Importance of a TB Medical Assessment

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- No conflict of interests
- No relevant financial relationships with any commercial companies pertaining to this educational activity

Importance of a TB Medical Assessment

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Think TB

TREATMENT IS PREVENTION –
Treatment prevents progression of LTBI to disease
Treatment may prevent development of LTBI after exposure

TREATMENT STOPS TRANSMISSION

Latent TB Infection (LTBI)

- Persons have evidence of infection with *Mycobacterium tuberculosis*:
  - Positive TST (Tuberculin Skin Test) or IGRA (Blood Test)

AND HAVE

  - No Active TB Symptoms
  - Chest X-ray which is normal, or shows only small granuloma or **stable** pleural or parenchymal scarring
  - They are Not infectious – Do not transmit TB

Active TB Disease

- Persons are **sick** and usually have at least one of the below
    - Abnormal CXR
    - Symptoms and or findings c/w TB disease
    - Specimen which is pcr positive or grows MTB
  - Usually are infectious

LATENT TB INFECTION

- We used to think the bacteria were in a complete resting state or dormant but
  - TB Bacteria **are metabolically active and dividing**, but infection is controlled by the immune system.

- **Current methods of LTBI diagnosis are less than perfect**
- Active TB Disease may develop if immunity wanes.

The Spectrum of TB Disease

Am J Resp and Critical Care Med Vol 203, Jan 15 2021

Classic Conceptualization of TB

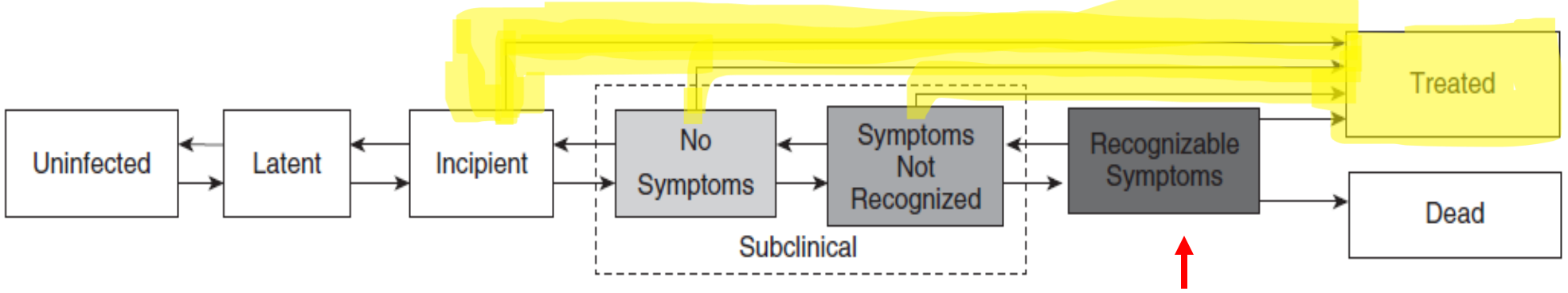
Updated Conceptualization of TB:

Incorporates Three Elements:

1) Subclinical stages from which transmission may occur without recognizable symptoms (extra boxes with grey shading)

2) Regression/resolution to milder disease possible (bidirectional arrows)

3) The potential for diagnosis and treatment before recognizable symptoms develop (upper arrows to "Treated")



Finding and treating TB earlier means we need to be aware of:

Those at risk of exposure to MTB

Those at increased risk of progression to TB disease if they are exposed.

Persons at Risk of (**Exposure**) MTB Infection or Disease

- People who have spent time with someone who has TB disease
- People from a country where TB disease is common:
  - most countries in Latin America, the Caribbean, Africa, Asia Eastern Europe, and Russia
- People who **live or work** in high-risk settings:
  - correctional facilities, long-term care facilities or nursing homes, and homeless shelters
- Health-care workers who care for patients at increased risk for TB disease
- Infants, children and adolescents exposed to adults who are at increased risk for latent tuberculosis infection or TB disease

Persons at Risk of **Progression** from Latent TB Infection to Active TB Disease

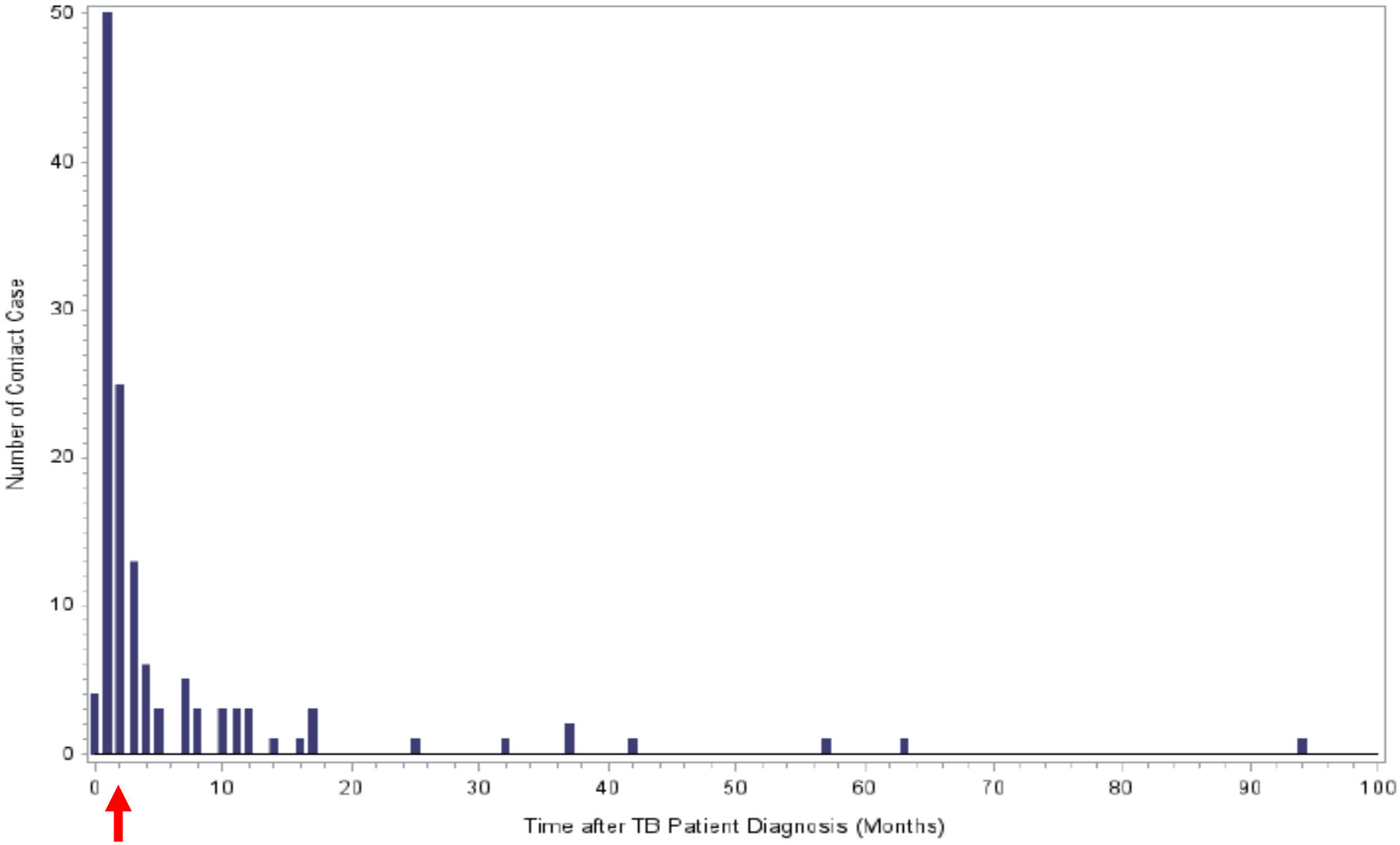
- **Recent exposure**
- **HIV infection**
- Chronic kidney disease
- Silicosis
- Diabetes
- Chest x-ray abnormality c/w previous inadequately treated TB
- Intravenous drug use
- Smoking – active and passive
- Underweight by >10% or rapid loss of at least 10% of body weight.

