A microscopic view of numerous Mycobacterium tuberculosis bacteria, which are rod-shaped and pinkish-red in color, set against a dark background. The bacteria are scattered across the frame, with some appearing in small clusters and others as individual rods.

Tuberculosis Outbreak in Kansas: Lessons learned from a Community Response

Matt Shoemaker, DO, FIDSA

Disclosures

- None

Good afternoon. I'm reaching out to this group as you have been identified as possibly being exposed to a tuberculosis

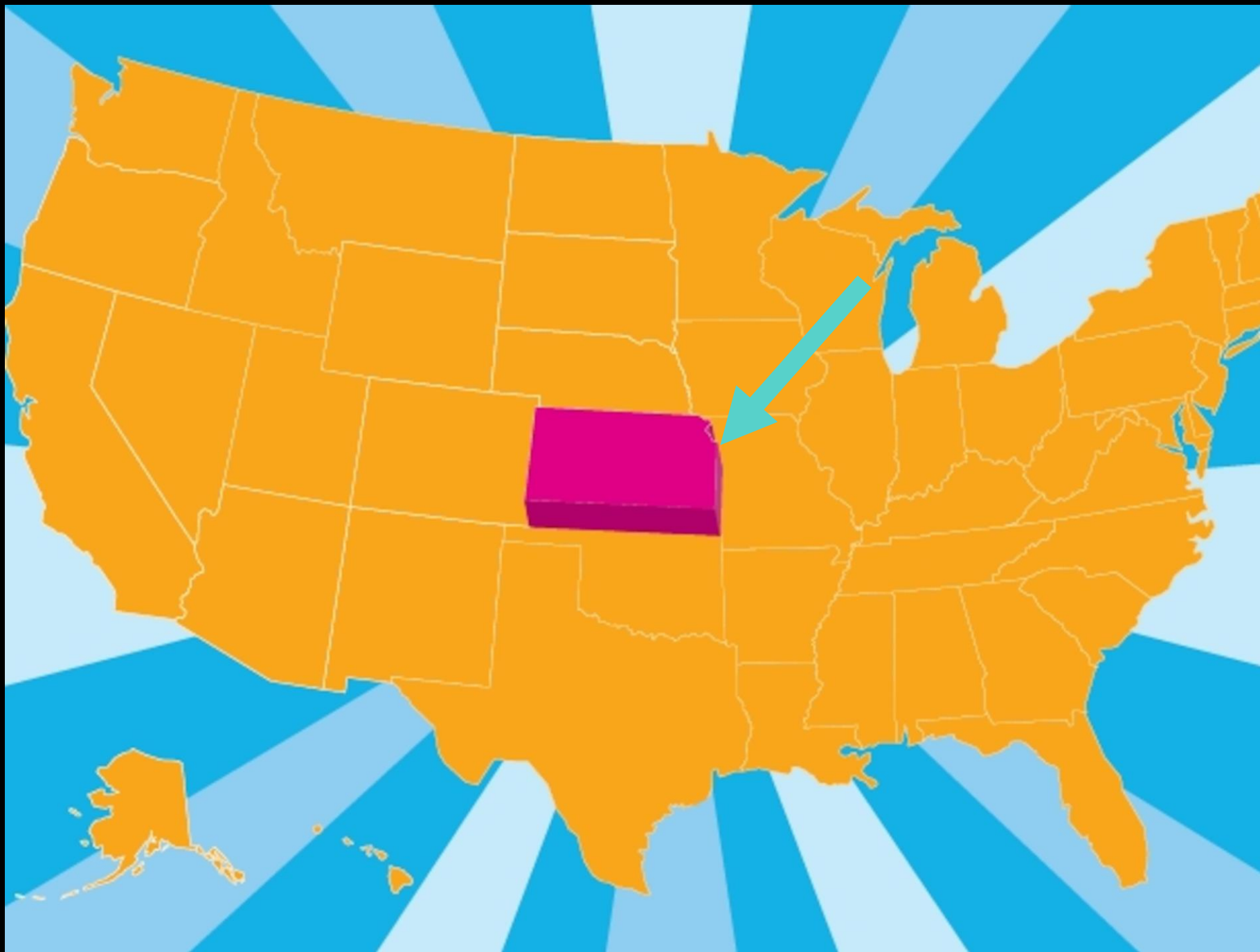
***Yet the captain of all
these men of death that
came against him to take
him away was Captain
Consumption, for he it
was that brought him
down to the grave.***

The Life and Death of Mr. Badman
John Bunyan (1680)



Objectives

- Examine the facts and contributing factors of the Kansas City TB outbreak
- Describe the coordinated response efforts between healthcare providers and public health agencies
- Identify lessons learned and strategies for improving future outbreak preparedness



Largest outbreak

KANSAS TUBERCULOSIS

Active cases

►► **67**

As of Jan. 25

Latent infections

►► **79**

Since 2024

KANSAS DEPARTMENT OF HEALTH AND SENIOR SERVICES

©CBS NEWS 24/7

HEALTH

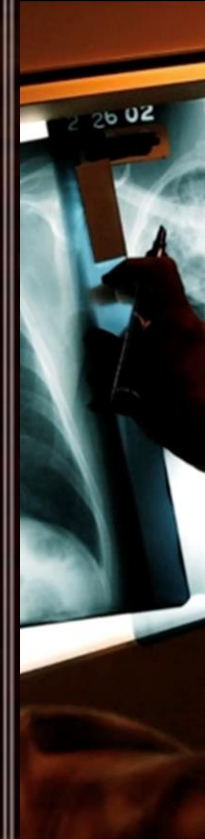
KANSAS
OUTBREAK IN HISTORY, 67 ACTIVE CASES REPORTED

**I DON'T ALWAYS EXPOSE
COWORKERS WITH TB**

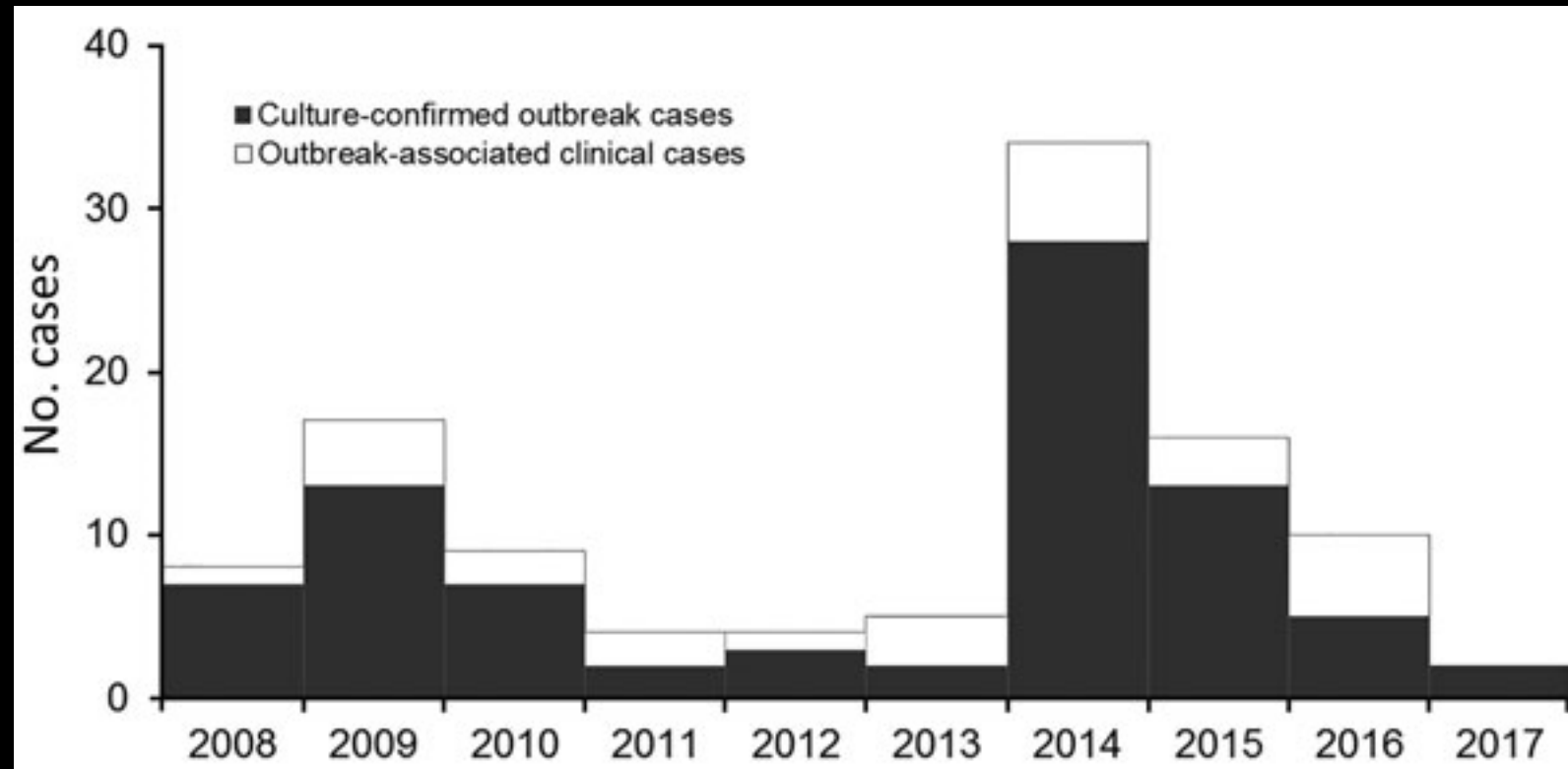


**BUT WHEN I DO, I MAKE SURE
IT MAKES NATIONAL NEWS.**

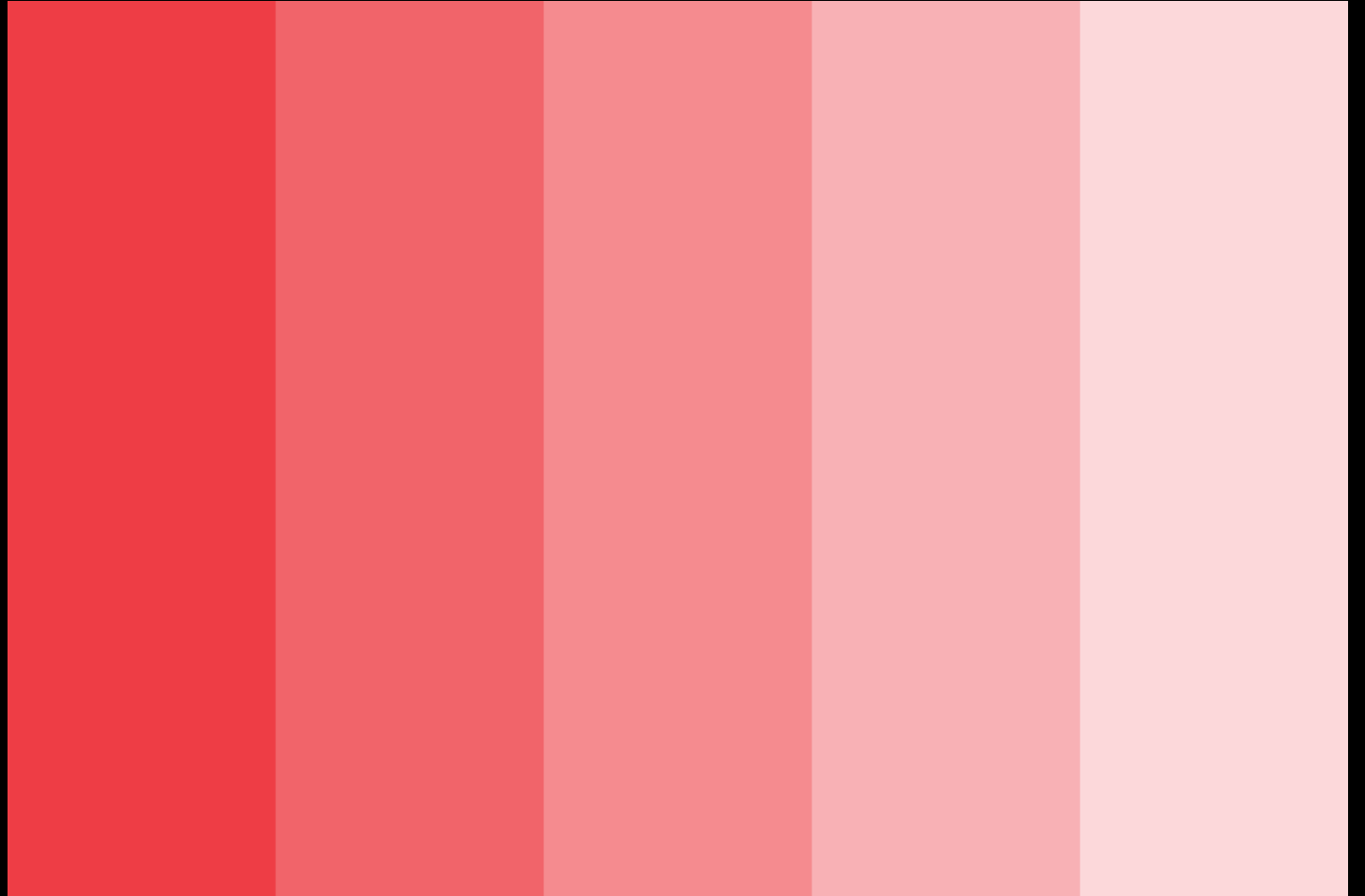
imgflip.com



174 cases homeless shelters GA

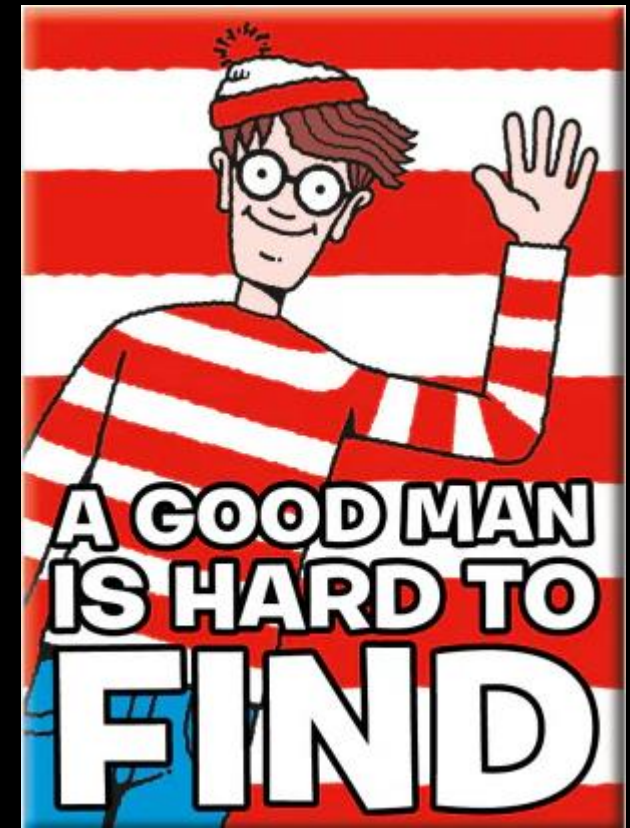


Tuberculosis Color Palette



Case: Act I

- 40-year-old male from TB endemic area
- Contact with case of active TB
- Significant difficulty tracking him down



