# TB Testing in NJ Schools

Update: Oct. 2020

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New Jersey Department of Health

# TB disease became reportable in the US in 1953

| | | |
|---|---|---|
| **1953** | **N= 84,304** | **52.6/100,000** |

89.4% decrease in TB morbidity in the U.S. since 1953

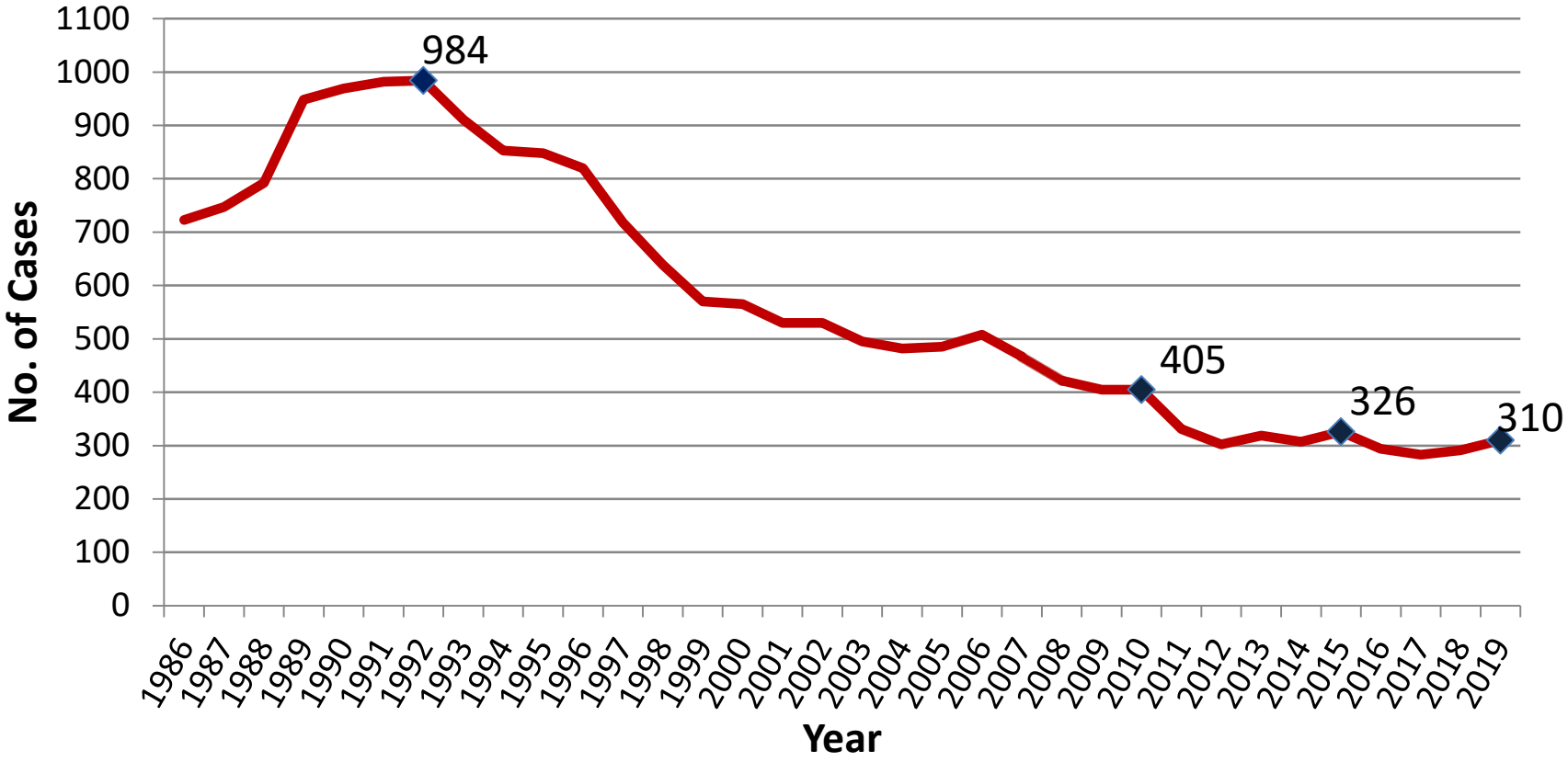
# TB in the United States

- In 2019, the United States reported the lowest number of TB cases (8,920) and lowest incidence rate (2.7 cases per 100,000 persons) on record