ATS-CDC. Am J Respir Crit Care Med 2000;161:S221

Persons at Risk of **Progression** from Latent TB Infection to Active TB Disease

- Immunosuppression
  - Organ transplant recipients
  - Hematologic cancers and head and neck cancers
  - Pregnancy and first three months post partum
  - Medications
    - TNFα inhibitors
    - Prednisone >15 mg, > 4 weeks
    - Chemotherapy
    - Other immunosuppressive drugs

Figure 1. Timing of Tuberculosis Diagnosis among 131 Contacts Diagnosed after the Index Case Diagnosis



2 months

JID
June 2018

Evaluation for TB

- In U.S. usually starts with a screening test to detect evidence of TB infection –
  - Only after the provider considers the Possibility of TB
  - TB Skin Test (**TST**)
  - Interferon Gamma Release Assays (IGRA)

Active TB Disease or TB Infection? The Clinical Evaluation

The single most important thing prior to starting treatment for TB Infection is to exclude active TB disease.

If in doubt – wait!

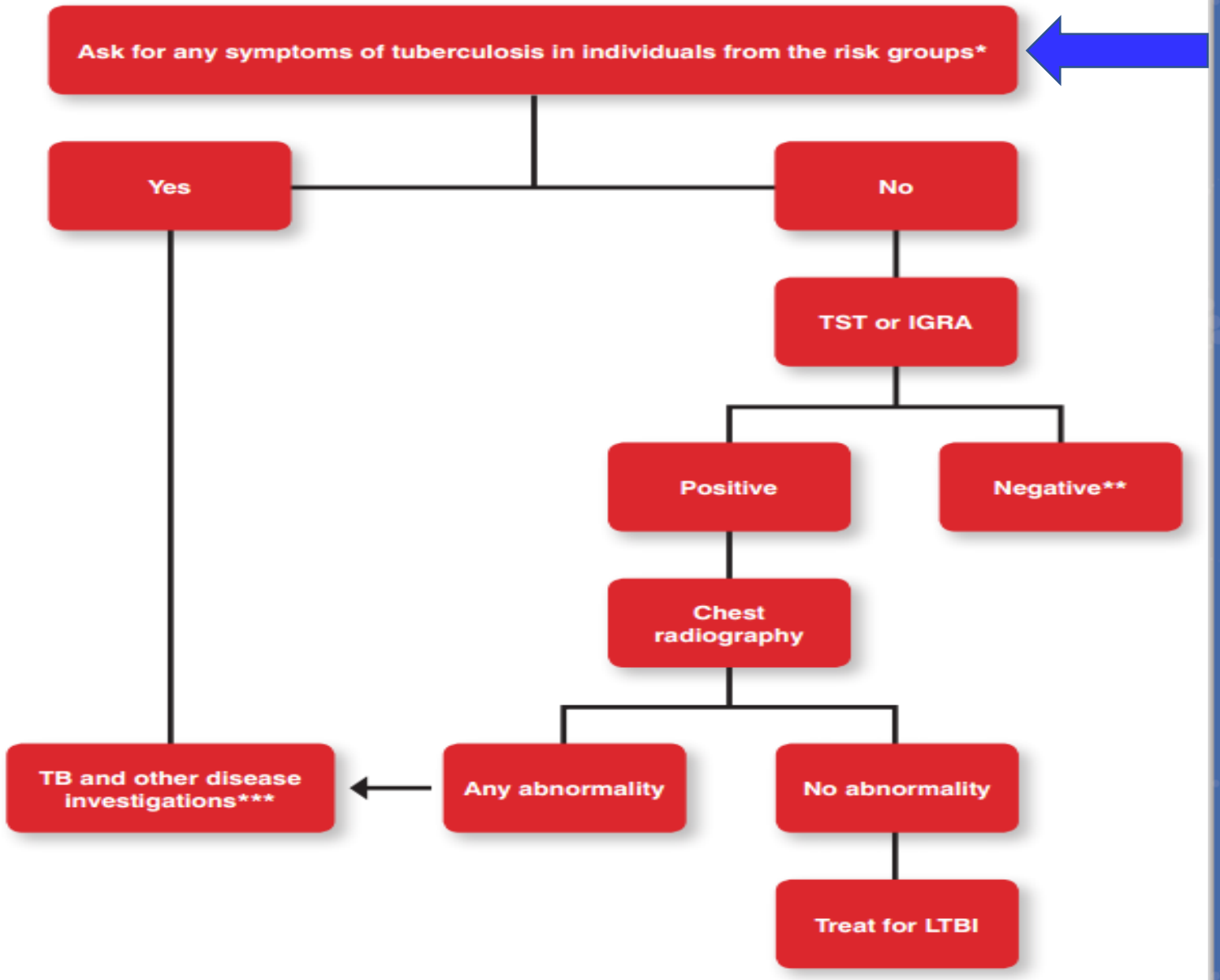
Evaluate for TB disease

Consider consultation with TB expert

WHO Guidelines on the management of latent tuberculosis infection 2015

Remember that the TST or IGRA may be negative in those with active TB!