Substrate

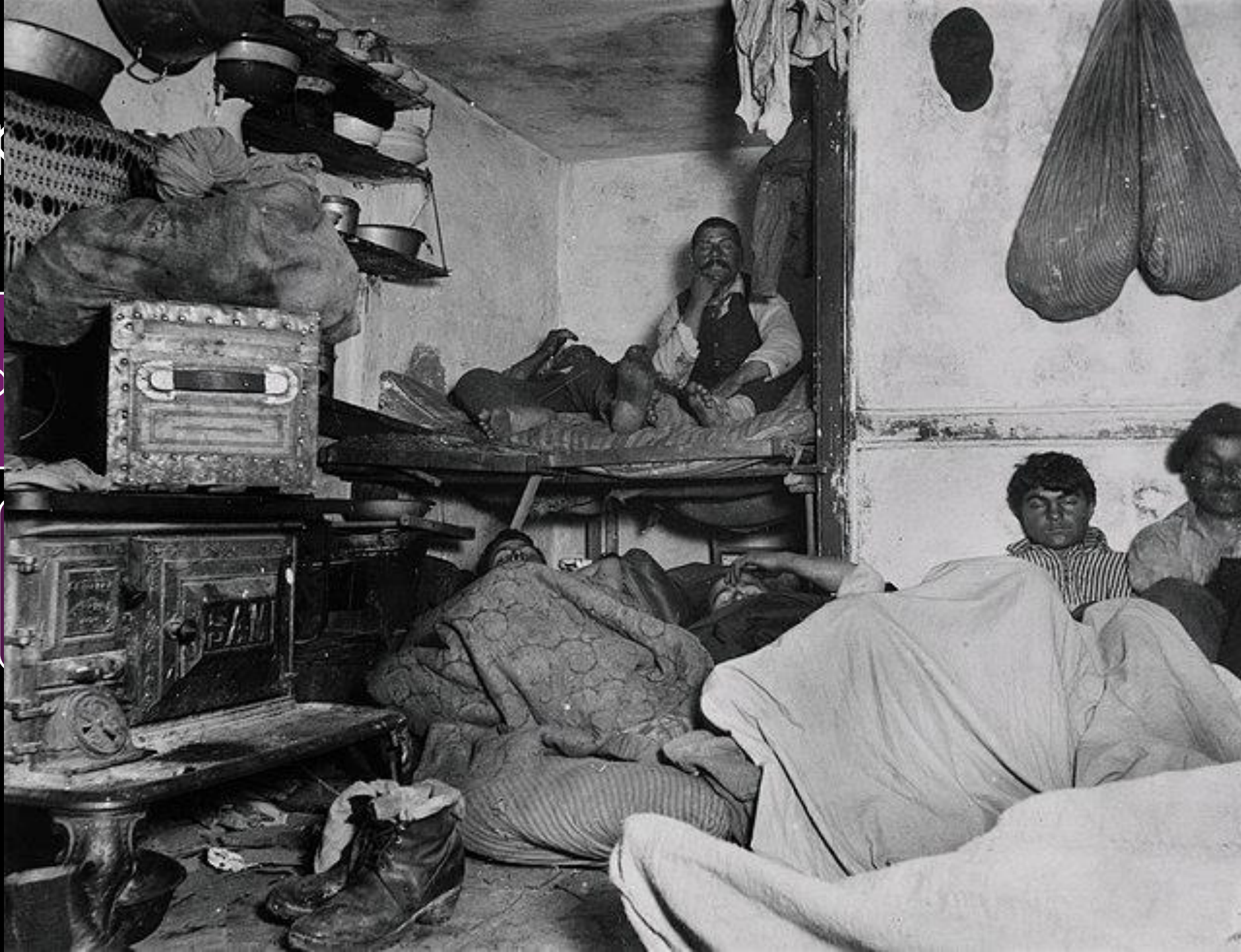


TUBERCULOSIS OUTBREAK

- Folks from TB endemic area
- Unaddressed LTBI
- High rates of diabetes
- Multi-generational houses
- Community gatherings
- Public school attendance
- Factory line work
- Lack of transportation
- Financial insecurity
- Language barrier
- Health literacy
- Medicine distrust
- TB stigma

Cap

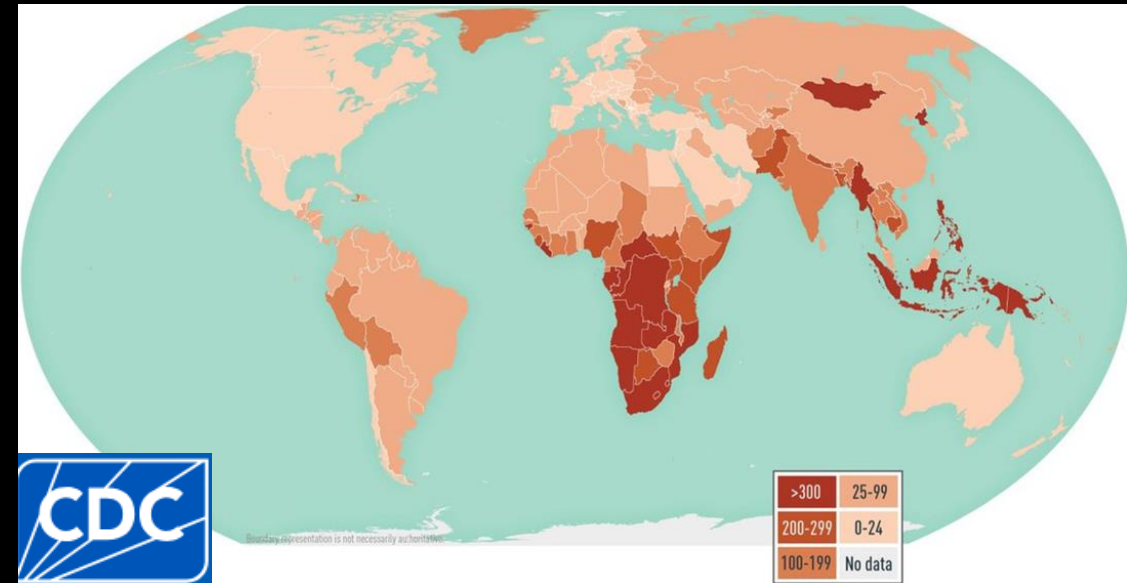
Evio



The White Plaque

- Burden of disease (2023)
 - ¼ of world's population
 - 10.8 million disease
 - 1.25 million deaths
- Leading infectious killer
 - **3500 deaths per day**
- **AIDS**
 - Highest risk factor for progression

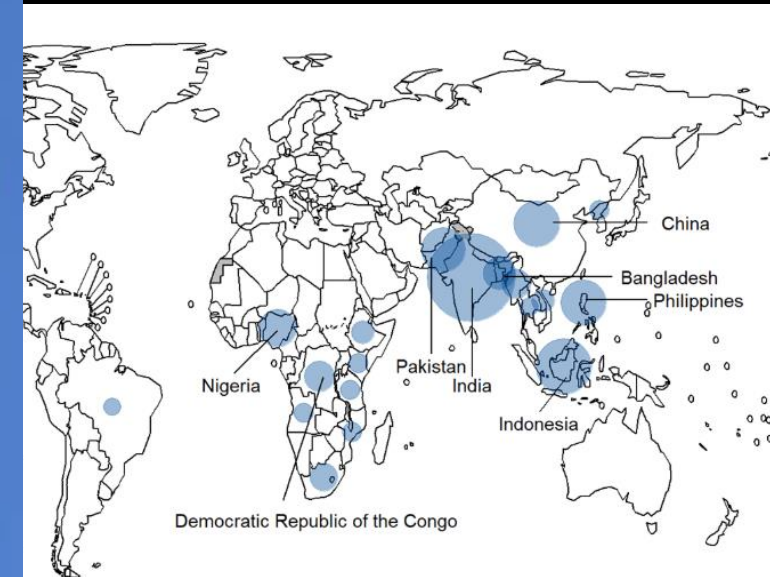
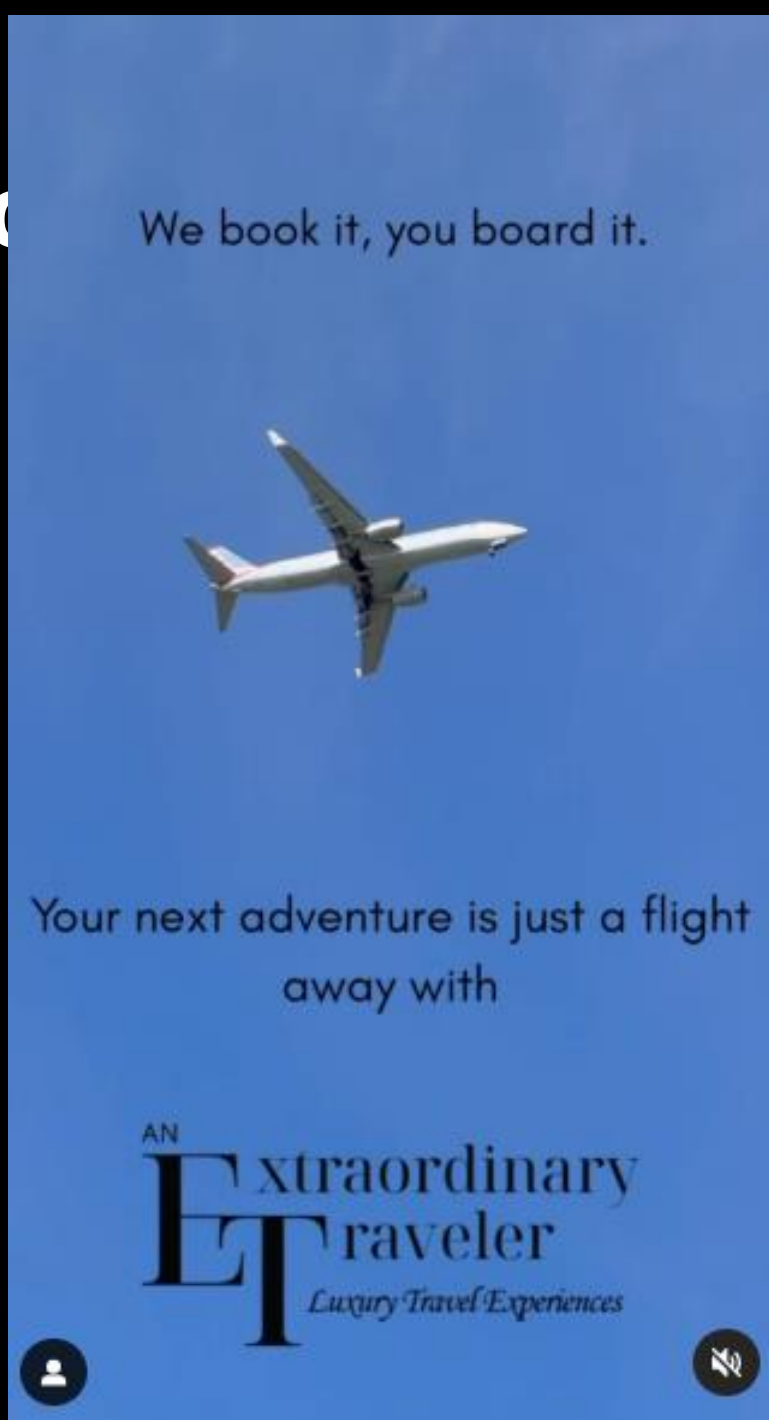
Tuberculosis incidence rates per 100,000 population



