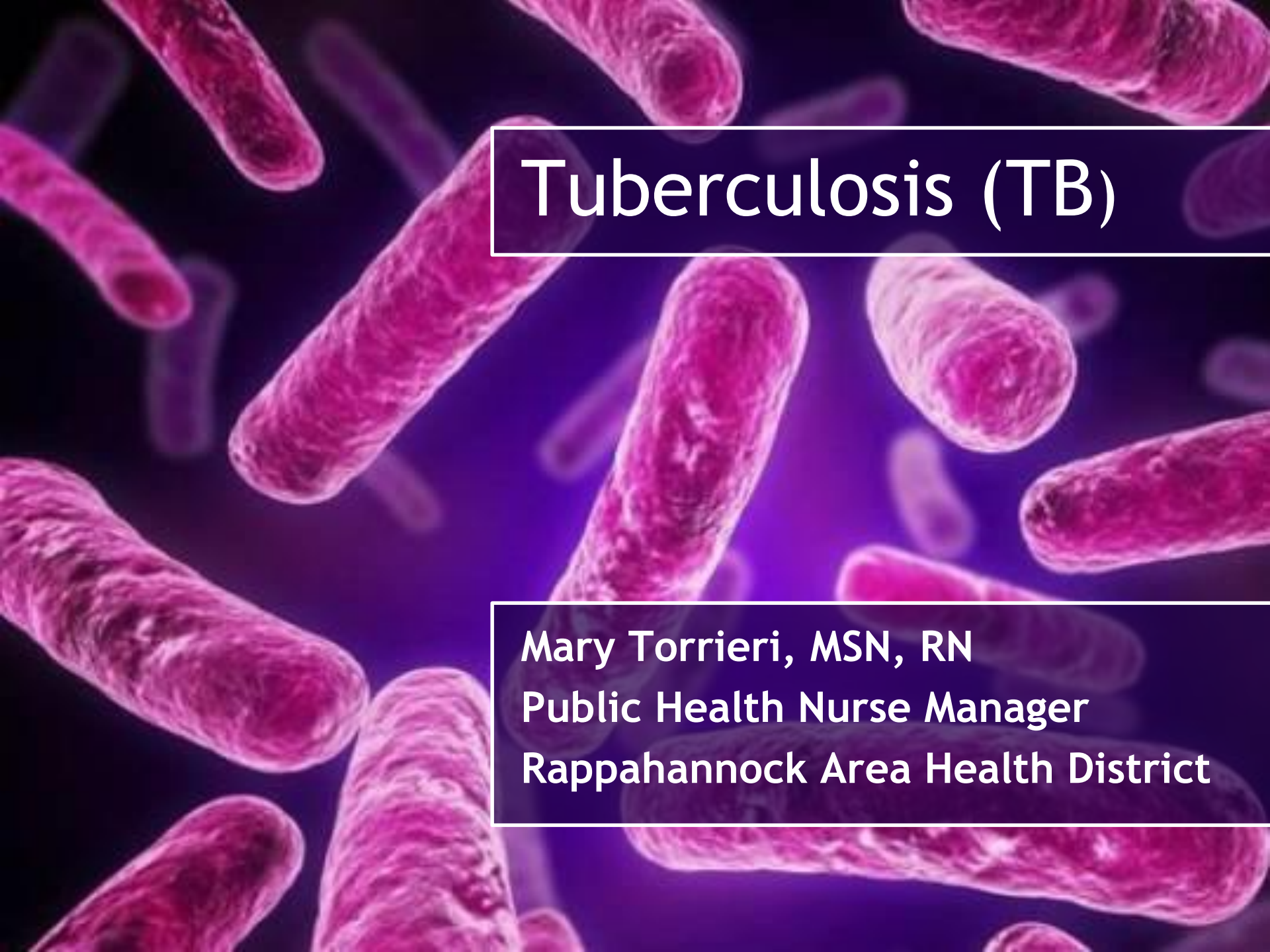


Tuberculosis (TB)

Mary Torrieri, MSN, RN
Public Health Nurse Manager
Rappahannock Area Health District

Agenda

- Overview of TB
  - Facts
  - Epidemiology
  - How TB is spread
  - TB screening and testing
  - Interpretation of TB test results
  - TB treatment
- Questions

Famous People with Tuberculosis

Eleanor Roosevelt
Wife of Franklin D. Roosevelt, 32nd President of the U.S.

Vivien Leigh
Scarlett O'Hara, Gone with the Wind in 1939

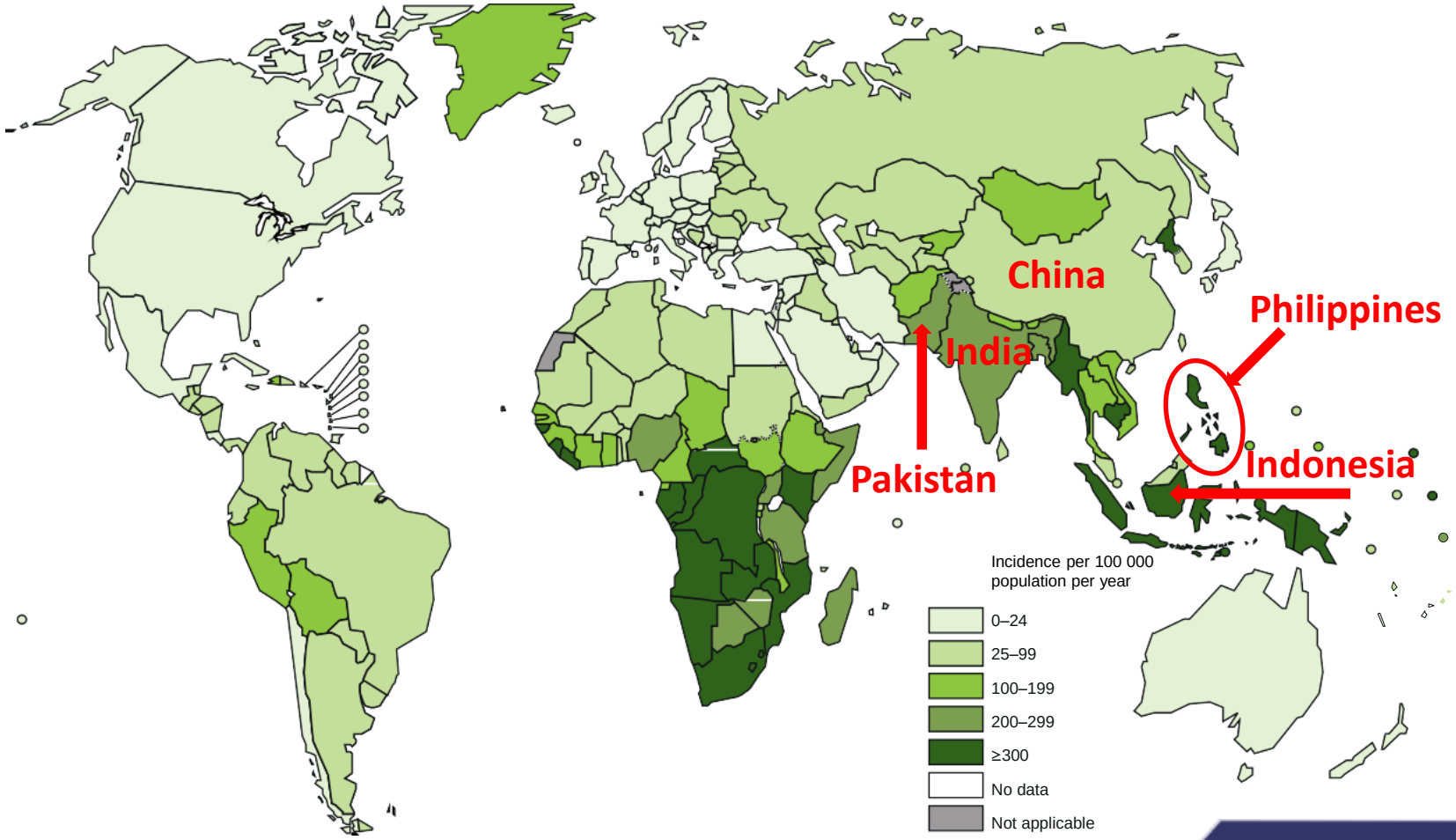
Val Kilmer as Doc Holliday in Tombstone

John Henry "Doc" Holliday
American gambler, gunfighter, dentist and good friend of Wyatt Earp

Tuberculosis Facts

- In 2017, about 10 million people were diagnosed with active TB
- 1 person dies from TB every 21 seconds (1.8 million/year)
- Each year an estimated 1 million children have TB and 170,000 of them die from it.
- TB is the leading killer from a single infectious disease (9th leading cause of death worldwide overall)
- TB is a leading killer of people who are HIV infected (35% of deaths of people infected with HIV)

Estimated TB Incidence Rates, 2017



High Burden TB Country List 2019

High Burden TB Country List 2019
(Countries with TB incidence rates of ≥ 20/100,000 population)
Data obtained from 2018 WHO Global Tuberculosis Report and reflects 2017 data