Figure 1. Algorithm for targeted diagnosis and treatment of LTBI in individuals from risk groups



* Any symptoms of TB include any one of: cough, haemoptysis, fever, night sweats, weight loss, chest pain,

Evaluate to Exclude Active TB Disease

- If the TST or IGRA is Positive –
  - **» OR**
- Child < 5 or immunocompromised person with recent exposure or patient has symptoms –
  - **–even if TST/IGRA negative -**
    - √ History
    - √ Physical examination
    - √ Chest X-Ray

Is There Evidence of Disease?

- Symptoms*
  - Fever
  - Chills
  - Night Sweats
  - Weight Loss
  - Cough (dry/productive)
  - Hemoptysis
  - Fatigue

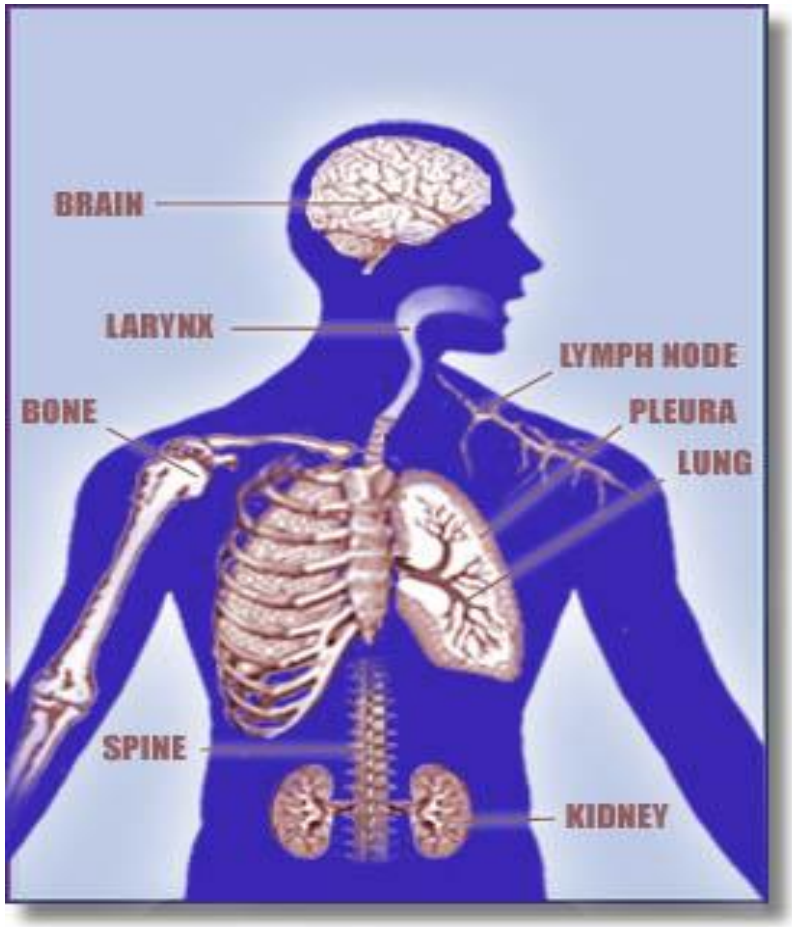
    * **only one may be present – or patient may deny all**

Is Patient at Risk of Progression to Disease?

- Medical History:
  - HIV
  - Silicosis
  - Chronic Kidney Disease
  - Diabetes
  - Immunosuppression
  - Drug/alcohol/tobacco
  - TB exposure

TB Evaluation – Focus on Possible Sites of TB Disease

- Lungs – Pulmonary
- Extrapulmonary
  - Larynx
  - Lymph nodes (cervical inguinal, supraclavicular, mediastinal, abdominal
  - Pleural effusion
  - Genitourinary
  - Bones & joints
  - Miliary (disseminated)
  - CNS (brain and/or meninges)



Physical Exam and Medical Assessment
(Careful exam can help determine if TB or LTBI)

- General assessment – does person look well?
- Lung exam
- Check for lymph nodes
- Palpate liver
- *In children* look at growth curve/weight/activity
- Look for anything that will complicate therapy!
- Laboratory abnormalities c/w active TB
  - Elevated platelet count, low serum albumin, anemia

Radiologic Exam

- CXR must be done **before treatment of TB Infection**
  - Must be read as normal

    Or
  - IF abnormal may consider starting treatment if:
    - Not consistent with Active TB
    - Stable abnormality confirmed over a 3 - month period
    - Negative sputum culture x 3 for MTB

CXR - Can Suggest TB Disease but Does Not Definitely **Diagnose or Exclude** TB Disease

Cavitary lesions
Upper lobe infiltrates
Pleural effusion especially in those with recent exposure
"Tree in bud" findings on CT exam

Common mimics of TB =

- Non-tuberculous mycobacteria (NTM)
- fungal infection
- bacterial abscesses

Usually thin walled cavities

- necrotic neoplasm (especially lung neoplasm)

May be Normal!