Burden of Tuberculosis

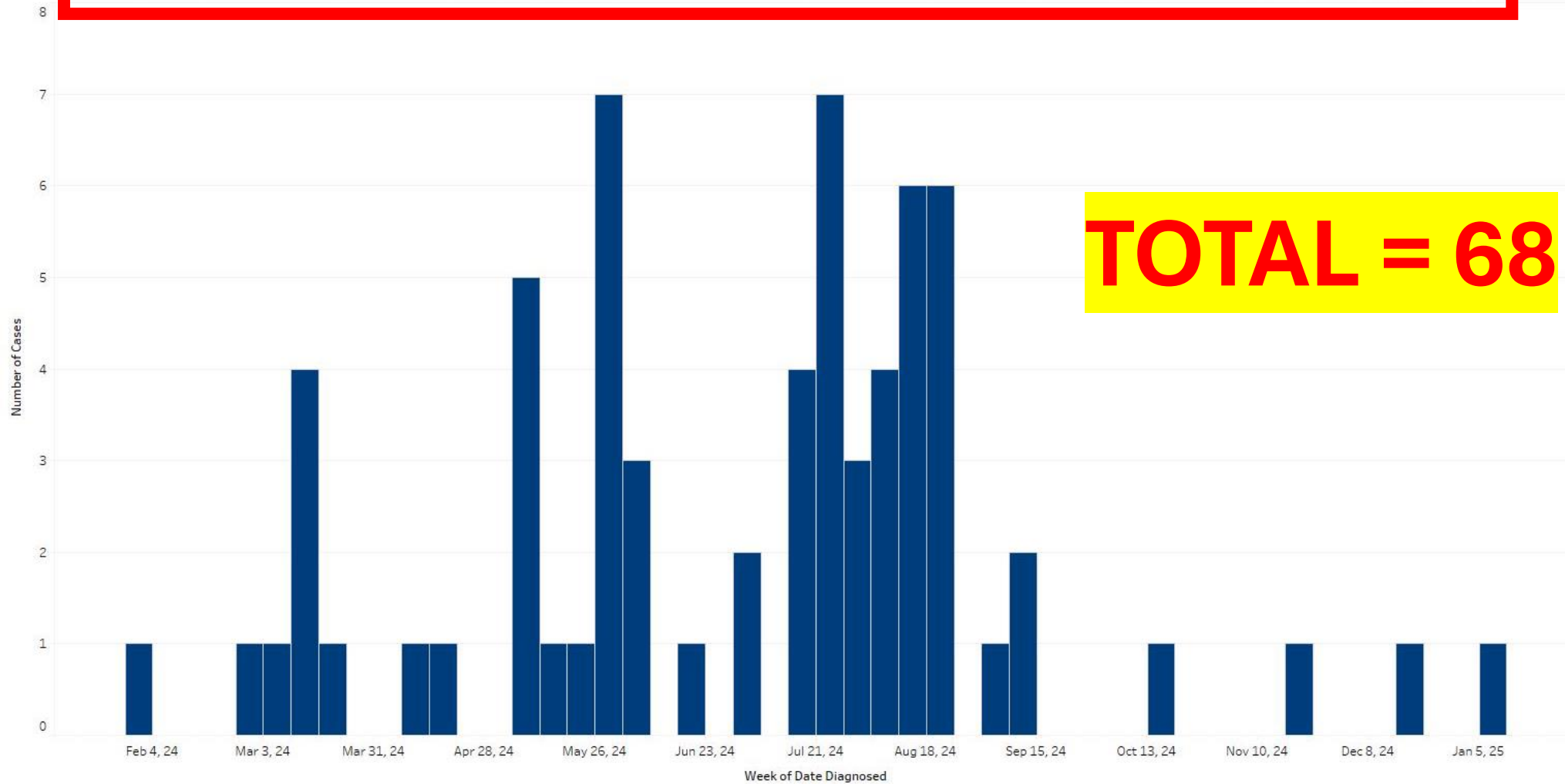
- 8 countries account for
- Bangladesh
- China
- Democratic Republic of
- India
- Indonesia
- Nigeria
- Pakistan
- Philippines

de (2023)

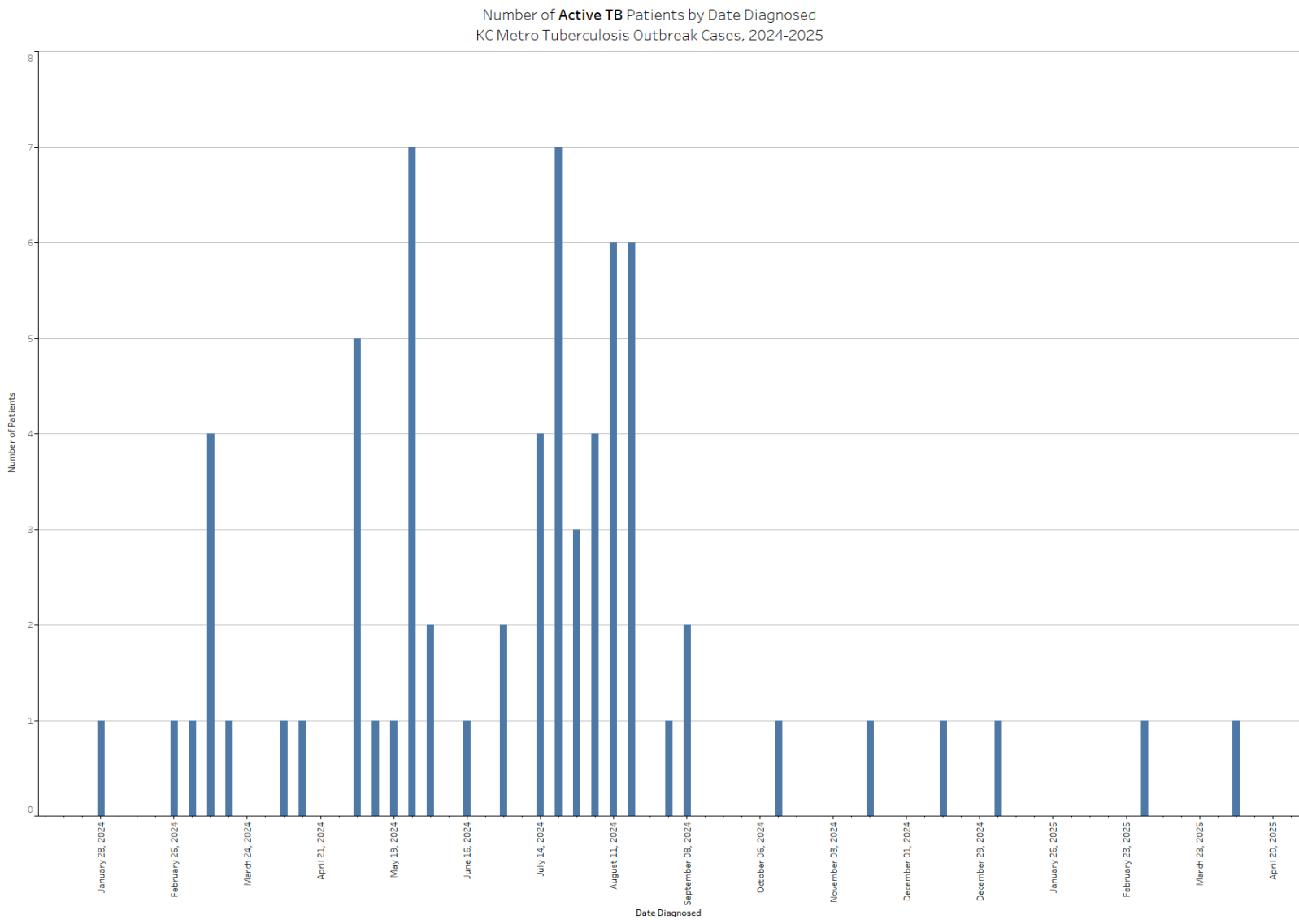


(countries with at least 100K) cases)

Number of Outbreak-Associated Active Tuberculosis Cases by Date Diagnosed, 2024-2025 KC Metro (N=67)



Outbreak Active TB Cases





**Care, treatment, and
study of tuberculosis**

New Tuberculosis Nomenclature

Latent tuberculosis

TB Infection (previously latent TB)

- Cell-mediated immune response after exposure to *M. tuberculosis*
- Infected but without illness

TB Disease (previously active TB)

- Illness due to *M. tuberculosis*

Active tuberculosis

Tuberculosis Is A Spectrum



Clinical category	Asymptomatic infection	Symptomatic disease
Pathologic finding	NS*	Tubercles
Microbiology test	Sputum culture negative	Sputum culture positive
Immunologic test	Tuberculous immunoreactivity (TST or IGRA)	
Public health goal	Not contagious	Contagious

↑ Pathogen Acquisition = Infection
 ↑ Pathogen Elimination: Natural or Treated

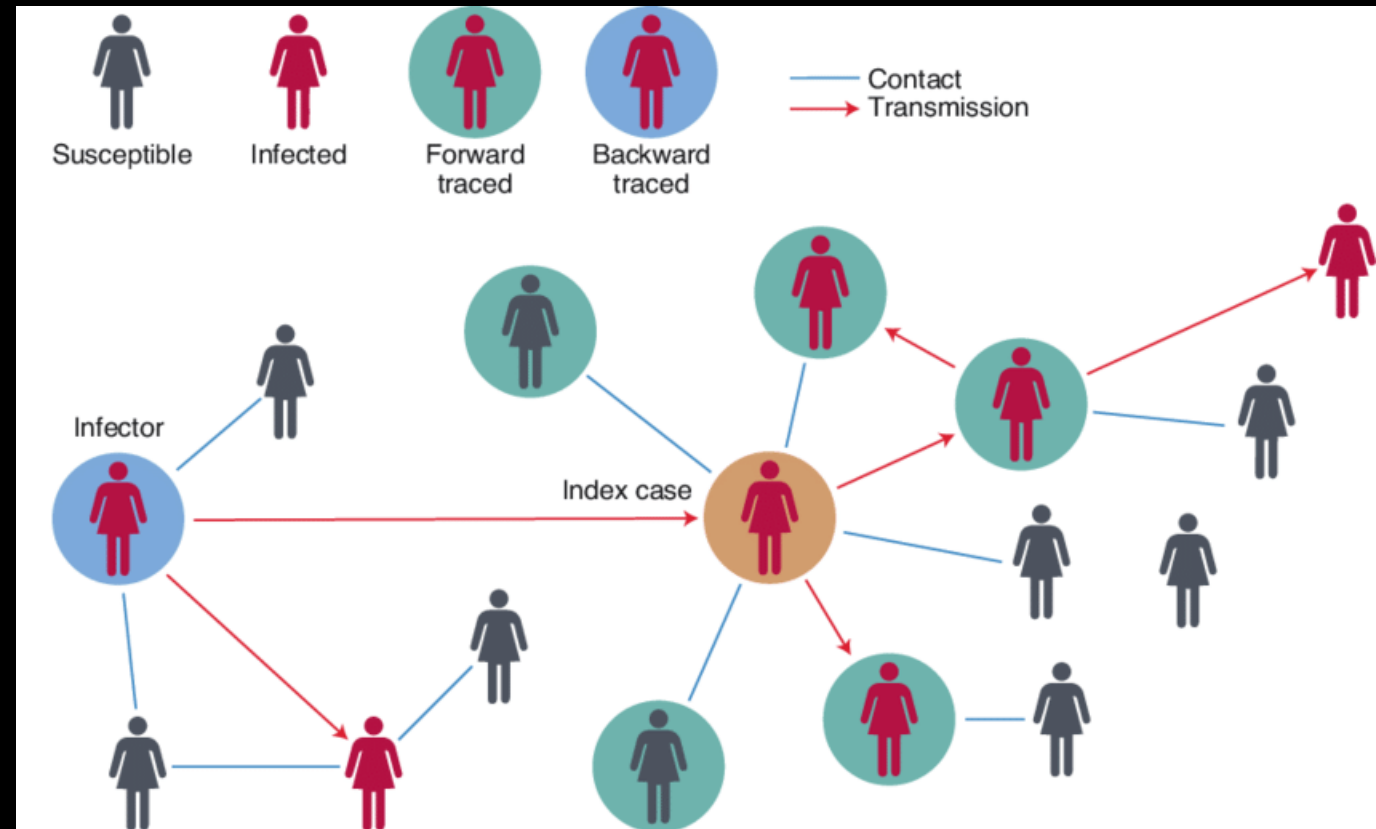
Case: Act II

- He denied any symptoms but...
- Friends and family reported that he was coughing up **blood** and losing weight

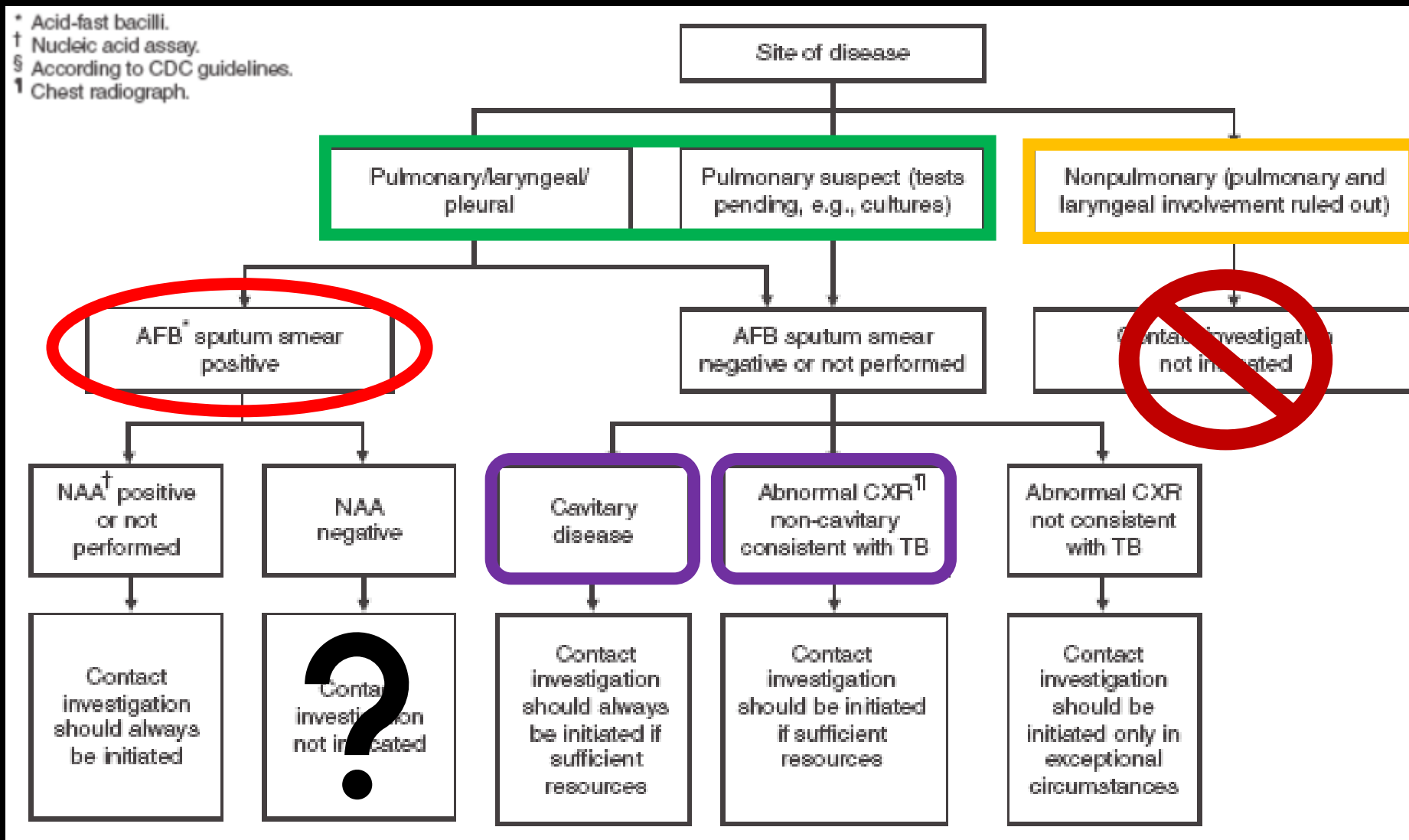


Contact tracing

- Process of identifying people who have recently been in contact with someone with an infectious disease
- **Index case:** the earliest known case in an outbreak