Country	Country	Country	Country
Afghanistan	Djibouti	Lithuania	Rwanda
Albania	Dominican Republic	Madagascar	Sao Tome and Principe
Algeria	Ecuador	Malawi	Senegal
Angola	El Salvador	Malaysia	Serbia
Anguilla	Equatorial Guinea	Maldives	Sierra Leone
Argentina	Eritrea	Mali	Singapore
Armenia	Eswatini (formerly Swaziland)	Marshall Islands	Solomon Islands
Azerbaijan	Ethiopia	Mauritania	Somalia
Bahamas	Fiji	Mexico	South Africa
Bangladesh	French Polynesia	Micronesia (Federated States of)	South Korea (Republic of Korea)
Belarus	Gabon	Moldova (Republic of)	South Sudan
Belize	Gambia	Mongolia	Sri Lanka
Benin	Georgia	Morocco	Sudan
Bhutan	Ghana	Mozambique	Suriname
Bolivia	Greenland	Myanmar (Burma)	Tanzania (United Republic)
Bosnia and Herzegovina	Guam	Namibia	Tajikistan
Botswana	Guatemala	Nauru	Thailand
Brazil	Guinea	Nepal	Timor-Leste
Brunei Darussalam	Guinea-Bissau	Nicaragua	Tokelau
Bulgaria	Guyana	Niger	Togo
Burkina Faso	Haiti	Nigeria	Tunisia
Burundi	Honduras	Niue	Turkmenistan
Cabo Verde	India	Northern Mariana Islands	Tuvalu
Cambodia	Indonesia	North Korea (Democratic People's Republic)	Uganda
Cameroon	Iraq	Pakistan	Ukraine
Central African Republic	Kazakhstan	Palau	Uruguay
Chad	Kenya	Panama	Uzbekistan
China	Kiribati	Papua New Guinea	Vanuatu
China, Hong Kong SAR	Kuwait	Paraguay	Venezuela
China, Macao SAR	Kyrgyzstan	Peru	Viet Nam
Colombia	Lao People's Democratic Republic	Philippines	Yemen
Comoros	Latvia	Portugal	Zambia
Congo	Lesotho	Qatar	Zimbabwe
Cote d'Ivoire	Liberia	Romania	
Democratic Republic of the Congo	Libya	Russian Federation	

Persons from these countries should be screened for TB and TB infection. Persons from countries not found on this list should only be tested if symptomatic or if they have risk factors.
Updated 12/28/2018 VDH TB Program

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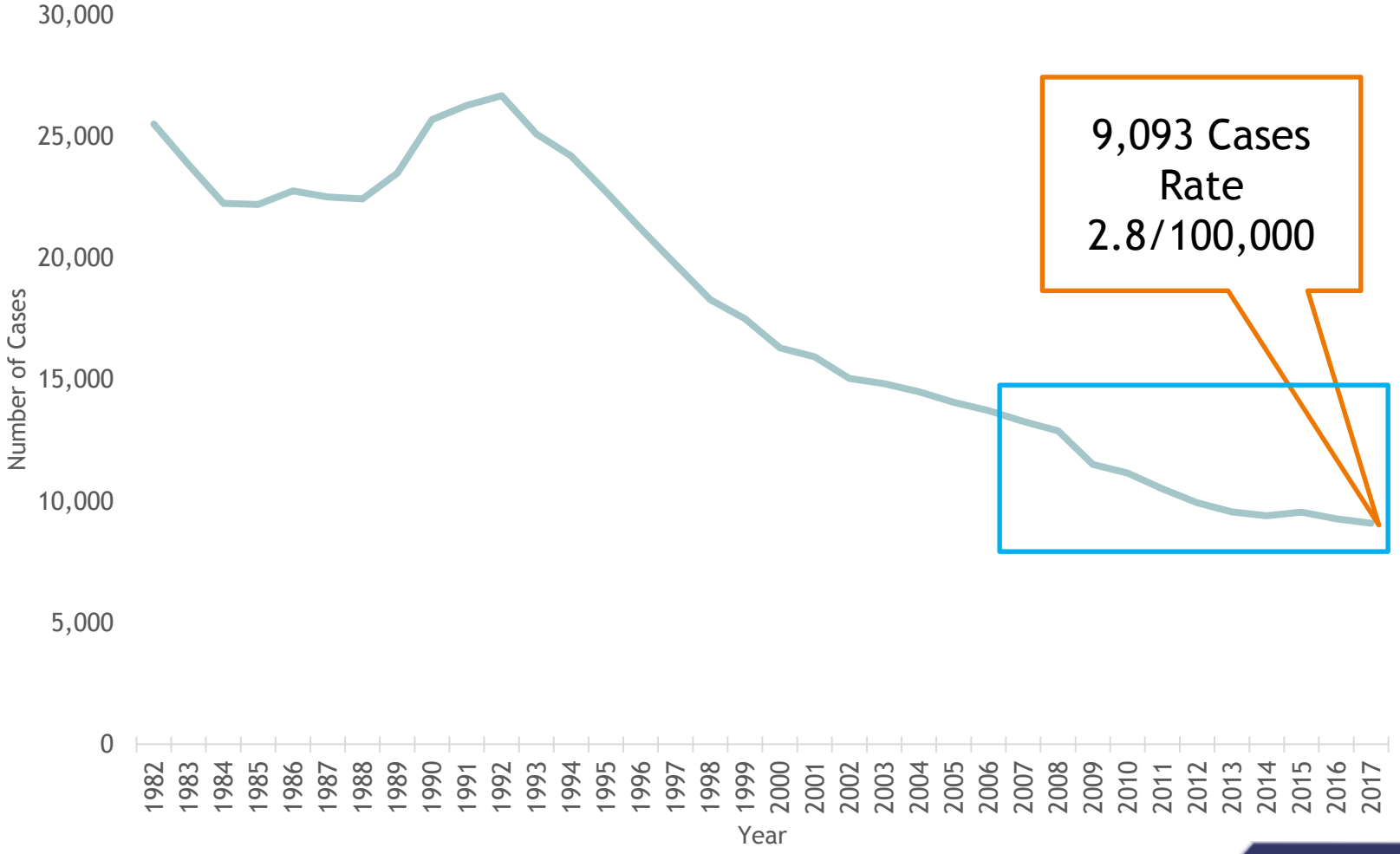
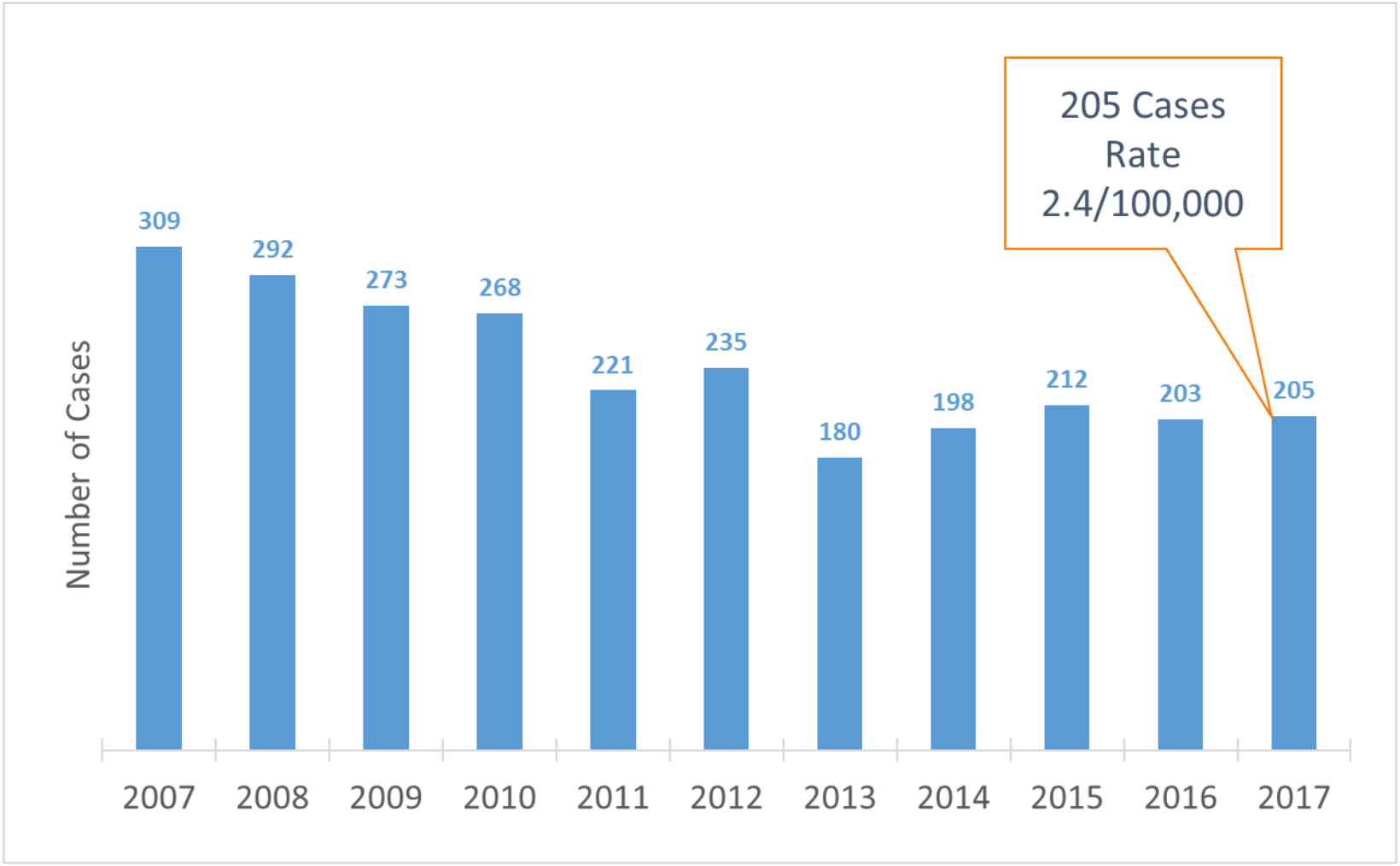
Protecting You and Your Environment

