




TUBERCULOSIS

Definition:-

- Oldest infectious disease in human history
- Bacterial, chronic, any part of the body.
- T.B → disability and death in many parts of world.
- No Rx → 1/2 of cases die within 2y.
- Rx nearly always results in cure
- 95% of initial infection → a long latent phase.
- < 5% may progress to PTB or EPTB.



- Those with pulmonary TB → infect between 10-15/year.
- 99% percent of TB deaths occur in the developing world

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- A large white left bracket and a large teal right bracket are positioned at the top of the slide, with a teal horizontal line connecting them across the width of the slide.
- **One-third of the world's population is infected by tuberculosis. Each year**
 - **8 million** of these develop the clinical disease → active TB
 - **Globally, TB is the second commonest cause of death, killing almost 2 million people annually**
 - **TB kills 4,700 people every day**
 - **One person is infected every second**

Global and Regional Incidence

- No country is free from T.B.
- Cities > rural areas
- Poor > rich
- Globally: 2.1 billion infected
 - **9 million New cases & 2 million deaths a year**
 - **90% in developing countries**
 - **80% in reproductive age group(15-54 Yrs)**
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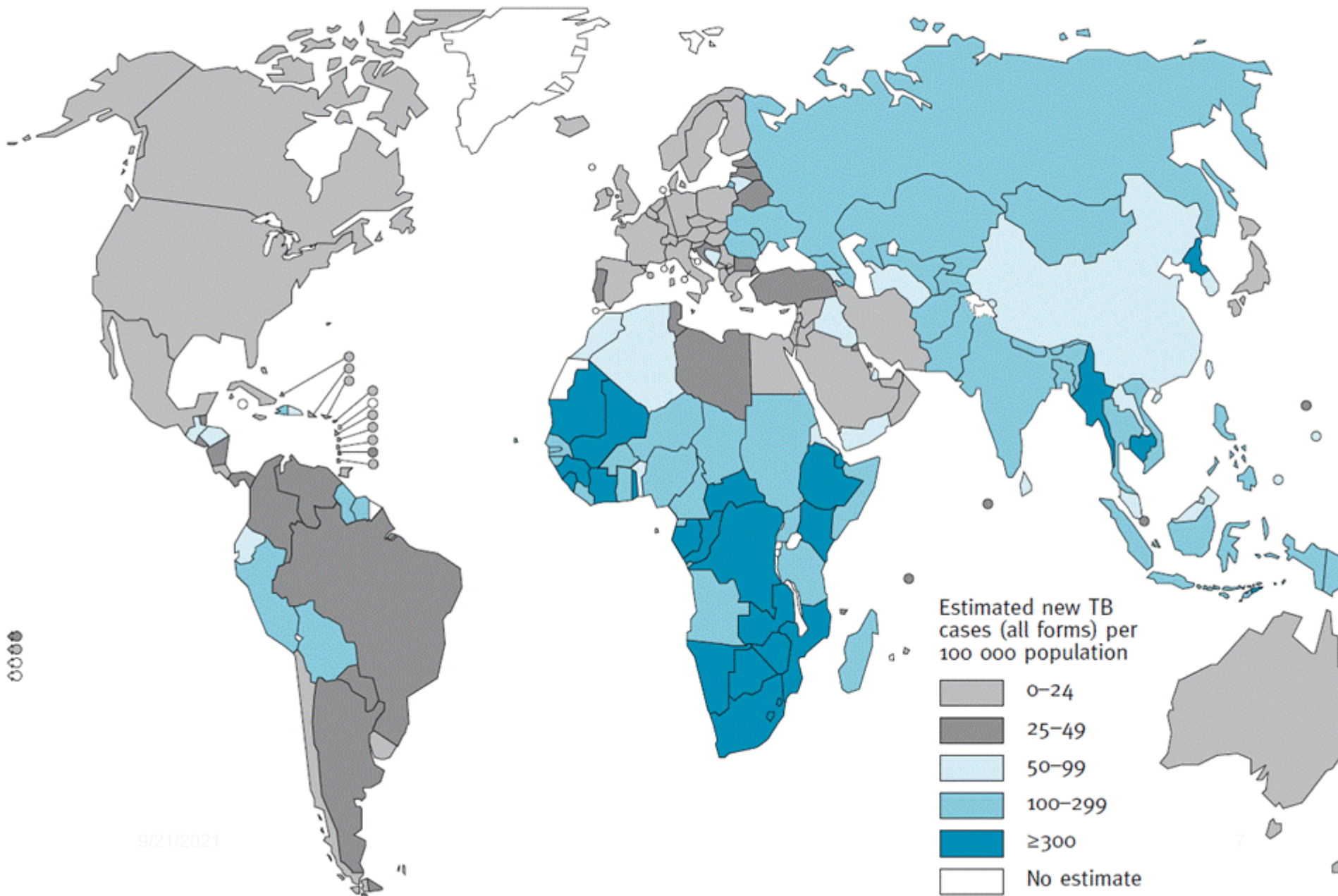