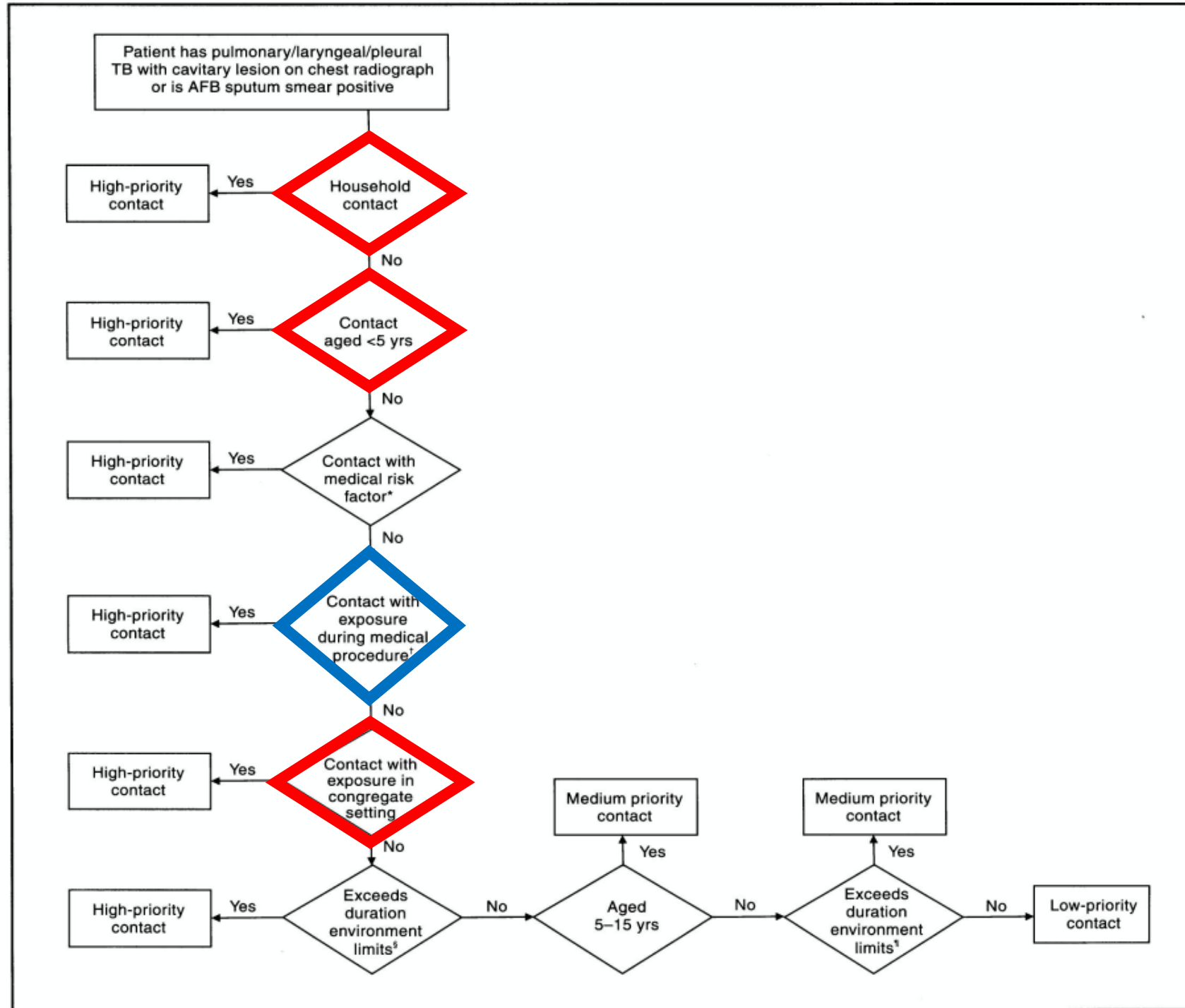
Decision to Initiate a TB Contact Investigation



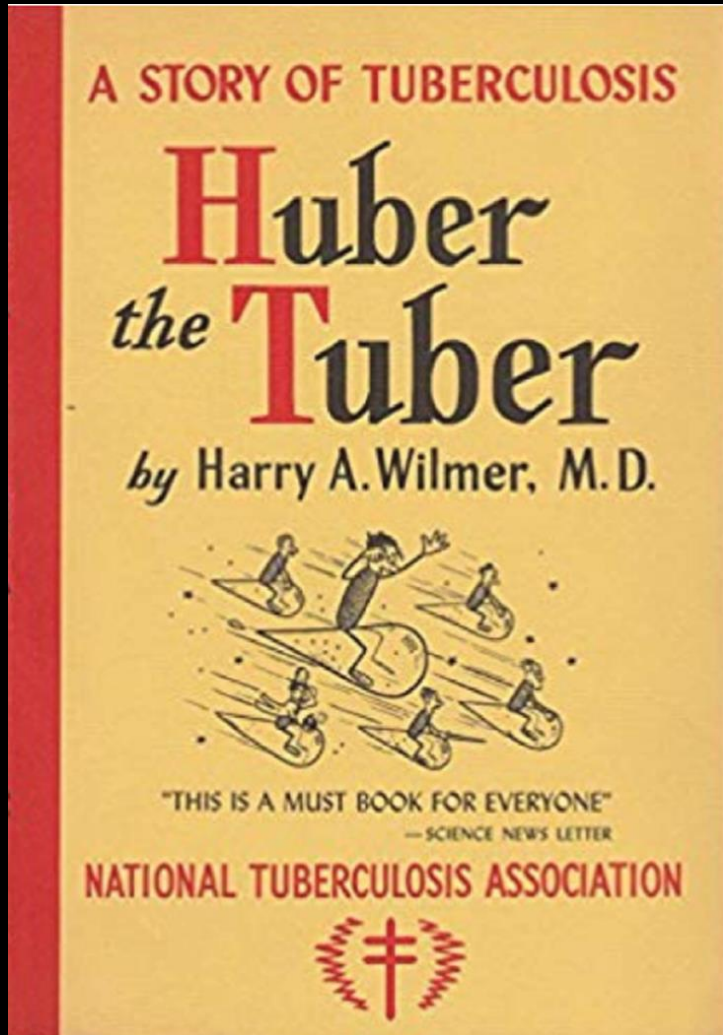
Prioritization of Contacts Exposed



Sputum AFB smear (+)
or
Cavitary pulmonary TB



Transmission of tuberculosis



How long is long enough?

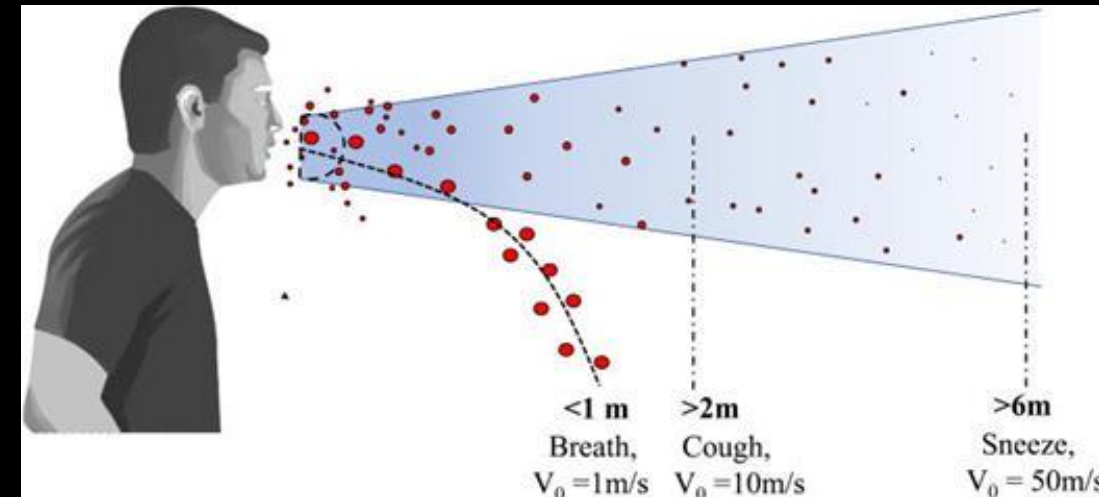
8 hours per week*

Close contact time

Generally, days to weeks

Tuberculosis transmission

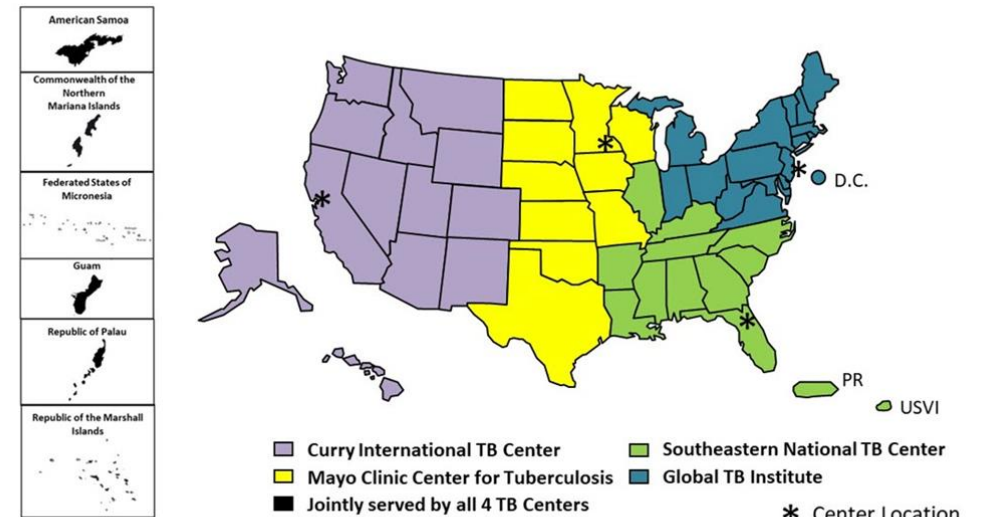
- Person to person
- Singing, sneezing, coughing, speaking, breathing
- Inhalation droplet nuclei
 - 1 to 5 mm diameter
- Increased risk
 - Untreated pulmonary and/or laryngeal TB
 - Cavitory lung disease
 - Sputum AFB smear (+)
 - Sputum TB NAAT (+)
 - Sputum AFB culture (+)
 - Short time to sputum AFB culture (+)
- Isolated extra-pulmonary* TB **NOT** contagious
- Immunocompromised considered pulmonary TB until proven otherwise



Tuberculosis Centers of Excellence

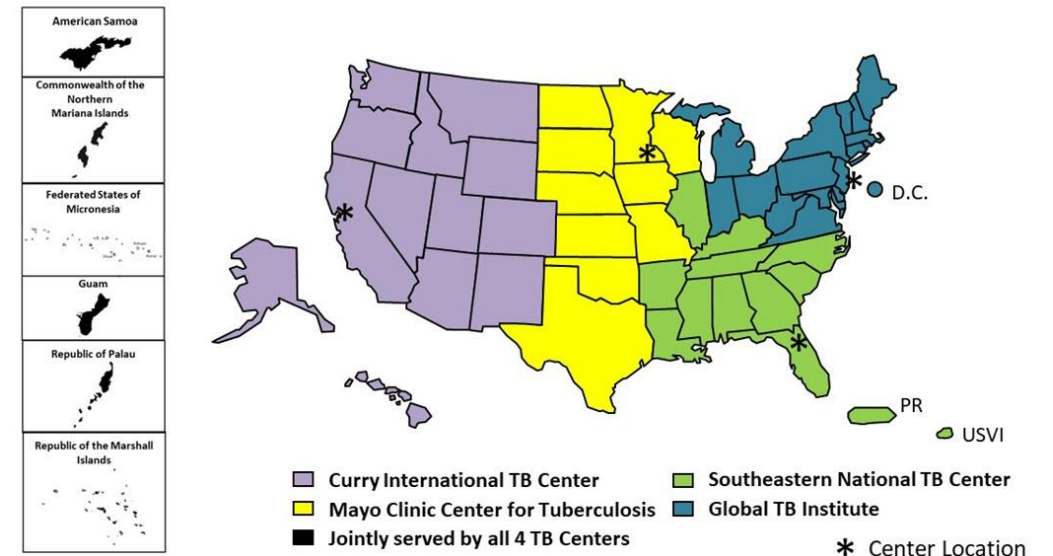
Supports TB control and prevention efforts

- Increasing knowledge, skills, and abilities for TB prevention and control through communication, education, and training activities
- Improving sustainable evidence-based TB clinical practices and patient care through the provision of expert medical consultation



Tuberculosis Centers of Excellence

- <https://www.currytbcenter.ucsf.edu/>
- <https://centerfortuberculosis.mayo.edu/>
- <https://sntc.medicine.ufl.edu/home/index#/>
- <https://globaltb.njms.rutgers.edu/>



