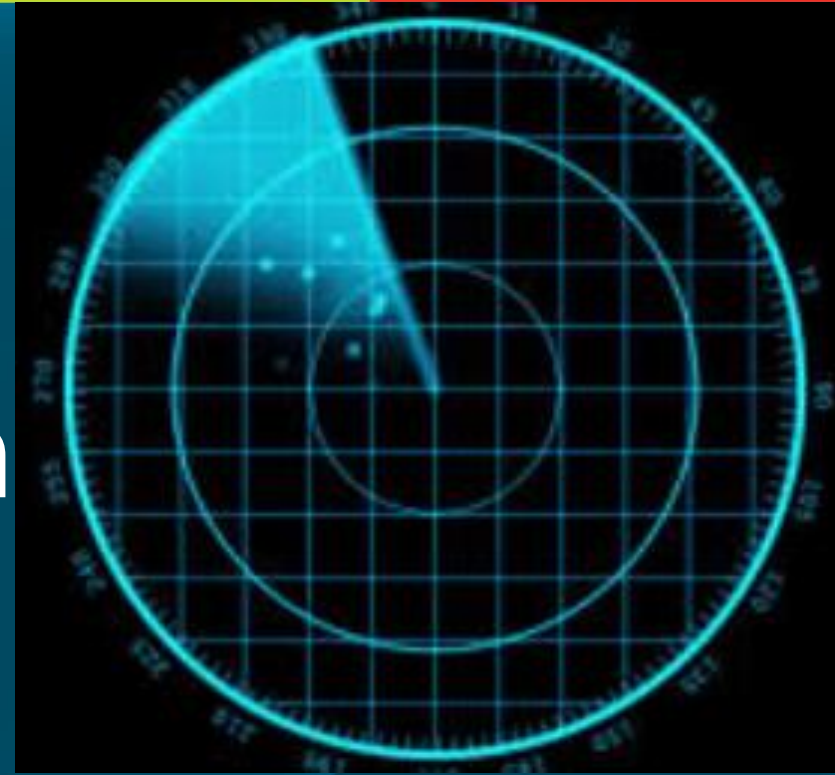


Tuberculosis on the Radar

Gib Morrow, MD, MPH
Health Officer
Kitsap Public Health District
June 12, 2024



KITSAP PUBLIC HEALTH DISTRICT

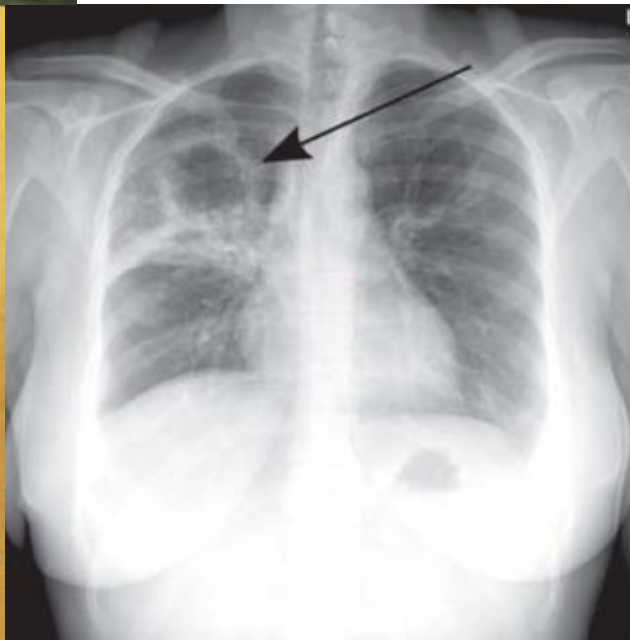
Tuberculosis – “consumption” still with us



- 6 Active current cases known
- 6–18-month treatment courses
- Multi-drug resistance
- Public Health Challenge



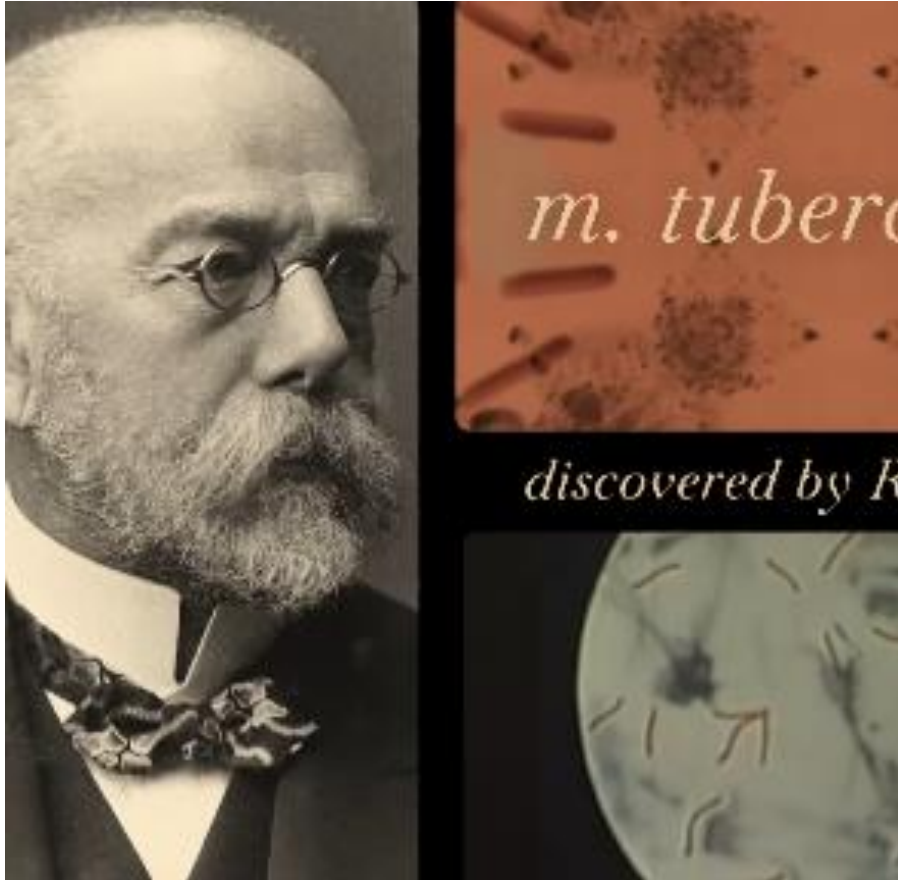
FIGHT TUBERCULOSIS
Red Cross Christmas Seal Campaign



- Advisories
- Hospital Meetings
- “TB on the Radar”
- Optimize mgmt. in Kitsap County



TB – A Brief History



- 3 million years of tuberculosis (the “white death”)
- 1600–1800s in Europe, TB caused 25% of all deaths
- TB has killed more people in history than the black death, leprosy, or HIV
- By the dawn of the 19th century, tuberculosis had killed one in seven of all people that had ever lived.
- In the 19th century, TB killed about a quarter of the adult population of Europe.



TAKE ON TB

Too many people in the U.S. still suffer from tuberculosis (TB).

TB IN THE U.S.



Up to **13 million** people could have latent TB infection



8,331 people were diagnosed with TB disease in 2022



602 people died of TB-related causes in 2021

The effects of the COVID-19 pandemic on TB trends in the United States are complex and will likely persist for many years.

To learn more about TB, visit: www.cdc.gov/tb



Centers for Disease Control and Prevention
National Center for HIV, Viral Hepatitis, STD, and TB Prevention

OCTOBER 2023

HEALTHCARE PROVIDERS CAN TAKE ACTION TO END TB

1 Think TB



Recognize risk factors and symptoms of TB.

2 Test for TB



Use the TB blood test for people at increased risk of TB.

3 Treat TB



Prescribe shorter regimens to help patients finish treatment.

TB CAN HAPPEN ANYWHERE & TO ANYONE

But some groups are at greater risk of TB than others. To eliminate TB, we must prioritize groups at increased risk of TB.

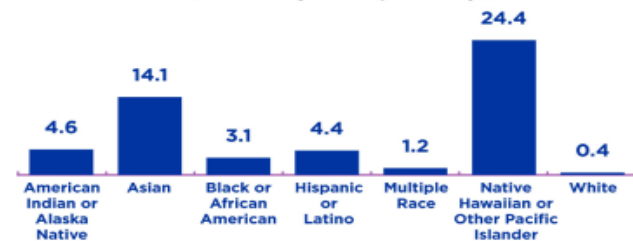
7 out of 10



TB cases occurred among non-U.S.-born persons

Racial and ethnic disparities in TB diagnoses continue to exist.