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- A large white left square bracket is on the left side of the slide, and a large teal right square bracket is on the right side. A horizontal teal line spans the width of the slide, positioned between the brackets.
- Kills economically productive age group, bet 15-49 years.
 - It primarily affects lungs, but can also affect skin, intestines, meninges, bones & joints, lymph glands & other tissues of the body.
 - Bovine tuberculosis which mainly affects cattle, can also be transmitted to man.

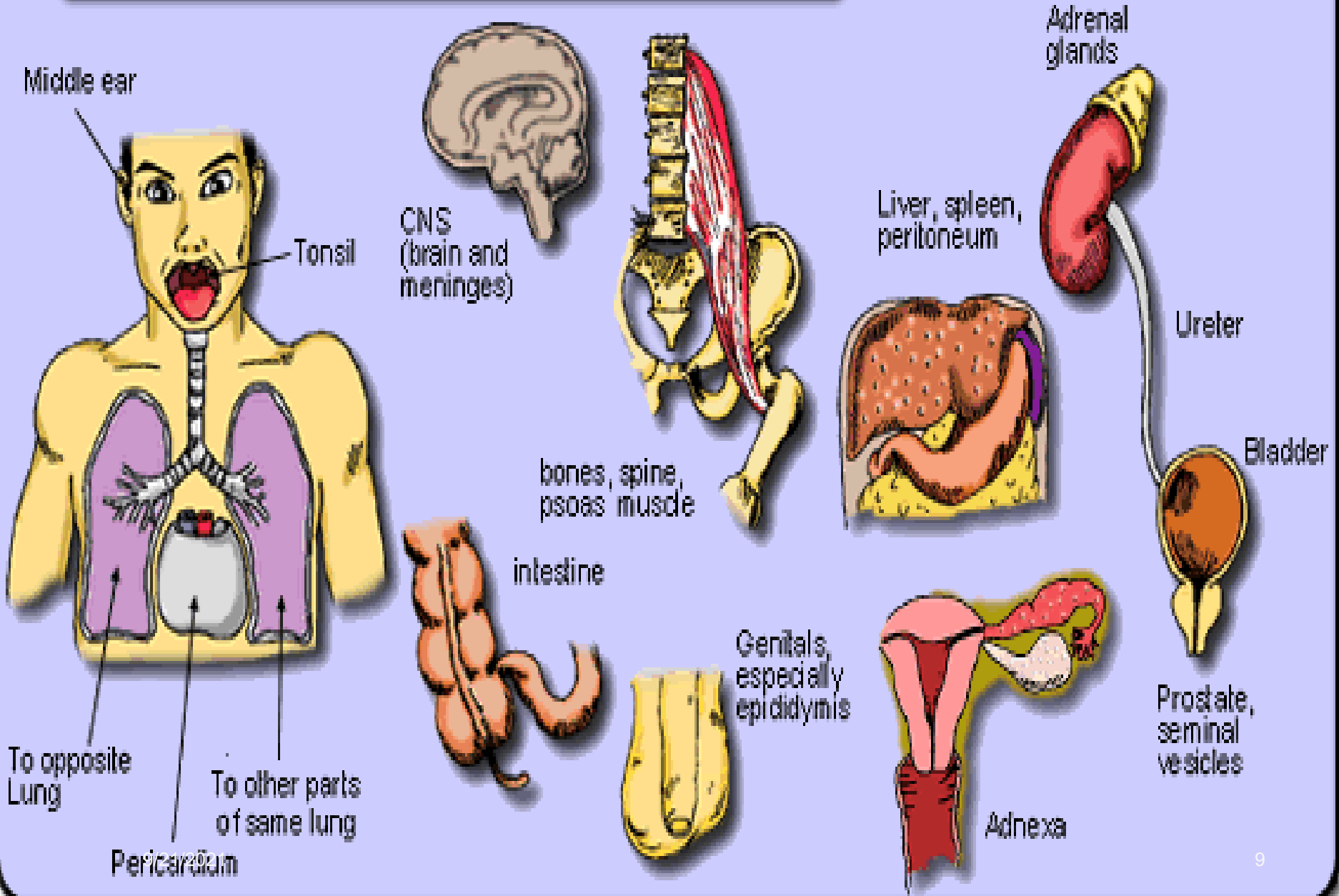
FIGURE 1

Estimated TB incidence rates, by country, 2009



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- Features of early stage: Fatigue, fever and weight loss are important early features
 - Features of advanced stage: Chest pain, cough and hemoptysis
 - CXR: “can precede clinical manifestations”
 - pulmonary infiltration
 - cavitations
 - fibrosis

Tuberculosis Affects Many Parts of the Body



[Agent and Reservoir:]

- M. tuberculosis in human, and M. bovis in cattle.
- Age:
 - Mortality and morbidity increase with age.
 - Serious outcome of initial infection is more frequent in unimmunized infants, adolescents and young adults.
 - Risk of developing disease is highest under 5 years of age, lowest later in childhood and high again among adolescents, young adults and the very old
- Gender:
 - Childhood → No difference.
 - Adult → mortality and morbidity in males>female .

[Incubation Period:]

- From infection to primary lesion (or positive tuberculin test) **4-12 wk**
- The highest risk of progressive PTB (or EPTB) is within the first or second year !!