Public Health – Local, State, CDC

- Staffing, staffing
- Contact investigation
- Treatment
- Prevention
- Education
- Communication
- Laboratory support
- Coordination/leadership
- Community engagement



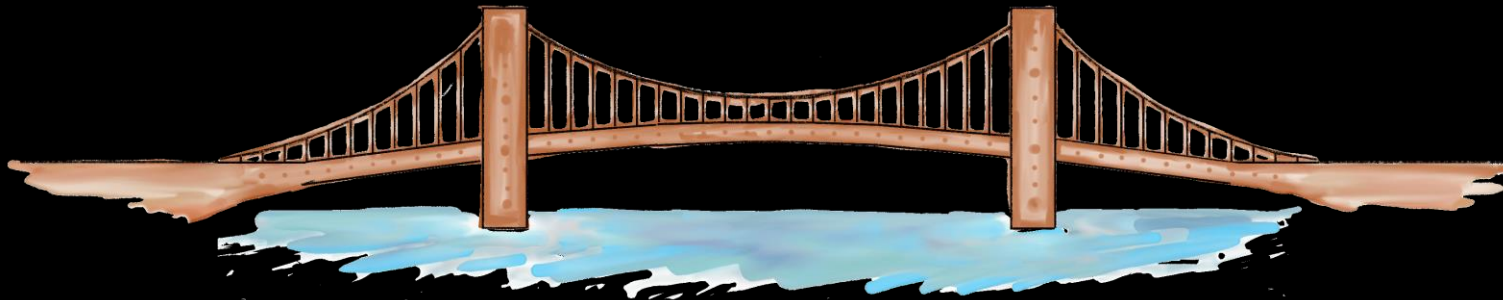
Case: Act III, Scene i

- 12/20/2024
 - Tuberculin Skin Test (TST) placed
 - Sputum
 - AFB smear: Negative
 - MTB NAAT: Negative
 - AFB culture: **PENDING**
 - Badge at work deactivated until TB workup complete
- 12/23/2024
 - **TST 16 mm induration**



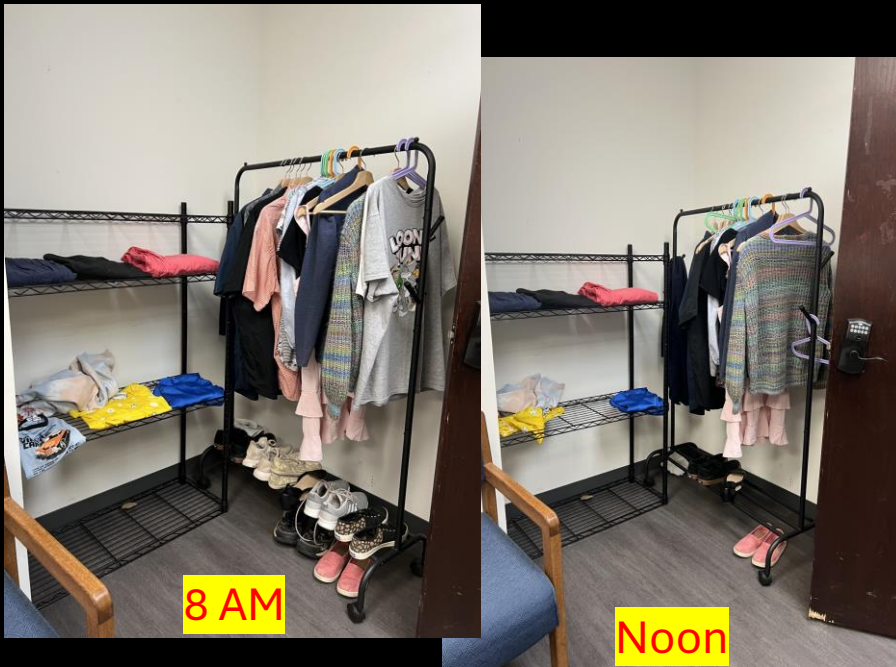
Community health workers (CHWs)

- Trusted member of the community
- Bridge between individuals, communities, and health and social services
- Understands the unique needs, experiences, and cultural nuances of the community they serve
- **Invaluable!**



A TRULY GREAT
**COMMUNITY
HEALTH
WORKER**
IS HARD TO FIND
DIFFICULT TO PART WITH
AND IMPOSSIBLE
TO FORGET

Community health workers (CHWs)

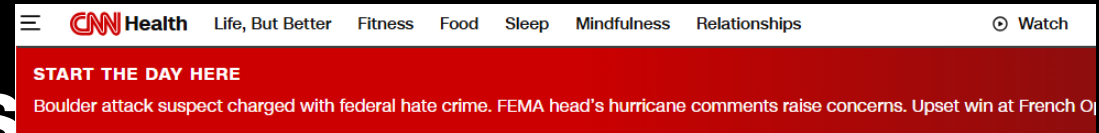


Going for
my CXR!!!

Medication
Adherence



Public health funding pos



Tuberculosis is the world's top infectious killer. Aid groups say Trump's funding freezes will cause more deaths

How it started:

How it's going:

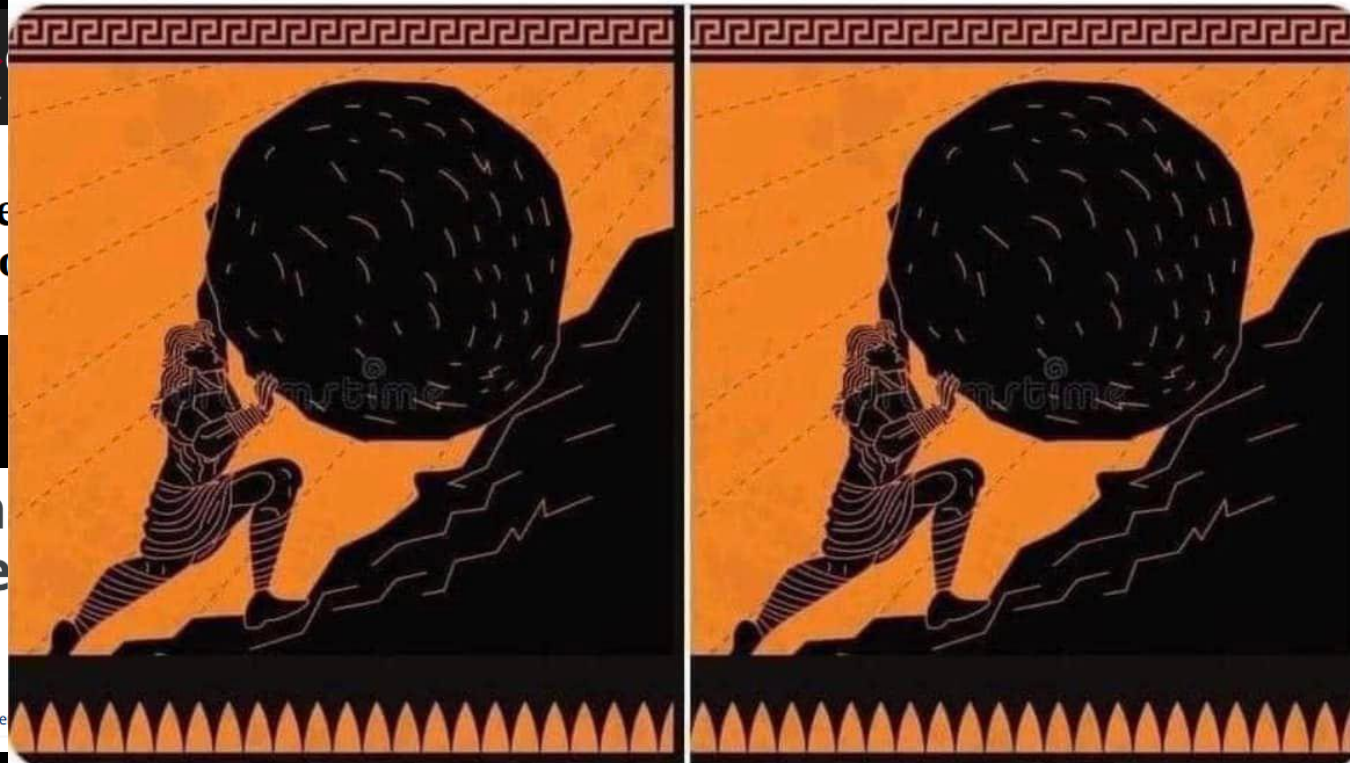


table TB
have'

nt TB

**s of possible
SAID cuts**

alth authorities say, with
sing.



**Funding
service
lives**

5 March 2025 | Departme

Public health funding post-COVID

- Challenges during KS TB outbreak
 - 11/2024 KDHE took over operations in trailers
 - CDC assisted public health associate program (PHAP)
 - 12/2024 moved into leased space
 - 2/14/2025 CDC PHAP terminations
 - 3/25/2025 HHS claw-back \$11.4B COVID funds
 - Funds distributed by CDC to local and state public health
 - 5/8/2025 RN and CHW terminated due to budgetary issues
 - Some were ultimately able to be rehired into different positions



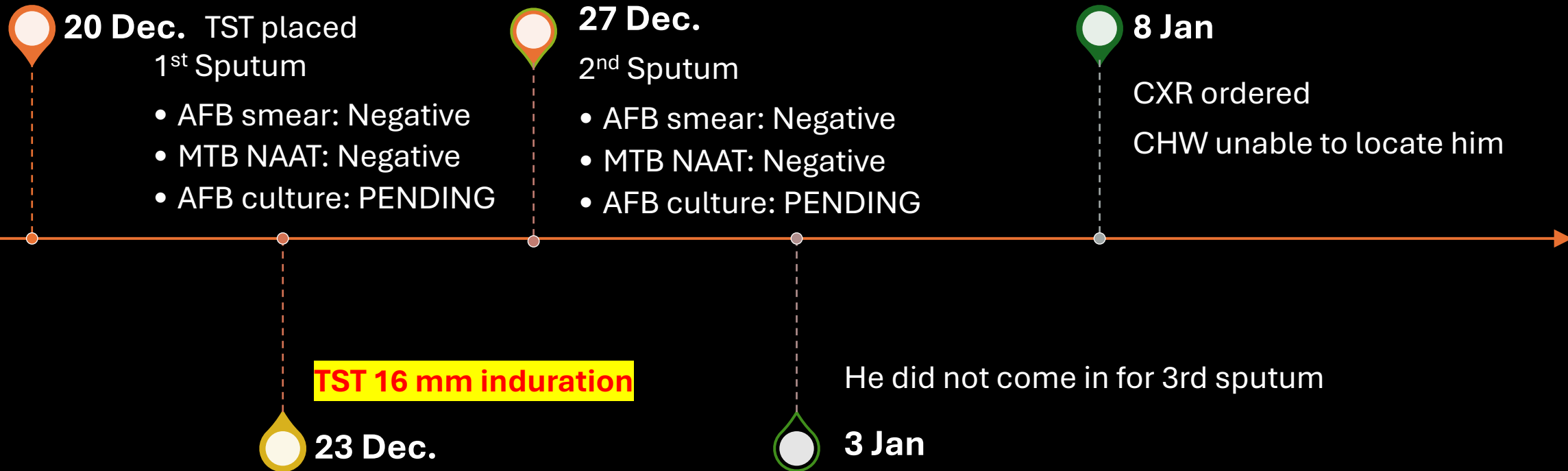
Public health associate program (PHAP)

- PHAP is a two-year, paid training program that prepares recent graduates to enter the public health workforce through field experience and structured learning
- PHAP has over 100 associates fulfilling hands-on public health workforce needs at any given time in nearly all 50 states, U.S. territories, and the District of Columbia



PHAP
PUBLIC HEALTH
ASSOCIATE PROGRAM

Case: Act III, Scene ii

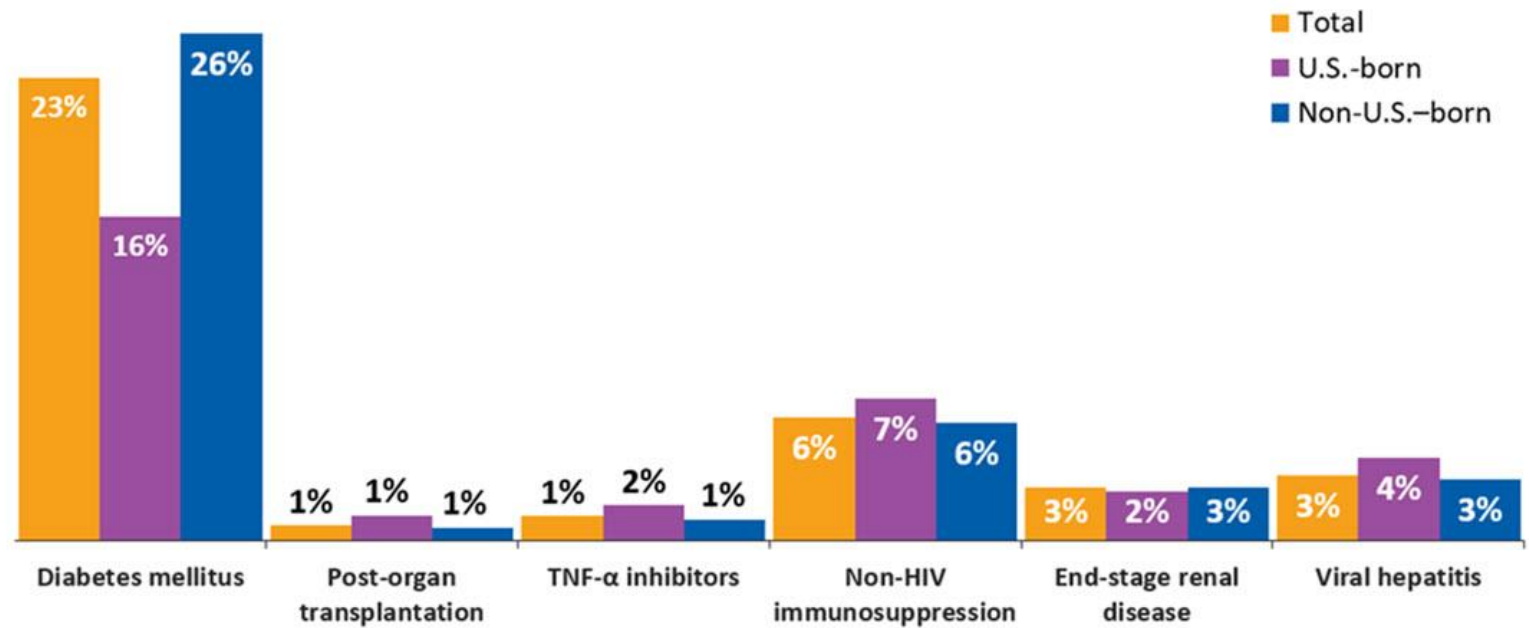


TST Induration

>5 mm	HIV or immunosuppressed Recent contacts with infectious TB disease CXR findings suggestive of previous TB disease
>10 mm	Born in high TB prevalence countries High-risk congregate settings Mycobacteriology laboratory workers High-risk medical conditions Children < 5 years of age
>15 mm	No TB risk factors