Reported Tuberculosis Cases, United States, 1982-2017



Tuberculosis in Virginia, 2007 - 2017

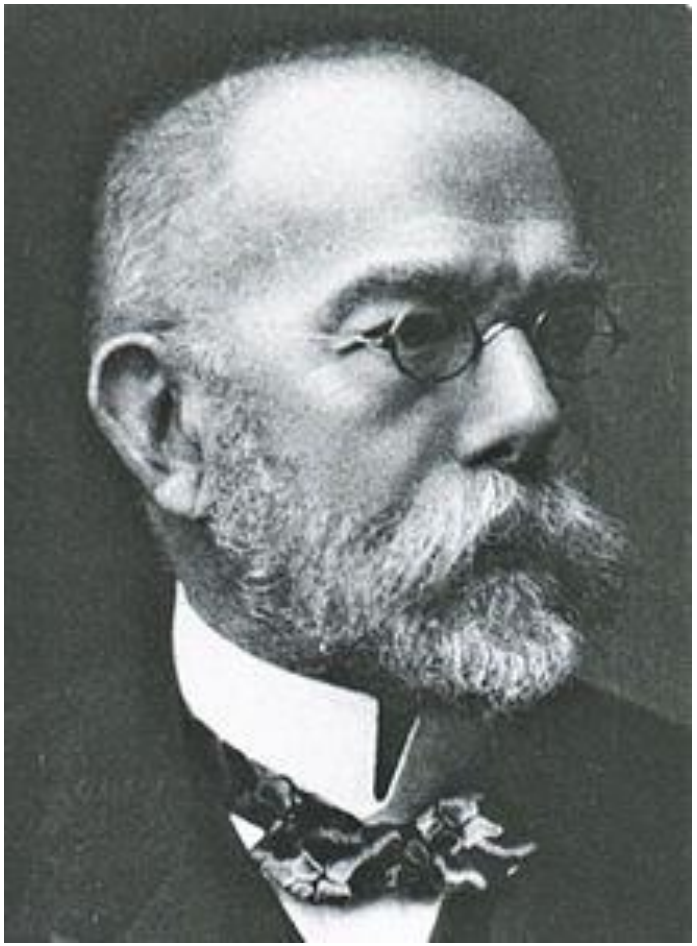


Basic Tuberculosis (TB) Facts

- TB is caused by a bacterium called *Mycobacterium tuberculosis (MTB)*
- TB is spread from person-to-person through the air when someone with the active disease in their lung coughs, sneezes, shouts or sings.

Basic Tuberculosis (TB) Facts

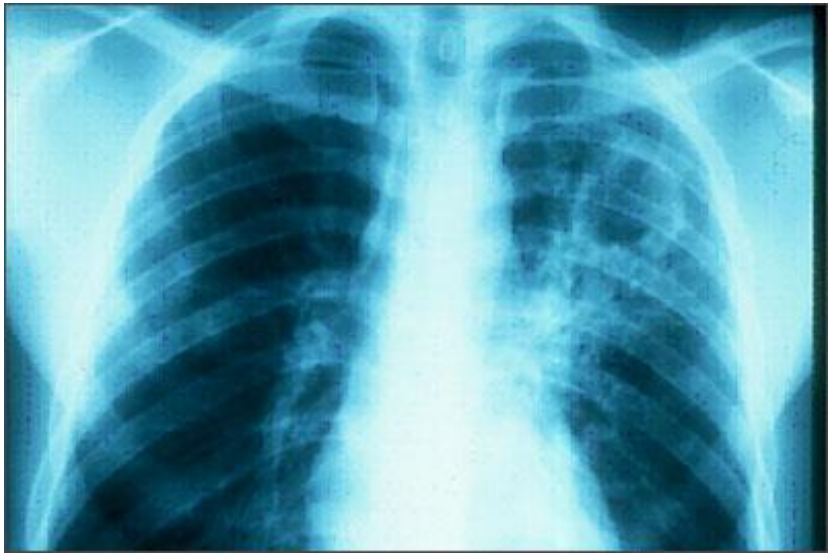
- “Vampire Panics”
- Dr. Robert Koch announced the discovery of M. Tuberculosis on March 24, 1882.
- During that time, TB killed 1 out of every 7 people living in the U.S. and Europe.



Dr. Robert Koch

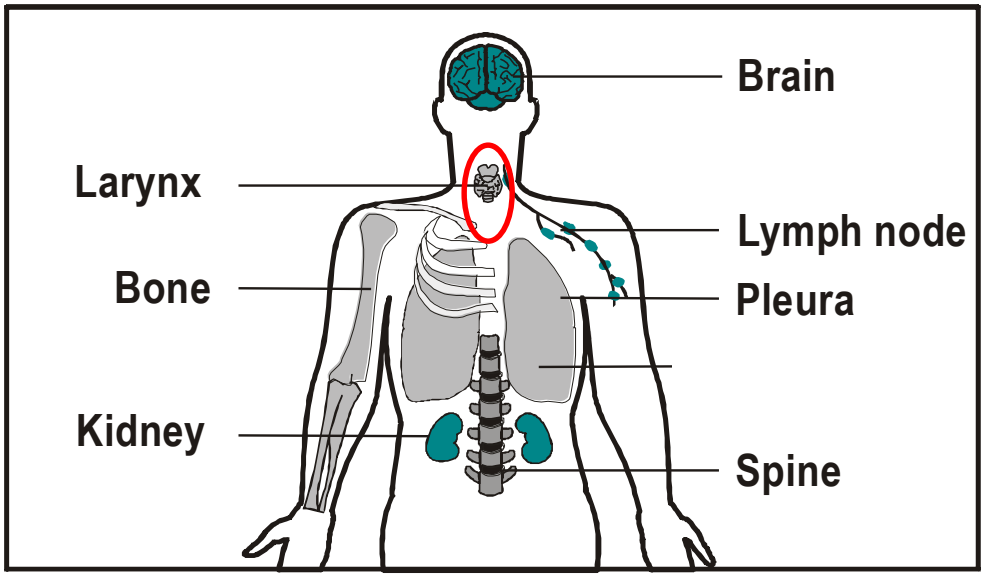
Sites of TB Disease

Pulmonary 80%



Laryngeal TB is VERY contagious

Extrapulmonary



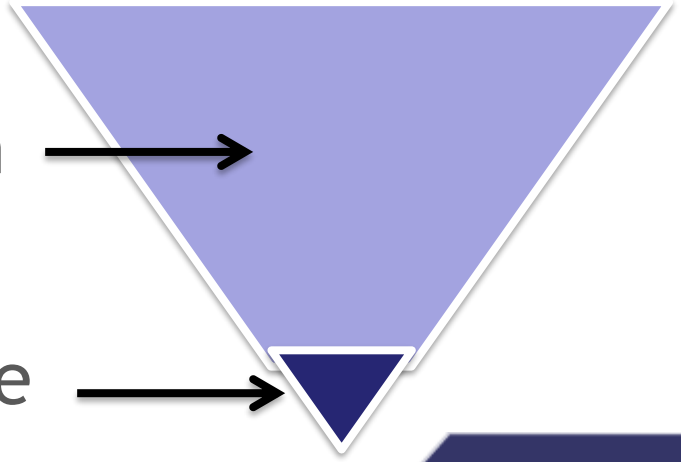
Symptoms will vary dependent on site

Basic Tuberculosis(TB) Facts

- *Not everyone infected with TB bacteria becomes sick*
  - It is estimated that 10% of those infected with TB will progress to active TB disease
  - As a result, two TB-related conditions exist:

90% Latent TB Infection

10% TB Disease

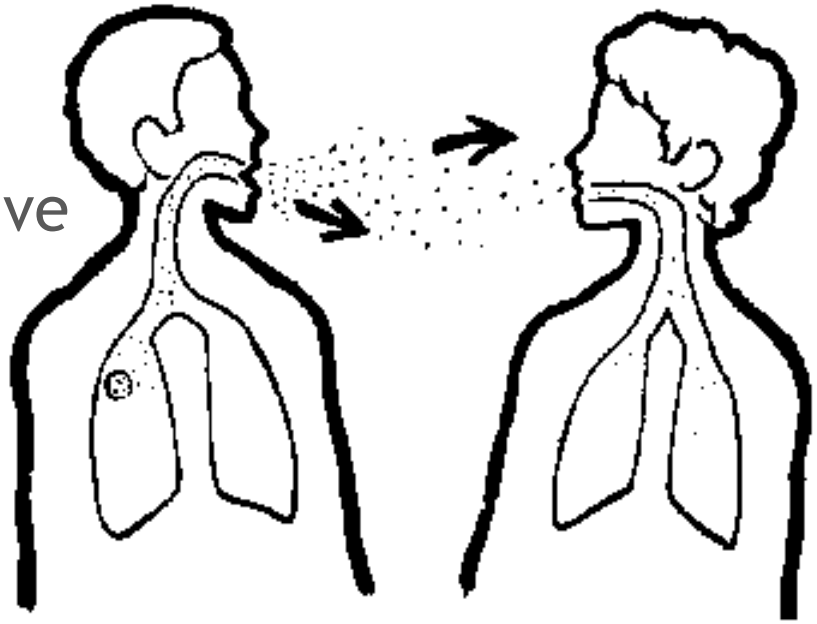


Transmission

TB is spread when a person with active TB disease coughs, sings, speaks and you breathe the air contaminated with the TB germs

