EPIDEMIOLOGY OF PULMONARY TUBERCULOSIS

KSU Department of Family & Community Medicine

October, 2017

435 Lecture Notes by Qusay Ajlan & Haifaa Almohsen

Original Content | **Titles** | Additional Notes | **Important**

LEARNING OBJECTIVES

- State the diagnostic criteria of pulmonary tuberculosis
- Describe trend & state reasons for resurgence of pulmonary tuberculosis
- List population subgroups at risk of pulmonary tuberculosis
- Draw the cycle of infection of pulmonary tuberculosis
- Outline the procedures of diagnosis of pulmonary tuberculosis with emphasis on the limitation of each procedure
- Describe measures for the prevention and control of pulmonary tuberculosis
- Describe the Directly Observed Therapy short course for the treatment of pulmonary tuberculosis

PERFORMANCE OBJECTIVE

- To decide on the best measure(s) for the prevention and control of pulmonary tuberculosis and to prevent its spread to susceptible population

PULMONARY TUBERCULOSIS

Pulmonary Tuberculosis is a respiratory tract Infection Caused By M. Tuberculosis

Suspected cases present with :

- 1-Cough & expectoration for 3 weeks
- 2-Low grade fever
- 3-Night sweating
- 4-Loss of weight

It's a public concern to diagnose tb early because patients can spread the disease

INFECTION could be either Primary (First exposure) or Post primary (Reactivation/re-infection)

DISEASE : either Active or latent form

1-active TB there is a Disease process (with symptoms)

2-Latent tuberculosis No disease yet (no symptoms)