Underlying risks for TB in the US

Percentage of Selected Risk Factors Among Persons with TB by Origin of Birth,* United States, 2023



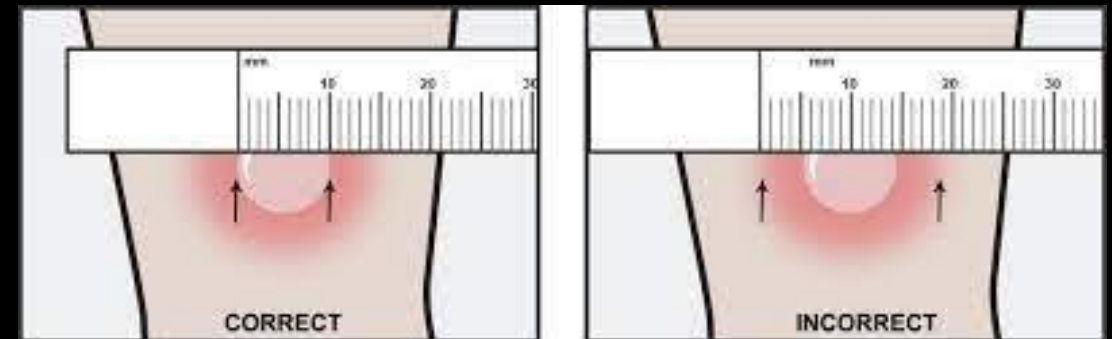
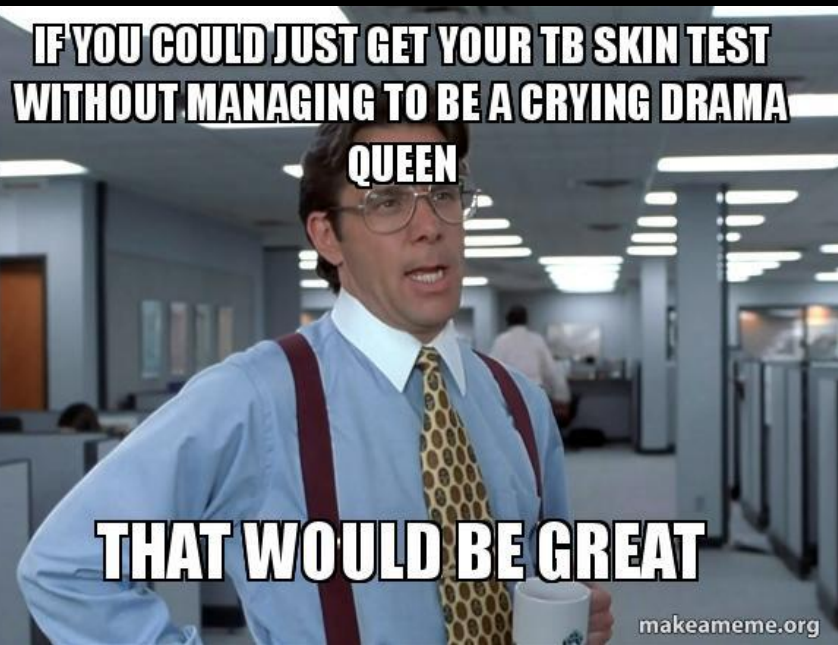
* Persons born in the United States, certain U.S. territories, or elsewhere to at least one U.S. citizen parent are categorized as U.S.-born. All other persons are categorized as non-U.S.-born.

TST Induration

Why do we wait 48 to 72 hours?



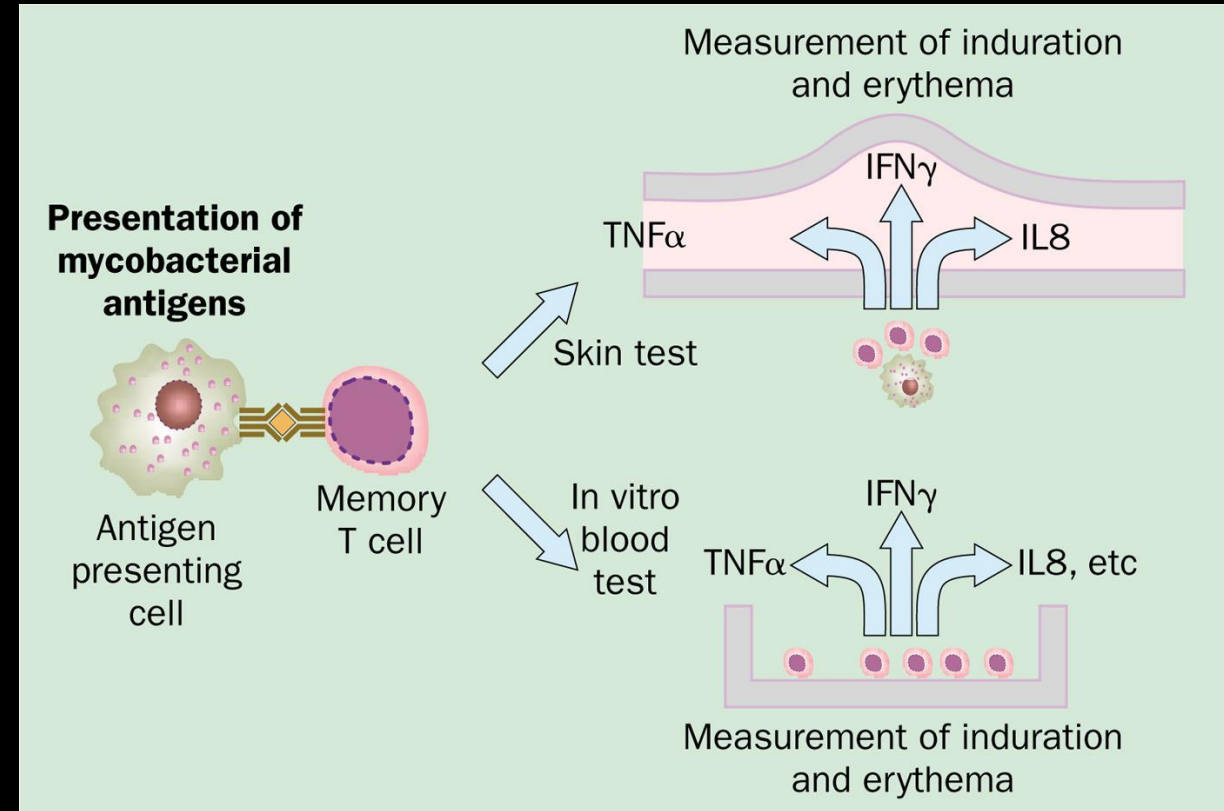
<https://www.cdc.gov/tb/webcourses/tb101/page385.html>



https://www.heartlandntbc.org/wp-content/uploads/2021/12/tb_testing_in_children_booklet_web.pdf




Interferon-gamma release assay

- aka IGRA, QFT, TB-Gold, T-Spot
- **NO clear advantage over TST**
- Pros:
 - 1 and done
 - NO reader variability
 - NO boosting effect
 - NO BCG 🐛
- Cons:
 - \$\$\$
 - Laboratory constraints
 - Still needs adequate T-lymphocytes



Why do we treat LTBI?

Risk of Developing TB Disease

Risk Factor	Risk of Developing TB Disease	Description
TB infection and no risk factors	About 10% over a lifetime 	For people with TB infection, no risk factors , and no treatment, the risk is about 5% in the first 2 years after infection and about 10% over a lifetime.
TB infection and diabetes	About 30% over a lifetime 	For people with TB infection, diabetes , and no LTBI treatment, the risk is about 30% over a lifetime (3 times as high as those with no risk factors).
TB infection and HIV infection	About 7% to 10% PER YEAR 	For people with TB infection, untreated HIV infection and with no LTBI treatment, the risk is about 7% to 10% PER YEAR, a very high risk over a lifetime.

TB Infection (LTBI) Treatment

Drug	Duration	Frequency
Isoniazid and Rifapentine	3 months	Weekly*
Rifampin	4 months	Daily
Isoniazid and Rifampin	3 months	Daily
Isoniazid	6 months	Daily or twice weekly*
Isoniazid	9 months	Daily or twice weekly*