Mode of Transmission

- TB is contagious airborne → droplet nuclei.
- When infected people cough, sneeze, talk or spit, they propel TB bacilli, into the air.
- Small no. needed for infection
- Bovine TB is transmitted through un-pasteurized milk or milk products.
- EPTB is not communicable
- TB can also be transmitted by direct invasion through wounds.

Communicability

- As long as there are viable bacilli in the sputum, but Infectivity is low
- But with intimate, prolonged contact there is 30% risk of infection
- Epidemics are reported among people congregated in enclosed spaces such as nursing homes, shelters for the homeless, hospitals, schools, prisons and office buildings.
- Communicability is influenced by the dose of bacilli, virulence, adequacy of ventilation and aerosolization of bacilli by cough
- Antimicrobial therapy can reduce the risk of infection significantly within few days to few weeks.



- **Patients remain infected unless treated.**
- **Effective chemotherapy reduces infectivity by 90% within 48 hours**

[Susceptibility]

Markedly increased with:

- **Immuno suppression (including HIV).**
- **Malnutrition.**
- **Silicosis.**
- **DM.**
- **Gastrectomy.**
- **Drug abuse.**

[Case Detection]

- TB Dx → Hx, clinical exam and diagnostic tests.
- Sputum smear microscopy is the most cost-effective method of screening PTB.

[TB In Iraq]

Incidence of all New TB cases

56 / 100000 Pop.

➤ **Incidence of New SS+ PTB**

25 / 100000 Pop.

➤ **Mortality of TB**

11 / 100000 Pop.

➤ **CDR (case detection) 43%**

➤ **TSR(treatment success) 85%**

Why **TB** Incidence, Mortality Increasing?

