

Tuberculosis & Leprosy: Diseases of Poverty



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Presentation Objectives

At the completion of this presentation, participants can:

- Evaluate suspected TB & leprosy
- Provide care for confirmed cases of TB & leprosy
- Advocate for TB & leprosy prevention



Tuberculosis



One-third of our world's citizens are presently infected.

Tuberculosis Background

Tuberculosis (TB) is one of today's most important health challenges:

- One-third of the world's population is infected
- 5-10% of those infected will become clinically ill
- 2 million die annually
- Highest number of new cases are in SE Asia
- Highest number of deaths per capita are in Africa – relate to the HIV epidemic
- Over 95% of TB deaths occur in low- and middle-income countries: A prototypical disease of poverty

What is the Natural History of Tuberculosis?



Tuberculosis Natural History

- *M. tuberculosis* is spread from person to person through respiratory droplets emitted when infected persons cough or sneeze
- In most new cases of infection, the body's immune system successfully suppresses, but does not eliminate infection. This state is termed *latent tuberculosis*
- Time, malnutrition and HIV infection, among other factors, may reduce immune resistance, and allow *reactivation* of TB, leading to clinical illness.

What Are Risk Factors For Tuberculosis?



Tuberculosis Risk Factors

- Crowded living conditions
- Armed conflict
- Poor nutritional status
- Lack of medical care access
- HIV infection
- Incomplete treatment
- Institutionalized persons
- Health care workers
- Those suffering from chronic diseases

How Is Tuberculosis Diagnosed?

