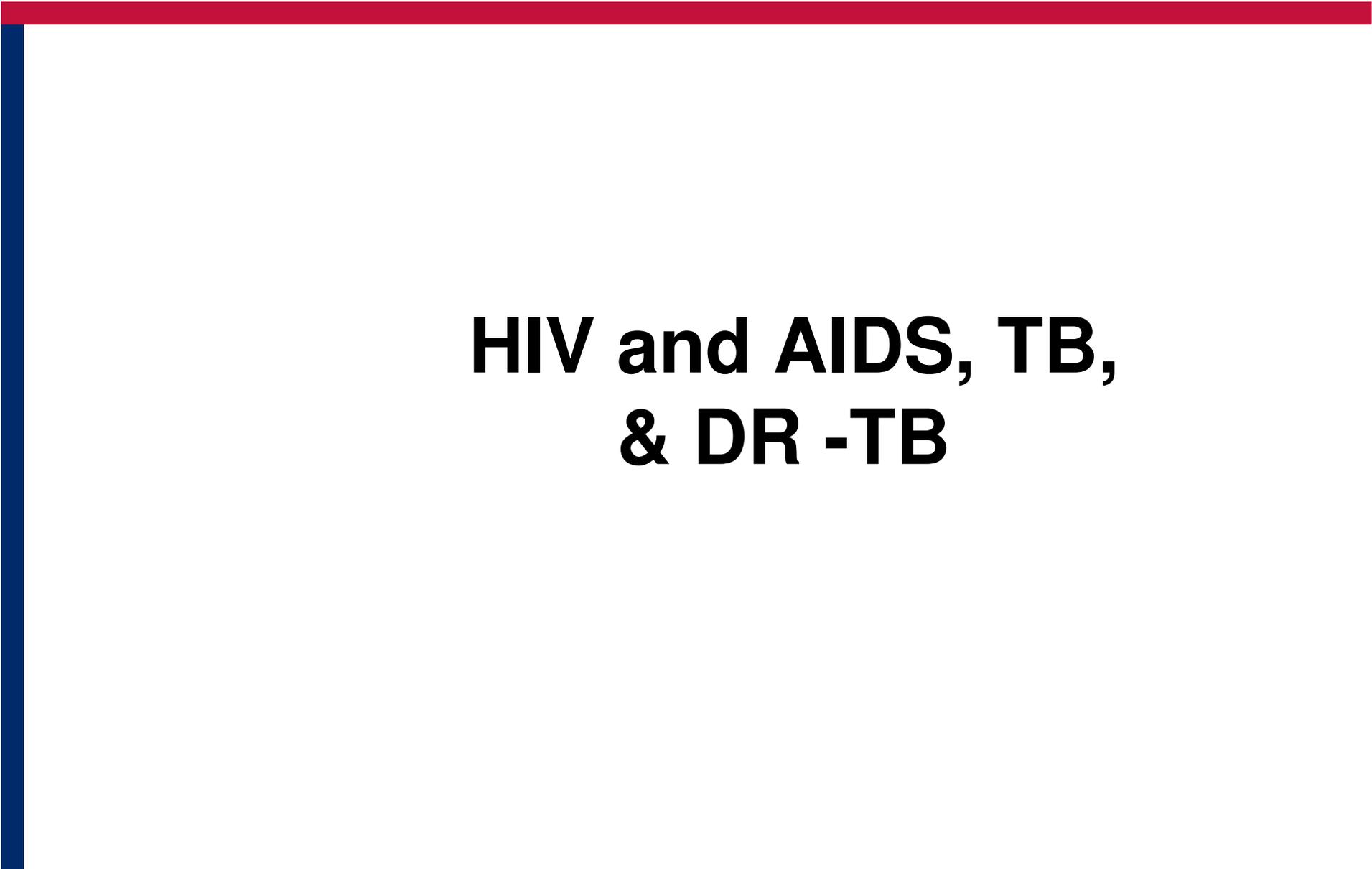
**Discovery of the
TB organism in
1882**

Robert Koch

Discovery of the TB germ

- Koch' postulate
- Culture
- Staining methods: Ehrlich, Ziehl & Neelson
- Proof of airborne spread
- BCG- Calmette & Guerin
- PPD/Tuberculin test
- Anti-TB drugs developed

What's the current situation?