PULMONARY TUBERCULOSIS

SMEAR POSITIVE

2 Positive sputum smears

OR

1 Positive sputum smear + positive radiology

OR

1 Positive sputum smear + positive culture

Not only smear +ve are considered tb pts

SMEAR NEGATIVE

3 Negative sputum smears + Suggestive symptoms

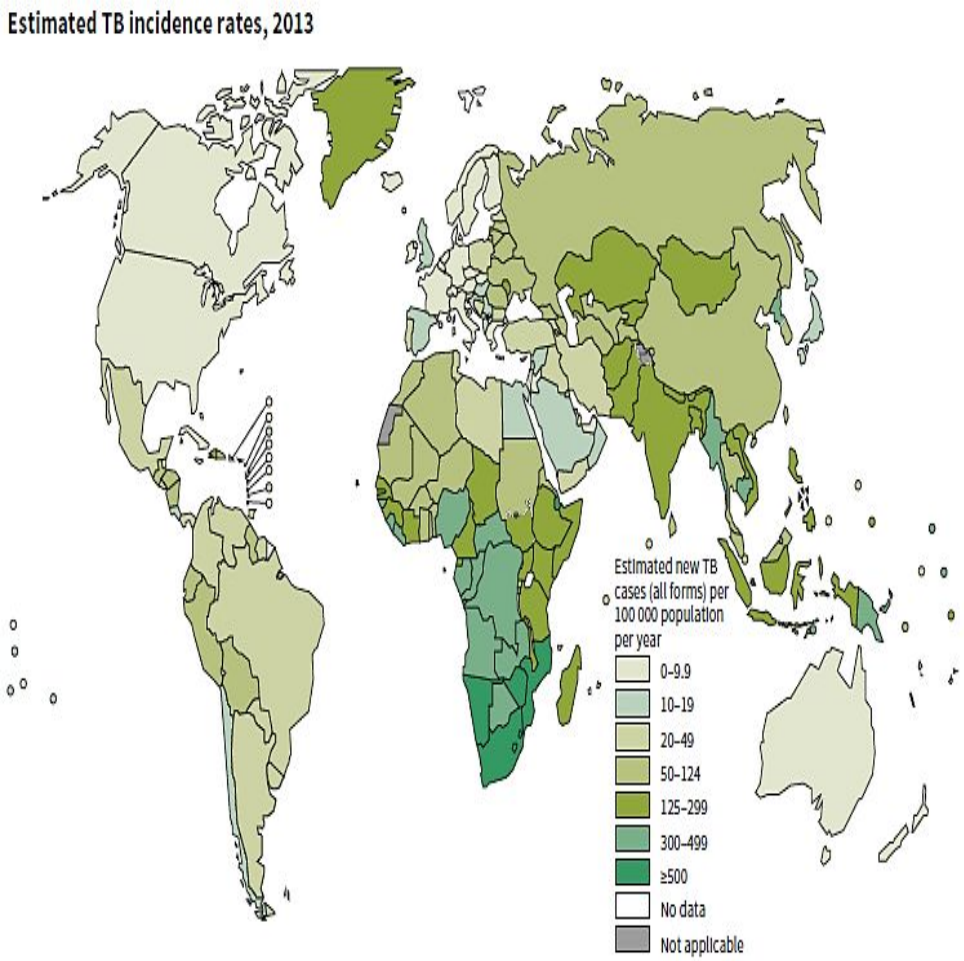
+ Positive radiology

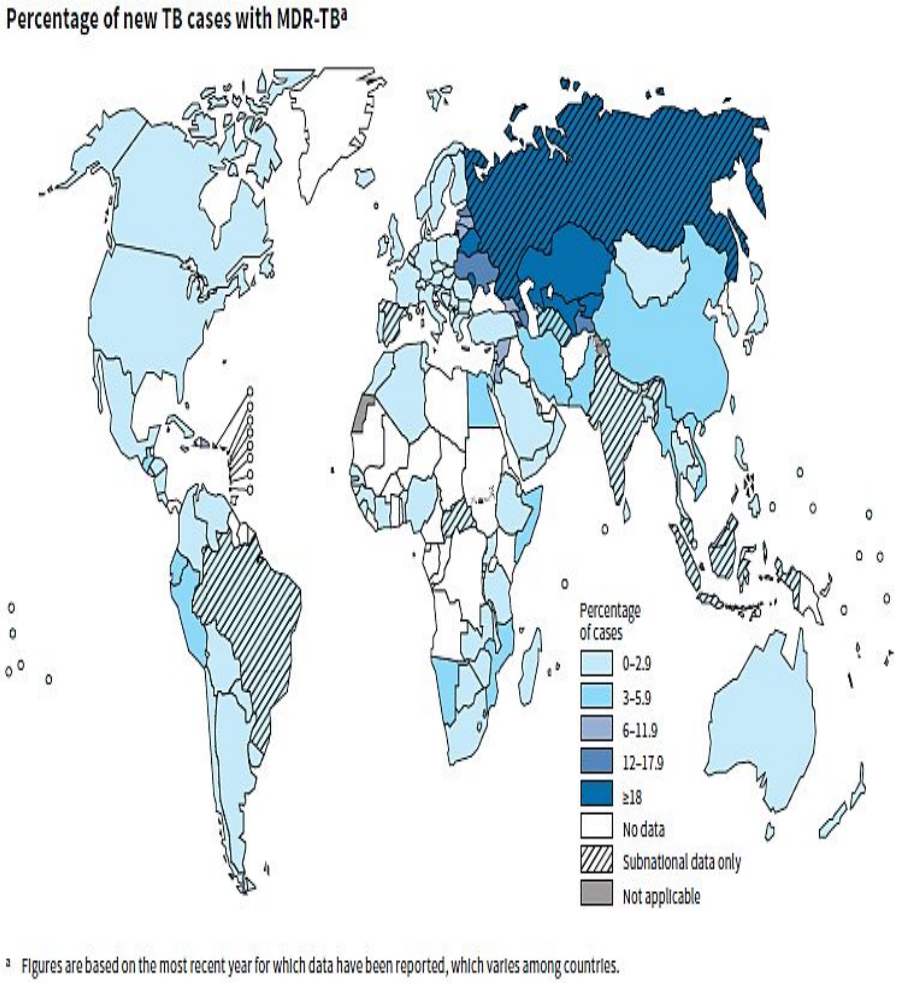
+ Decision to treat as TB

OR,

Culture positive but negative sputum smear

Multi drug resistent TB is common in russia





Global Tuberculosis Report – WHO, 2014

PULMONARY TB EPIDEMIOLOGY IN SAUDI ARABIA

64,345 reported cases; 48% non-Saudis for 2000 – 2013

Annual incidence rate (2013).

- Between 14 to 17 per 100,000 populations.
- Between 8.6 and 12.2 per 100,000 Saudi population.