TB Incidence Rates per 100,000 Population



CDC IS COMMITTED TO ENDING TB IN THE UNITED STATES

CDC supports finding and treating TB disease and expanding testing and treatment for latent TB infection through:



Vigilant surveillance



Better diagnostics & treatment options



Engaging affected communities & medical providers



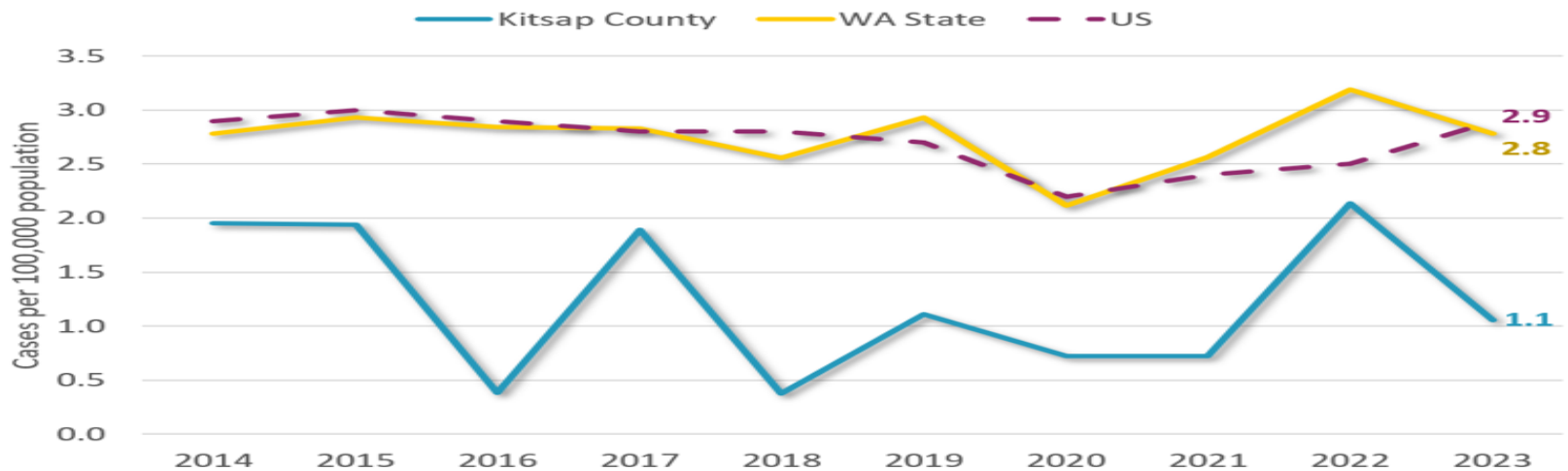
Supporting local & state health departments

CALL PUBLIC HEALTH (360) 728-2235

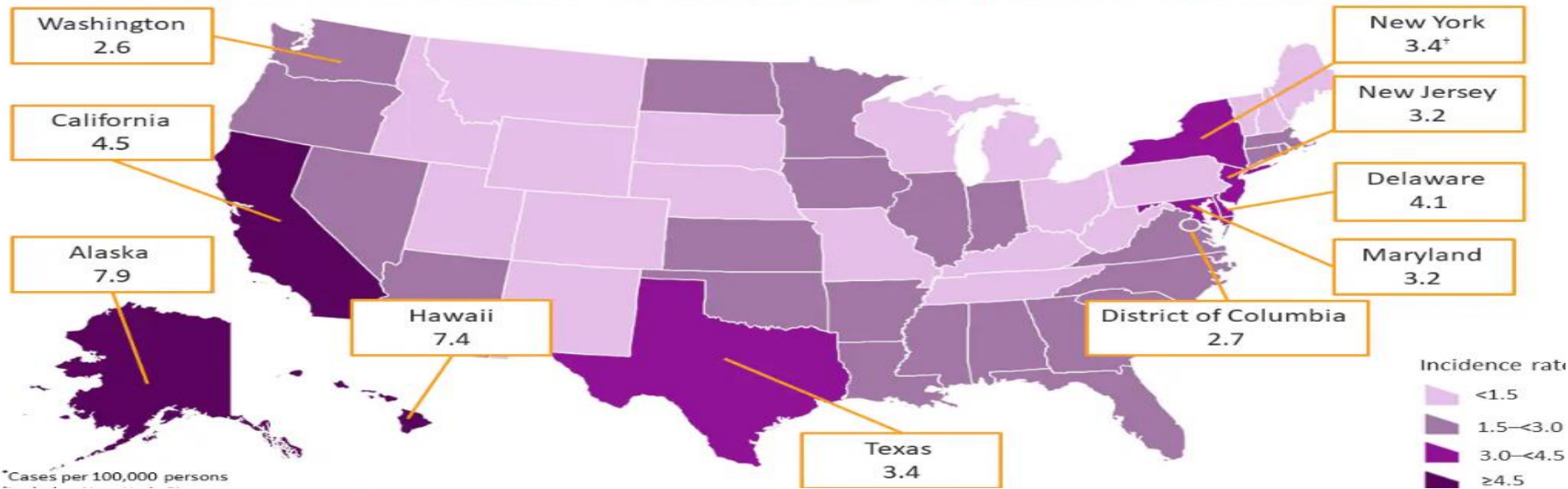


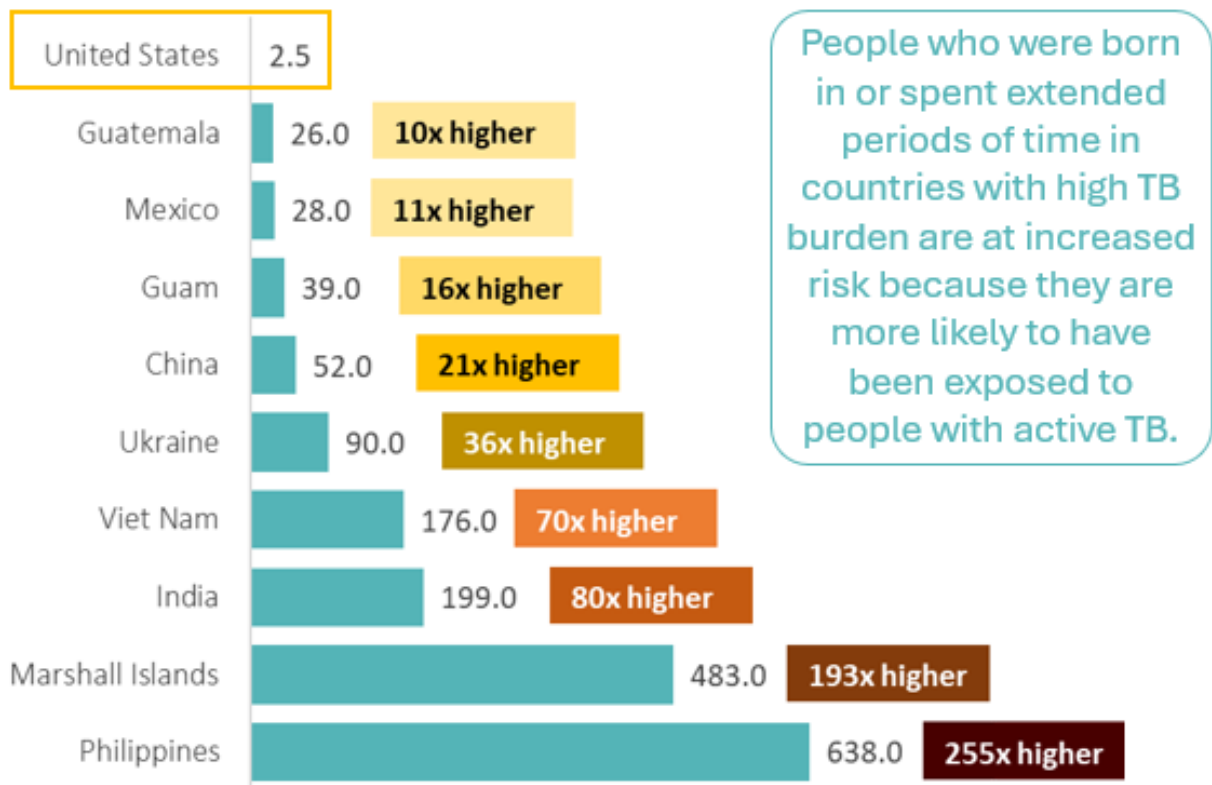
KITSAP PUBLIC HEALTH DISTRICT

TB Case Rates* Kitsap County, Washington State, and the US, 2014-2023



TB Incidence Rates* by Reporting Area, United States, 2021





People who were born in or spent extended periods of time in countries with high TB burden are at increased risk because they are more likely to have been exposed to people with active TB.

Most Kitsap cases exposed outside the U.S.

- In Kitsap County, **79%** of cases reported 2014-2023 were born in and/or spent extended periods of time in countries with high TB burdens.
- **Many cases' exposure likely occurred years ago.** Of cases born outside the continental U.S., over 50% had been living in the U.S. for 10 years or more.

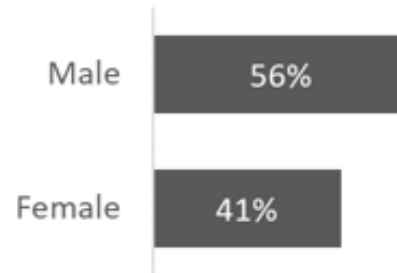
TB cases per 100,000 people, 2022 (Source: WHO)



Kitsap TB Cases, 2014 - 2023

There were
33 cases
reported
2014-2023

Who had TB in Kitsap County?