sureAdhere
by dimagi

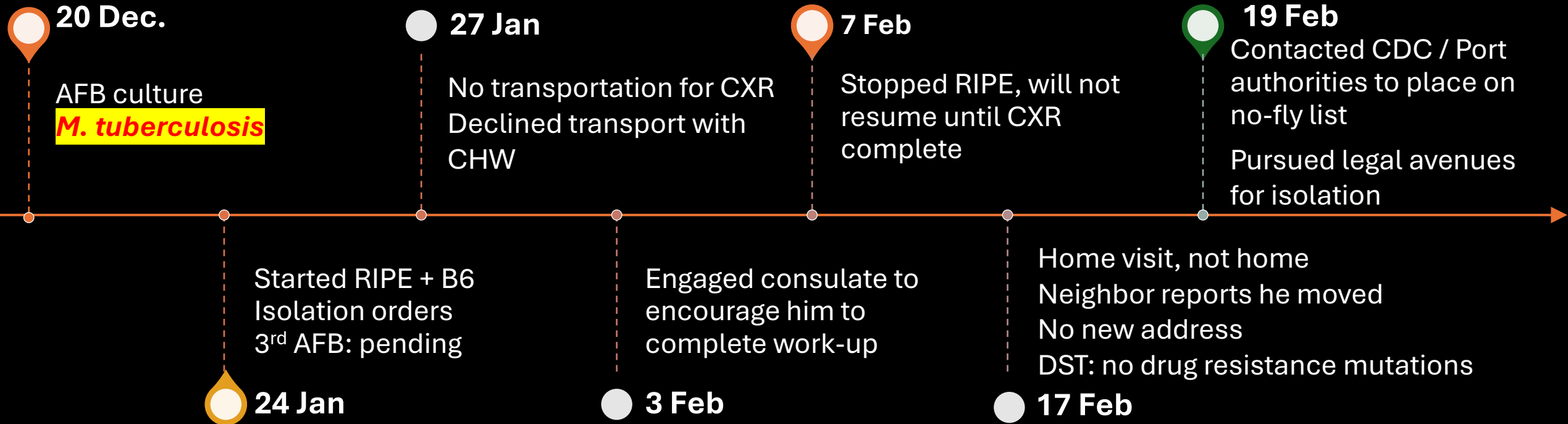


There's a Universe
inside of you

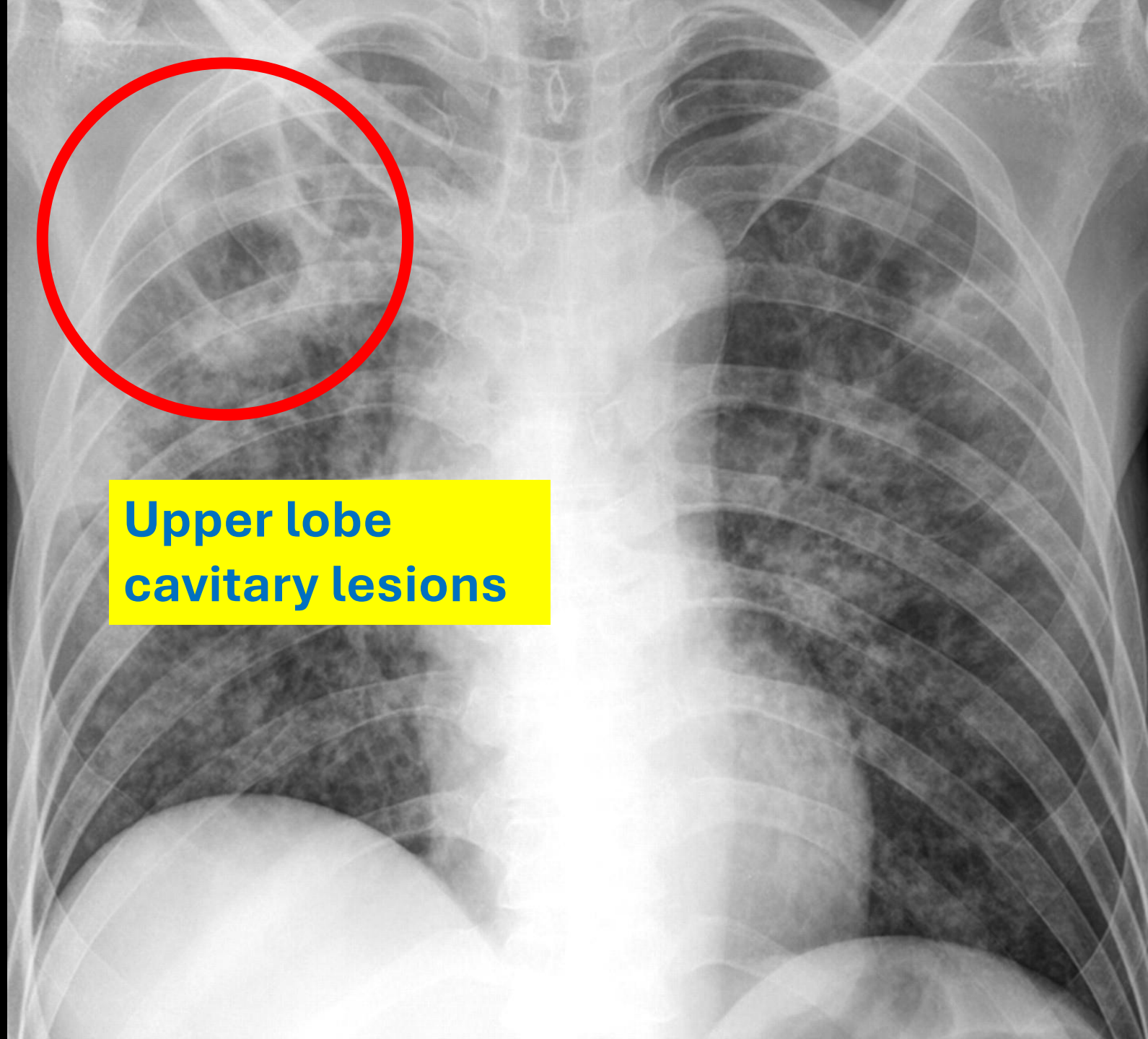


This is
definitely
tuberculosis

Case: Act III, Scene iii

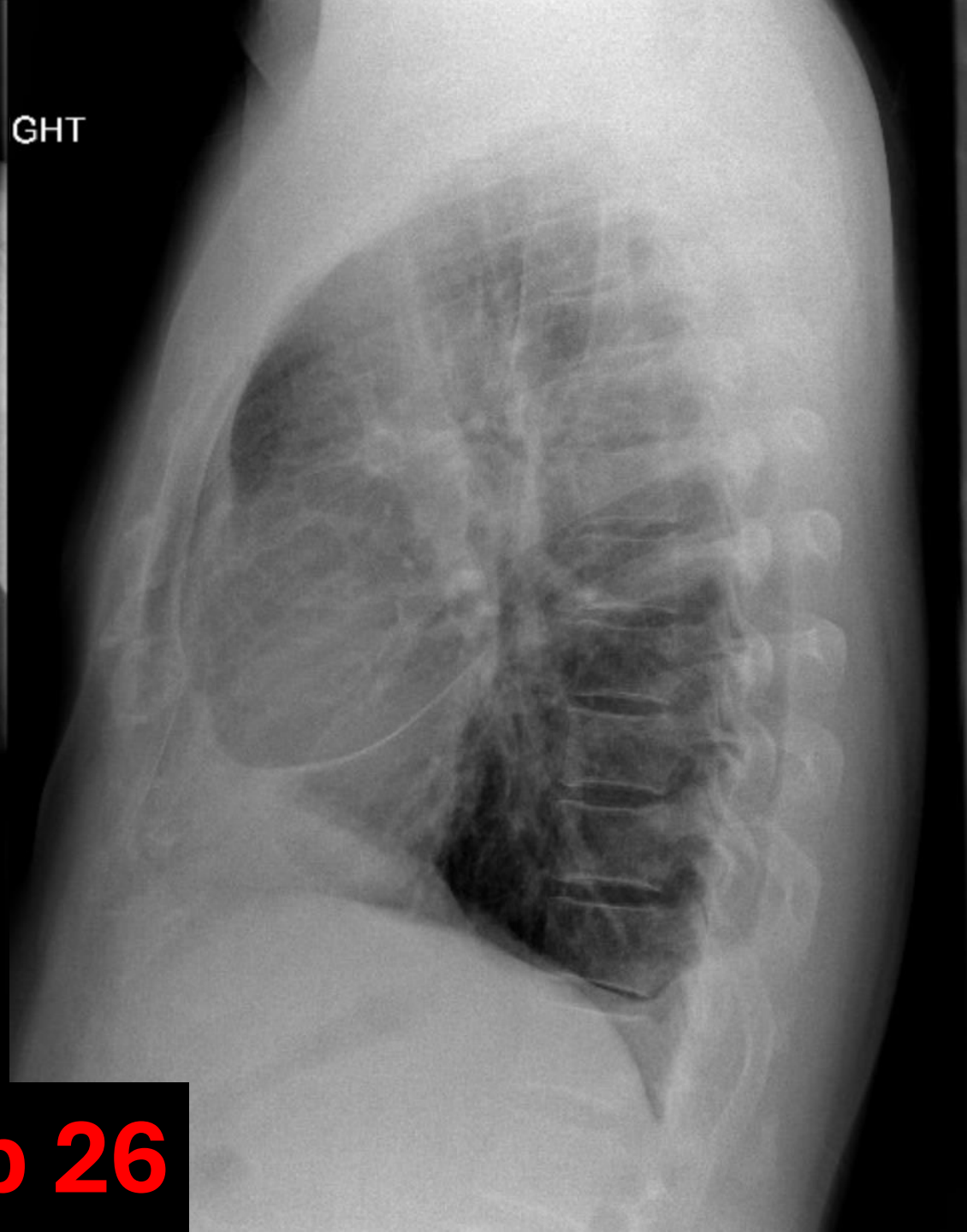
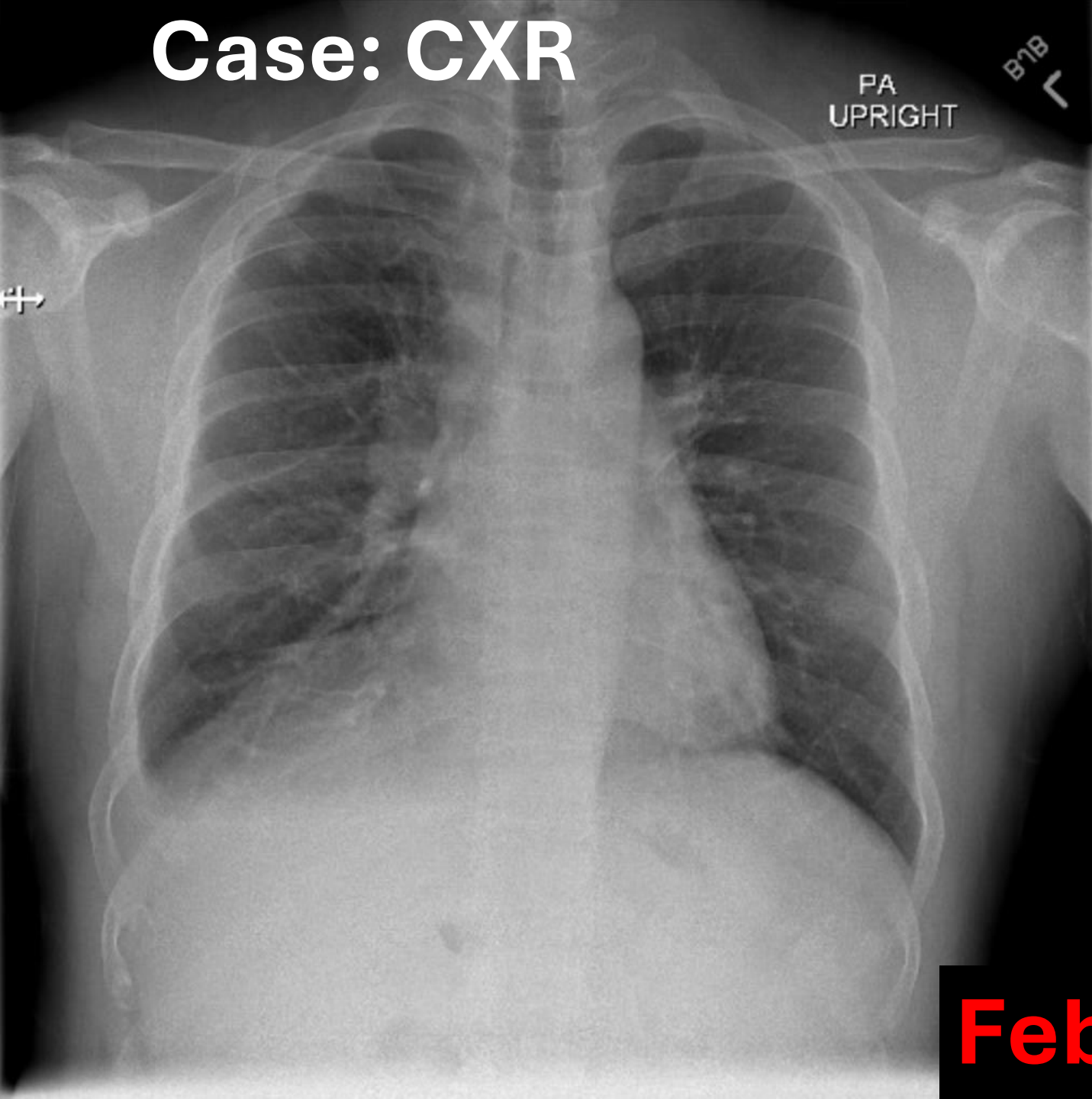


What we *think*
TB looks like
in the 🇺🇸

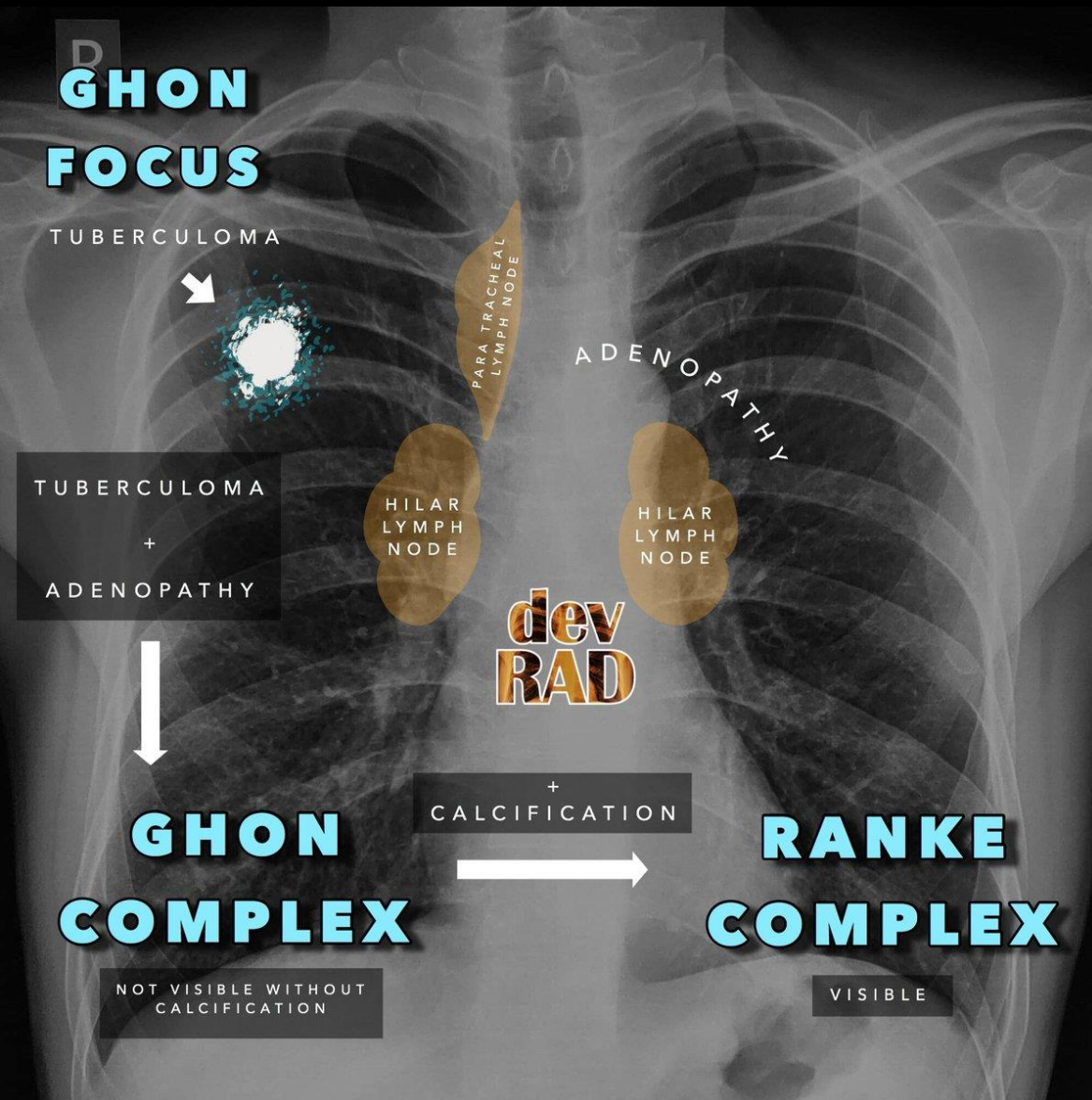


Upper lobe
cavitory lesions

Case: CXR



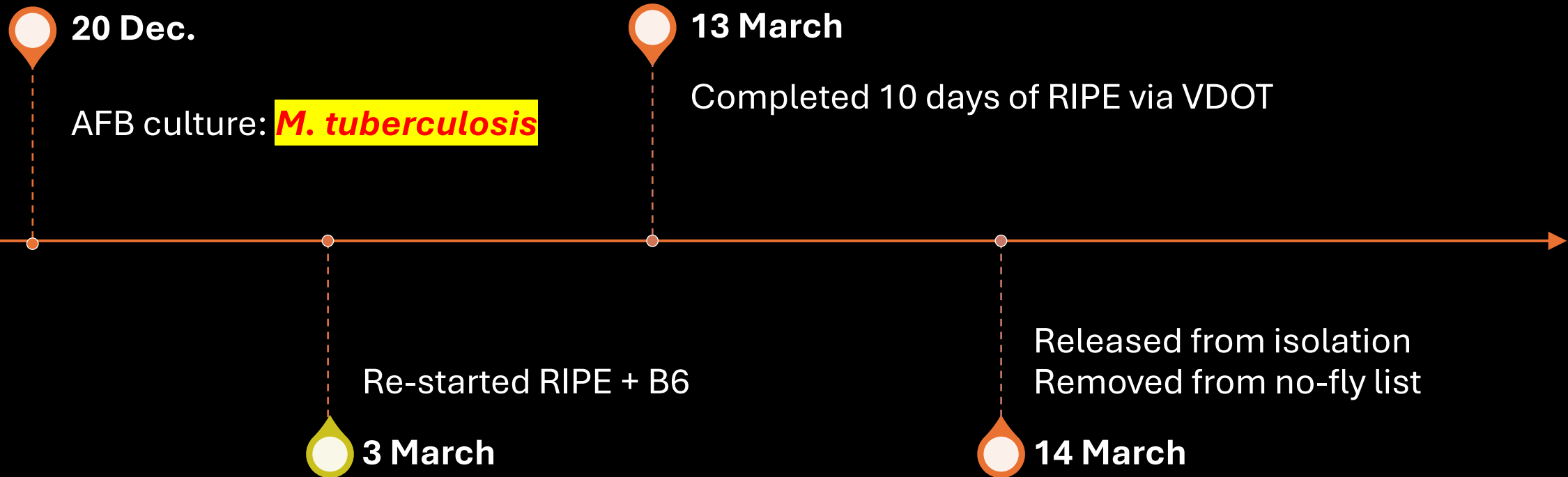
Feb 26



Classic TB CXR Findings

- **Ghon lesion or focus:** granuloma in the lung due to tuberculosis infection, sequela of primary tuberculosis
- **Ghon complex:** granuloma AND ipsilateral adenopathy
- **Ranke complex:** late fibrocalcific lesions