Won't be asked about specific numbers

Tb resurgence

Resurgence of TB leads to :

1-Deterioration of the living conditions which makes it harder to treat.

2-Appearance of strains of M. tuberculosis resistant to anti-tuberculosis drugs.

3-pandemic raise of HIV/AIDS could lead to increased resurgence of tb.

MAJOR RISK FACTORS OF PULMONARY TUBERCULOSIS

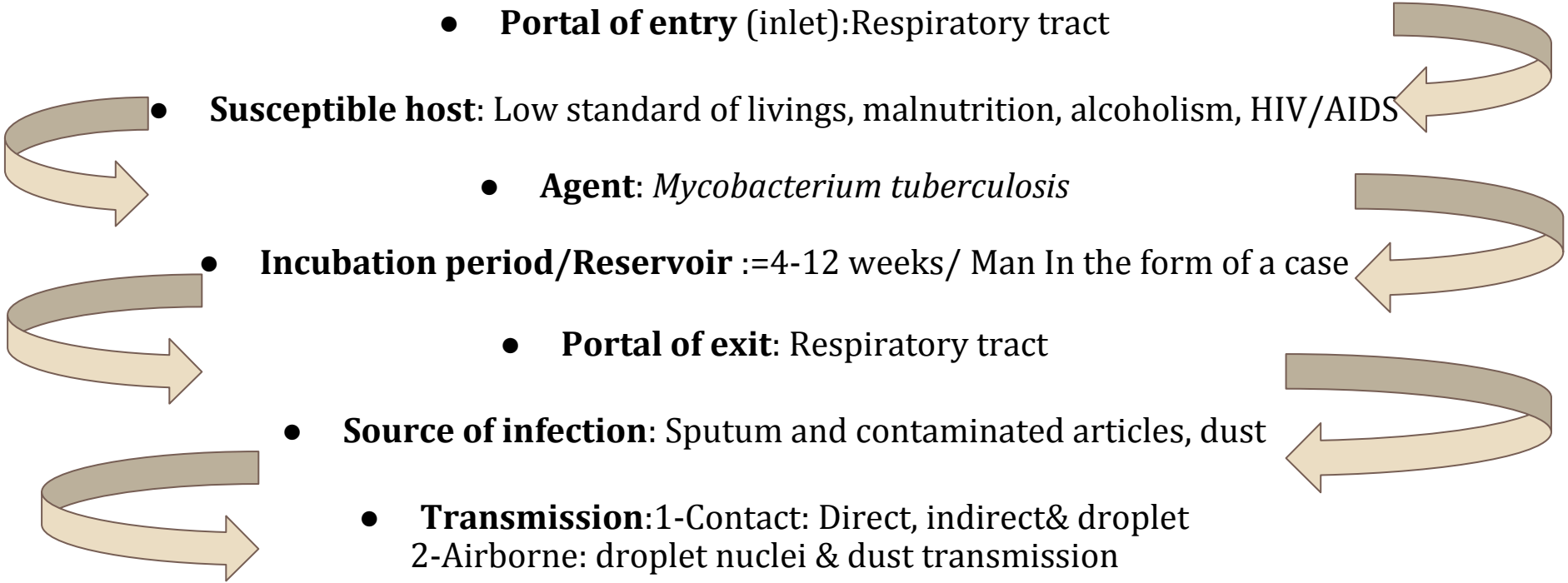
Social factors: Unfavorable social conditions
Pre-pathogenic conditions: HIV/AIDS, diabeteS
Occupation: Exposure & working conditions
Habit: Smoking

PROGRESS

- Annual slow decline in the rates of tuberculosis
- An estimated of 37 million lives saved between 2000 and 2013 as a result of effective diagnosis and treatment.

CYCLE OF INFECTION OF PULMONARY TUBERCULOSIS

- **Portal of entry** (inlet):Respiratory tract
- **Susceptible host**: Low standard of livings, malnutrition, alcoholism, HIV/AIDS
- **Agent**: *Mycobacterium tuberculosis*
- **Incubation period/Reservoir** :=4-12 weeks/ Man In the form of a case
- **Portal of exit**: Respiratory tract
- **Source of infection**: Sputum and contaminated articles, dust
- **Transmission**:1-Contact: Direct, indirect& droplet
  2-Airborne: droplet nuclei & dust transmission



DIAGNOSIS OF TUBERCULOSIS

Non specific symptoms and signs which mimic chest infection contribute to the delay of diagnosis and consultation

Investigations used :

1- tuberculin skin test (mantoux technique).
2- chest radiograph.
3- microscopic examination of sputum specimen.
4- culture of sputum specimen.