1 person
died as a result of TB



<10 cases
were younger
than 18 years

<10 cases
were 18 – 45
years old

10 cases
were 45 – 64
years old

12 cases
were 65 years
or older

1 out of 3
TB cases
were under
45 years
old

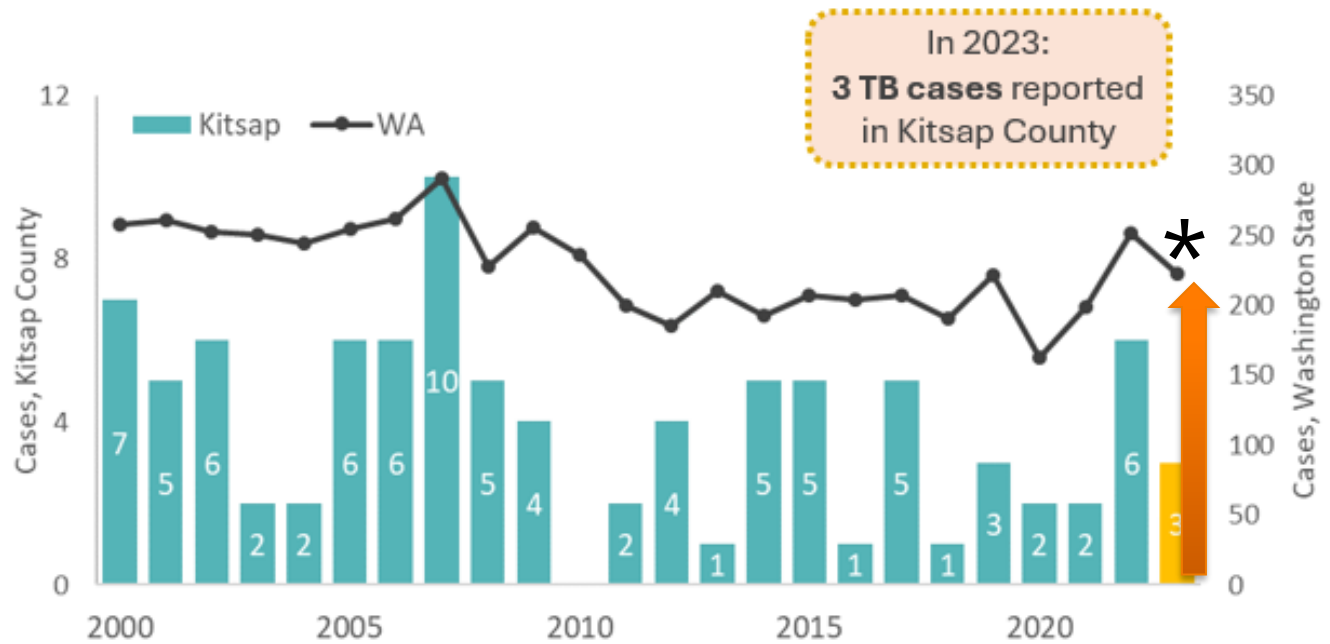
Sources: Public health surveillance data, accessed 4/29/2024



TB in Kitsap County, 2000 -2023

TUBERCULOSIS

- There were **3 TB cases** reported in Kitsap County in 2023.
- Over the past 10 years, there have been **1 – 6 cases reported annually**.
- CDC estimate that there are **~3,000 people with latent (inactive) TB infection** in Kitsap County (2019).

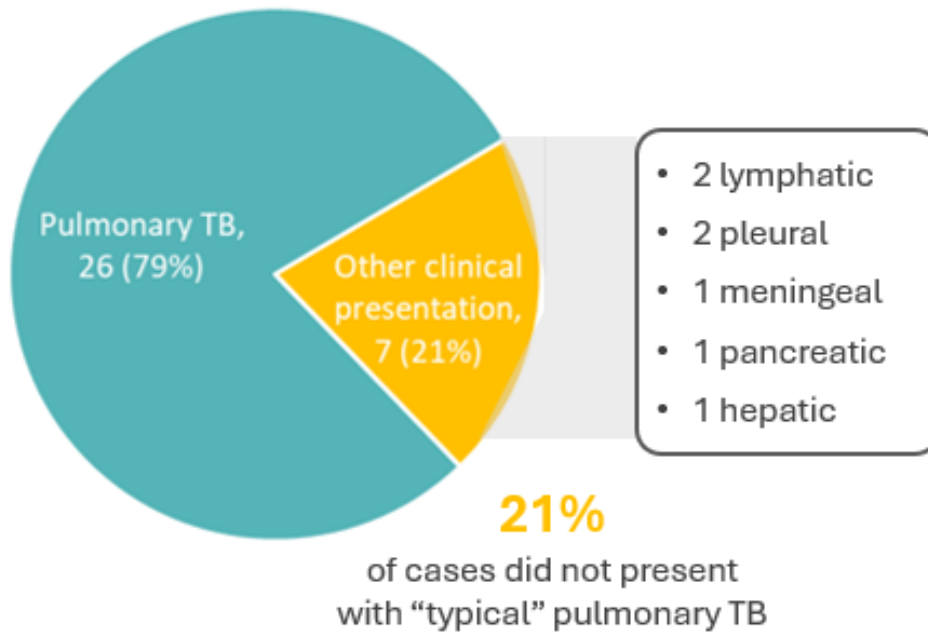


Sources: Public health surveillance data, accessed 4/29/2024

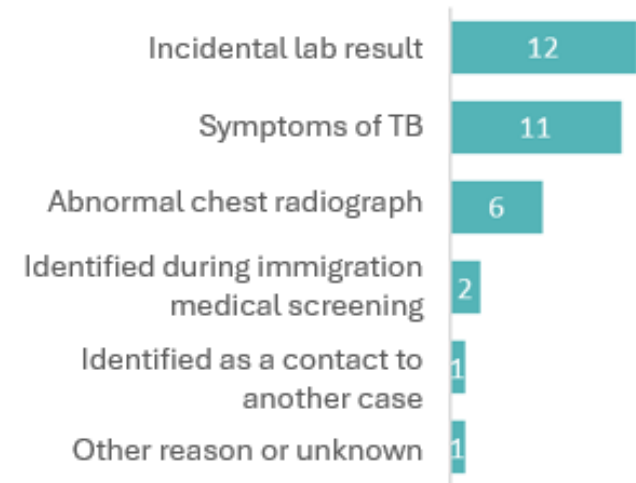


Kitsap TB Cases, 2014 - 2023

What kind of illness did cases have?



Why were cases initially evaluated for TB?



Almost half of Kitsap’s cases were identified as a result of proactive screening

Sources: Public health surveillance data, accessed 4/29/2024

TB Treatment Outcomes, 2014 - 2023



**25 (76%) completed
TB treatment**



2 were deceased at time of report

**1 was advised to discontinue treatment
due to adverse treatment reaction and
low public health risk**

2 died before treatment was completed

1 was lost to follow-up



Outcome undetermined at time of writing

Sources: Public health surveillance data, accessed 4/29/2024

Multidrug-resistant TB (MDR-TB)

is TB that is resistant to rifampin and isoniazid, two of the key first-line drugs used to treat TB.

Drug resistance has a big impact for people with TB



MDR-TB increases treatment time from 6 months to 9-18 months.



Second-line drugs are more expensive and sometimes more difficult to obtain and to get covered by insurance.



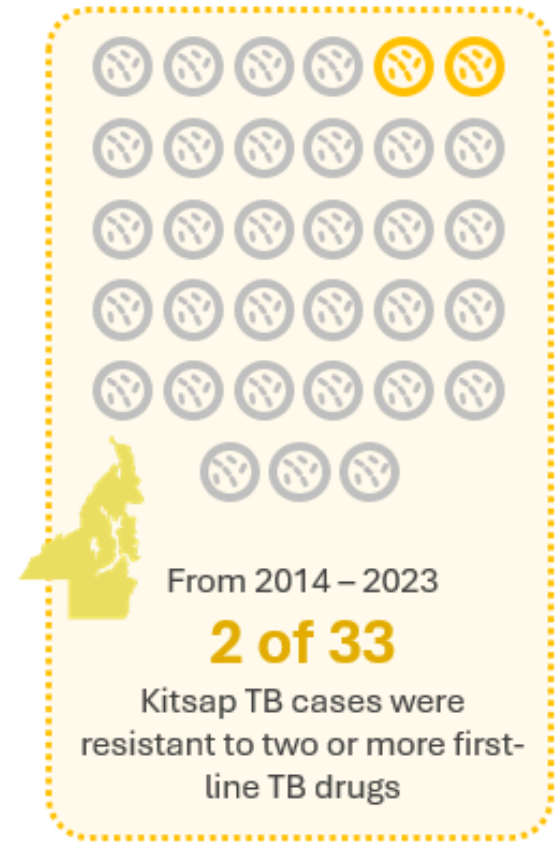
CDC estimates that MDR-TB is **9x more costly** than susceptible TB cases.