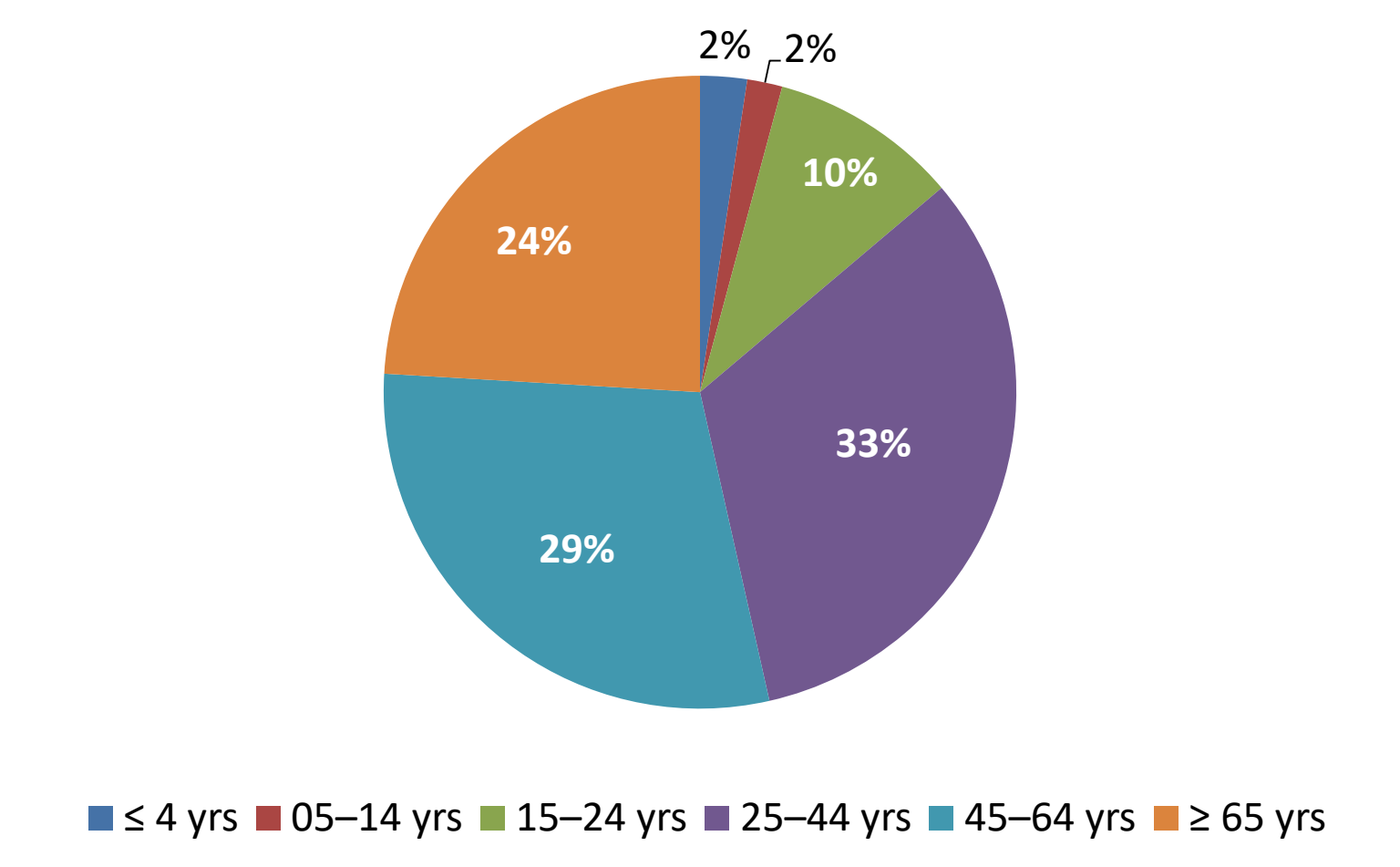
- The national incidence rate was 2.7 cases per 100,000 persons