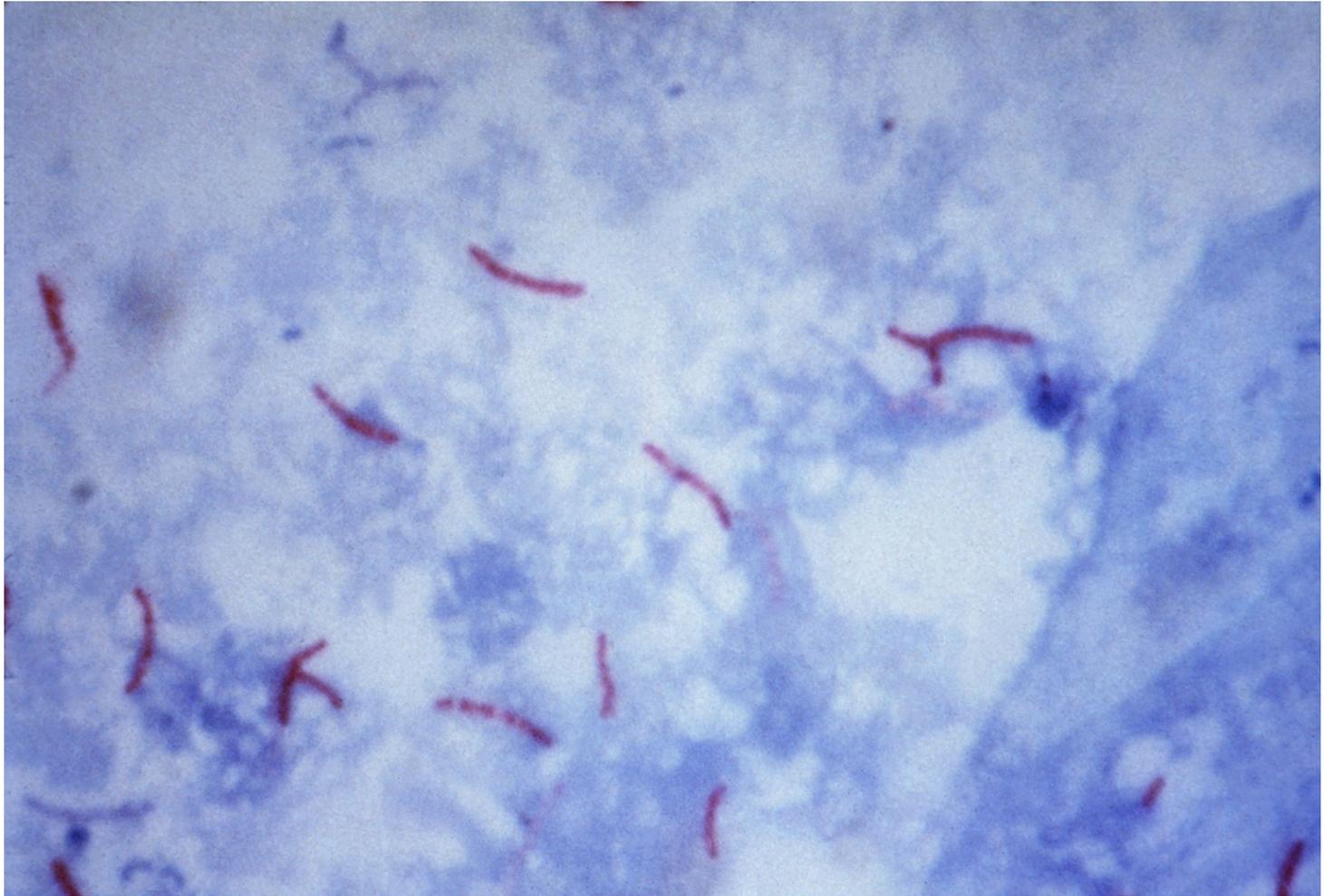


Tuberculosis Diagnosis: General

- General symptoms and signs of tuberculosis include fever, malaise and weight loss.
- Pulmonary TB is the most common form of the disease, with accompanying cough, hemoptysis and shortness of breath.
- Differential diagnosis may include other pneumonias, lymphomas and pulmonary fungal infections

Tuberculosis Diagnosis: Lab

- To diagnose suspected pulmonary TB, ideally obtain at least three morning sputums and stain for detection of acid-fast bacillus (AFB).
- TB should never be ruled out on the basis of a negative AFB stain alone
- Because of their frequent coexistence, persons with TB should be also tested for HIV infection.
- Patients with TB are frequently anemic and have elevated erythrocyte sedimentation rate (ESR).



Acid-fast bacilli in sputum are diagnostic of tuberculosis.

**What Chest
X-Ray Finding
Are Most
Consistent
With TB?**



Tuberculosis Diagnosis: X-Ray

Chest X-ray findings consistent with pulmonary TB include infiltrate, cavitary lesions, hilar adenopathy, or miliary patterns. Such findings are most common in the apical posterior portion of the lung.



**The diffuse
nature of
miliary TB.**



What is this pathology?

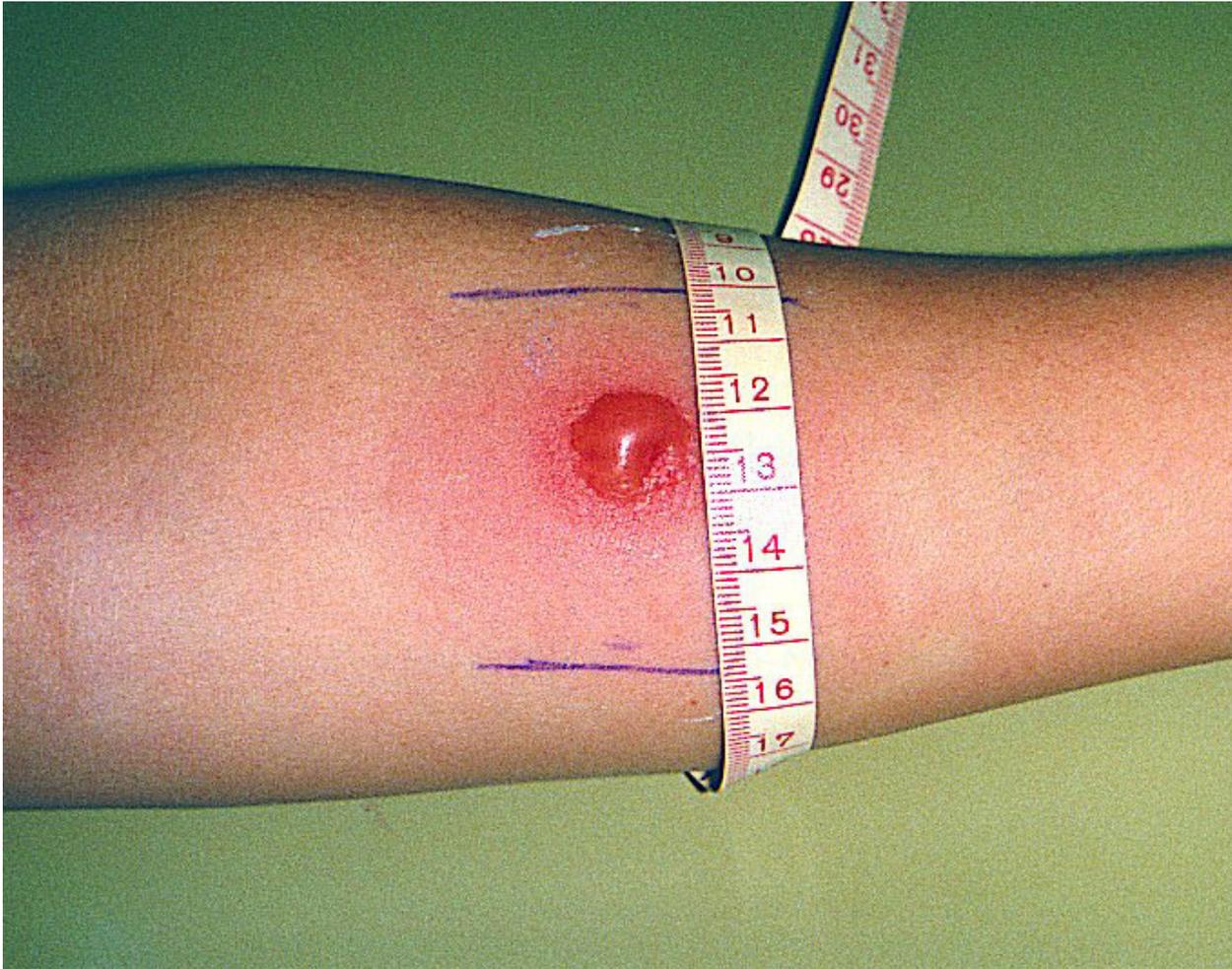
What Is The Role Of PPD Testing?