Transmission

Person with active pulmonary TB

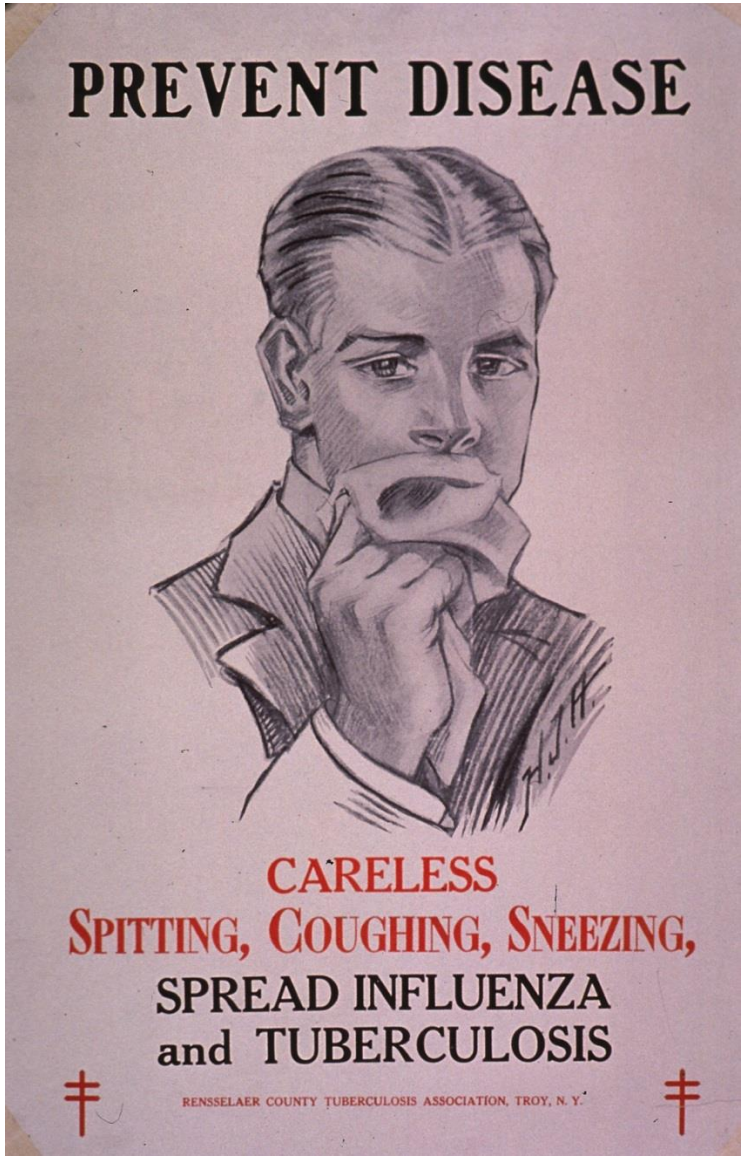


Person breathing TB bacteria

TB bacteria becomes airborne

TB is **NOT** spread by

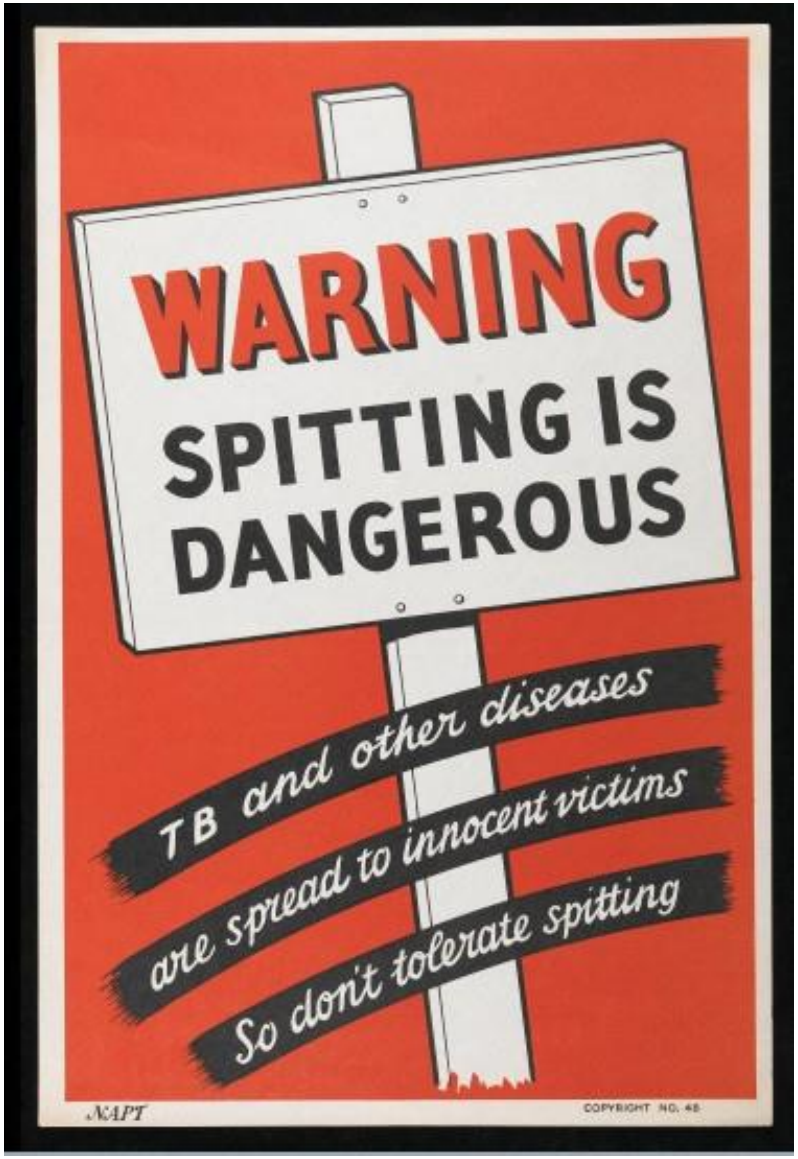
- Quick, casual contact, like passing someone on the street
- Sharing cigarettes or drinking containers
- Exchanging saliva or other body fluids
- Sharing utensils or food
- Shaking hands
- Kissing
- Using public telephones


PREVENT DISEASE
CARELESS
SPITTING, COUGHING, SNEEZING,
SPREAD INFLUENZA
and TUBERCULOSIS
RENSSELAER COUNTY TUBERCULOSIS ASSOCIATION, TROY, N. Y.

