



Missed Opportunities: An Evaluation of Reports of Latent Tuberculosis Infection (LTBI) Three Months or More from Sputum Collection for Evaluation for Tuberculosis (TB) Disease, Virginia, 2020-2021

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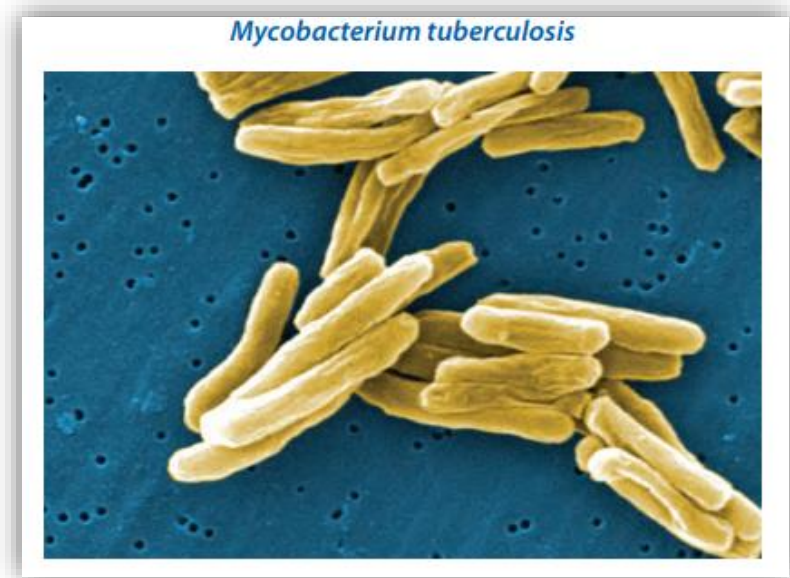
Virginia Department of Health

Overview

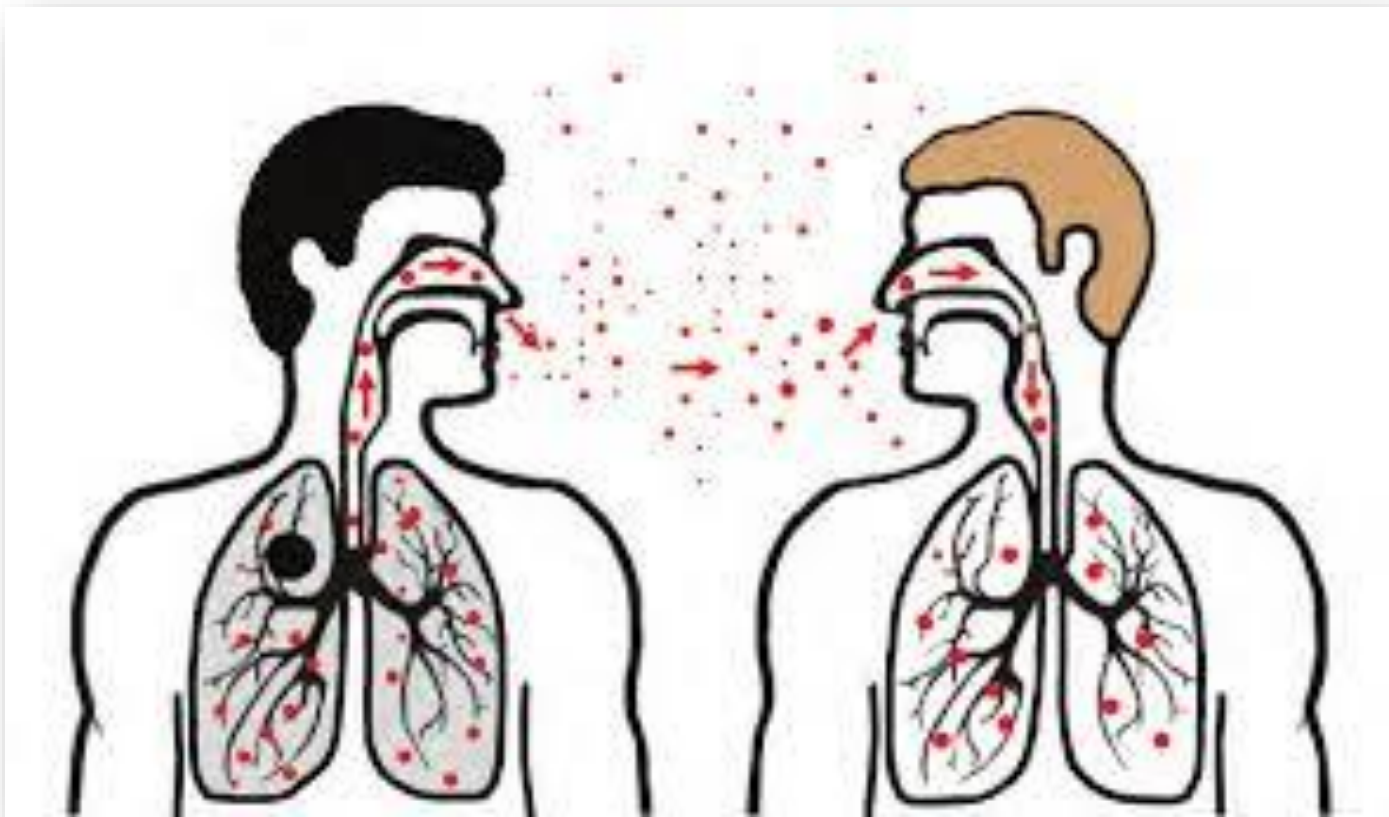
- TB Disease and LTBI
- Methods
- Results
- Discussion
- Conclusions and Next Steps
- Acknowledgments