Role Of PPD Testing

In communities where TB is uncommon, purified protein derivative (PPD) skin testing is routinely used to detect both latent and active TB infection.

However, where TB prevalence is high, the majority of individuals may be PPD positive, and treatment is reserved only for those with clinical evidence of active TB infection. Therefore, PPD testing is of limited usefulness.



**Reactive PPD – Common in locales
of high TB prevalence**

Where Does Extrapulmonary TB Occur?



Extrapulmonary Tuberculosis

- Extrapulmonary TB occurs in less than 20 percent of cases, but can infect any organ or tissue of the body, causing more organ- or site-specific symptoms and signs.
- AFB are generally difficult to identify on aspiration or biopsy in suspected extrapulmonary TB.
- More common sites include cervical lymph nodes, kidneys, lumbar spine (Pott's Disease), peritoneum, pericardium, and brain



Lymphadenitis is the most frequent form of extrapulmonary tuberculosis.

Question

Which ONE statement on extra-pulmonary TB is MOST true?

- A Lymphatic TB most commonly involves the cervical nodes (scrofula).
- B Peritoneal TB typically presents as an acute abdomen, with acid-fast bacillus (AFB) often present on peritoneal fluid analysis.
- C Skeletal TB most commonly affects the shoulders and elbows.
- D TB meningitis usually presents with rapid-onset fever and seizures.
- E Renal TB is uncommon because of the relatively low oxygen tension of the kidney.

Answer

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Explanation Part 1

Lymphatic TB most commonly involves the cervical nodes (scrofula). Node enlargement is slow and painless. Typically, several smaller nodes surround a single larger node. Over time, the nodes become matted together and the skin may become fixed. Renal TB is common because of the high blood flow and high oxygen tension in the kidney—conditions that favor mycobacterial replication. Skeletal TB most commonly affects the spine, hip, and knee.