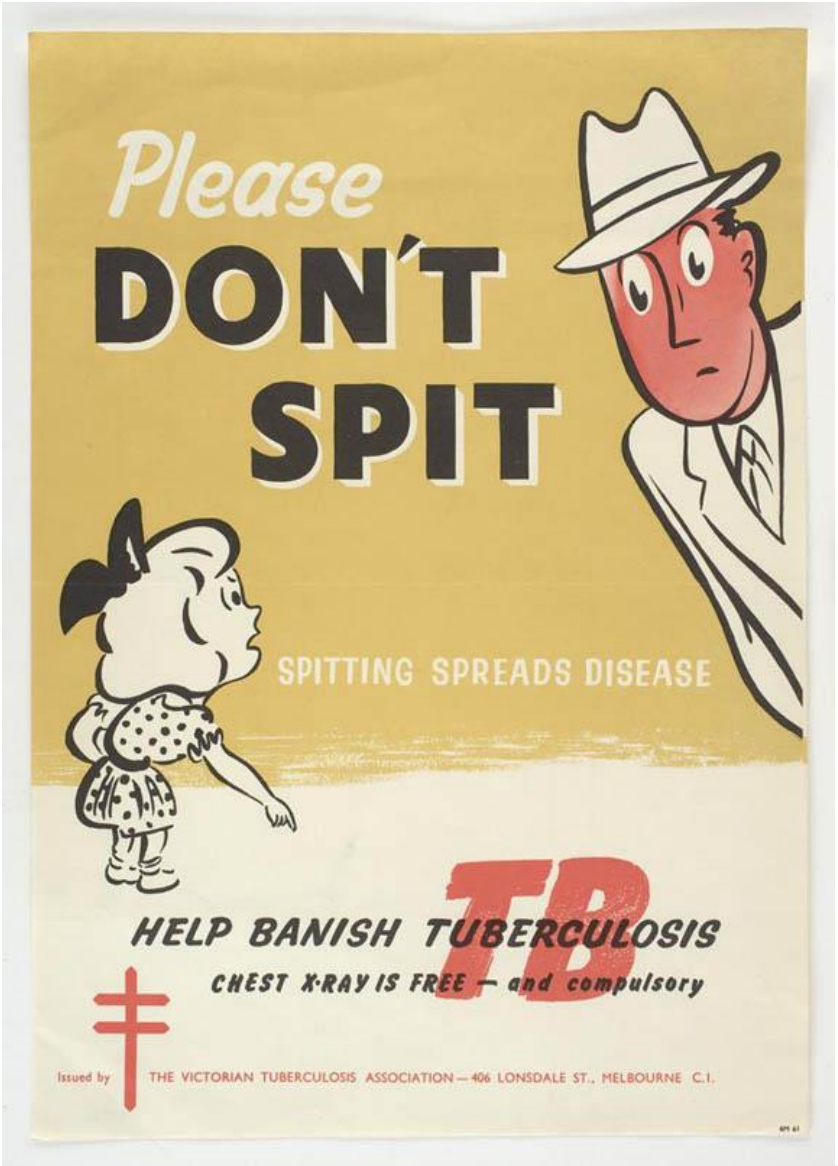
c. 1925


TUBERCULOSIS
DON'T KISS ME!
YOUR KISS OF AFFECTION
THE GERM OF INFECTION

c. 1936



c. 1950



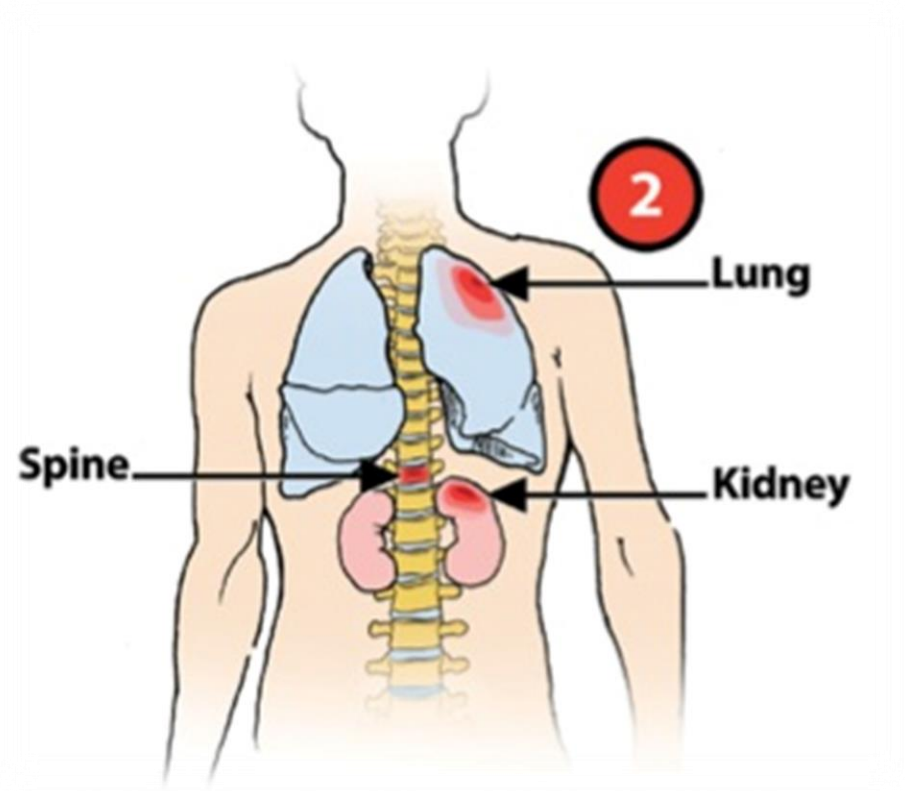
c. 1950s


Hundreds Die of Consumption
BECAUSE
SPITTING
SPREADS DISEASE
Do not spit yourself--Ask others to stop
ISSUED BY THE
VIRGINIA ANTI-TUBERCULOSIS ASSOCIATION
1110 Capitol Street, Richmond, Va.
WRITE FOR INFORMATION ON CONSUMPTION

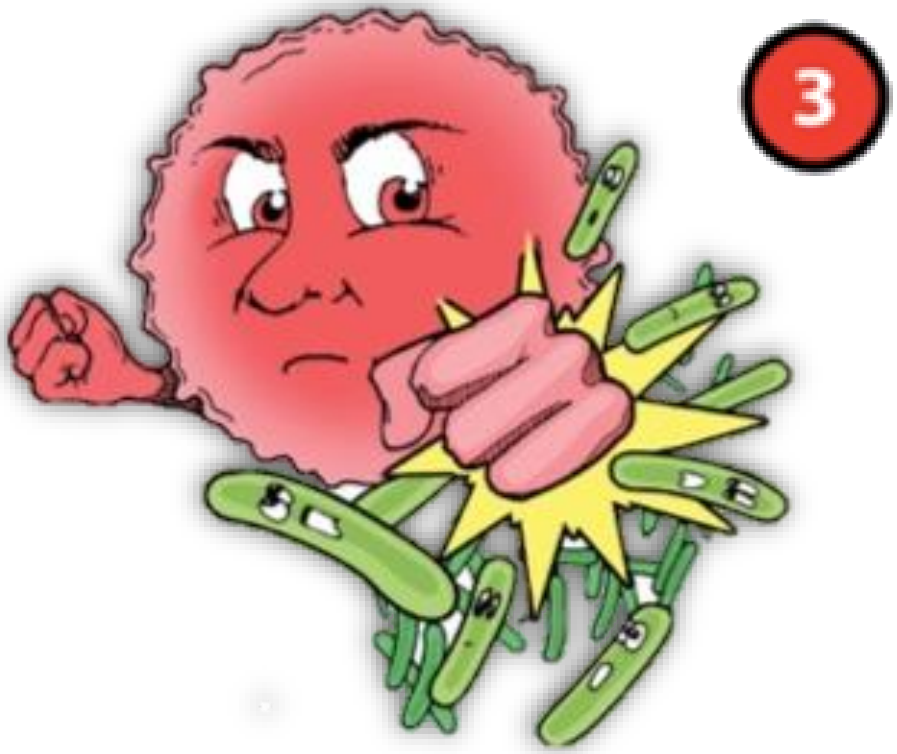
c. 1920s

"Shared air" is a concept used in TB investigations. It means a person must share air with an active TB case to be exposed to the TB germ.

You can't "take TB home" to your family just by being exposed.



- TB germs are breathed in and reach your lungs
- From the lungs, TB germs may spread through the bloodstream to other parts of your body



- The immune system begins to recognize and fight TB germs
- If your immune system is working well, it eventually surrounds the TB germs, keeping you well

Latent Tuberculosis Infection (LTBI)

- Most people infected with the Tuberculosis bacteria have Latent Tuberculosis Infection
- Only about 10% of people infected with the Tuberculosis bacteria will progress to Active Tuberculosis

Difference Between LTBI and TB Disease

A Person with LTBI

- Does not feel sick
- Cannot spread TB germs to others
- Has a normal chest x-ray
- Needs treatment for LTBI to prevent active TB disease

A Person with Active TB

- Usually feels sick
- May spread TB germs to others
- May have abnormal chest x-ray
- Needs treatment to treat active TB disease

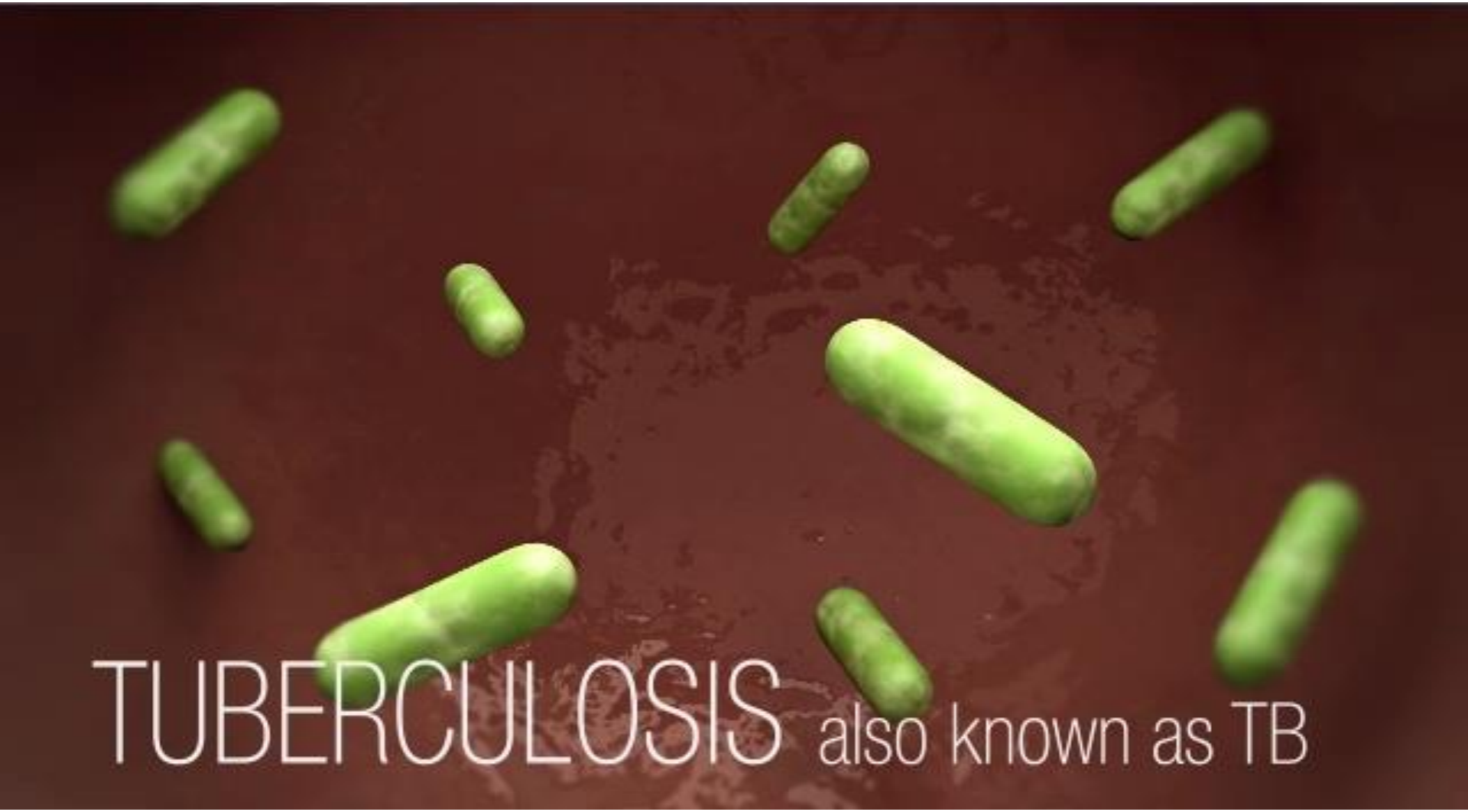
Difference Between LTBI and TB Disease

A Person with LTBI

- No symptoms

A Person with Active TB

- Symptoms may include
  - Persistent cough (>3 weeks)
  - Fatigue
  - Weight loss
  - Fever
  - Chills
  - Night sweats
  - Chest pain
  - Blood in sputum