In Washington State, there have been **1-8 cases of MDR-TB per year** over the last five years.



Globally, treatment success is almost **30% lower** for people with MDR-TB than for those with drug-susceptible TB.



Resources

- [2023 Kitsap County Community Health Assessment](#)
- [The White Death: A History of Tuberculosis](#)
- [Health Advisory: Tuberculosis Updates \(5/12/22\)](#)
- [Health Advisory: Tuberculosis testing for people who were previously incarcerated \(12/08/2023\)](#)
- [Resolution Declaring High Costs and Insufficient Access to Care are Public Health Crises](#)
- [Healthcare System Challenges and Opportunities in Kitsap County, Washington](#)



Local Health Jurisdiction Responsibilities in Case Management of Individuals with Active Tuberculosis

Alexandra Kimes, BSN, RN
Public Health Nurse Supervisor
Tuberculosis and Immunizations



KITSAP PUBLIC HEALTH DISTRICT

Washington State Laws related to Tuberculosis

- **Washington Administrative Codes (WAC) 246-170**
 - TUBERCULOSIS—PREVENTION, TREATMENT, AND CONTROL
- **Revised Codes of Washington (RCWs) 70.28 and 70.30**
 - CONTROL OF TUBERCULOSIS
 - TUBERCULOSIS – HOSPITALS, FACILITIES, AND FUNDING



WAC 246-170-031

- 1) Each local health department shall assure the provision of a comprehensive program for the prevention, treatment, and control of tuberculosis. Services shall include:
 - a) Prevention and screening, with emphasis on screening of high risk populations;
 - b) Diagnosis and monitoring, including laboratory and radiology;
 - c) Individualized treatment planning [...]; and
 - d) Case management.
- 2) In the absence of third party reimbursement, the local health department shall assure the provision of inpatient or outpatient care, including DOT/DOPT and case management.
- 5) Sufficient nursing, clerical, and other appropriate personnel shall be provided to furnish supervision of preventive and outpatient treatment, surveillance, suspect evaluation, epidemiologic investigation, and contact workup.



Prevention and Screening

- Primary prevention efforts for the control of tuberculosis center around referral and education around treating latent tuberculosis infection (LTBI).
- The primary screening performed by the Local Health Jurisdiction is of individuals who are immigrating to the United States.
 - Electronic Disease Notification (EDN) for Class B arrivers
 - Civil Surgeon
 - Special Circumstances
- Kitsap Public Health (KPHD) also screens individuals identified as close contacts to individuals with active tuberculosis disease (TB).



Diagnosis and Monitoring

- In most cases KPHD defers diagnosis to the managing care providers of individuals with active TB. Our Health Officer may diagnose and assume partial or complete care management of an individual, however community-based care management is more feasible and allows for better continuity of care including and beyond TB treatment.
- KPHD's Epidemiology team also conducts routine surveillance for TB rule-outs, diagnoses, and flags from the local hospital system to try to catch cases that may have not yet been reported, or who are not yet being worked up for TB.



Individualized Treatment Planning

Once a case of Active Tuberculosis Disease has been identified and diagnosed, nurse case managers are responsible for following:

- Ensuring appropriate drug sensitivity testing is being done to ensure the patient is on the appropriate course of treatment, and ongoing lab work to ensure treatment is effective.
- Consulting with WA DOH and national TB experts regarding treatment plans for complex or unusual circumstances as needed and communication recommendations between providers.
- Providing patient education about duration, course, and potential side effects of treatment, and criteria for completion of treatment.
- Working with providers, patients and other community partners/resources to ensure treatment completion.



Case Management

In addition to individualized treatment planning for all individuals with an active tuberculosis diagnosis, nurse case managers at KPHD provide comprehensive case management as recommended by the WA DOH and the CDC, including, but not limited to:

- DOT/vDOT monitoring
- Provision of resources to assist during isolation period, including food, utility bill assistance, rental assistance, and other basic necessities.
- Transportation to and from appointments, or gas cards enabling the patients to transport themselves.
- Translation services for both our own services provided, as well as for other appointments and to access community resources as needed.
- Applications for health insurance, reduced medical bills or charity care, and assistance managing other medical appointments or conditions that may impact treatment or disease course.
- Ongoing nurse consultation and monitoring through out treatment.



RCW 70.28.10

All practicing health care providers in the state are hereby required to report to the local health department cases of every person having tuberculosis who has been attended by, or who has come under the observation of, the health care provider within one day thereof.

- Health care providers and Health care facilities: TB disease (confirmed or highly suspicious, i.e., initiation of empiric treatment) notifiable to local health jurisdiction (LHJ) within 24 hours.
- Laboratories: Mycobacterium tuberculosis complex (MTC) (Tuberculosis) culture, Nucleic acid amplification detection (NAT or NAAT), or drug susceptibilities (molecular and culture based) notifiable to Department of Health within 2 business days; submission required – Mycobacterium tuberculosis complex positive isolate (earliest available isolate for the patient), within 2 business days.



Community Partnerships

Care coordination is essential to the successful completion of treatment of Tuberculosis. Individuals with active tuberculosis disease may encounter many points of care in the medical system, need various resources, or may have pre-existing medical conditions that still need to be managed while they complete TB treatment. Some of our regular partners in this care management process include:

- Local Hospital teams – Hospitalists, Nurses, Social Work and Nurse Case Managers
- Local Primary Care Physicians and their Patient Navigators
- Specialists such as Pulmonology and Infectious Disease
- Radiology and Laboratory Professionals
- Kitsap Community Resources
- Kitsap Immigration Assistance Center
- Washington State Department of Health TB Nurse Consultants and TB Collaborative Network



Resources

Centers for Disease Control and Prevention. (2024, April 4). Core curriculum on tuberculosis.

<https://www.cdc.gov/tb/hcp/education/core-curriculum-on-tuberculosis.html>

Washington State Department of Health. (n.d.) Tuberculosis: Public health professionals.

<https://doh.wa.gov/you-and-your-family/illness-and-disease-z/tuberculosis-tb/public-health-professionals>



Clinical Presentation & Diagnosis of Tuberculosis Disease

Christopher Spitters, MD, MPH
Washington State DOH TB Program
June 13, 2024

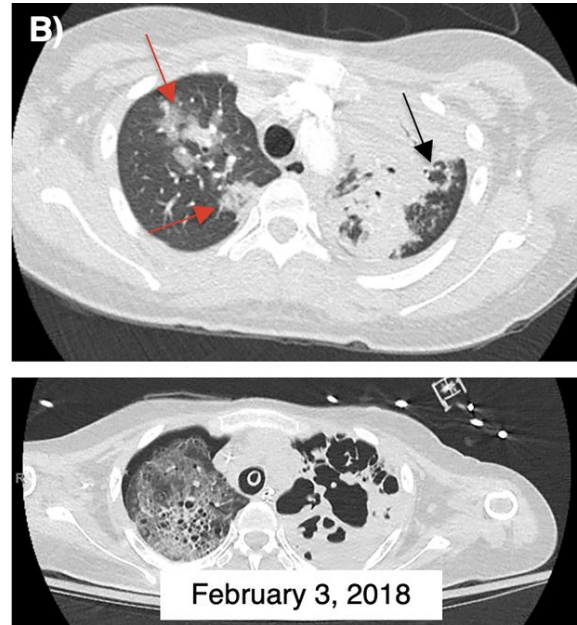
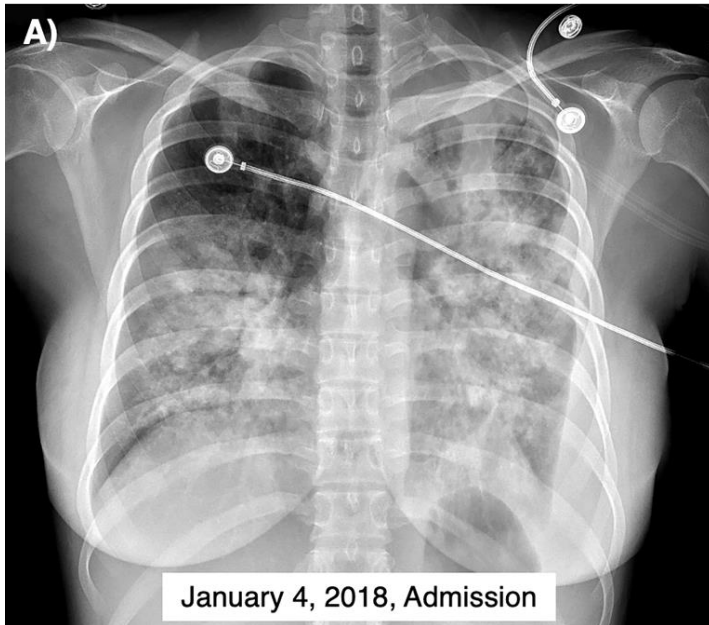