Explanation Part 2

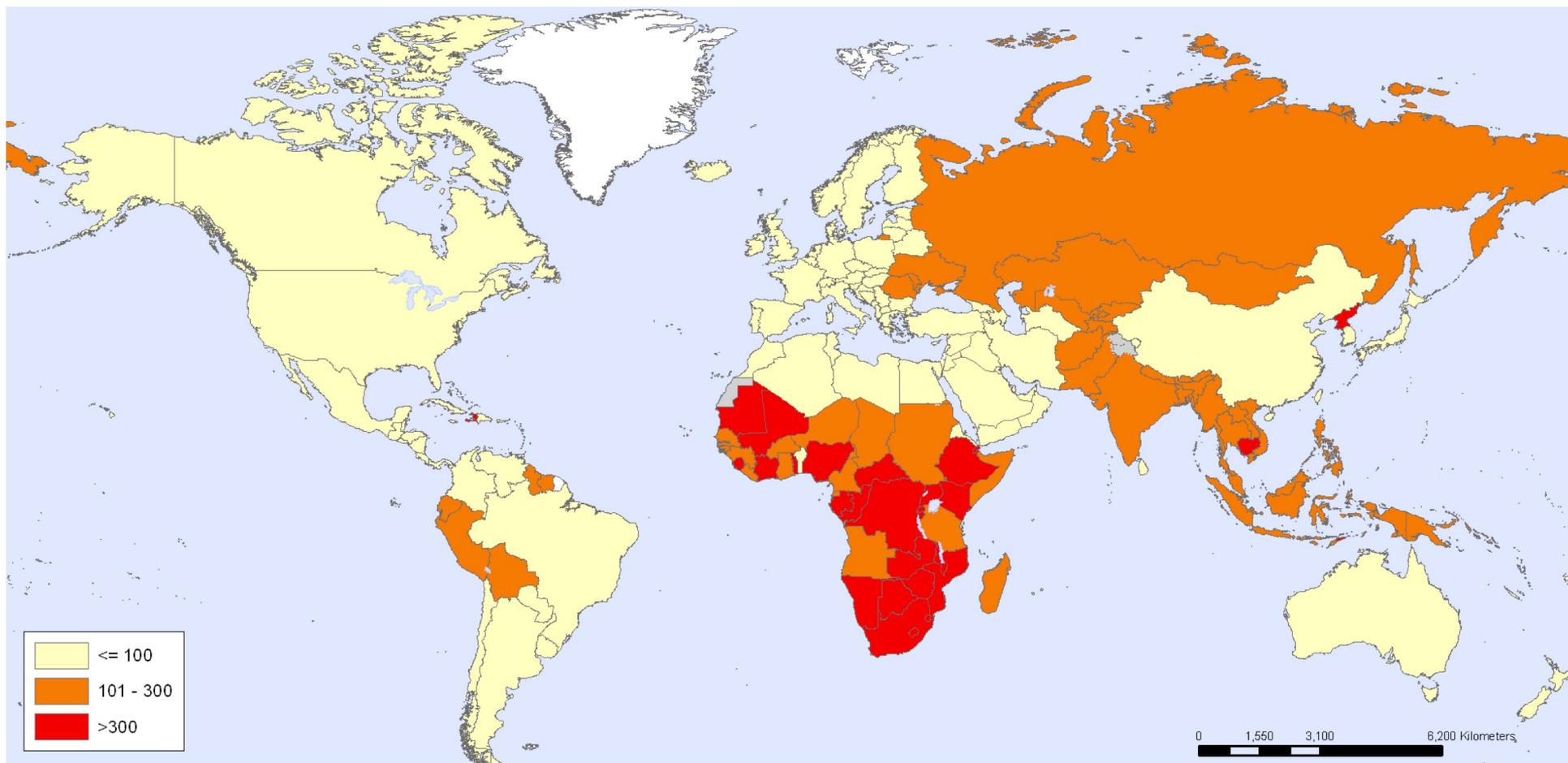
Spinal TB usually involves the lower thoracic spine, with T10 most commonly affected. TB meningitis typically has an insidious onset with low-grade fever, malaise, headache, irritability or listlessness, and neck stiffness. Peritoneal TB typically presents with progressive ascites and constitutional symptoms. Peritoneal fluid analysis will show a high protein content (exudative) and lymphocytosis. AFB is rarely found on smear.

What Is the Connection Between Tuberculosis And HIV Infection?