Bacteriologic and Histologic Examinations

- **3 initial Sputum Specimens** for
  AFB smear and culture
  Ask for a pcr (GeneXpert) on initial specimen if you suspect TB disease
  For both pulmonary and extra-pulmonary TB

- Collected 8-24 hours apart
  with at least 1 early morning specimen
  one induced specimen
  one observed specimen

Bacteriologic and Histologic Examinations

Extrapulmonary Specimens

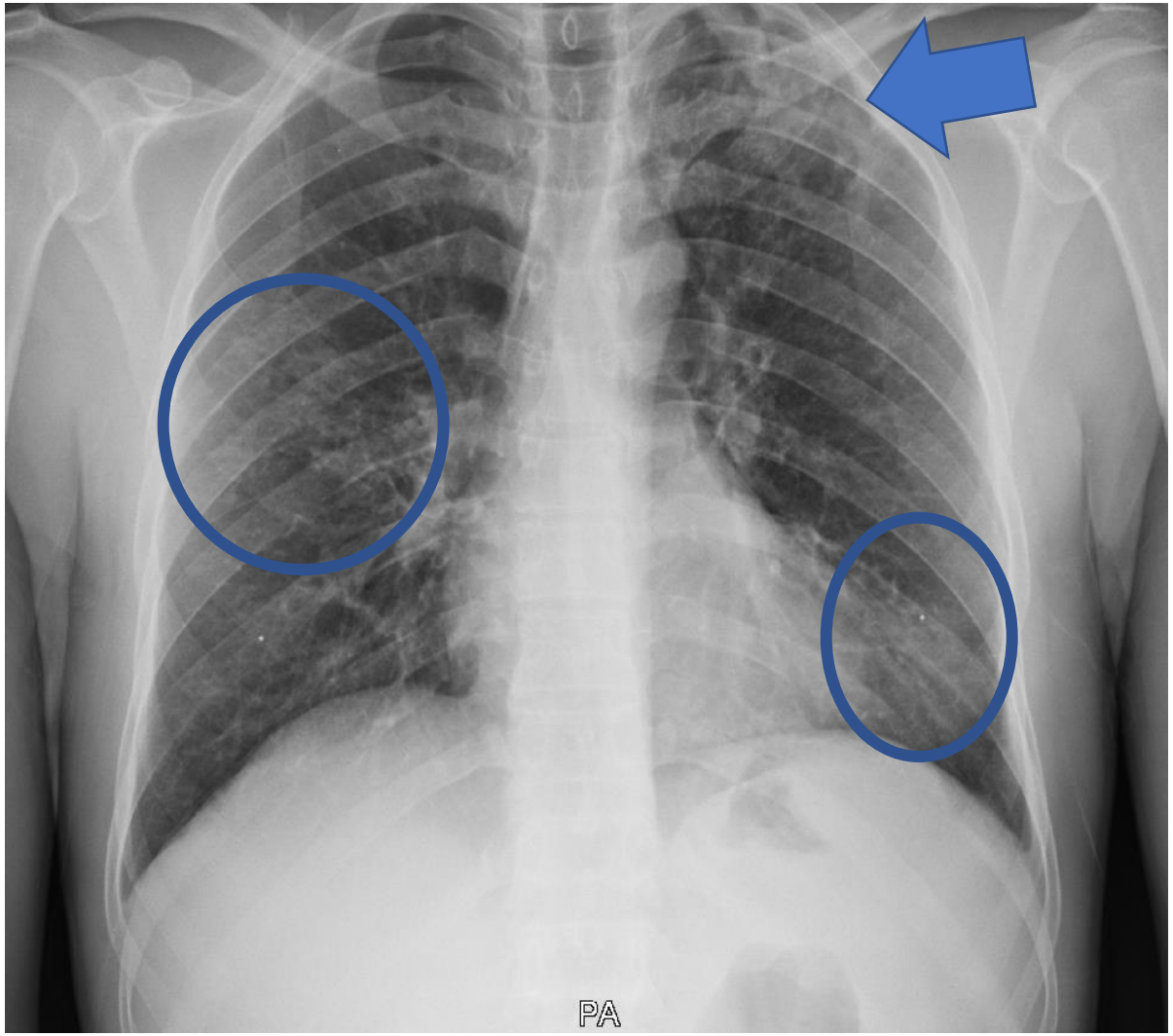
- Urine
- Cerebrospinal fluid *
- Pleural fluid *
- Ascites *
- Pus
- Biopsy specimens

*recovery poor – less likely to be pcr, smear or culture positive

Case Study - Immigrant Evaluation For TB Spring 2018

- 13-year-old immigrated from Northeastern African country within last year
- Thin but otherwise well
- Positive T-Spot
- Normal CXR