Disclosures

- No relevant relationships or interests in commercial entities to disclose
- Financial ties: WA DOH and Snohomish County only
- Off-label uses: PCR on non-respiratory specimens

Cautionary Tale

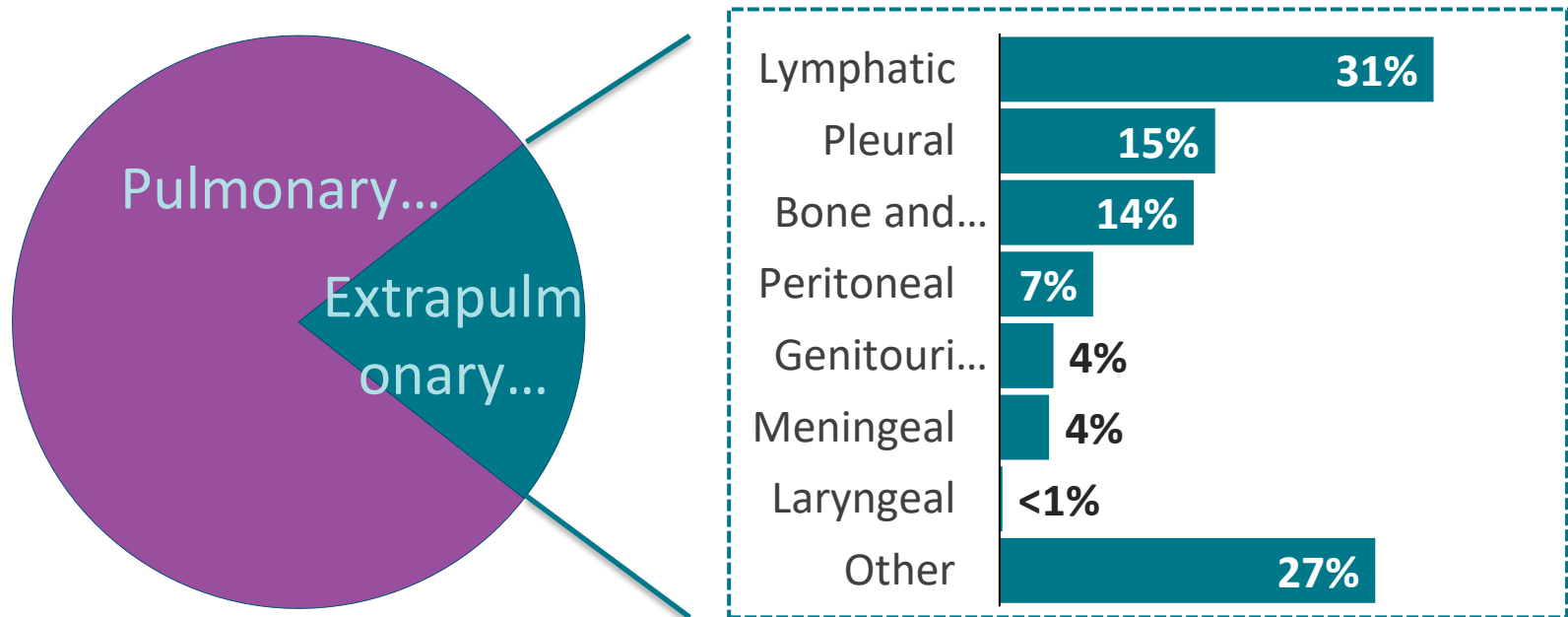
“A 19-year-old [3-wk post-partum] woman originally from the Republic of the Marshall Islands presented with diffuse pneumonia and acute hypoxemic respiratory failure. She died one month into her hospitalization, but the diagnosis of pulmonary tuberculosis (TB) was not made until one day before her demise. A contact investigation screened a total of 155 persons with 36 (23%) found to have latent TB infection and seven (4.5%) with active pulmonary TB.”



Learning Objectives

- Recognize symptoms and findings suggestive of active TB.
- Conduct a comprehensive medical evaluation for tuberculosis to assess for disease when appropriate.
- Apply CDC's national guidelines on diagnosis of tuberculosis to aid medical decision making.

Percentage of TB Cases by Site of Disease,* United States, 2021



*Patients may have more than one disease site but are counted in mutually exclusive categories for surveillance purposes.

†Any pulmonary involvement which includes cases that are pulmonary only and both pulmonary and extrapulmonary.

Source: [CDC](#), 2021.

Diagnostic Elements

- Clinical syndrome
- Epidemiologic risk
- Physical exam findings
- Imaging
- Specimen collection
- Accessory testing (HIV, TST/IGRA, CMP, CBC/DIFF, viral hepatitis serologies)
- Results-->medical decision making

Clinical Syndrome

- Classic pulmonary TB: cough, sputum, fever, night sweats, weight loss increasing gradually over the course of many weeks to months.
- Exceptions to chronicity: immunosuppressed, children <5 y/o
- Pain, swelling and/or dysfunction at extrapulmonary sites +/- constitutional symptoms
- Asymptomatic: 10-20%

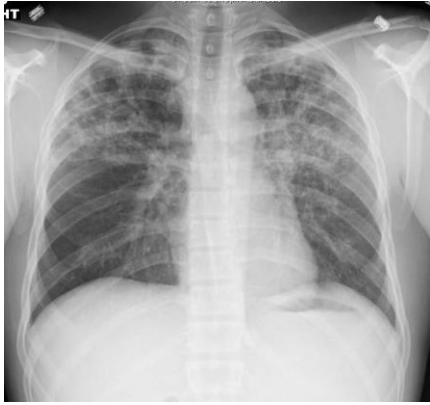
Epidemiologic Risk Factors

- Close contacts of pulmonary cases
- Fibronodular changes on CXR s/o prior TB
- Severe immunosuppression
- **Immigrants from medium-to-high incidence countries**
- Mycobacteriology lab workers
- Other residential or occupational groups (e.g., HCW, jails/prisons, shelters, extended travel)

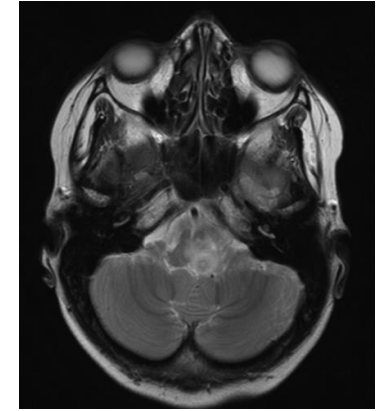
Medical Risk Factors

- Diabetes
- ESRD
- Immunosuppression
 - TNF alpha blockade
 - HIV
 - Solid organ transplantation
- Fibrosis on CXR (old/inactive TB)
- Heme, head/neck and lung cancers
- Rapid weight loss or chronic low body weight
- Short gut, intestinal bypass
- Silicosis