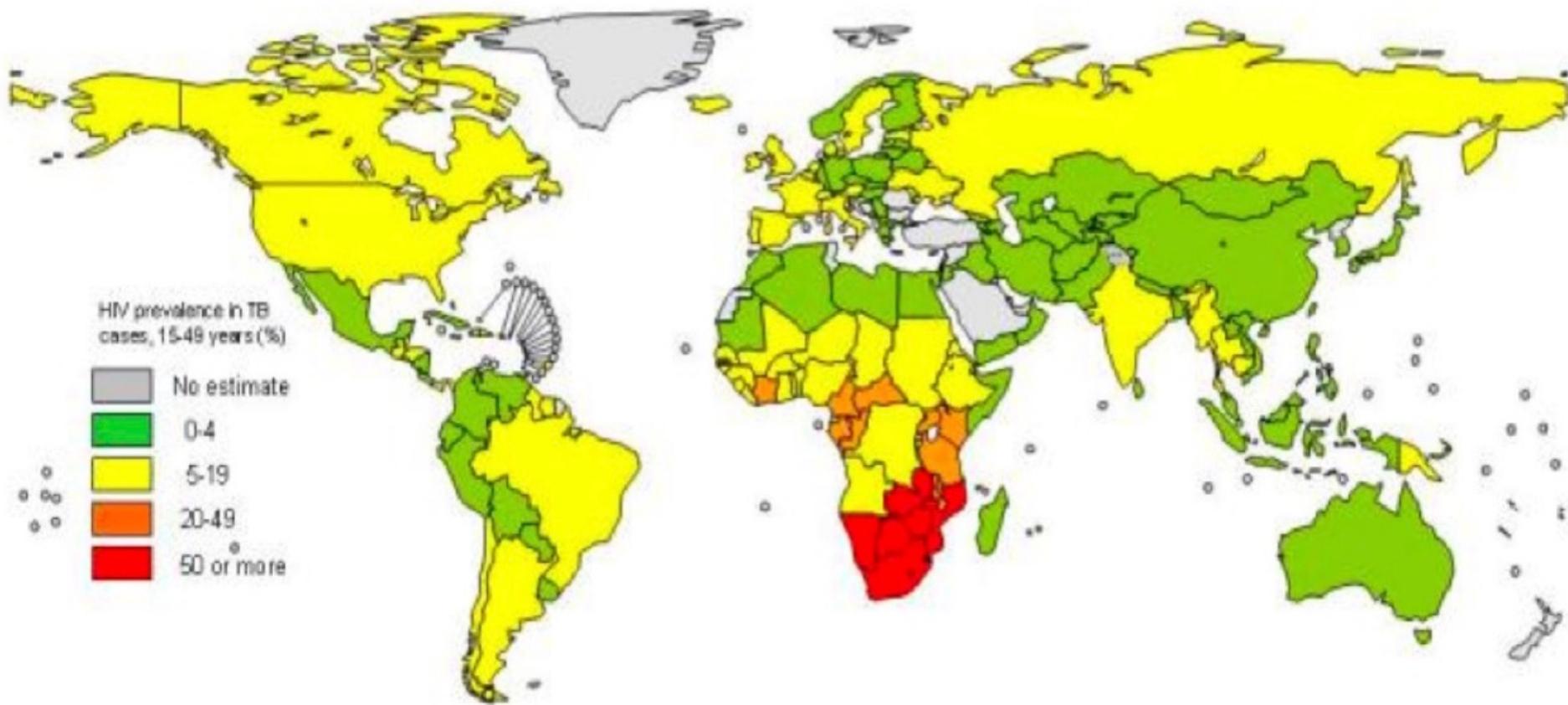


Tuberculosis And HIV Infection

- In developing nations, TB is the leading HIV-associated opportunistic infection, and the leading cause of death among HIV-infected persons.
- TB is also the only major HIV opportunistic infection that poses a significant risk to non-HIV infected individuals.
- TB tends to occur earlier than many other opportunistic infections
- All patients with TB should be offered HIV testing. And, HIV-infected persons must be monitored for TB infection.



TB Incidence



HIV Prevalence

How Is Tuberculosis Treated?