Latent TB Infection



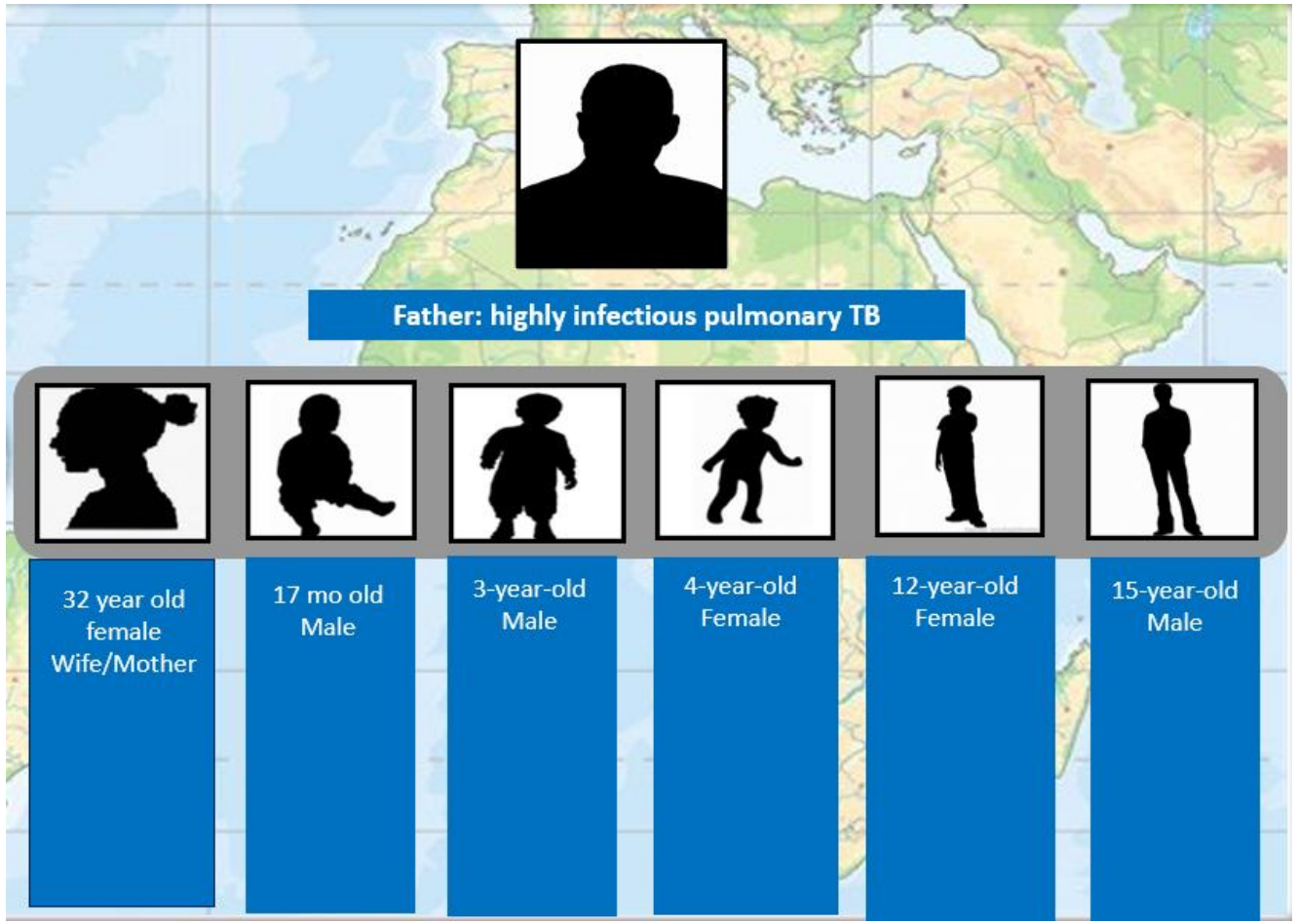
May 2019

37 year old African man
4 months of cough, weight loss, and poor energy
6 weeks after starting TB treatment remains strongly AFB smear positive

AFB – Acid Fast Bacilli

ACTIVE TB DISEASE

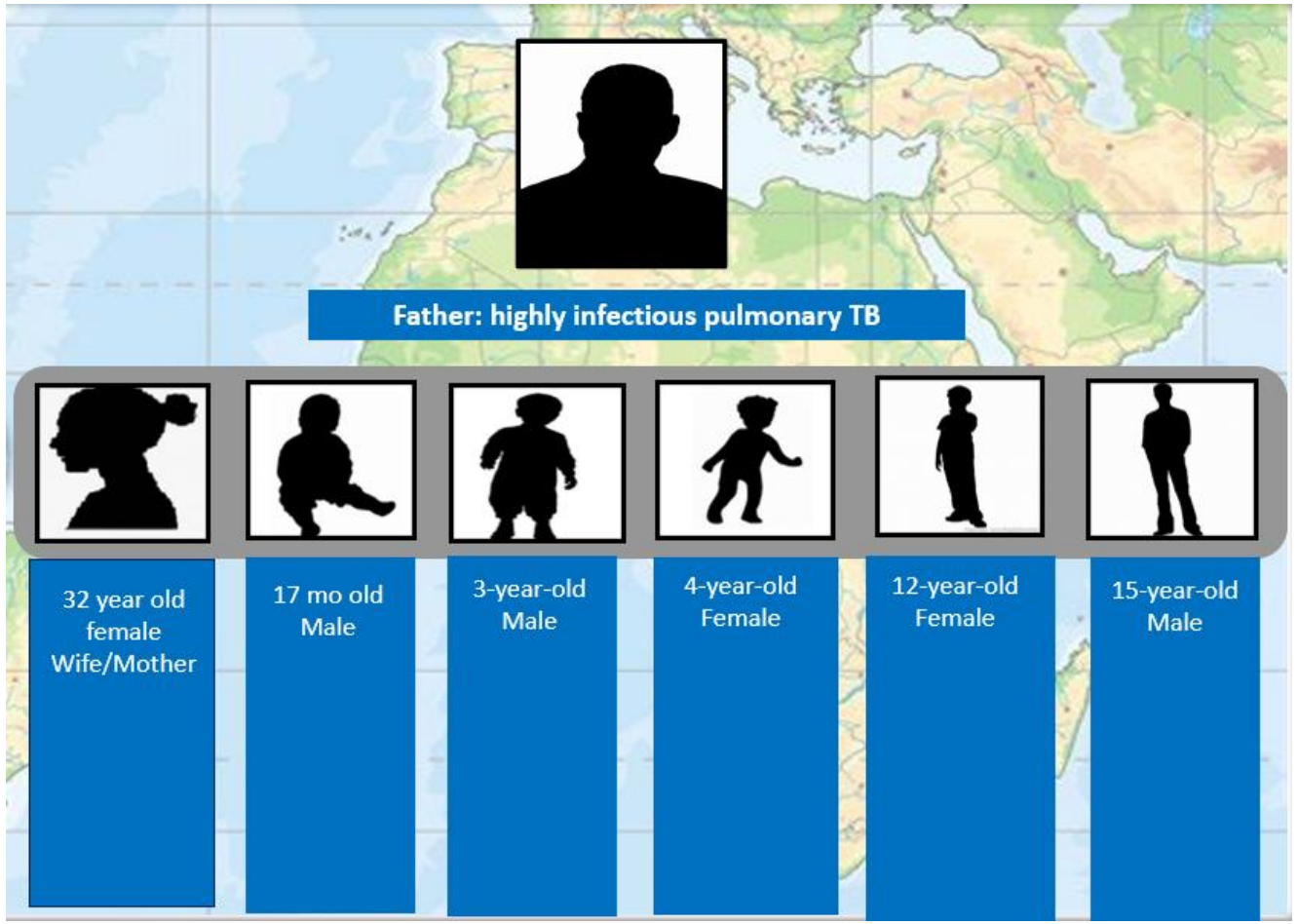
Family of Newly Diagnosed Patient Comes to Clinic – **What Now?**



1
2
3
4
5

Public Health's responsibility is to:
*Find and treat disease if it is there
*Find and treat LTBI if it is there
*Protect the vulnerable contacts even if all tests are negative