- >Half (n= 4583) of all cases occurred in just four states (California, Texas, New York, and Florida)

# TB Morbidity
# New Jersey, 1986–2019



# Reported TB Cases by Age Group New Jersey, 2015–2019 (N=1,504)



Current guidelines suggest that low-risk persons in the US general population need not receive routine screening [32]. The anticipated yield is low, and there is an increasing risk of false-positive results due to the low prevalence of latent tuberculous infection but high prevalence of sensitization to nontuberculous mycobacteria. Groups of high-risk adults and children in whom screening is likely to be productive have been defined, and consensus recommendations of the American Thoracic Society (ATS) [32] and Centers for Disease Control and Prevention (CDC) [33] can be viewed on the Internet at . They have been endorsed by the Infectious Diseases Society of America and the American Academy of Pediatrics.

**Evolution and Current Use of the Tuberculin Test**
Ellie J. C. Goldstein, Elsie Lee, Robert S. Holzman
*Clinical Infectious Diseases*, Volume 34, Issue 3, 1 February 2002, Pages 365–370, https://doi.org/10.1086/338149
**Published:** 01 February 2002

# Who Should be Tested

Español (Spanish)

Certain people should be tested for TB infection because they are at higher risk for being infected with TB bacteria, including:

- 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 (for example: 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

Many people who have latent TB infection never develop TB disease. But some people who have latent TB infection are more likely to develop TB disease than others. Those at high risk for developing TB disease include:

https://www.cdc.gov/tb/topic/testing/whobetested.htm

# NJ Schools TB Testing Regulation

- The current requirement is for testing in only two groups of students;
  - Those entering a school system in the United States for the first time, if born in a high TB incidence country (**not** listed on page 3 of the guidance), and
  - Those transferring to the New Jersey school system directly from a high TB incidence country (**not** listed on page 3 of the guidance).

- Employees and other adults having direct contact with the student population.

“Ending TB will require a dual approach of maintaining and strengthening current TB control priorities while increasing efforts to identify and treat latent TB infection in high-risk populations.”

https://www.cdc.gov/features/burden-tb-us/index.html

# Recent Transmission in the United States

- Nationally, 1,787 (13.1%) of 13,650 genotyped cases reported during 2016–2017 are attributed to recent transmission
- More than 80% of TB cases in the United States result from longstanding, untreated latent TB infection
- **Up to 13 million**: estimated number of people in the United States living with latent TB infection