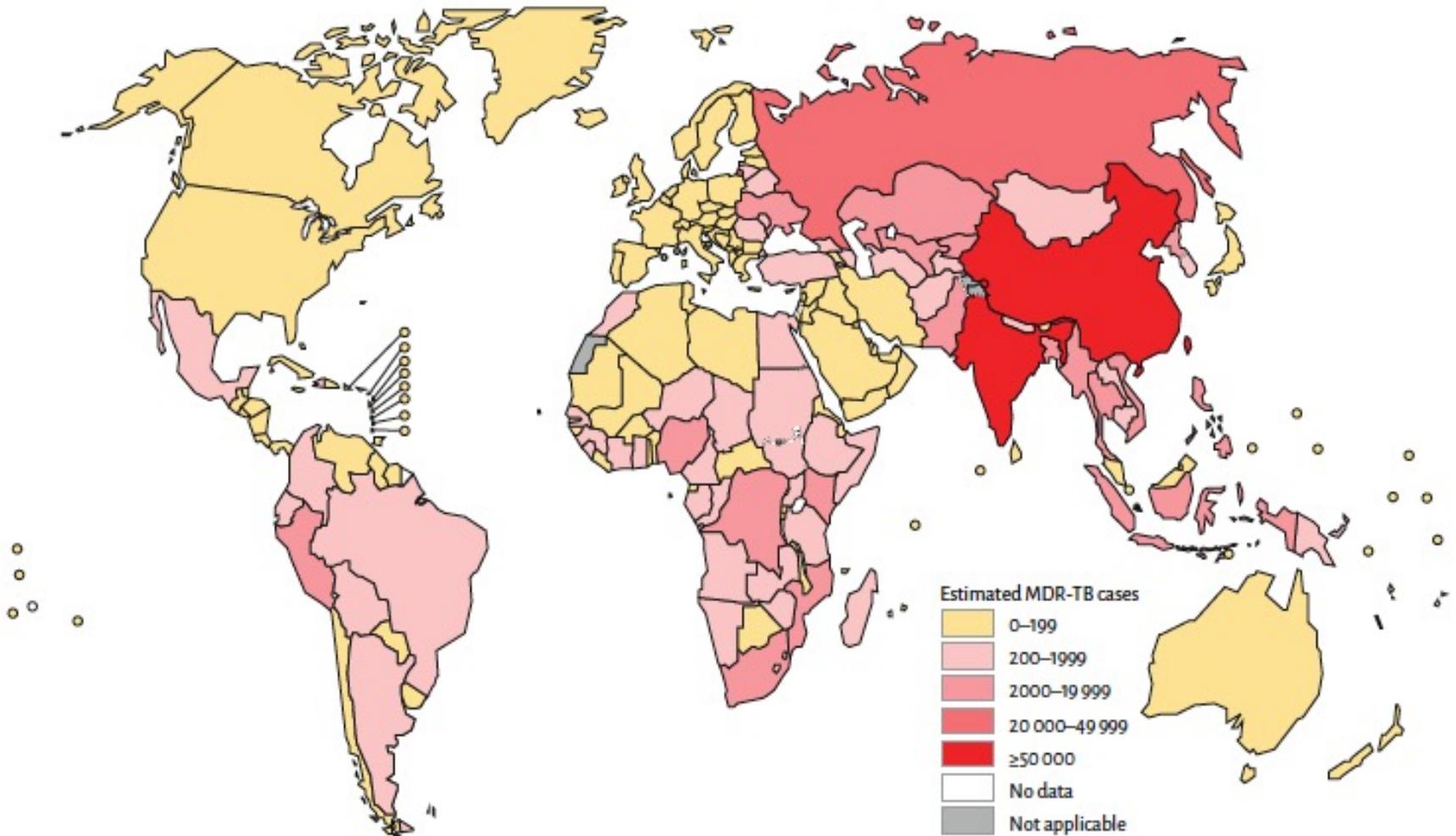
Tuberculosis Treatment 1

- TB treatment is potentially complex.
- For uncomplicated active disease, treatment in the initial 2-month phase usually includes isoniazid (INH), rifampin (RIF), pyrazinamide (PZA), and ethambutol (EMB).
- Two drugs, usually INH and RIF, are then used in the continuation phase for an additional 4 to 7 months.
- Failure to complete the prescribed course often leads to development of resistant TB infection.

Tuberculosis Treatment 2

- Regular monitoring for clinical response is essential: body weight, hemoglobin and erythrocyte sedimentation rate (ESR).
- Children are generally treated with identical drugs. Ethambutol, however, is contraindicated in children.
- Failure to complete the prescribed course often leads to development of resistant TB infection.
- *Most countries have well-designed national guidelines for TB management. These regimens should be followed.*

Number of MDR-TB cases estimated to occur among notified pulmonary TB cases, 2014



Number of cases of multidrug-resistant TB (2014).

What Are Signs Of Resistant TB?



TB Drug Resistance - Suspect

Suspect if:

- No defervescence after 2 weeks of treatment
- Sputum culture continues to demonstrate AFB after 3 months of treatment
- Patient has a history of previous TB treatment, and especially if the course was incomplete
- The likely source of the patient's infection is a person with suspected to be drug-resistant TB

What is the management of Resistant TB?



TB Drug Resistance - Act

- Add a minimum of two new medications (never add only a single new medication)
- Assure directly observed treatment for the patient
- Plan a longer duration of therapy — at least 12 months after sputum has become AFB-negative
- If possible, submit a patient's TB sample for drug susceptibility testing



Directly observed treatment short course (DOTS) calls for a responsible person to ensure TB patients take their medication as prescribed.

Tuberculosis Prevention And Control

The WHO *END TB* Strategy is built around:

- Early diagnosis of TB including screening contacts and high-risk groups universal drug-susceptibility testing
- Treatment of all with TB with DOTS
- Collaborative TB/HIV activities, and management of co-morbidities
- Vaccination against tuberculosis

What Are The Vaccines Against TB?





Administration of BCG vaccine to newborn infant provides only modest protection

Vaccination Against Tuberculosis

- The vaccine currently used is Bacille Calmette-Guérin (BCG).
- BCG at birth is a standard part of WHO's Expanded Program on Immunization (EPI) in countries where TB is endemic.
- BCG is effective in decreasing the risk of disseminated TB in infants and children.
- BCG vaccine is only about 50 to 60 percent effective against pulmonary tuberculosis in children, and its effectiveness wanes as children reach adolescence.