Culture of sputum specimen is more sensitive and specific but smear is much more faster

TUBERCULIN SKIN TEST

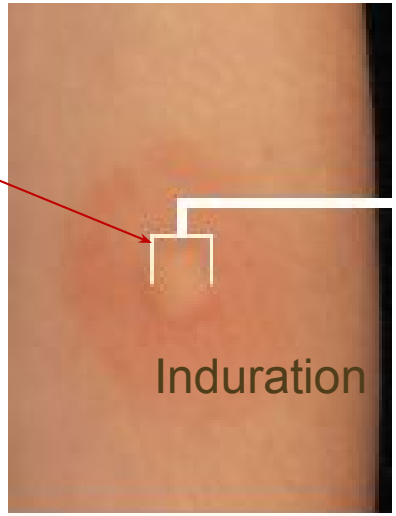
0.1 ml PPD

(1)

(2)

(3)

Erythema
Edema



Induration

(4)

TUBERCULIN SKIN TEST

Report induration size in mm

Induration = Previous exposure to M. protein

Size

if 10 + mm = positive could be due to BCG vaccine

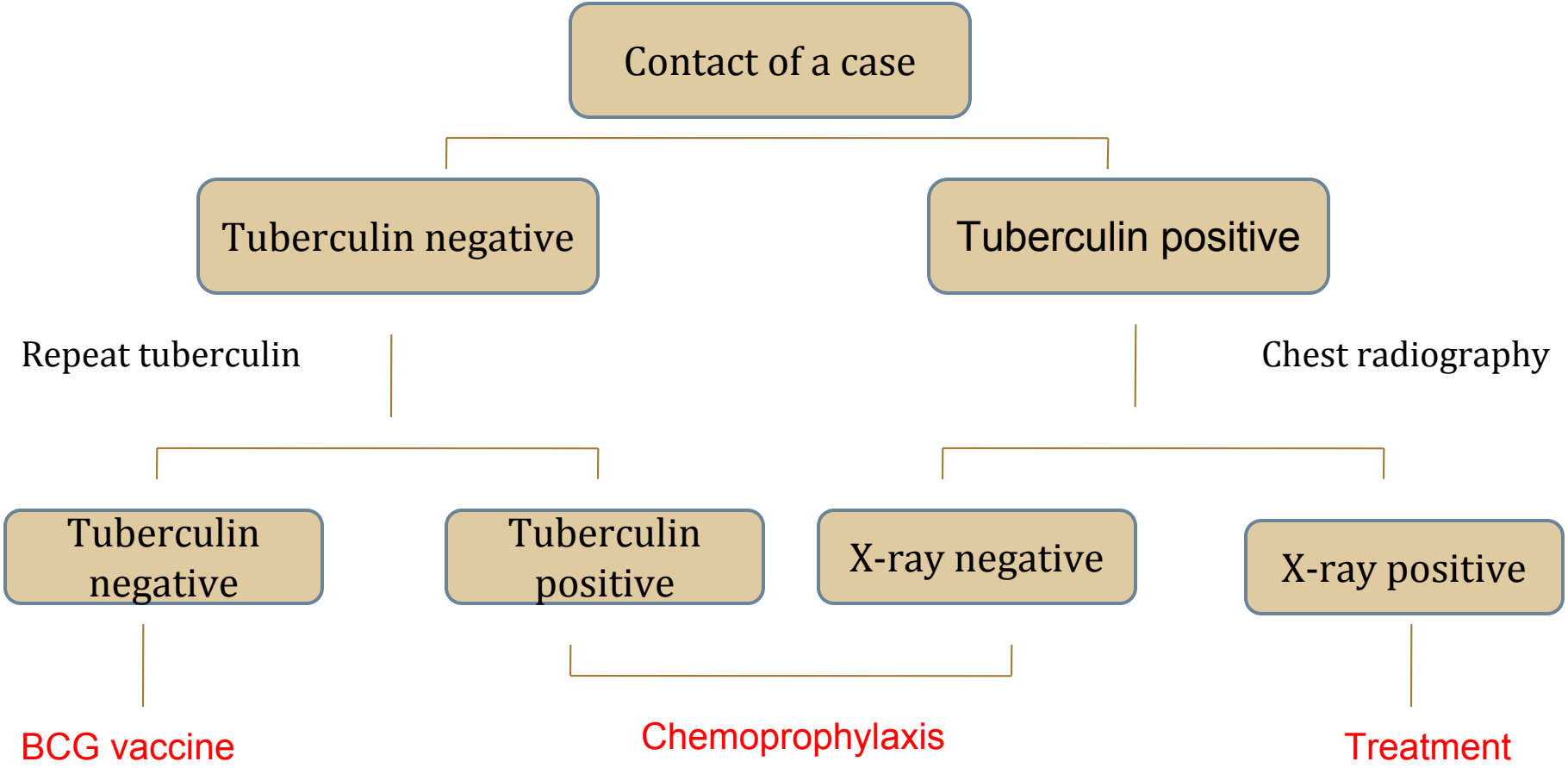
5 - <10 mm = positive in immune compromised