Tuberculosis

- TB is caused by a bacterium called *Mycobacterium tuberculosis*
- The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain
- Not everyone infected with TB bacteria becomes sick
 - LTBI
 - TB disease

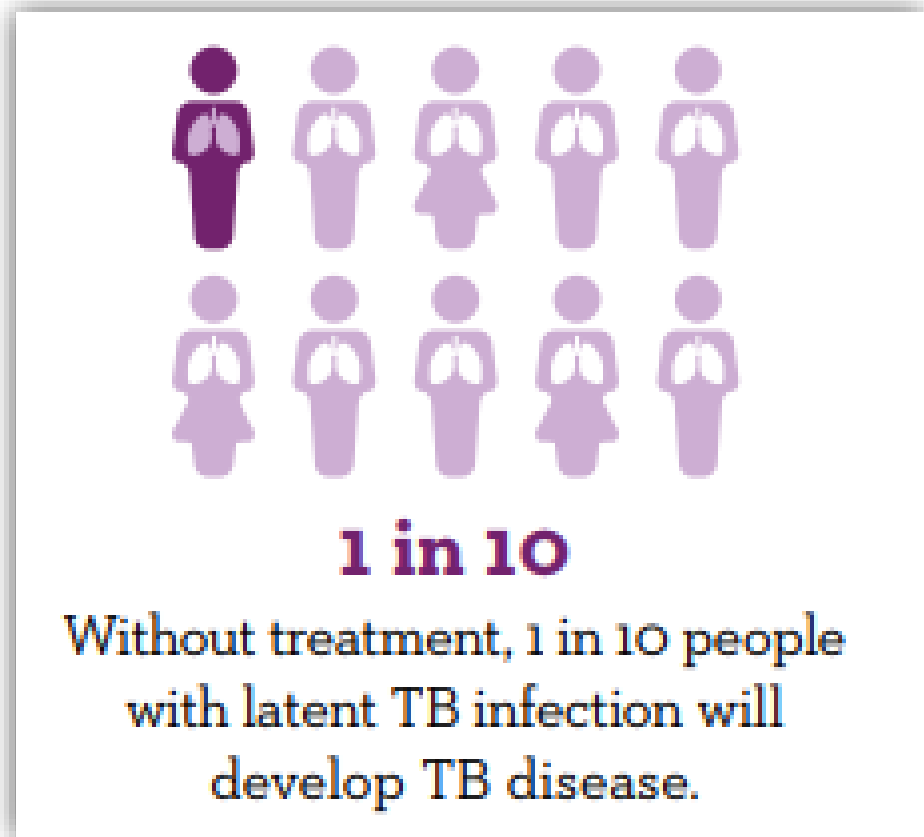


Tuberculosis - Transmission



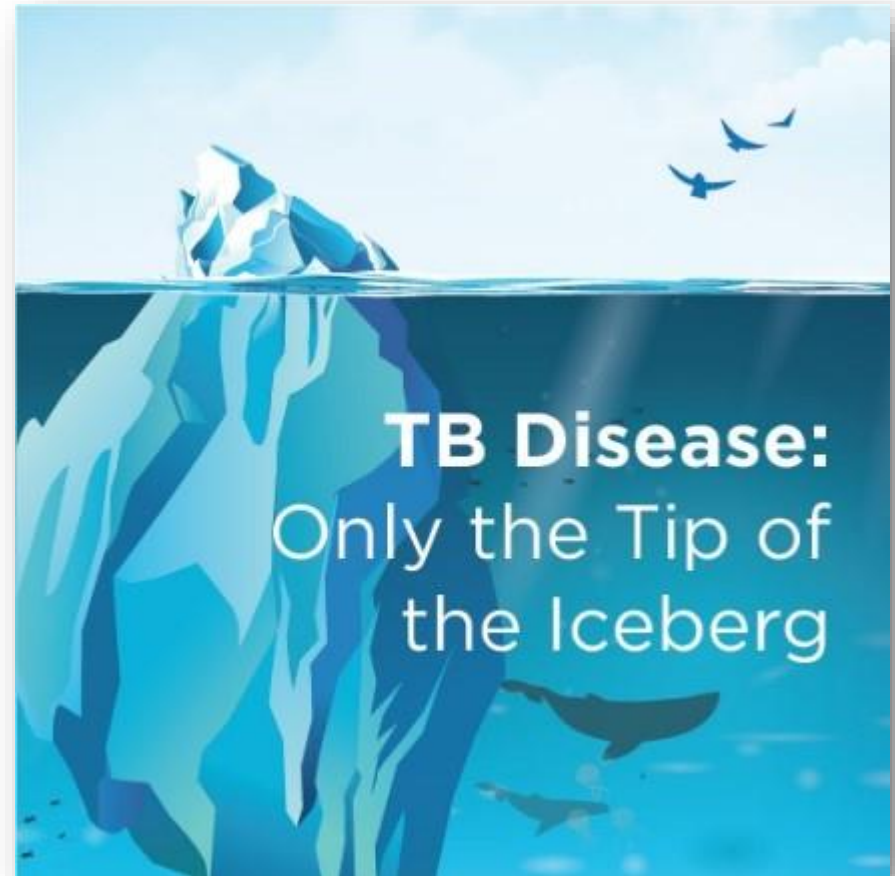
Tuberculosis - Incubation Period

- Weeks
- Years
- Lifetime



Latent TB Infection

- Up to 13 million people in the United States have LTBI
- Improved detection and treatment is critical for TB elimination