New TB Vaccines?

- WHO reports that 16 different TB vaccines are currently in clinical trials, some approaching or currently in proof-of concept studies in the field, and many more in preclinical development.

Question

ALL the following regarding BCG vaccine are true, EXCEPT which ONE?

- A The effectiveness of BCG vaccine against pulmonary tuberculosis in children is about 95 percent.
- B BCG vaccine is administered in many countries with a high prevalence of TB and is an integral part of EPI.
- C BCG vaccine is quite effective at decreasing disseminated tuberculosis infections (such as tuberculous meningitis) in infants and children.
- D BCG vaccine should not be administered to infants who are at low risk for TB.
- E BCG vaccination may cause a false-positive skin test for TB.

Answer

ALL the following regarding BCG vaccine are true, EXCEPT which ONE?

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Explanation

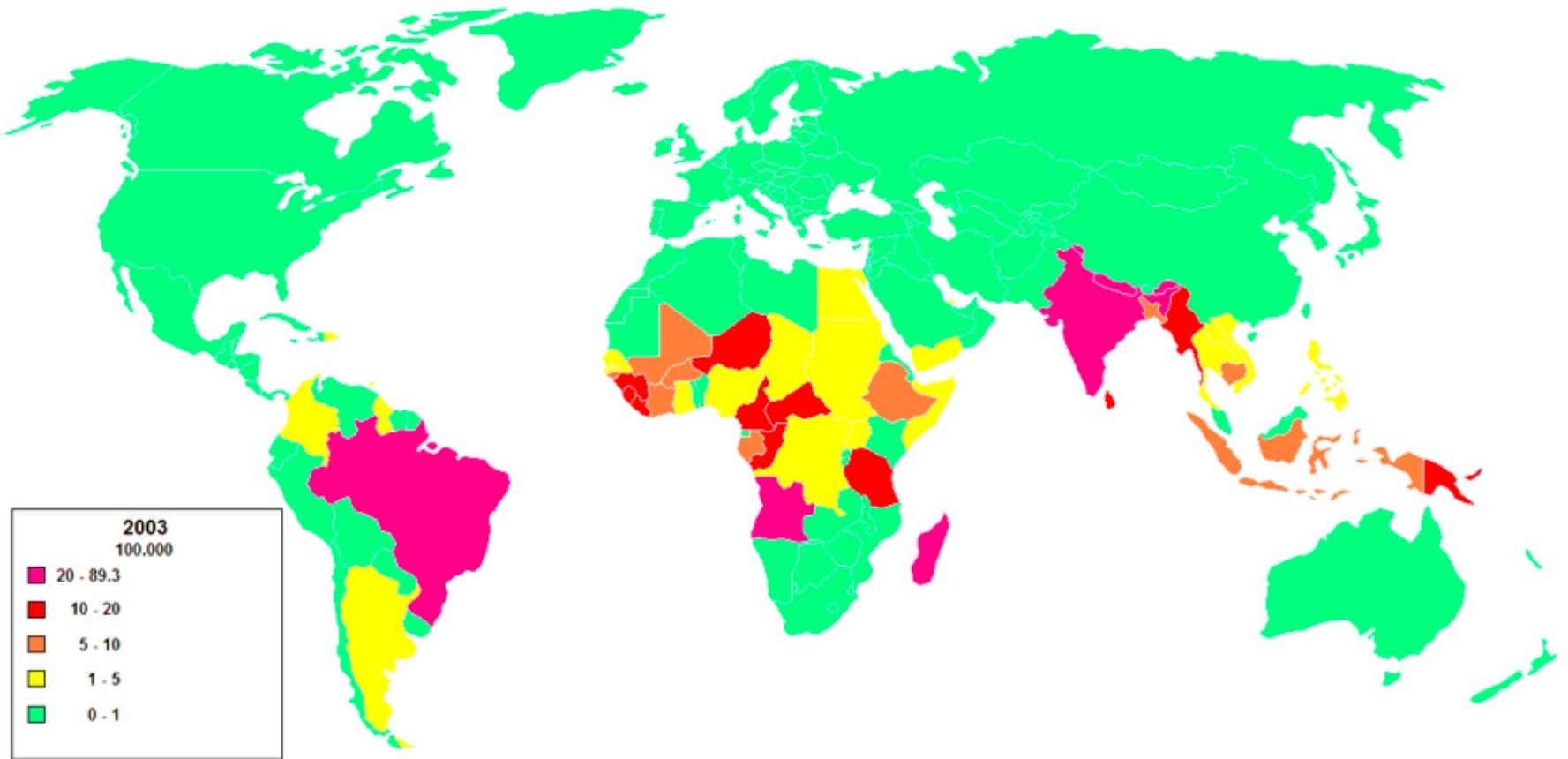
Immunization with BCG at birth continues to be a standard part of EPI in developing countries and it appears to be quite effective at decreasing the risk of disseminated TB infections, such as tuberculous meningitis, in infants and children. However, BCG vaccine is only about 50 to 60 percent effective against pulmonary tuberculosis in children. Therefore, BCG immunization at birth probably results in only a modest decrease in disease by adulthood and little impact on TB in a given community.