Family of Newly Diagnosed Patient Comes to Clinic – **What Now?**

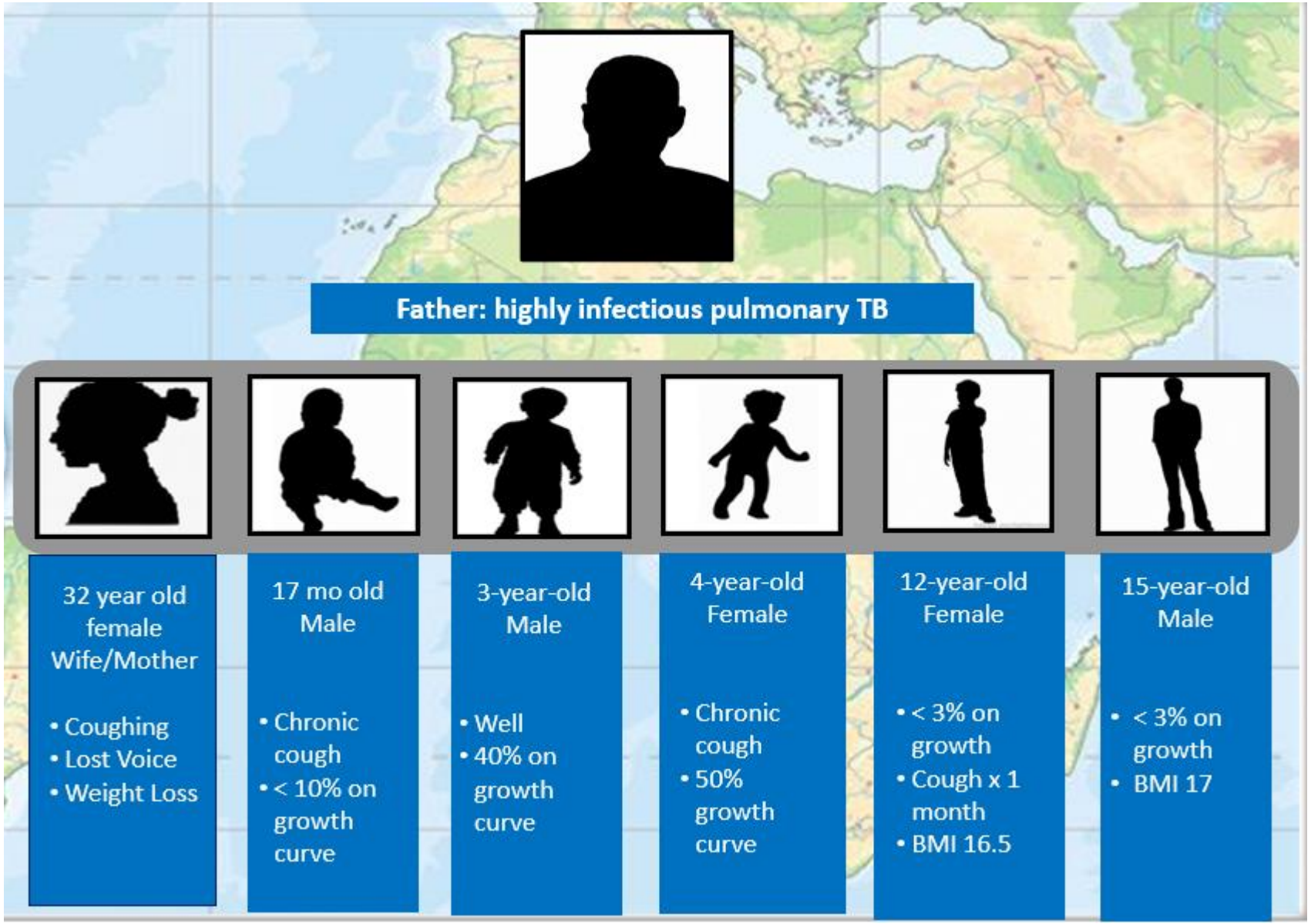


- 1 IGRA or TST
  - BCG vaccinated
- 2 Evaluate for symptoms of TB; generally, do they look well? Kids playful? Alert?
- 3 Medical Assessment
  - Weight, BMI, Growth curve for kids
  - Targeted exam – lungs, lymph nodes
- 4 CXR
- 5 Sputum if any signs or symptoms

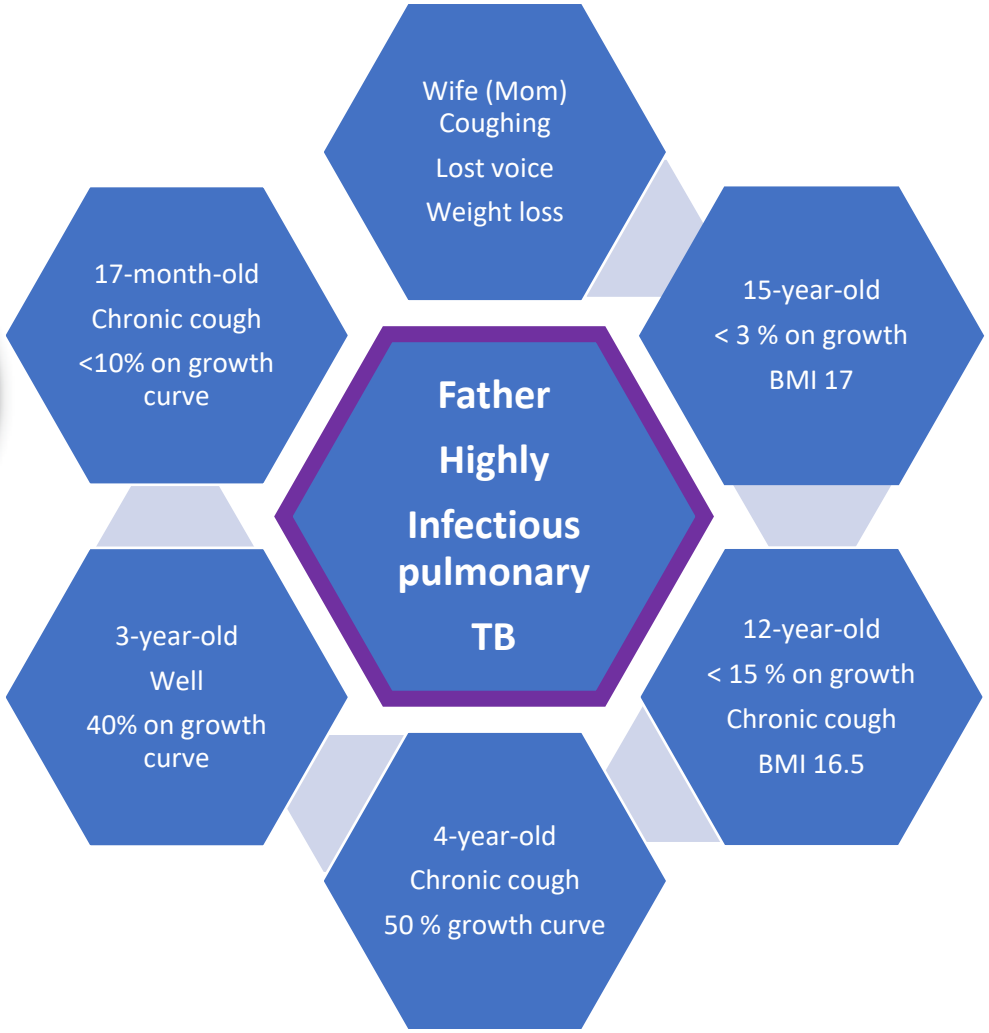
Public Health's responsibility is to:
Find and treat disease if it is there
Find and treat LTBI if it is there
Protect the vulnerable contacts even if all tests are negative