Reportable Condition

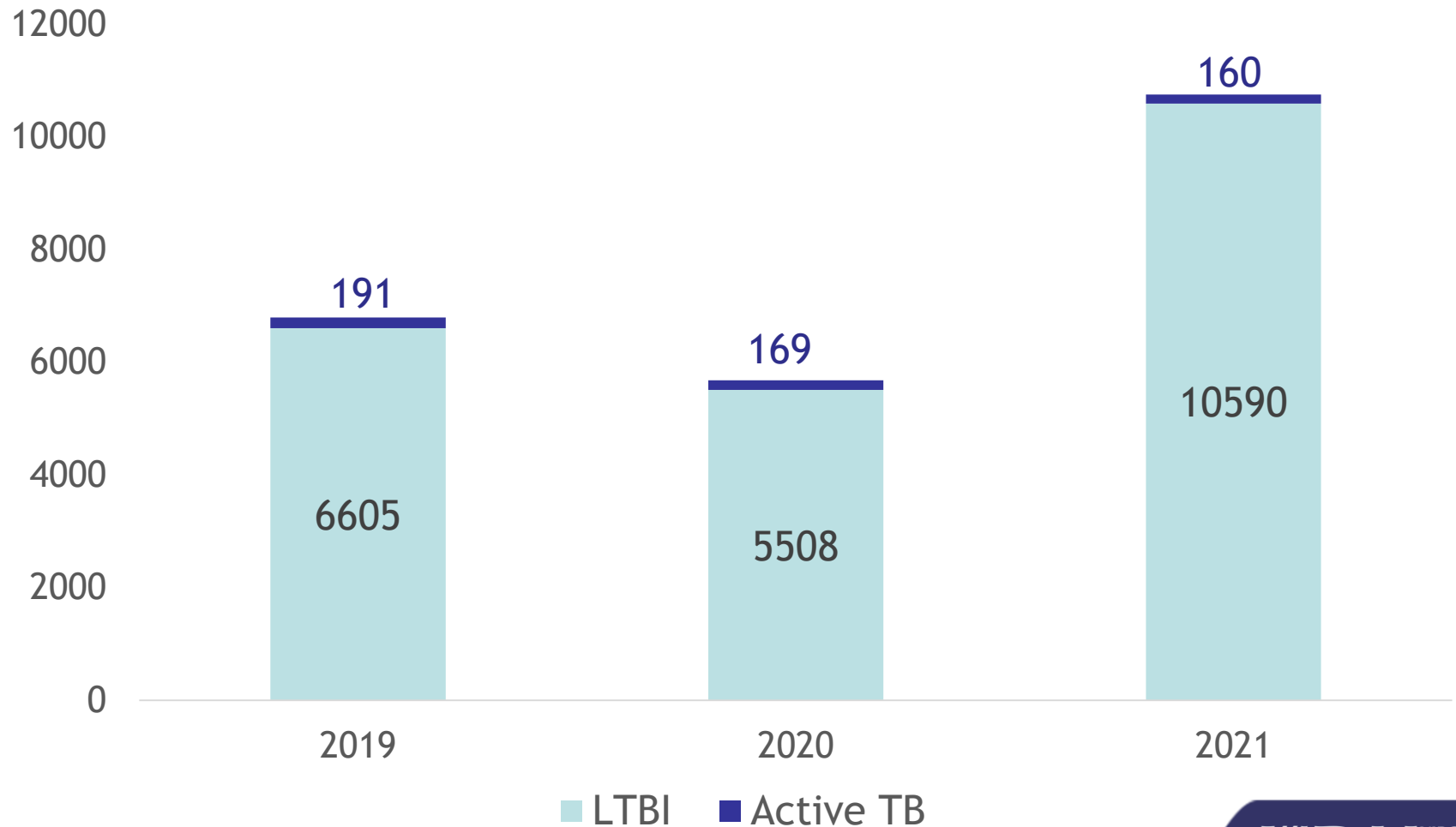
- LTBI added to reportable disease list in November 2018
- Reportable by providers and laboratories
- Majority of reports are positive interferon-gamma release assays (IGRAs) captured via ELR