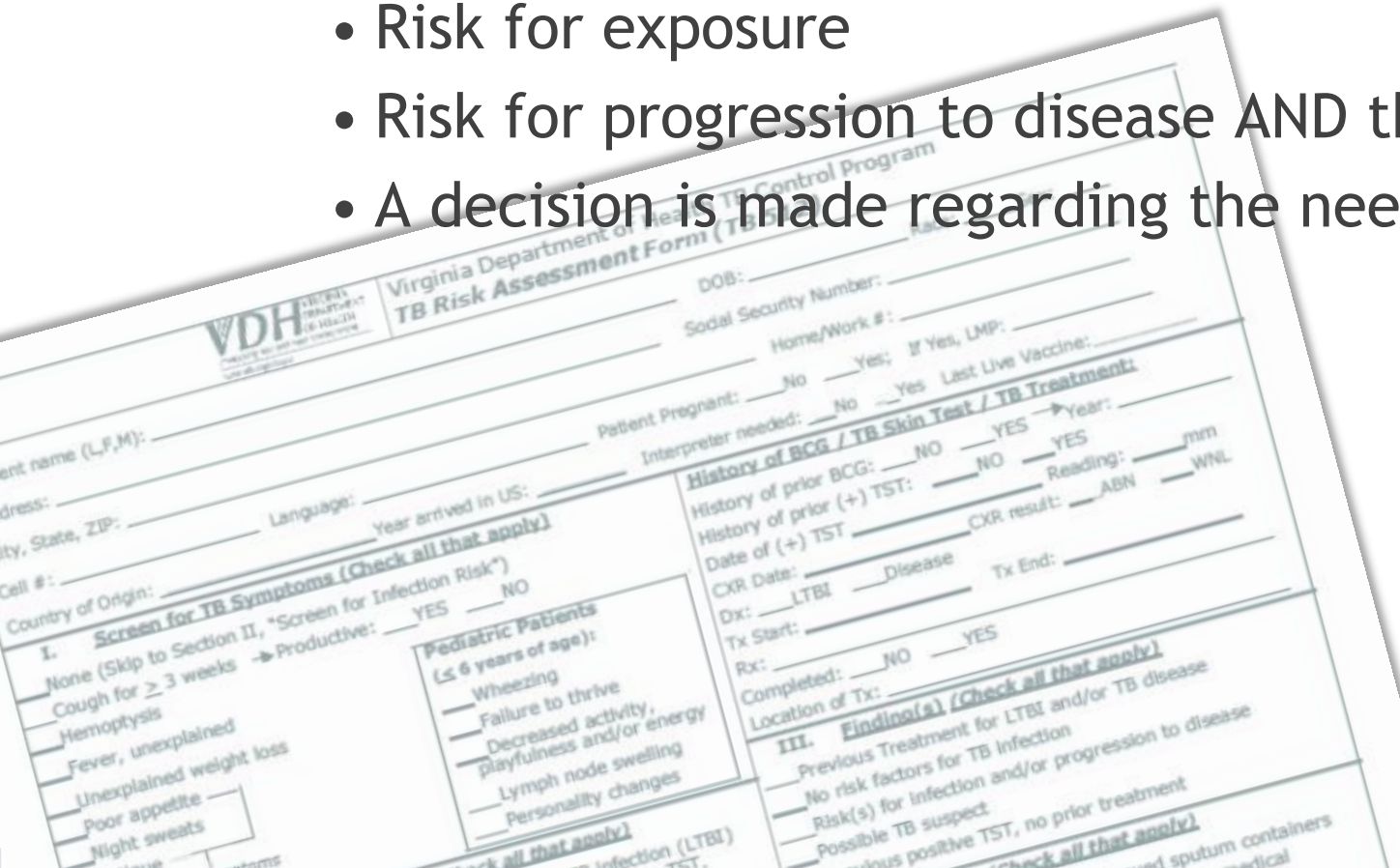


https://youtu.be/9112brXCOVc

TB Screening vs TB Testing

Screening is an interview to evaluate for

- Symptoms of TB
- Risk for exposure
- Risk for progression to disease AND then……
- A decision is made regarding the need for testing

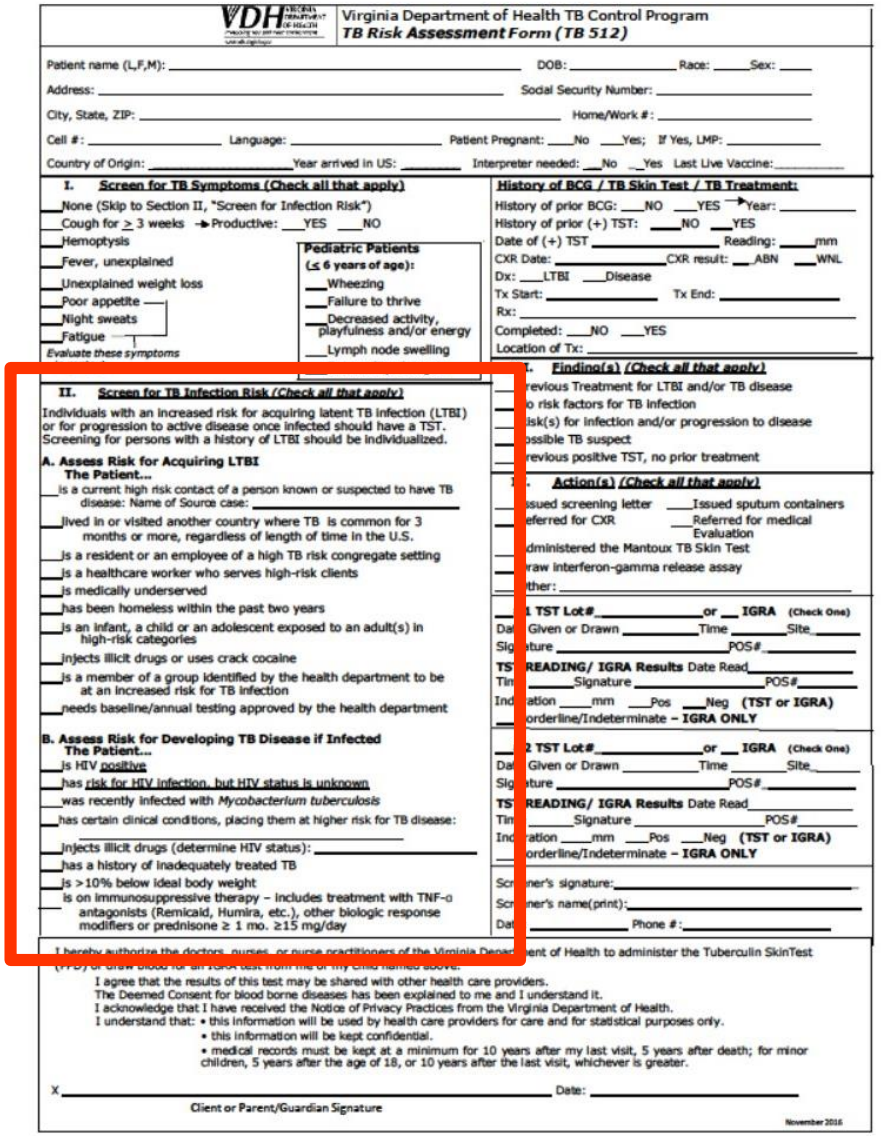


VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

TB Screening

Reviews Risk

- TB symptom review
- Risk for TB Infection
- Risk for progression to TB disease



Virginia Department of Health TB Control Program
TB Risk Assessment Form (TB 512)

Patient name (L,F,M): _____ DOB: _____ Race: ____ Sex: ____

Address: _____ Social Security Number: _____

City, State, ZIP: _____ Home/Work #: _____

Cell #: _____ Language: _____ Patient Pregnant: ___No ___Yes; If Yes, LMP: _____

Country of Origin: _____ Year arrived in US: _____ Interpreter needed: ___No ___Yes Last Live Vaccine: _____

I. Screen for TB Symptoms (Check all that apply)

___None (Skip to Section II, "Screen for Infection Risk")
___Cough for ≥ 3 weeks → Productive: ___YES ___NO
___Hemoptysis
___Fever, unexplained
___Unexplained weight loss
___Poor appetite
___Night sweats
___Fatigue
Evaluate these symptoms

Pediatric Patients (≤ 6 years of age):
___Wheezing
___Failure to thrive
___Decreased activity, playfulness and/or energy
___Lymph node swelling

II. Screen for TB Infection Risk *(Check all that apply)*

Individuals with an increased risk for acquiring latent TB infection (LTBI) or for progression to active disease once infected should have a TST. Screening for persons with a history of LTBI should be individualized.