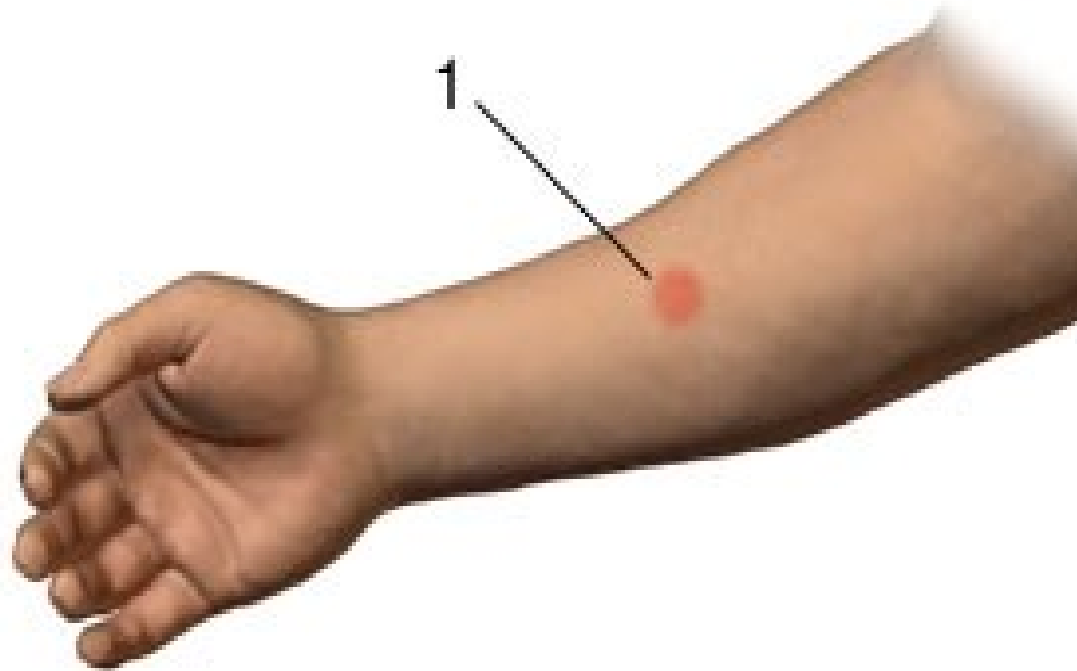
- Poor strategic Plans
- HIV/AIDS: **HIV is accelerating the spread of TB:**
 - **HIV ↔ TB**
 - **TB → leading cause of death in HIV-positive**

➤ MDR-TB:

disease due to TB bacilli resistant to at least INH and R (most powerful 2). MDR-TB is rising at alarming rates in some countries, especially in former Soviet

- Poverty
- War, Immigration
- No effective Vaccine
- No New Drugs

POSITIVE TUBERCULIN TEST



9/21/2021



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Size of reaction	Persons considered to have \oplus test
>5 mm	HIV \oplus or immunosupp (eg, prednisone 15 mg/d \times >1 mo) Close contacts with Pt w/ active TB; CXR w/ apical fibrosis c/w TB
>10 mm	All other high-risk or high-prevalence populations Recent conversion (\uparrow in induration by >10 mm in last 2 y)
>15 mm	Everyone else
False \ominus	Faulty application, anergy (including from active TB), acute TB (2–10 wk to convert), acute non-TB infections, malignancy
False \oplus	Improper reading, cross-reaction with nontuberculous mycobacteria (NTM), BCG vaccination (although usually <10 mm by adulthood)
Booster effect	\uparrow induration due to immunologic boost by prior skin test in previously sensitized individual (by TB or NTM, or BCG). Test goes from $\ominus \rightarrow \oplus$ but does <i>not</i> represent true conversion due to <i>recent</i> infection. 2nd test is Pt's true baseline. Can be 1 y after initial test.