VIRGINIA REPORTABLE DISEASE LIST	
<p>Reporting of the following diseases is required by state law (Sections 32.1-36 and 32.1-37 of the Code of Virginia and 12 VAC 5-90-80 of the Board of Health Regulations for Disease Reporting and Control – http://www.vdh.virginia.gov/surveillance-and-investigation/division-of-surveillance-and-investigation/commonwealth-of-virginias-late-board-of-health). Report all conditions when suspected or confirmed to your local health department (LHD). Reports may be submitted by computer-generated printout, Epi-1 form, CDC or VDH surveillance form, or upon agreement with VDH, by means of secure electronic submission.</p> <p>BOLD = Laboratories must submit initial isolate or other initial specimen to the Division of Consolidated Laboratory Services (DCLS) within 7 days of identification. All specimens must be identified with patient and physician information, and the LHD must be notified within the timeframe specified below.</p>	
REPORT IMMEDIATELY	REPORT WITHIN 3 DAYS
<p>Anthrax (<i>Bacillus anthracis</i>) [a] Botulism (<i>Clostridium botulinum</i>) [a] Brucellosis (<i>Brucella</i> spp.) [a] Cholera (<i>Vibrio cholerae</i> O1/O139) [a] Coronavirus infection, severe (e.g., SARS-CoV, MERS-CoV) [a] Diphtheria (<i>Corynebacterium diphtheriae</i>) [a] Disease caused by an agent that may have been used as a weapon Haemophilus influenzae infection, invasive [a] Hepatitis A [a] Influenza-associated deaths if younger than 18 years of age Influenza A, novel virus [a] Measles (Rubella) [a] Meningococcal disease (<i>Neisseria meningitidis</i>) [a] Outbreaks, all (including but not limited to foodborne, health-care-associated, occupational, toxic substance-related, waterborne, and any other outbreak) Pertussis (<i>Bordetella pertussis</i>) [a] Plague (<i>Yersinia pestis</i>) [a] Poliovirus infection, including poliomyelitis [a] Psittacosis (<i>Chlamydia psittaci</i>) [a] Q fever (<i>Coxiella burnetii</i>) [a] Rabies, human and animal [a] Rubella [a], including congenital rubella syndrome [a] Smallpox (Variola virus) [a] Syphilis (<i>Treponema pallidum</i>), congenital, primary, and secondary [a] Tuberculosis, active disease (<i>Mycobacterium tuberculosis</i> complex) [a,b] Tularemia (<i>Francisella tularensis</i>) [a] Typhoid/Paratyphoid infection (<i>Salmonella</i> Typhi, <i>Salmonella</i> Paratyphi) [a] Unusual occurrence of disease of public health concern Vaccinia, disease or adverse event [a] Vibriosis (<i>Vibrio</i> spp.) [a,e] Viral hemorrhagic fever [a] Yellow fever [a]</p>	<p>Amebiasis (<i>Entamoeba histolytica</i>) [a] Arboviral infections (e.g., CHIK, dengue, EEE, LAC, SLE, WNV, Zika) [a] Babesiosis (<i>Babesia</i> spp.) [a] Campylobacteriosis (<i>Campylobacter</i> spp.) [a] Candida auris, infection or colonization [a,c] Carbapenemase-producing organism, infection or colonization [a] Chancroid (<i>Haemophilus ducreyi</i>) [a] Chickenpox (Varicella virus) [a] Chlamydia trachomatis infection [a] Cryptosporidiosis (<i>Cryptosporidium</i> spp.) [a] Cyclosporiasis (<i>Cyclospora</i> spp.) [a] Ehrlichiosis/Anaplasmosis (<i>Ehrlichia</i> spp., <i>Anaplasma phagocytophilum</i>) [a] Giardiasis (<i>Giardia</i> spp.) [a] Gonorrhea (<i>Neisseria gonorrhoeae</i>) [a] Granuloma inguinale (<i>Calymmatobacterium granulomatis</i>) Hantavirus pulmonary syndrome [a] Hemolytic uremic syndrome (HUS) Hepatitis B (acute and chronic) [a] Hepatitis C (acute and chronic) [a] Hepatitis, other acute viral [a] Human immunodeficiency virus (HIV) infection [a] Influenza, confirmed seasonal strain [a] Lead, blood levels [a] Legionellosis (<i>Legionella</i> spp.) [a] Leprosy/Hansen's disease (<i>Mycobacterium leprae</i>) Leptospirosis (<i>Leptospira interrogans</i>) [a] Listeriosis (<i>Listeria monocytogenes</i>) [a] Lyme disease (<i>Borrelia</i> spp.) [a] Lymphogranuloma venereum (<i>Chlamydia trachomatis</i>) Malaria (<i>Plasmodium</i> spp.) [a] Mumps [a] Neonatal abstinence syndrome (NAS) Ophthalmia neonatorum Rabies treatment, post-exposure Salmonellosis (<i>Salmonella</i> spp.) [a] Shiga toxin-producing <i>Escherichia coli</i> infection [a,d] Shigellosis (<i>Shigella</i> spp.) [a] Spotted fever rickettsiosis (<i>Rickettsia</i> spp.) [a] Streptococcal disease, Group A, invasive or toxic shock [a] <i>Streptococcus pneumoniae</i> infection, invasive and <5 years of age [a] Syphilis (<i>Treponema pallidum</i>), if not primary, secondary, or congenital Tetanus (<i>Clostridium tetani</i>) Toxic substance-related illness [a] Trichinosis/Trichinellosis (<i>Trichinella spiralis</i>) [a] Tuberculosis infection [a] Vancomycin-intermediate or vancomycin-resistant <i>Staphylococcus aureus</i> infection [a] Yersiniosis (<i>Yersinia</i> spp.) [a]</p>
<p>LEGEND</p> <p>[a] Reportable by directors of laboratories. These and all other conditions listed must be reported by physicians and directors of medical care facilities. [b] Laboratories report AFB, <i>M. tuberculosis</i> complex or any other mycobacteria, and antimicrobial susceptibility for <i>M. tuberculosis</i> complex. [c] Includes submission of <i>Candida haemulonii</i> specimens to DCLS. [d] Laboratories that use EIA with a positive control should forward positive stool specimens or enrichment broth to DCLS. [e] Includes reporting of <i>Photobacterium</i> spp. and <i>Campylobacter holliisae</i>.</p>	
<p>Effective November 2018</p>	

Tuberculosis infection [a]

[a] Reportable by directors of laboratories. These and all other conditions listed must be reported by physicians and directors of medical care facilities.

TB and LTBI in Virginia



Missed Opportunities?