A. Assess Risk for Acquiring LTBI The Patient…

___is a current high risk contact of a person known or suspected to have TB disease: Name of Source case: _____
___lived in or visited another country where TB is common for 3 months or more, regardless of length of time in the U.S.
___is a resident or an employee of a high TB risk congregate setting
___is a healthcare worker who serves high-risk clients
___is medically underserved
___has been homeless within the past two years
___is an infant, a child or an adolescent exposed to an adult(s) in high-risk categories
___injects illicit drugs or uses crack cocaine
___is a member of a group identified by the health department to be at an increased risk for TB infection
___needs baseline/annual testing approved by the health department

B. Assess Risk for Developing TB Disease if Infected The Patient…

___is HIV positive
___has risk for HIV infection, but HIV status is unknown
___was recently infected with *Mycobacterium tuberculosis*
___has certain clinical conditions, placing them at higher risk for TB disease: _____
___injects illicit drugs (determine HIV status): _____
___has a history of inadequately treated TB
___is >10% below ideal body weight
___is on immunosuppressive therapy – includes treatment with TNF-α antagonists (Remicaid, Humira, etc.), other biologic response modifiers or prednisone ≥ 1 mo. ≥15 mg/day

History of BCG / TB Skin Test / TB Treatment:

History of prior BCG: ___NO ___YES Year: _____
History of prior (+) TST: ___NO ___YES
Date of (+) TST _____ Reading: ____mm
CXR Date: _____ CXR result: ___ABN ___WNL
Dx: ___LTBI ___Disease
Tx Start: _____ Tx End: _____
Rx: _____
Completed: ___NO ___YES
Location of Tx: _____

I. Finding(s) *(Check all that apply)*

___revious Treatment for LTBI and/or TB disease
___o risk factors for TB infection
___isk(s) for infection and/or progression to disease
___ossible TB suspect
___revious positive TST, no prior treatment

I. Action(s) *(Check all that apply)*

___ssued screening letter ___Issued sputum containers
___eferred for CXR ___Referred for medical Evaluation
___dministered the Mantoux TB Skin Test
___raw interferon-gamma release assay
___ther: _____

___**1 TST Lot#**_____**or** ___**IGRA** **(Check One)**
Da___ Given or Drawn _____Time _____Site_____
Sig___ature _____POS#_____
TST READING/ IGRA Results Date Read_____
Tim___Signature _____POS#_____
Ind___ation ____mm ___Pos ___Neg **(TST or IGRA)**
___orderline/Indeterminate – **IGRA ONLY**

___**2 TST Lot#**_____**or** ___**IGRA** **(Check One)**
Da___ Given or Drawn _____Time _____Site_____
Sig___ature _____POS#_____
TST READING/ IGRA Results Date Read_____
Tim___Signature _____POS#_____
Ind___ation ____mm ___Pos ___Neg **(TST or IGRA)**
___orderline/Indeterminate – **IGRA ONLY**

Sc___ner's signature: _____
Sc___ner's name(print): _____
Da___ Phone #: _____

I hereby authorize the doctors, nurses, or nurse practitioners of the Virginia Depa___ent of Health to administer the Tuberculin SkinTest (PPD) or draw blood for an IGRA test from me or my child named above.
I agree that the results of this test may be shared with other health care providers.
The Deemed Consent for blood borne diseases has been explained to me and I understand it.
I acknowledge that I have received the Notice of Privacy Practices from the Virginia Department of Health.
I understand that: • this information will be used by health care providers for care and for statistical purposes only.
• this information will be kept confidential.
• medical records must be kept at a minimum for 10 years after my last visit, 5 years after death; for minor children, 5 years after the age of 18, or 10 years after the last visit, whichever is greater.

X _____ Date: _____
Client or Parent/Guardian Signature

November 2016

VDH TB Risk Assessment Form (TB 512)

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

Risk Factors for Acquiring LTBI

- Contact to person with active TB disease
- Lived in or visited high burden TB country ≥ 3 months
- Resident/employee of high TB risk congregate setting, correctional facilities, nursing homes, homeless shelters.
- Healthcare worker serving high-risk clients
- Medically underserved
- Homeless in the past two years
- Infant, child, adolescent exposed to adults in high-risk categories
- Injects illegal drugs

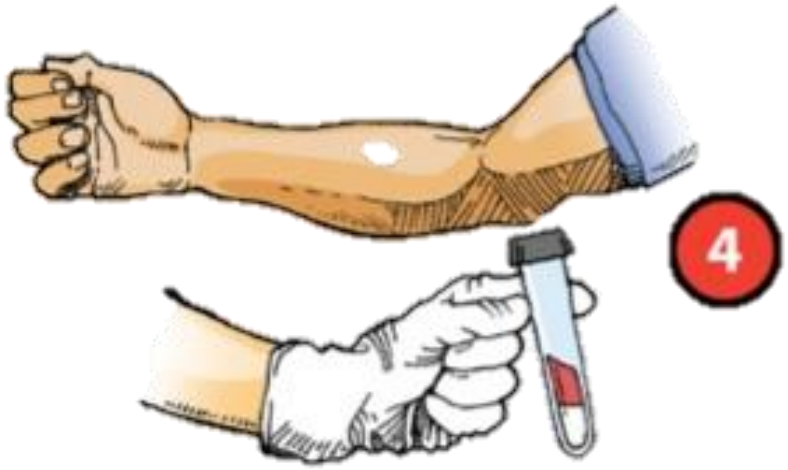
Risk Factors for Developing TB Disease if Infected

- HIV positive
- Risk for HIV infection, but HIV status unknown
- Recently infected with Mycobacterium tuberculosis
- Certain medical conditions
  - including substance abuse, chest x-ray findings that suggest previous TB, diabetes mellitus, silicosis, prolonged corticosteroid therapy, cancer of the head and neck, leukemia, lymphoma, hematologic and reticuloendothelial diseases, end stage renal disease, intestinal bypass or gastrectomy, and chronic malabsorption syndromes.
- >10% below ideal body weight
- Immunosuppressive therapy
  - TNF-a antagonist (Remicaid, Humira, etc.), prednisone ≥ 1 month ≥15 mg/day

If the patient has any risk factors, then…

What do we do?

TB Testing



A TB Skin Test (TST) or blood test is the only way you can tell if you have ***TB infection***

- **TST: A**n antigen (protein) is injected just under the skin and forms a wheel or bubble beneath the skin.
- **Blood test: B**lood is drawn from the arm and sent to a lab

TST and IGRA – a comparison

	TST	IGRA
Requires a functioning immune system	YES	YES
Identify TB infection	YES	YES
Diagnose LTBI (with further evaluation)	YES	YES
Boosting	YES	NO
Cross reacts with BCG	YES	NO
Inexpensive	YES	NO
Single visit	NO	YES
Reader bias	Possible	NO
Data on use	Plenty	Limited
Use with children <2	Preferred	Caution

Routine testing with both is not recommended

What happens if there is a positive TST or blood test?

TB or Not TB…

Chest x-ray to help determine if you have ***TB infection*** (also called Latent TB Infection or LTBI) or ***TB disease***