CXR



MRI brain

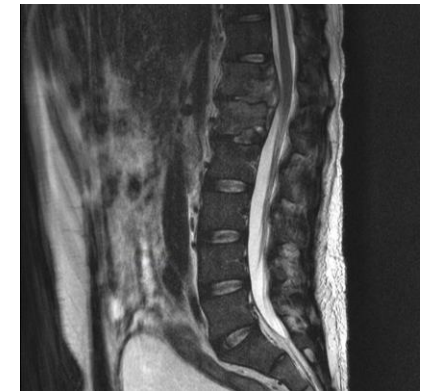


Neck CT



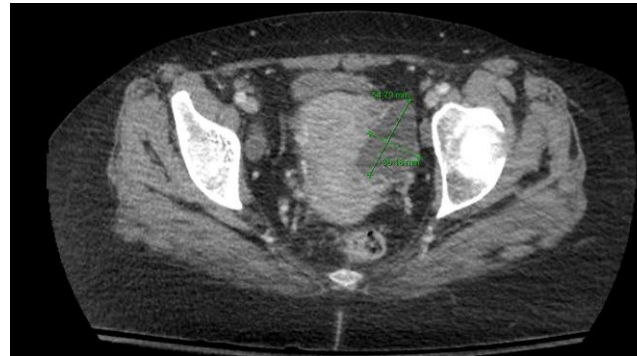
Chest CT

Imaging

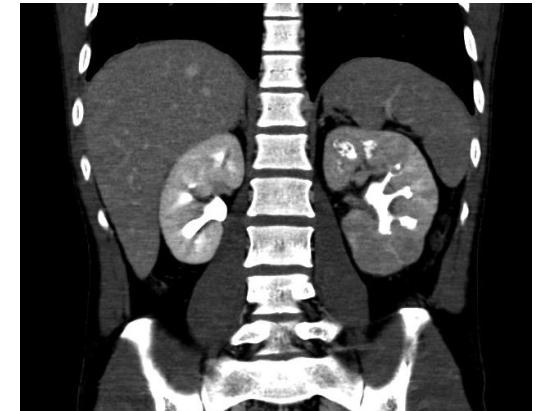


MRI spine

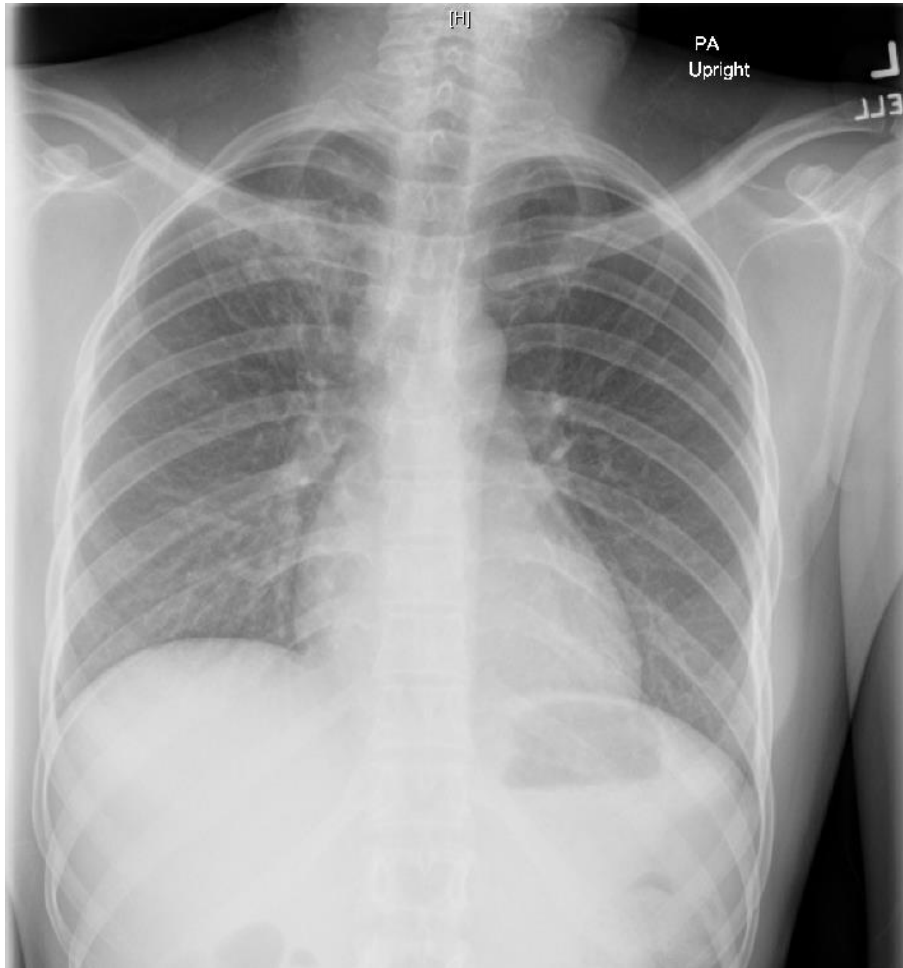
CT Abdomen/Pelvis



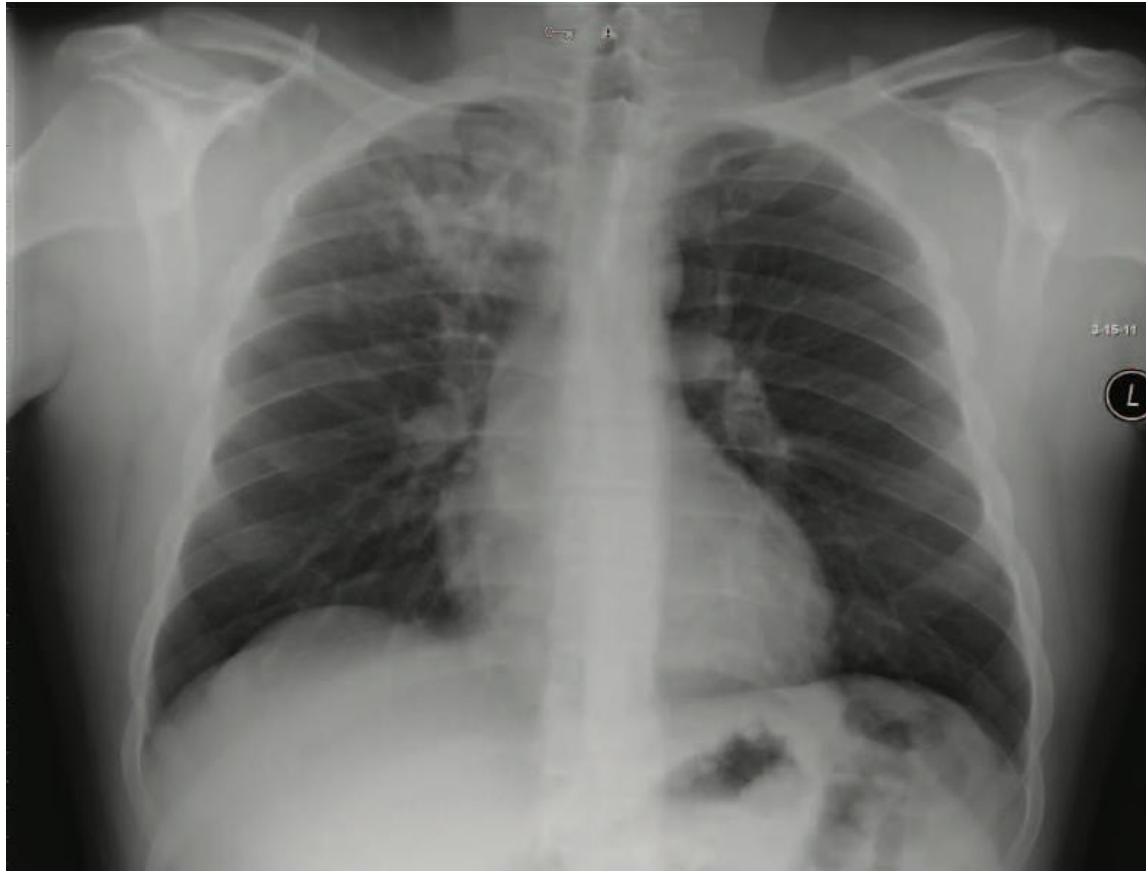
Plus ultrasound for aspiration of LNs and effusions