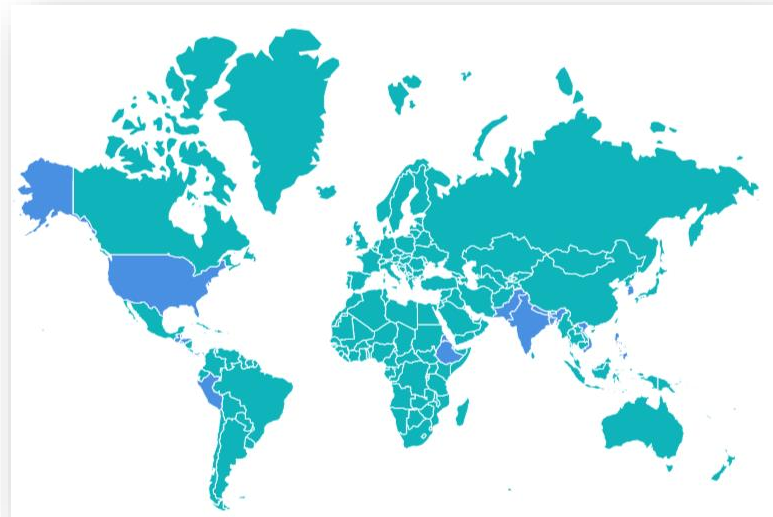
- Patients may be tested for LTBI in the community and either never be fully evaluated or never be treated for LTBI at that time
 - Even if offered, patients may decline treatment for latent infection
- Some of these patients go on to develop active TB disease
- Is there a missed opportunity for encouraging treatment initiation?

Methods

- Examined counted TB cases from 2020 and 2021 (n=329) and matched with any existing LTBI reports available in the Virginia Electronic Disease Surveillance System (VEDSS).
- Inclusion criteria: Report of at least one positive IGRA or TST collected since November 2018, 90 days or more prior to work up for active TB disease.
- Earliest date of sputum collection was used as a proxy for work up for active disease.

Results

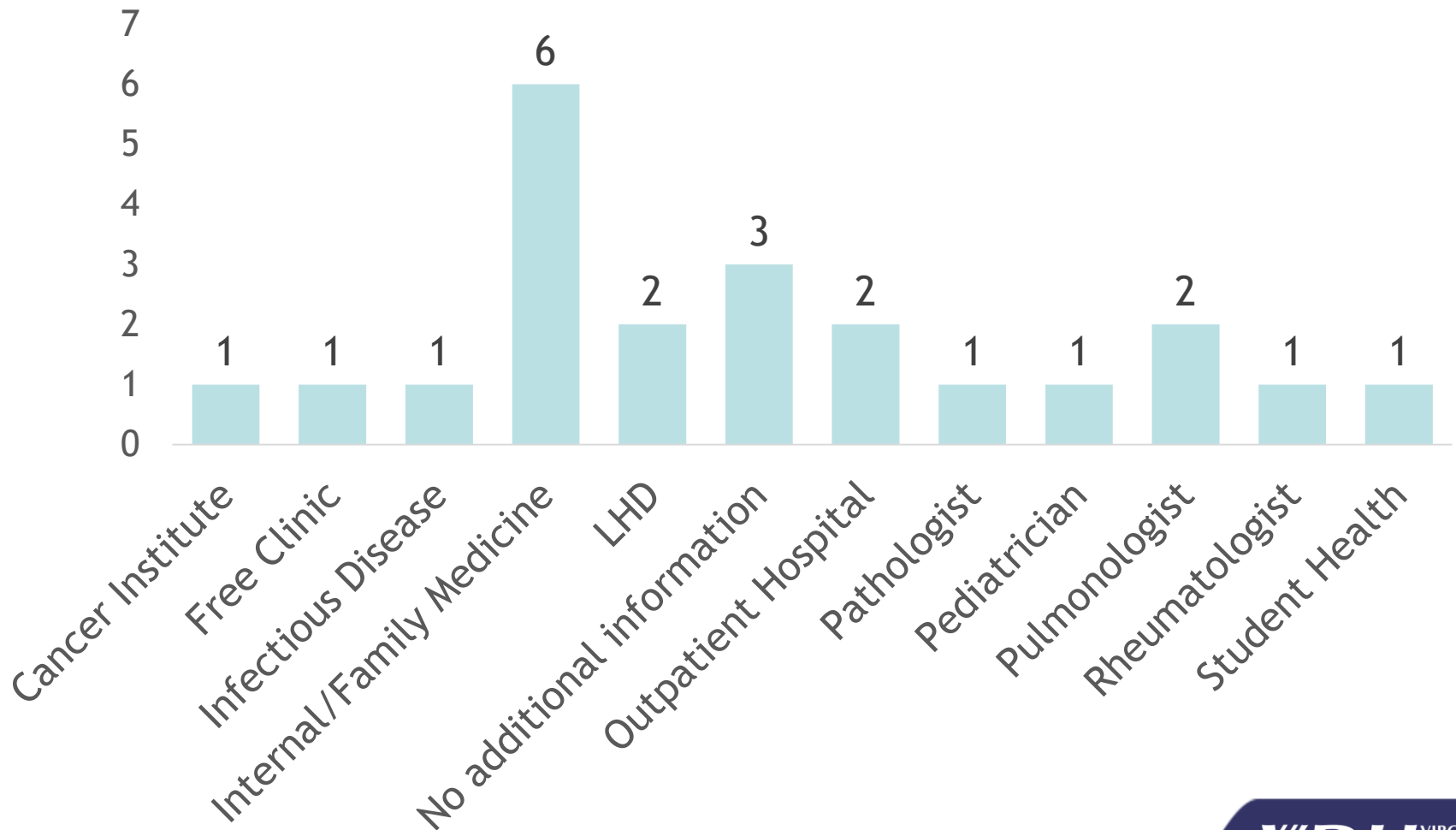
- 22 patients with active TB disease met inclusion criteria
 - Average age 48 (range 9-82)
 - 50% (11) female
 - 95% (21) non-U.S.-born
 - 45% (10) reported additional risk factors:
 - Diabetes
 - Other immunosuppression
 - TNF antagonist therapy
 - TB contact