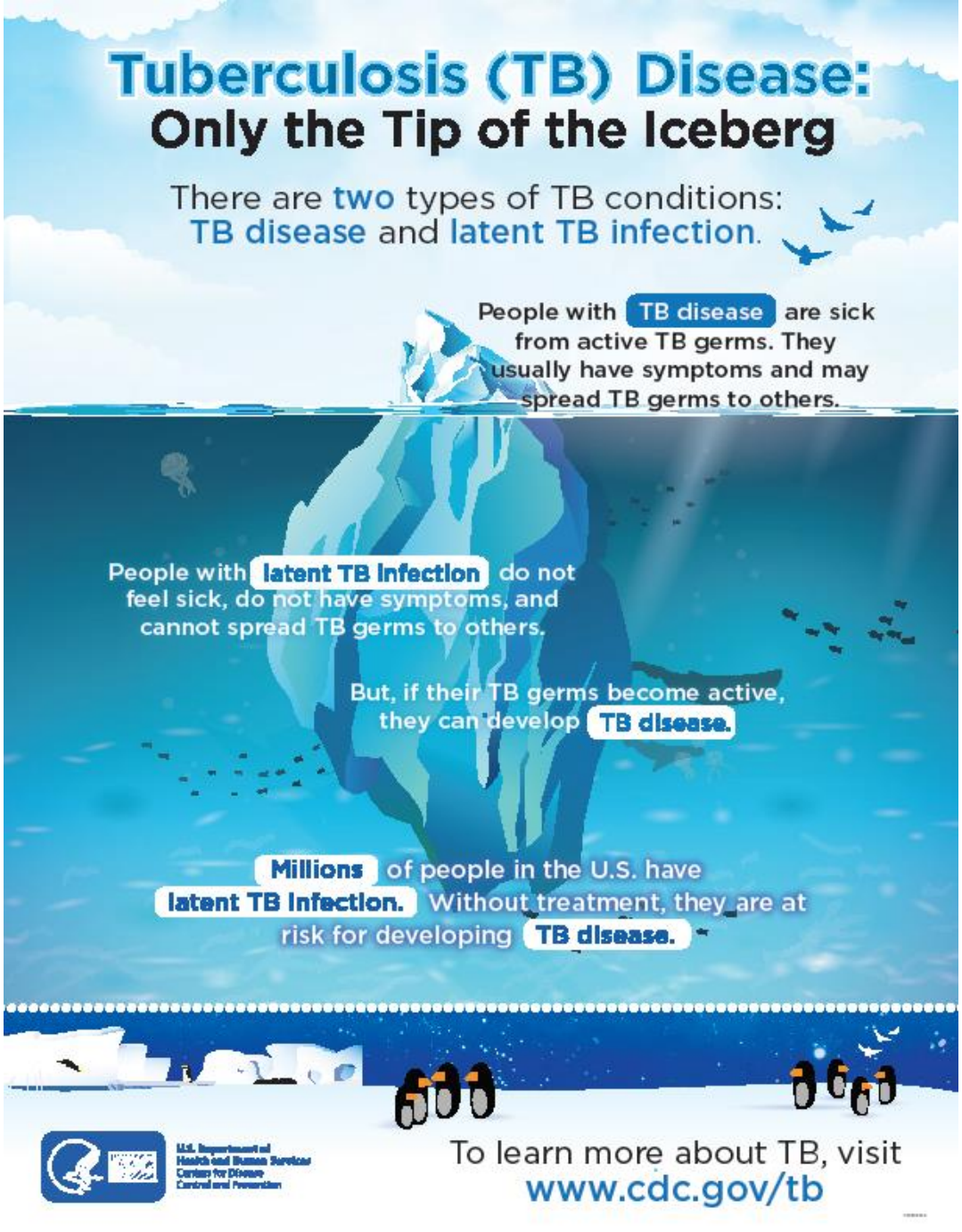
LTBI vs Active Tuberculosis

LTBI

- No symptoms
- Normal chest x-ray

Active Tuberculosis

- May have symptoms
- Abnormal chest x-ray
- …then…
- Collect sputum specimens
- Isolate


Tuberculosis (TB) Disease:
Only the Tip of the Iceberg
There are two types of TB conditions:
TB disease and latent TB infection.
People with TB disease are sick from active TB germs. They usually have symptoms and may spread TB germs to others.
People with latent TB infection do not feel sick, do not have symptoms, and cannot spread TB germs to others.
But, if their TB germs become active, they can develop TB disease.
Millions of people in the U.S. have latent TB infection. Without treatment, they are at risk for developing TB disease.
To learn more about TB, visit
www.cdc.gov/tb

Remember….

- If you have TB infection, *you cannot spread TB germs to others*
- If you have a positive TST or blood test, *it does not mean you have active TB disease*

- There are medications to treat LTBI and active TB disease
- Taking TB medications as prescribed is very important to help the patient get better and to prevent the spread of TB germs to others
- Completing treatment for LTBI lowers the likelihood of progression to active TB disease from about 10% to about 1-2%

LTBI Treatments

- Positive TST or IGRA
- Asymptomatic
- Negative chest x-ray

Drug	Dosage		Length of treatment	# of Doses	Approval	Age
Rifapentine/ Isoniazid	900 mgs 900 mgs	Once weekly by DOT	3 months	12	2010	≥2
Rifampin	600 mgs/daily		4 months	120	2000	Any
Isoniazid	300mgs/daily		9 months (6 mths)	270 (180)	1965	Any

To test is to treat!

Directly Observed Therapy or DOT

Most effective strategy to ensure adherence to treatment.

Patient meets with a health care worker every time they need to take their medications.

Patient takes their TB medications while the health care worker watches.

Health care worker asks the patient about any problems or side effects with the medication.

DOT should be done at a time and place that is convenient for the patient.

DOT should be used for all patients with TB disease.

Promoting treatment – Messaging

"Latent TB infection is an infection with a germ that needs treatment with antibiotics to cure"

"Treatment reduces the risk of the germ growing and then making you feel sick"

"No one truly knows who will begin to get sick.

"You feel okay now because the TB bacteria in your body are numbered in the thousands, not the millions.

"TB destroys the organ it grows in; You will not get back what you lose"

"When TB wakes up makes you sick you can infect other people and will need to stay away from your friends and family"

Potential Reasons for Not Wanting Tx

- ☑ Does not believe in antibiotics
- ☑ Want to drink alcohol
- ☑ Has difficulty remembering to take medication
- ☑ Does not think TB infection is a "big deal"
- ☑ Drug interactions
- ☑ "Feel fine"
- ☑ Has heard that INH can kill your liver
- ☑ Is pregnant or breastfeeding
- ☑ "My doctor said I don't have to"
- ☑ Transportation
- ☑ Clinic hours
- ☑ Work
- ☑ Family commitments
- ☑ School
- ☑ Family/friend advice
- ☑ Religious beliefs
- ☑ Does not believe the test is positive

TB Personal Story

https://youtu.be/QZWU4VuKraE

Summary

LTBI

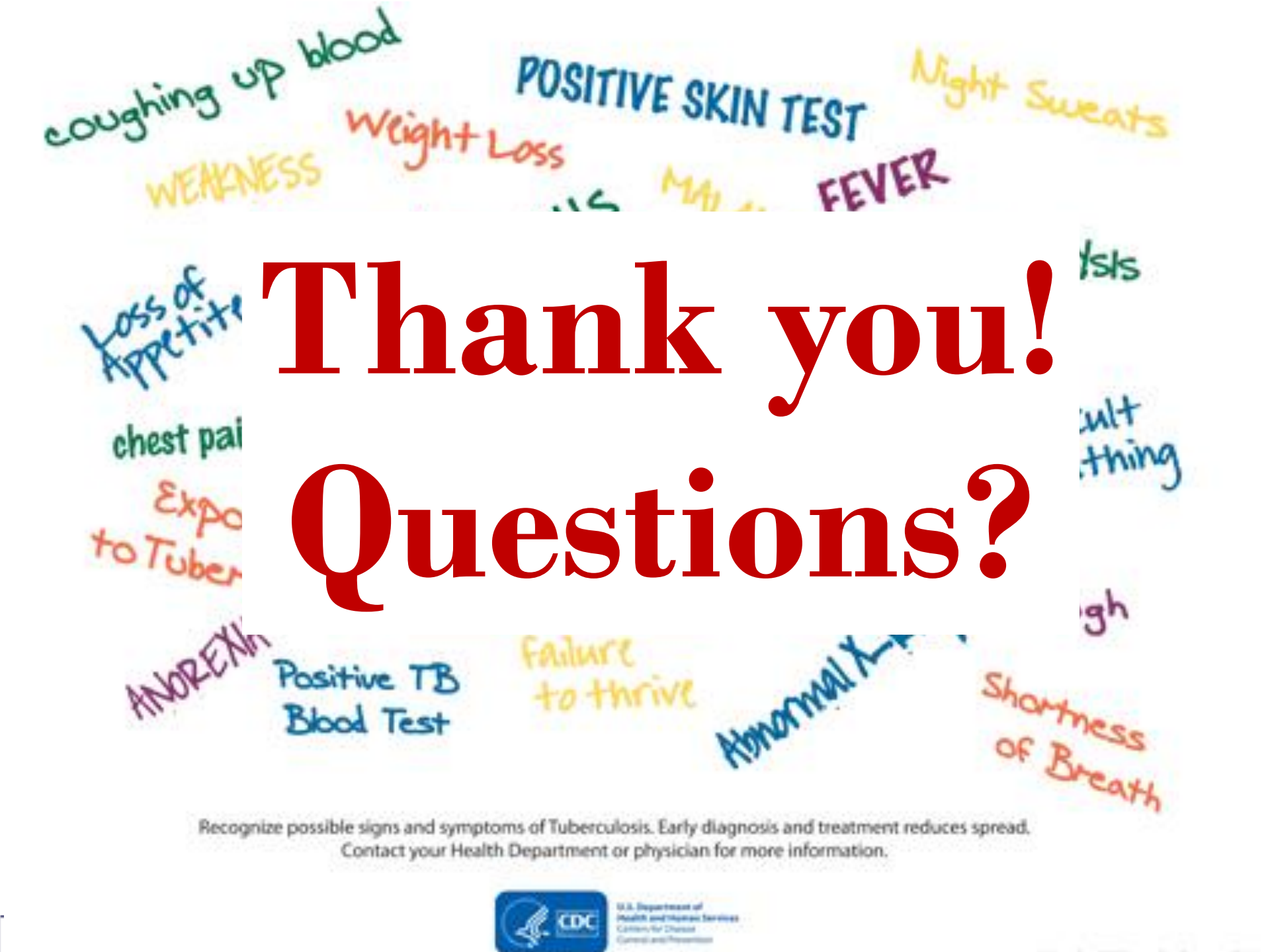
- Does not feel sick
- No symptoms
- Cannot spread TB germs to others
- Has a normal chest x-ray
- Needs treatment for LTBI to prevent active TB disease

Active Tuberculosis

- Usually feels sick
- May have symptoms
- May spread TB germs to others
- May have abnormal chest x-ray
- Needs treatment to treat active TB disease

Resources

- Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/tb/topic/basics/default.htm
- Virginia Department of Health: http://www.vdh.virginia.gov/
- Wikipedia: https://www.wikipedia.org/


coughing up blood
POSITIVE SKIN TEST
Night Sweats
Weight Loss
WEAKNESS
FEVER
Loss of Appetite
chest pai
Expo
to Tuber
ANOREXI
Positive TB Blood Test
failure to thrive
Abnormal X-
Shortness of Breath
Thank you!
Questions?
Recognize possible signs and symptoms of Tuberculosis. Early diagnosis and treatment reduces spread.
Contact your Health Department or physician for more information.
CDC