≥ 15 mm = suggestive of infection rather than BCG

But remember that tuberculin skin test is a helping diagnostic test

(more investigation are required)

Induration



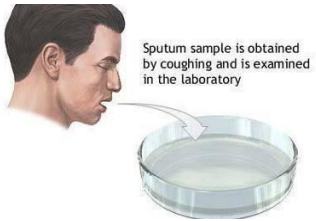
- TUBERCULIN TESTING IN MANAGING CONTACTS

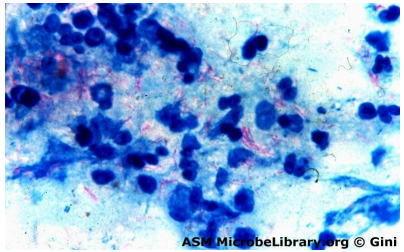
CHEST RADIOGRAPHY SPUTUM SMEAR & CULTURE

Chest radiography findings :

1. Enlarged mediastinal LN
2. Consolidation (area of opacity)
3. Cavitations (dark area)
4. Negative (not uncommon

Sputum smear and culture :1-collection 2-microscope 3-culture





CULTURE

PREVENTION & CONTROL OF RIs

Minimize exposure

- Isolation of case
- (respiratory precautions)
- Concurrent disinfection (patients' items)
- Ventilation & exposure to sunlight
- Cleaning floor with disinfectant

Protection of susceptible

- Prophylaxis BCG vaccine: Live attenuated vaccine, 0.1ml IM injection in the left deltoid within 40 days of birth
- Improve nutrition status
- Masks for caregivers and patients

Identification and treatment

- Anti-tuberculosis drugs

Monimize/Control of transmission

Increase host resistance

Eliminate reservoir

DIRECTLY OBSERVED THERAPY SHORT COURSE (DOTS)

its important to give the patient the drug in a hospital or by a caregiver because studies have shown that patients may discontinoue

First line medications

2 months

Initial phase

(2 HRZE)
Isoniazid (H)
Rifampicin (R)
Pyrazinamide (Z)
Ethambutol (E)

4 months or 8 months if recurent

Maintenance phase

(4 HR) daily or $(4\ HR)_3$ (three times per week)
Isoniazid (H)
Rifampicin (R)

Or use Fixed Dose Combination therapy (FDC) - ALL IN ONE tablet

q1/ a patient suspected to have tb , skin tuberculin test showed a 12 mm intubation which of the following is correct and a negative chest xray ?

A- isolate and treat for 6 months

B- give the patient a prophylaxis treatment

C-give the patient a BCG vaccine

D- investigation results are negative send the patient home

q2/An immunocompromised smoker patient , 15 years ago was diagnosed with TB , A week a go he started to develop symptoms of tb which of the following is correct

A-appearance of strains of M. tuberculosis resistant

B-the patient has **(tb resurgence)**

C-Deterioration of the living conditions

D-all of the above

q1=B

q2=D