Tuberculin reaction is suppressed in

- Critically ill TB patients
- Infections (measles)
- Live attenuated viral vaccines
- Immunosuppressed
- Pregnancy



At the Source

By treating tuberculosis
according to
WHO *recommendations*

PREVENTION of T.B

1. Health Education:

- Mode of spread
- Methods of control
- Importance of early diagnosis
- Importance of proper prolonged treatment

2. Provide facilities for early diagnosis and treatment for:

- Cases
- Contacts (symptomatic or not)
- Suspects who:
 - Have chronic respiratory symptoms

3. Outreach Services:

- Supervision of treatment of cases
- Arrange for examination of contacts and suspects in the community

4. BCG vaccination for:

- Infants
- Negative tuberculin (esp. contacts)

5. Bovine T.B.

- Slaughter of tuberculin reactors
- Pasteurization of milk

[CONTROL of T.B]

1. Report to local health authorities

2. Cases :

- Prompt treatment
- Hospitalize if :
 - Severely ill
 - Open case
 - Home treatment is difficult or impossible for social or medical reasons
- Cover mouth and nose when coughing or sneezing
- Re-emphasize adherence to Rx regimen.
- Adequate ventilation

CHEMOTHERAPY

ANTI-TUBERCULOUS DRUGS: should be

- Highly effective
- Free from side-effects
- Easy to administer
- Reasonably cheap, free or easily available

TWO-PHASE CHEMOTHERAPY:

- Short, aggressive & intense phase, 1-3 months, (3 or more drugs are combined)
- Continuation phase of 6-9 months



BACTERICIDAL DRUGS:

- Rifampicin
- Isoniazid
- Streptomycin
- Pyrazinamide

BACTERIOSTATIC DRUGS:

- Ethambutol
- Thioacetazone

[DOTS]

It is the most effective strategy available for controlling the TB epidemic today !!!

- DOTS is a successful mean of TB control and management practice for widespread use through PHC network
- implementation of DOTS include health sector reforms
- The technical, logistical, operational and political aspects of DOTS work together to ensure its success and applicability in a wide variety of contexts
- WHO and its international partners have formed the DOTS-Plus Working Group, which is attempting to determine the best possible strategy to manage MDR-TB. One of the goals of DOTS-Plus is to increase access to expensive second-line anti-TB drugs for WHO-approved TB control programs in low and middle income countries



- **The best cost effective strategy being used world-wide to ensure cure of tuberculosis.**
- **During intensive phase a health worker watches as patients swallow the drugs.**
- **In continuation phase, medicine is issued in multi blister pack weekly.**
- **Successful chemotherapy depends on adequate and regular drug intake.**
- **Through DOTS a cure can be assured.**

DIRECTLY OBSERVED TREATMENT, SHORT COURSE (DOTS) CHEMOTHERAPY

five key components:

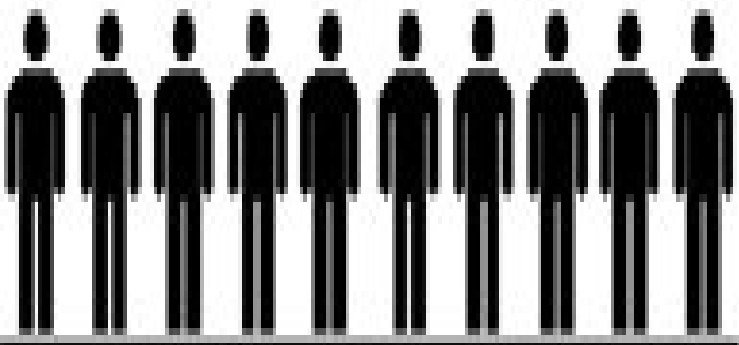
1. Government commitment to sustained TB control activities.
2. Case detection by sputum smear microscopy among symptomatic patients self-reporting to health services.
3. Standardized treatment regimen of six to eight months for at least all sputum smear- positive cases, with DOTS for at least the initial two months.
4. A regular, uninterrupted supply of all essential anti-TB drugs.
5. A standardized recording and reporting system that allows assessment of treatment results for each patient and of the TB control program performance overall (WHO 2004).