Case: Act IV, Scene i



Case: Act IV, Scene ii

12/20

- AFB smear: Negative
- MTB NAAT: Negative
- AFB culture: *M. tuberculosis*

03/13

- AFB smear: Negative
- MTB NAAT: Negative
- AFB culture: No growth

12/27

- AFB smear: Negative
- MTB NAAT: Negative
- AFB culture: No growth

03/14

- AFB smear: Negative
- MTB NAAT: Negative
- AFB culture: No growth

01/24

- AFB smear: Negative
- MTB NAAT: Negative
- AFB culture: *M. tuberculosis*

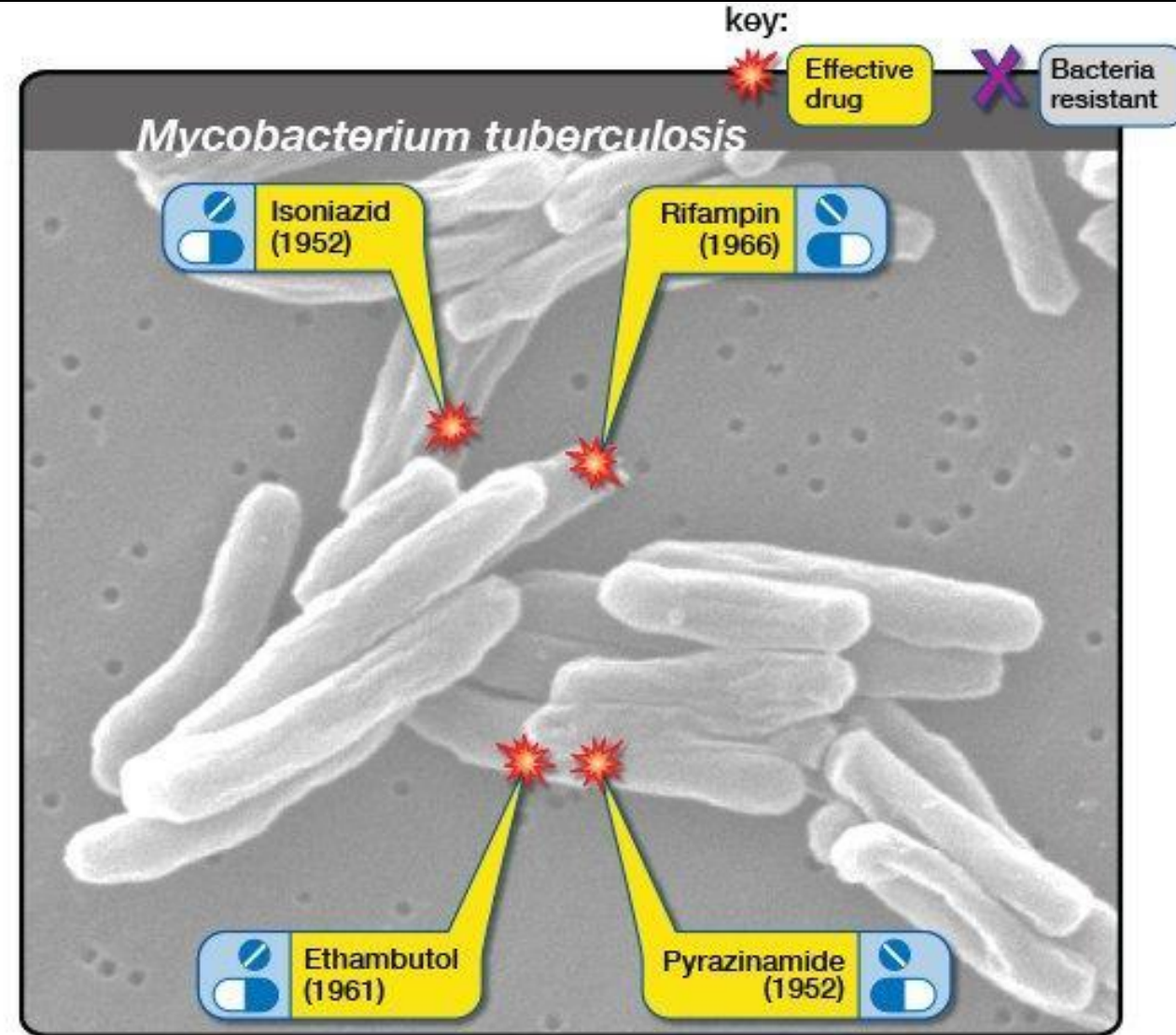
03/17

- AFB smear: Negative
- MTB NAAT: Negative
- AFB culture: No growth

**Tuberculosis
treatment**

Intensive Phase 2-months	Continuation Phase 6-months
Rifampin	Rifampin
Isoniazid	Isoniazid
Pyrazinamide	
Ethambutol	

Anti-tuberculous therapy through the years



Case: Act V

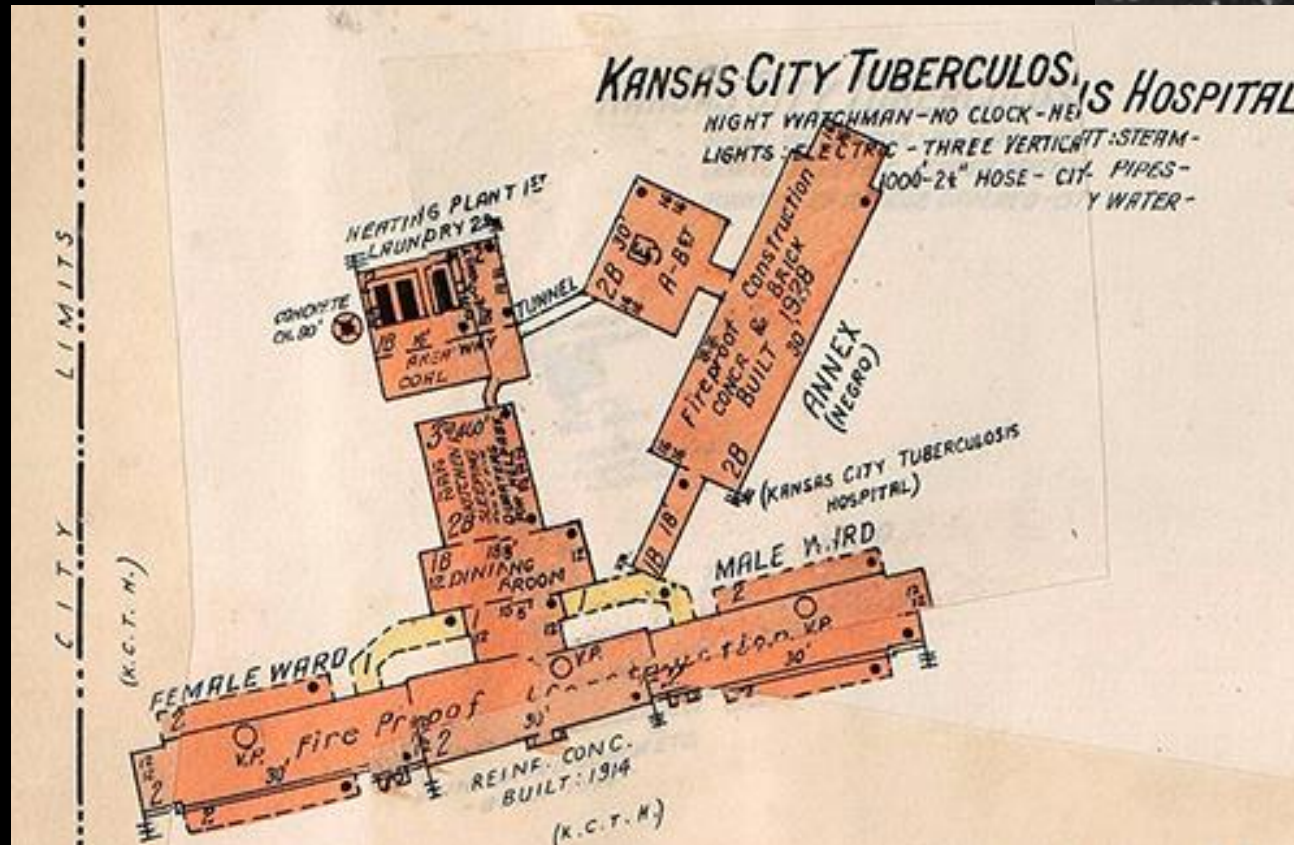
- He notified us that he would be flying back to his home country
- We notified local public health in his home country
- He was given enough medications for his travel and was instructed to engage with local public health upon his arrival
- He failed to engage with local public health upon arrival
- Local public health went to the address he provided, he was not there
- He was placed back on the no-fly list

WHAT DID WE LEARN?

- TB is alive and well
- Outbreaks = team sport
- CHW rule!
- Funding is fickle
- Do NOT neglect LTBI
- Perseverance

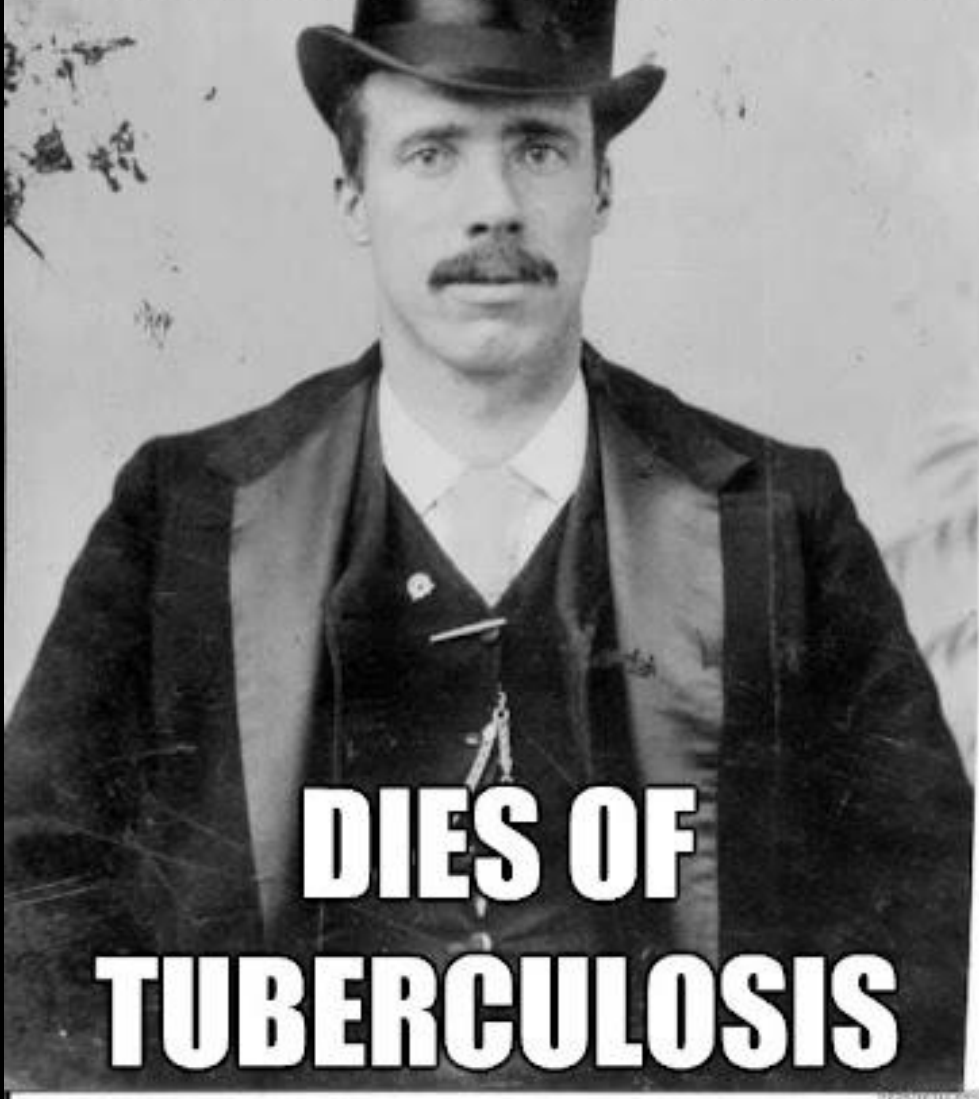


Kansas City Tuberculosis Hospital (1917-1945)



Kansas City Tuberculosis Hospital (1917-1945)

**"'NO SPITTING' LAWS
VIOLATE MY RIGHTS!"**



**DIES OF
TUBERCULOSIS**



**SERIOUS
INQUIRIES
ONLY**