**HIV and AIDS, TB,
& DR -TB**

SA Tuberculosis epidemic

- Global rank (no of cases) 4
- Incidence (per 100000/yr) 900
- Prevalence (per 100000/yr) 511
- TB Mortality (per 100000/yr) 71
- TB cases HIV+ (15-49 yrs) 58%
- New cases Drug Resistant 1.8%

WHO Report 2007

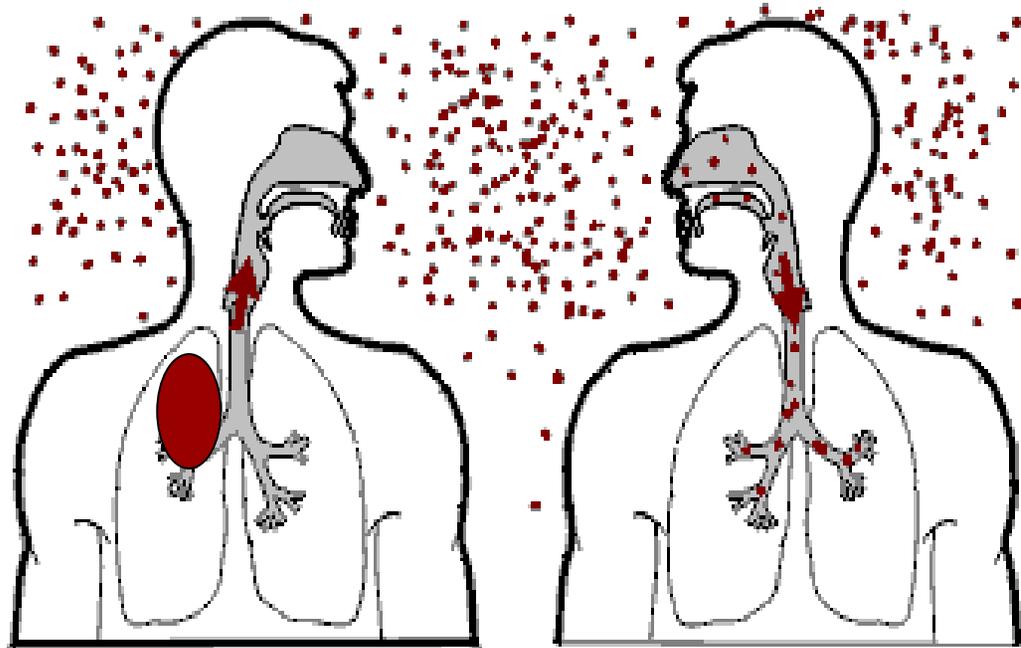
Why DR-TB is Increasing in SA

Poorly managed TB Control Programs

- poor adherence to protocols (diagnosis, drugs)
- poor patient follow up
- poor treatment adherence by patients

TB TRANSMISSION

- TB spread by someone with disease in their lungs who is coughing; i.e. patient with active disease
- Risk of infection depends on degree of contact, infectiousness, and ventilation
- Susceptibility of the exposed person



What may enhance transmission?

Patient with active disease

- Disease involving the lungs
- Duration of infectiousness (presence of cavitations, extensive disease)
- Presence of a cough
- Undergoing a procedure that can induce coughing or aerosolization of tubercle bacilli (sputum induction, bronchoscopy)

TB Transmission

4 steps in TB pathogenesis:

1. *Exposure*

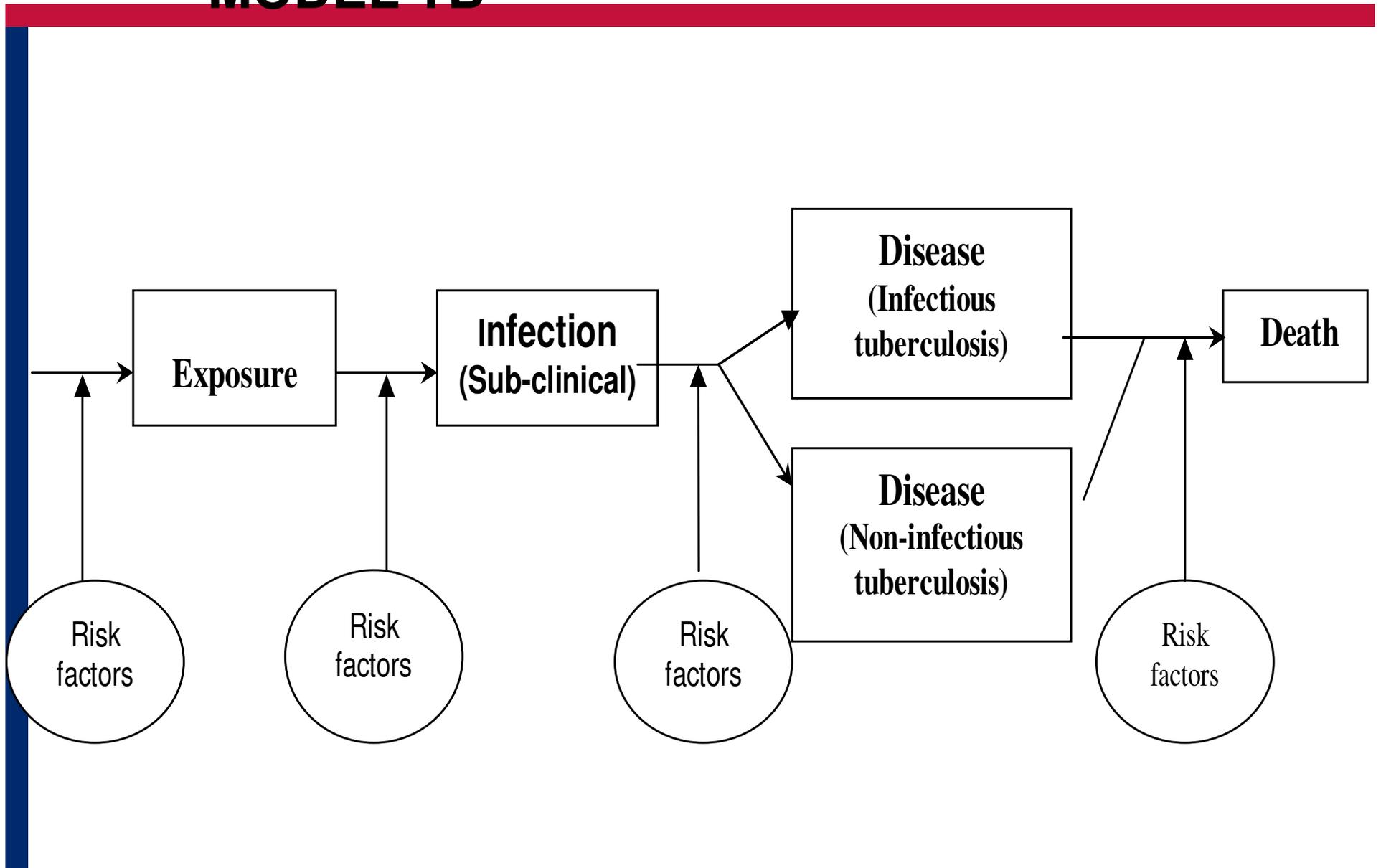
2. *Infection*

3. *Disease*

4. *Death*

TB Transmission cont...

MODEL TB



TB Transmission cont...

The environment

- Presence of someone with active TB disease who is not on effective therapy (undiagnosed, untreated, non-compliant, unrecognized drug resistance)
- Exposure of susceptible individuals to an infectious person in small enclosed settings
- Inadequate ventilation that results in insufficient dilution or removal of infectious droplet nuclei
- Re-circulation of air containing infectious droplet nuclei
- Duration of exposure

The susceptible individual

Compromised immune system

- HIV
- Diabetic
- steroid therapy
- chemotherapy (cancer)
- children <5years
- poor nutrition

Disease following TB infection

- Time since infection (length of exposure)
- HIV co-infection
- Age
- Strain virulence
- Genetic factors
- Medical conditions (silicosis, diabetes mellitus, malignancies, renal failure, steroid therapy)

Post-primary TB

- Occurs after a latent period of months or years
- Reactivation occurs when dormant bacilli start to multiply due to a weakened immune system
- It can result from re-infection by resistant strains of TB bacilli