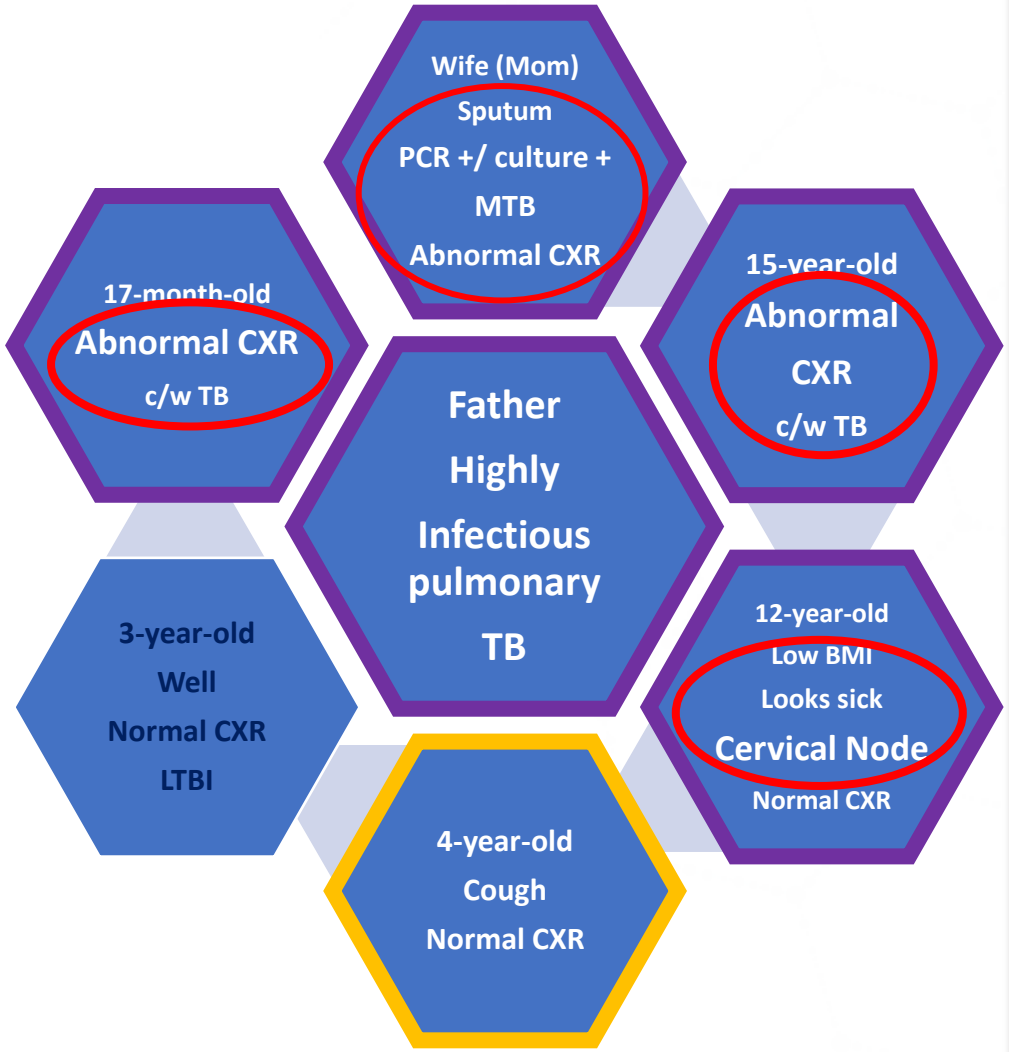
2019 Contact Investigation in Family

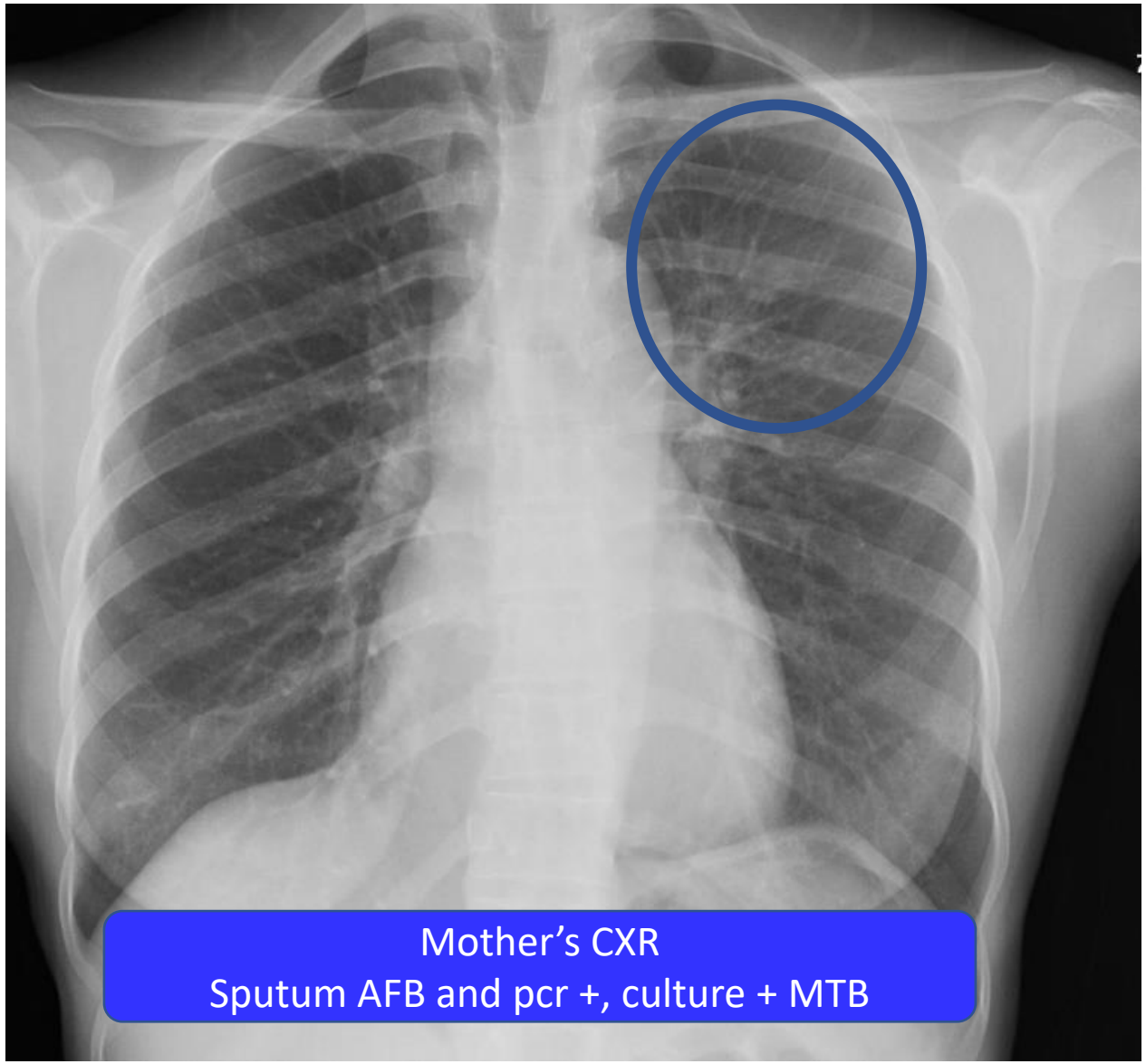
Epidemiology is Critical Information



2019 Contact Investigation in Family
All IGRA positive except 17-month-old - 20 mm blistering TST