Advantages of DOTS

- Accuracy of TB diagnosis is doubled
- Treatment success rate is upto 95%
- Prevents spread of infection, thereby, reducing incidence and prevalence rates
- Improve quality of health
- Prevents failure of treatment & emergence of MDR-TB
- Helps alleviating poverty by saving lives

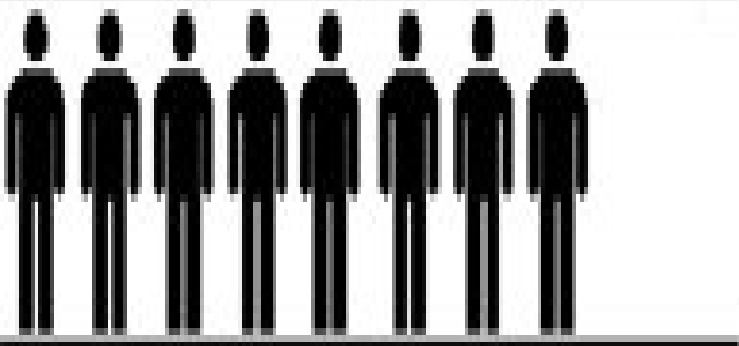
Effective TB Control

- WHO targets are to detect 70% of new TB cases and to cure 85% of those detected.
- WHO-recommended Rx strategy for detection and cure of TB is DOTS
- **DOTS combines five elements;**
 - **political commitment**
 - **microscopy services**
 - **drug supplies**
 - **surveillance and monitoring systems**
 - **use of highly efficacious regimes with direct observation of treatment**



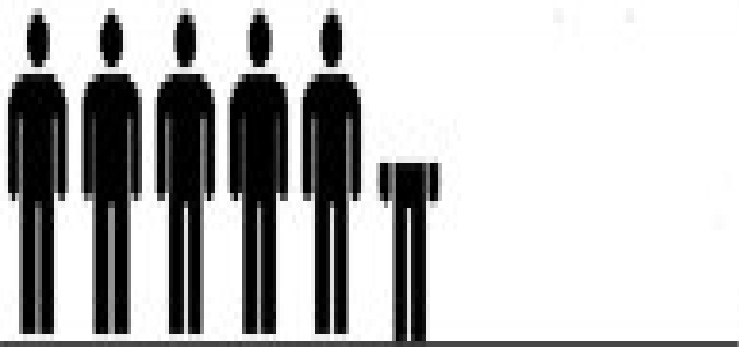
100%

All people with active TB (about 8 million new cases per year)