Results

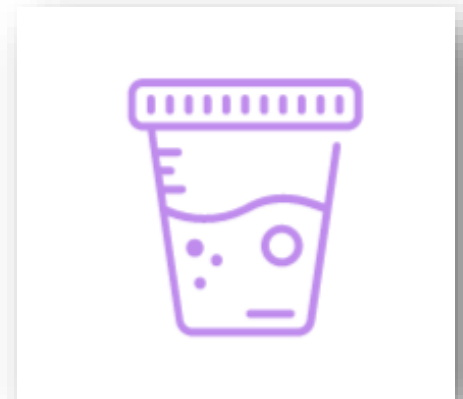
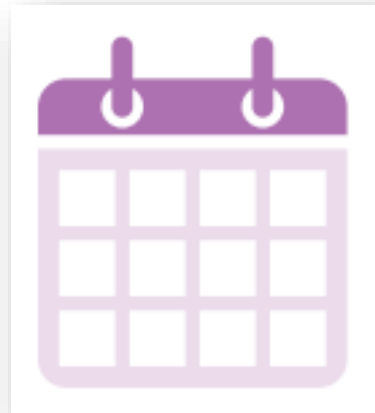
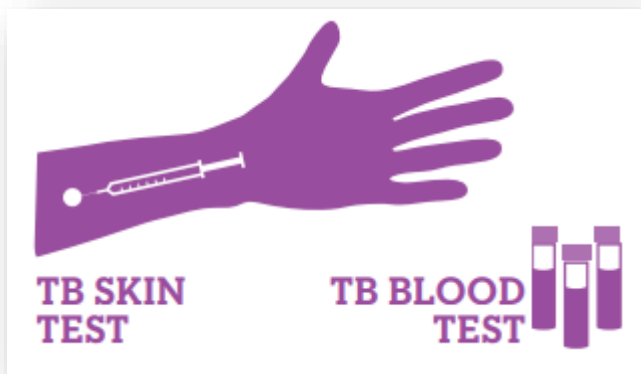
- 55% (12) evaluated for active disease due to TB symptoms
- 55% (12) had a pulmonary site of disease
- 74% (17) had an abnormal chest x-ray
- 45% (10) sputum culture positive
- 23% (5) sputum smear positive

Ordering Provider of Initial IGRA






Results

- Average number of days from initial positive test for infection to earliest sputum collection: 233 days (range 91-819)



Discussion

- Likely missed opportunities to prevent progression to disease
- Shorter treatment duration options available for LTBI:

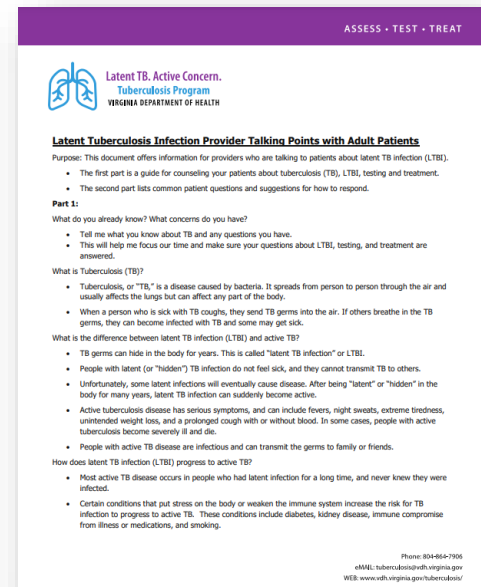
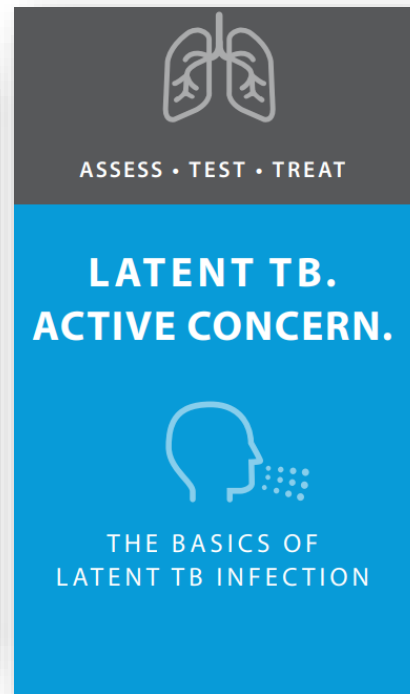
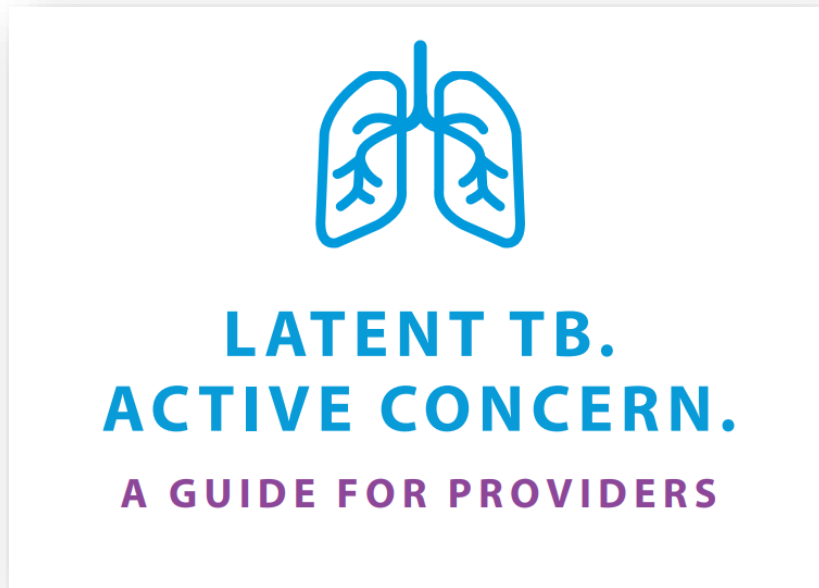
	DRUG	DURATION	FREQUENCY
Preferred	ISONIAZID [†] AND RIFAPENTINE ^{††} (3HP) 	3 months	Once weekly
	RIFAMPIN [§] (4R) 	4 months	Daily
	ISONIAZID [†] AND RIFAMPIN [§] (3HR) 	3 months	Daily

Limitations

- Without follow-up at time of initial positive test for TB infection, unknown if treatment was offered and if offered, reason for declination
 - Treatment was declined for 2 patients with more complete information
- Majority of LTBI reports received via ELR
 - Reporting gap from providers

Conclusions and Next Steps

- Additional prioritized follow-up for positive IGRAs could encourage treatment offered by community provider
 - Opportunity to provide education/resources
 - Connection to care if needed



Conclusions and Next Steps

- Prioritized follow-up project initiated in September by TB Program
 - Rheumatology practices
 - Pediatric practices
 - Occupational Health
 - FQHC/Free Clinics
 - Endocrinology practices
 - Retina/Uveitis practices
- GA funding requests for additional resources

Acknowledgments

- Virginia Department of Health Local TB Programs
- Virginia Department of Health Central Office TB Program

Thank you!

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