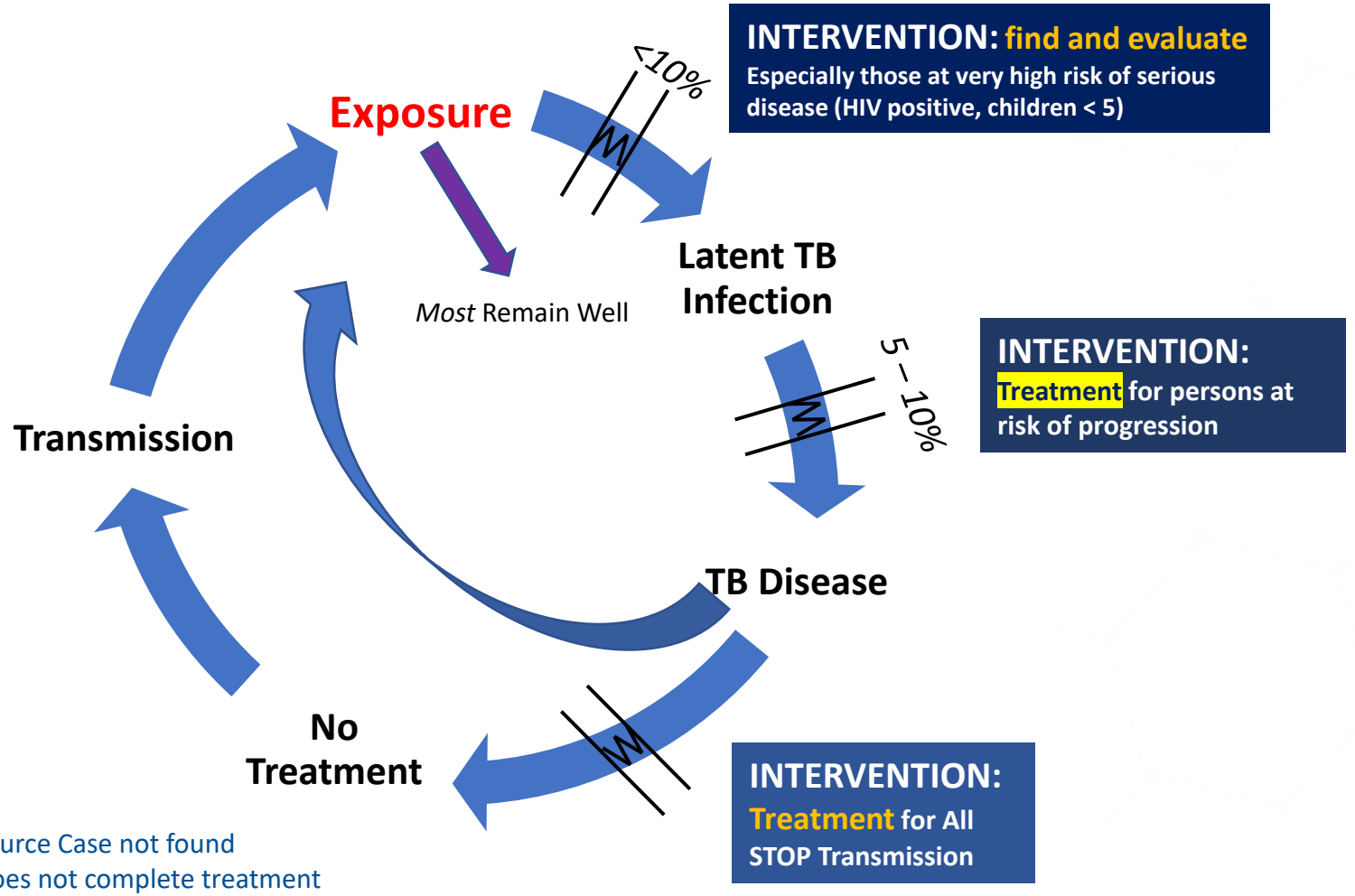


Mother's CXR
Sputum AFB and pcr +, culture + MTB

CXR read as normal

CXR can be normal -
Make sure your patient's really is.

Treatment is Prevention



Think TB

TREATMENT IS PREVENTION – WE DO NOT HAVE AN EFFECTIVE VACCINE – YET

TREATMENT STOPS TRANSMISSION