**Is Leprosy
Still a
Problem
Today?**



Leprosy Background

- Leprosy is a chronic granulomatous infection caused by *Mycobacterium leprae* and *Mycobacterium lepromatosis*, both acid-fast rods.
- Infection, most likely via respiratory droplets, can occur at any age.
- The incubation period is 3 to 5 years.
- Clinical manifestations are determined by the quality of immune response
- The worldwide prevalence of leprosy has fallen steadily since use of multidrug therapy in the 1980s.



In 2018, 211,973 new cases of leprosy were reported – mostly from India, Nepal and Burma .

WHO Leprosy Classification

- Paucibacillary (Tuberculoid): skin lesions and/or nerve lesions resulting in anesthetic patches, muscle atrophy and loss of sensation.
- Multibacillary (Lepromatous): generalized infection involving skin, the anterior eye, cutaneous and peripheral nerve trunks, and oral, nasal and upper respiratory mucous membranes (cooler locations).



Anesthetic macules with sharp demarcations of paucibacillary leprosy.



Hand contractures may result from ulnar nerve damage of paucibacillary leprosy.



Skin and mucosal lesions of multibacillary leprosy: may also involve the anterior eye, and oral, nasal and upper respiratory mucous membranes.

Leprosy Diagnosis

- Differential diagnosis may include lupus erythematosus, lupus vulgaris, sarcoidosis, dermal leishmaniasis and yaws (a spirochete treponema infection).
- Laboratory demonstration of acid-fast bacilli in skin biopsy or skin smears is strong evidence of leprosy.
- Infection may be accompanied by mild anemia, elevated erythrocyte sedimentation rate (ESR) and hyperglobulinemia.

Question

Which ONE statement about leprosy is FALSE?

- A Risk factors for infection include family contacts of untreated leprosy patients and poor socioeconomic status.
- B Loss of digits and extremities is due to sensation loss, trauma and secondary infection.
- C Leprosy infection has a high predilection for cooler regions of the body, including skin, mucous membranes and peripheral nerves.
- D Most clinical cases of leprosy appear within 1 to 2 months of exposure.
- E Leprosy can begin at any age.

Answer

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D Most clinical cases of leprosy appear within 1 to 2 months of exposure.

E Leprosy can begin at any age.

Explanation

The usual incubation period for leprosy is 3 to 5 years. Leprosy infection has a high predilection for cooler regions of the body, including skin, mucous membranes and peripheral nerves. Risk factors for infection include family contacts of untreated leprosy patients, compromised immunological status and poor socioeconomic status. Complications of leprosy typically include crippling of the hands and feet, usually due to sensation loss, trauma and secondary infection.

Leprosy Treatment

- Multidrug therapy is effective. *No segregation!*
- Components and duration of therapy is dependent on the form of leprosy.
- Paucibacillary: rifampicin and dapsons for 6 mo.
- Multibacillary leprosy: rifampicin, clofazimine and dapsons for 12 mo.
- Within one month, pts are no longer infectious
- Surveillance for complications like contractures, corneal opacities, and extremity trauma.
- Management often requires a multidisciplinary approach, including orthopedics, ophthalmology and physical therapy.

How Can Leprosy Be Prevented?



Leprosy Prevention and Control

- Success is largely based upon early case-finding and chemotherapy, and regular exam of close contacts for early detection of leprosy.
- BCG vaccine offers some protection against leprosy, but no effective vaccine is in use
- The greatest obstacle to elimination of leprosy continues to be misconceptions about the disease (“unclean”), to be overcome through effective health education and appropriate care of those suffering.

***Every Person Cared For
Is Also An Opportunity
To Improve Your Skills***



Polish your skills to serve forgotten people



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