Non-cavitary RUL infiltrate



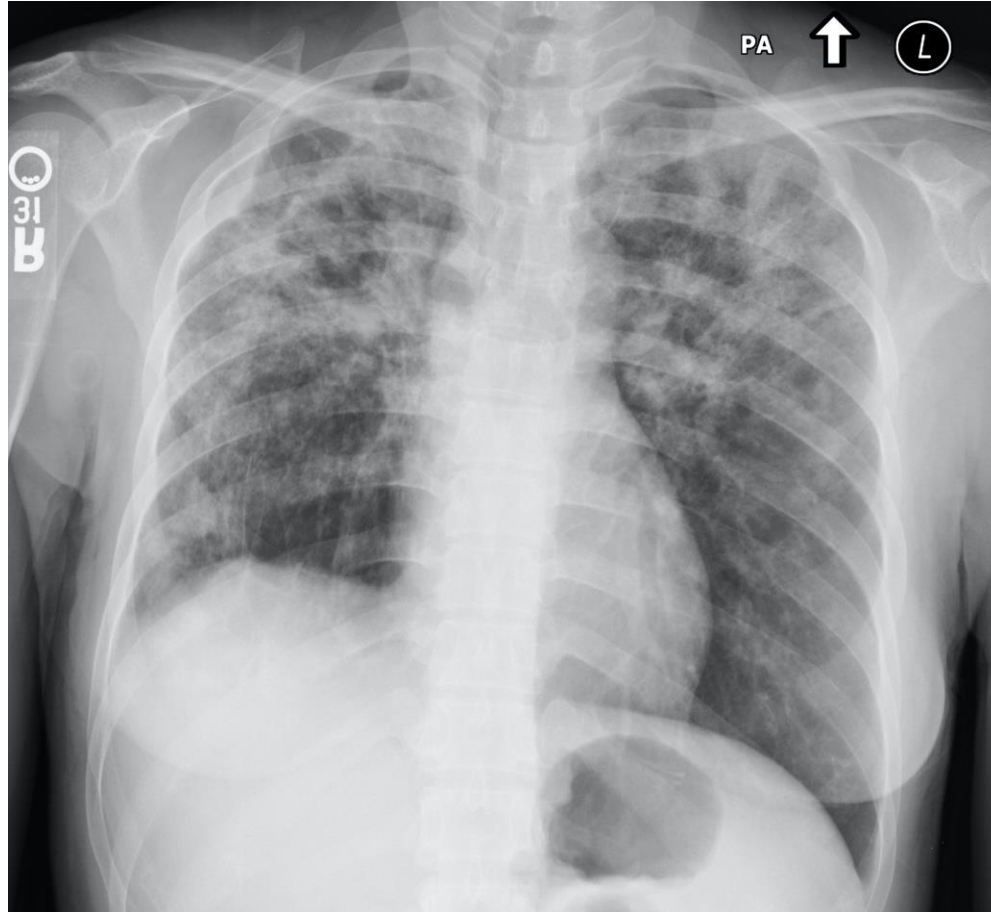
Non-cavitary RUL infiltrate



R>L bilateral UL infiltrates



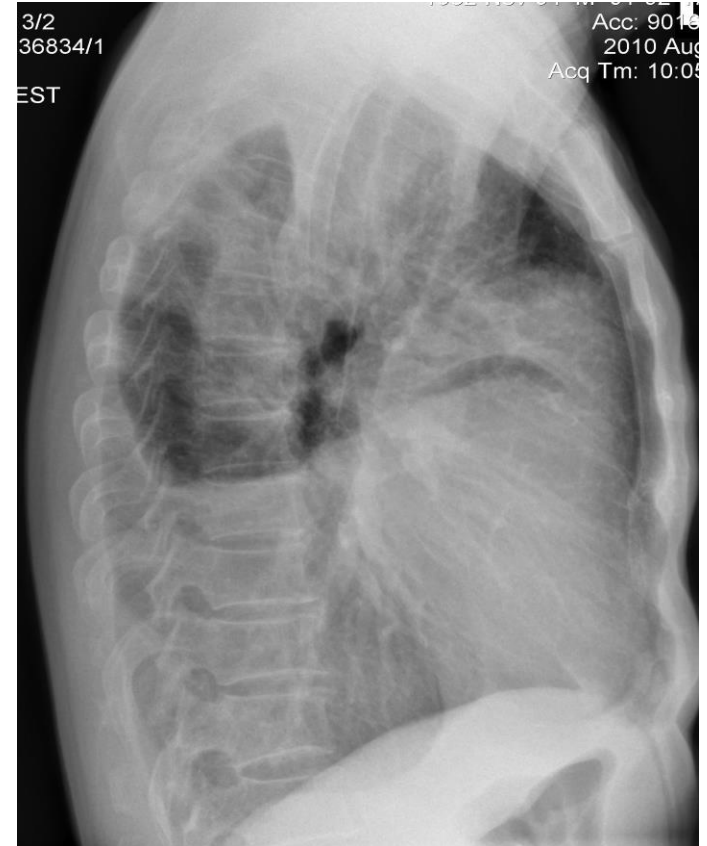
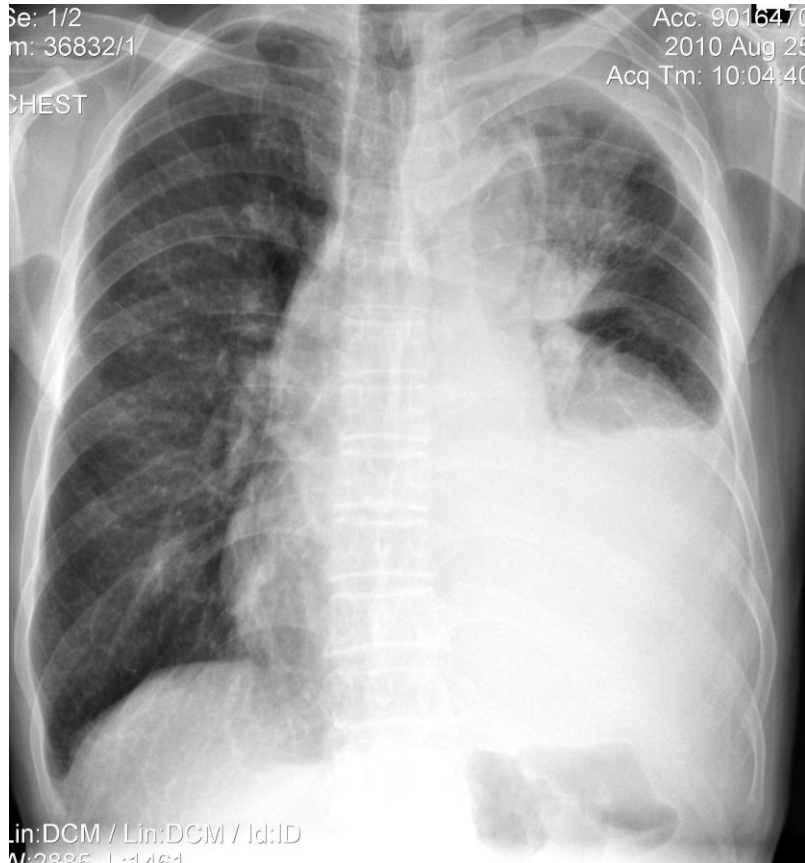
Extensive bilateral UL infiltrates



Even more extensive bilateral upper>lower zone infiltrates



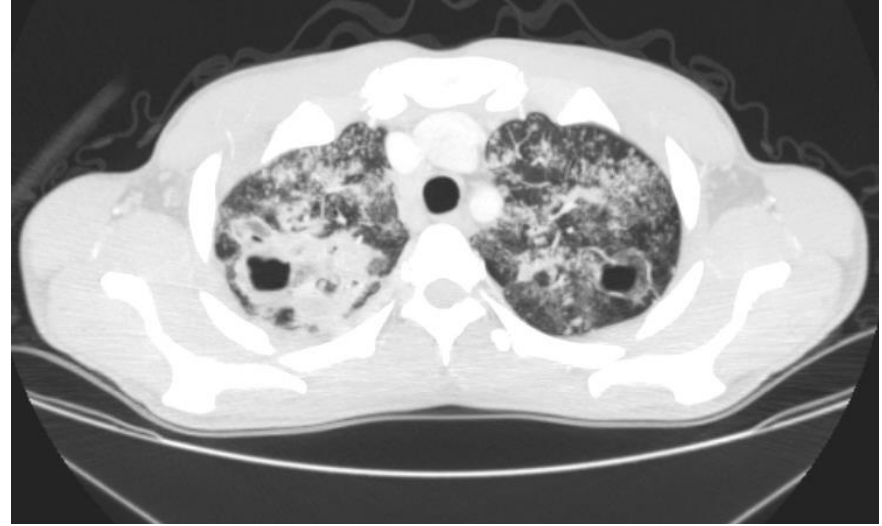
L pleural effusion + LUL infiltrate



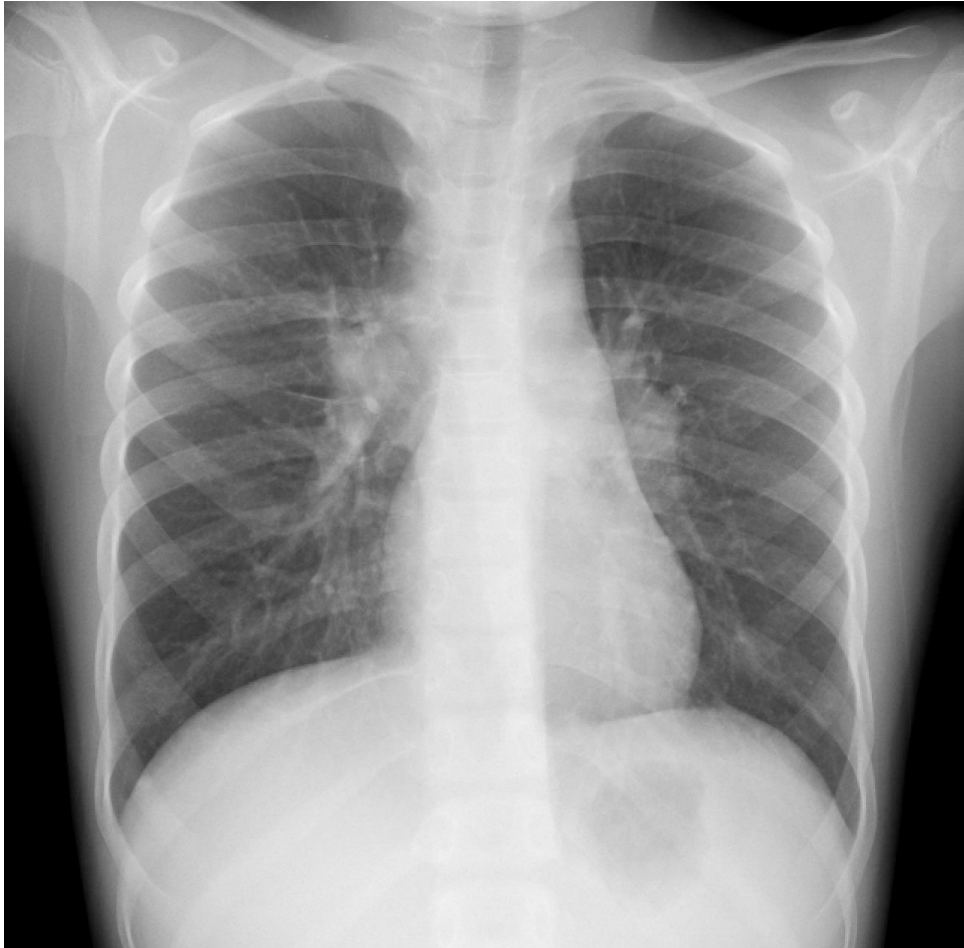
Miliary Pattern



Bilateral cavitory infiltrates with extensive endobronchial spread and miliary nodules



R hilar lymphadenopathy



General Patterns in Presentation of TB

Primary/immunosuppressed

- Adenopathy
- Effusions
- Dissemination
- Extrapulmonary sites
- Smear-negative more common
- More SIRS
- More IRIS

Reactivation/adult

- Pulmonary
- Reactivation type
- Cavitation
- Less extrapulmonary
- Smear positive more common
- Less IRIS

Specimen Collection

Airway

- Spontaneous sputum x 3
- Induced sputum (at least 2)
- Endotracheal aspirate
- BAL

Other

- Gastric aspirate
- Trans-bronchial bx
- Pleural fluid
- Pleural biopsy
- LN/abscess FNA
- LN excisional biopsy
- CT-guided needle biopsy
- Fluids
 - Pleura/peritoneum/pericardium
 - CSF
 - Joint
- Other tissues (peritoneum, gut, endometrium, etc.)