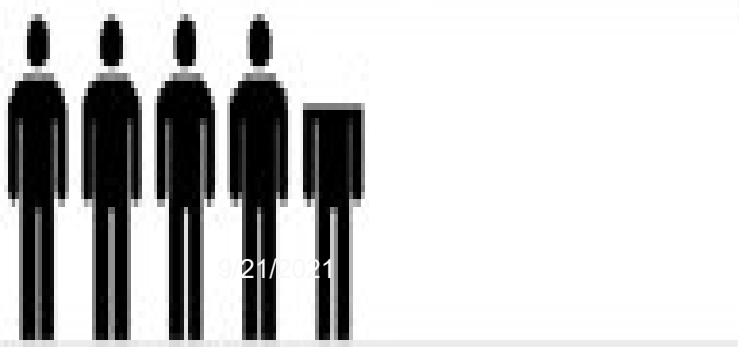
80%

People with active pulmonary TB




56%


DOTS case finding goal: 70% of all active pulmonary patients

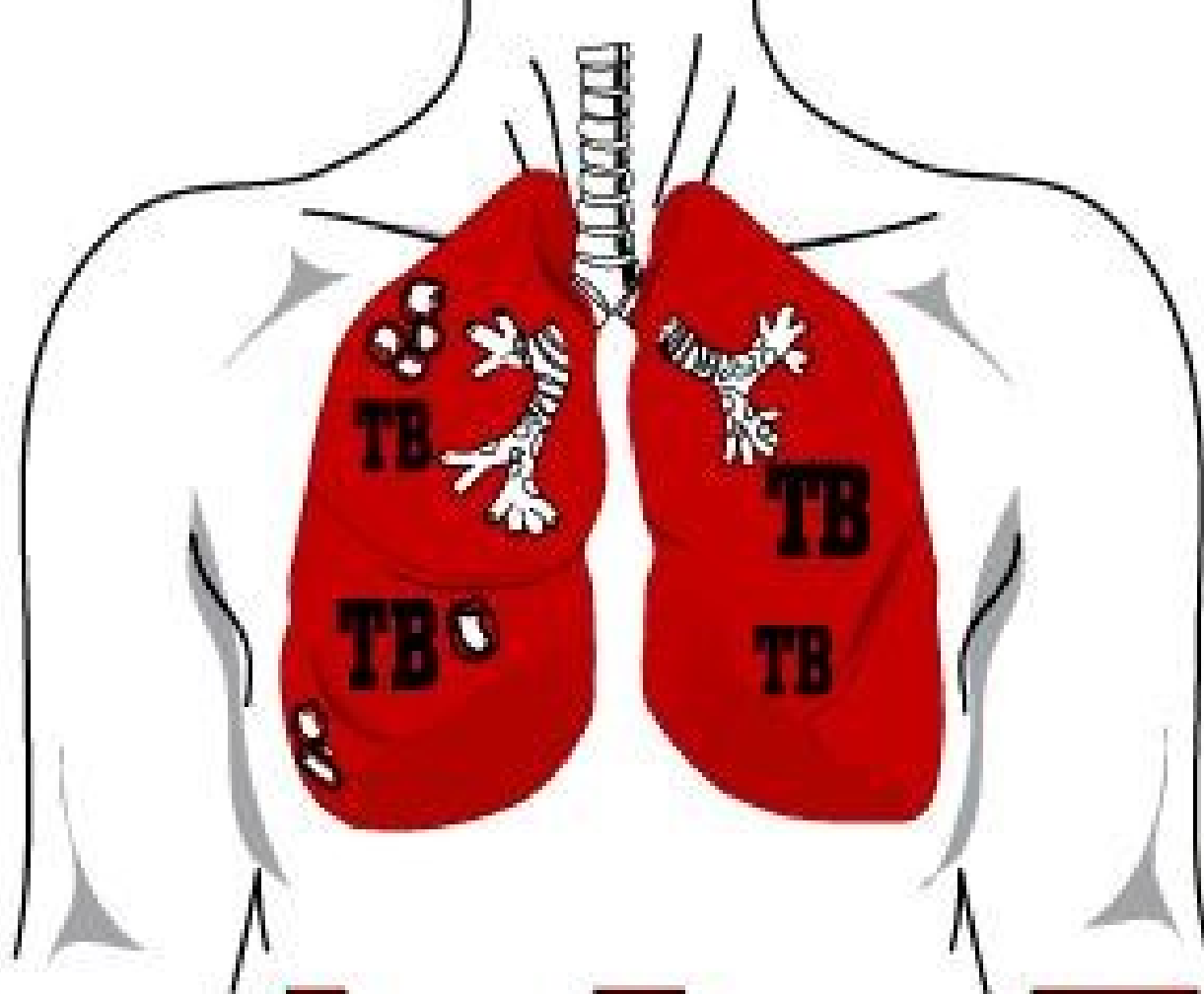


48%

DOTS treatment goal: 85% cure rate for detected smear+ patients

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- Once Dx by microscopy, health and community workers and trained volunteers observe and record patients swallowing the full course of the correct dosage of anti-TBs (Rx lasts 6-8 month)
 - The most common anti-TBs; INH, rifampicin, pyrazinamide, streptomycin and ethambutol.
 - Sputum smear testing is repeated after two months, to check progress, and again at the end of treatment.
 - DOTS produces cure rates of up to 95% even in poorest countries
 - DOTS prevents development of MDR-TB by ensuring full Rx
 - DOTS → “most cost-effective of all health interventions.”

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 - DOTS produces cure rates of up to 95% even in poorest countries
 - DOTS prevents the development of MDR-TB by ensuring the full course of treatment
 - DOTS strategy is the “most cost-effective of all health interventions.”
 - WHO targets are to detect 70% of new TB cases and to cure 85% of those detected.



HEAR **A**CT **L**EARN **T**REAT

TUBERCULOSIS