Collection of Respiratory Specimens

- Sputum Expectoration:
 - 3 specimens (at least 8 hours apart)
 - 1 spot specimen (induce prn)
 - 2 consecutive first-morning specimens
- Induction (if unable to raise specimen)
- Bronchoscopy
- Post-bronchoscopy sputum
- Gastric Aspiration

ATS/IDSA/CDC 2017 Dx Guidelines: sputum→induction→bronchoscopy

Bronchoscopy Indications

- Unable to obtain specimen via induction or gastric aspirate
- Sputum smear/PCR negative but clinical suspicion of TB still high
- Sputum smear negative and MDR is a high concern
- Specimen needed for testing to address suspected non-TB conditions

Always collect post-bronchoscopy sputum when TB is in the differential

Specimen Testing

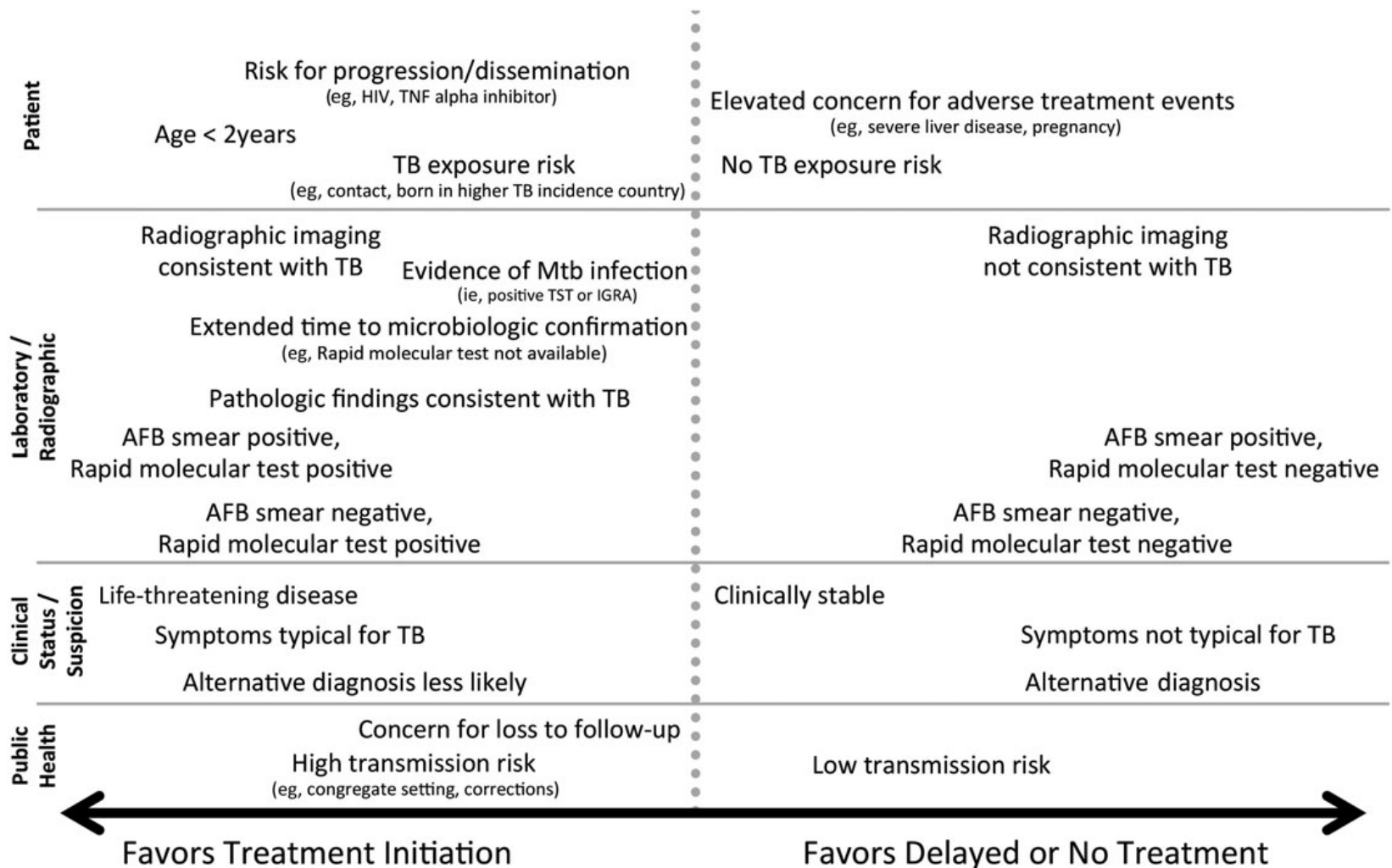
Mycobacteriology

- Acid-fast bacillus stain & culture
- TB nucleic acid amplification x 1-2
- Unfixed tissue specimens for PCR and culture!!

Other (but TB-focused)

- Cytology/histopathology
- Cell count and differential
- Protein, glucose, LDH
- Adenosine deaminase
- Interferon-gamma release assay (e.g., Quantiferon, T-Spot)

Medical Decision Making



Releasing from Airborne Isolation Precautions among Inpatients

Sputum smear positive

- Rx \geq 14 days
- Clinical improvement
- No resistance likely
- Smears neg x3

OR

Culture neg x2

Sputum smear positive

- Rx \geq 7 days
- Clinical improvement
- No resistance likely

Hospital Discharge Criteria Pulmonary TB Cases

- On effective therapy
- Tolerating therapy
- No need for ongoing acute care
- Local public health engaged
- Household contact evaluations underway
- Window chemoprophylaxis for children <5 and immunosuppressed
- Local public health approves of post-discharge housing and treatment plan ([WAC 246-170-041](#))

TB Control & Prevention Process Objectives

1. Diagnosis and prompt initiation of effective treatment of active cases.
2. Identification, engagement, testing and (if appropriate) treatment of contacts.
3. Targeted testing and treatment of latent TB infection.

Latent TB Infection

Testing Indications

- Close contact to a case
- Foreign birth
- Extended travel
- Congregate settings
- Severe immunosuppression
- ESRD
- DM (+ epidemiologic risk)
- Scarring on CXR
- Low body weight

Diagnosis

- Asymptomatic
- Positive test (IGRA preferred)
- Normal chest radiograph

Treatment

- RIF daily x4months
- Rifapentine-INH wkly x 12 doses
- INH/RIF x 3 mos
- INH x 6-9 mos

Summary-1

- Cough, sputum, fever, night sweats or weight loss sensitive but non-specific
- Diagnosis: history → imaging → specimens
- Airborne infection isolation precautions
- 3 respiratory specimens for AFB smear/culture.
- Xpert (preferred) or other PCR on 1-2 specimens.

Summary-2

- Collect specimens from additional suspected sites.
- Communicate with public health early and often.
- Test and treat for latent TB in relevant risk groups through primary care.

Questions/Comments

christopher.spitters@doh.wa.gov



Additional Resources

- CDC. [Core Curriculum on Tuberculosis: What the Clinician Should Know](#) (free CME).
- ATS/IDSA/CDC. [Diagnosis of Tuberculosis in Adults and Children](#). Clin Infect Dis 2017;64(2):e1-e33.
- ATS/IDSA/CDC. [Treatment of Drug Susceptible Tuberculosis](#). Clin Infect Dis 2016;63(7):e147-e195.
- CDC. [Guidelines for Preventing the Transmission of Tuberculosis in Healthcare Facilities](#). MMWR 2005;54(RR-17):1-141.
- WA DOH. [Latent Tuberculosis Treatment Guidance in Washington State](#).
- CDC. [Testing for Latent TB Infection](#).
- CDC. [Treatment for Latent TB Infection](#).