2017 State and City TB Report
https://www.cdc.gov/tb/statistics/transmission.htm

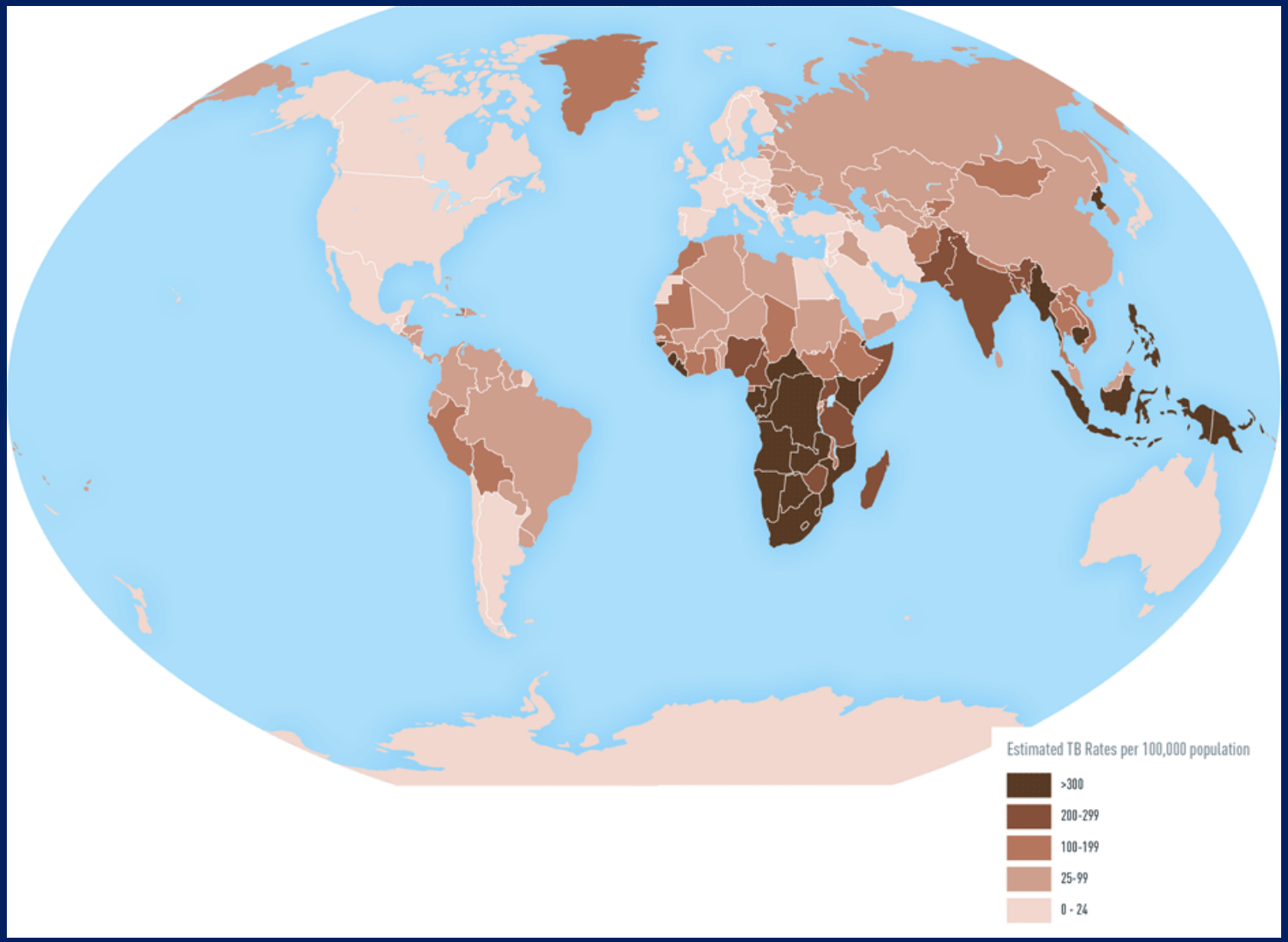
# National Trends in Tuberculosis, 2018

- TB disease in the United States is most common among people who were born in countries with high rates of TB

- In 2018, a total of 70.2% of reported TB cases in the United States occurred among non-U.S.-born people

Trends in TB, 2018

# Map 4-12. Estimated tuberculosis incidence rates, 2016




CDC Yellow Book (Health Information for International Travel)

“Country of birth continues to be a risk factor for TB diagnosed in the United States because the risk of TB exposure varies by country.”

*Reported Tuberculosis in the United States*, 2016 Centers for Disease Control and Prevention National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention Division of Tuberculosis Elimination October 2017

# Know the Law

**N.J.S.A. Title 18A: EDUCATION**

**N.J.S.A. Title 26: HEALTH AND VITAL STATISTICS**

# Title 18A - EDUCATION

- **18A:40-11. Exclusion of pupils having communicable tuberculosis**

Any pupil found to have communicable tuberculosis shall be excluded from school and a report of each such case shall be filed by the school medical inspector with the health officer of the municipality in which the pupil resides. Readmission to school may be granted when proof satisfactory to the school medical inspector is furnished to indicate that the pupil is free from communicable tuberculosis.

# Title 18A - EDUCATION

- **18A:40-16. Tuberculosis infection; determination of presence**

The board of education of every school district shall periodically determine or cause to be determined the presence or absence of tuberculosis infection in any or all pupils in public schools, and, with respect to frequency, procedure, and selection of pupils, shall comply with the rules of the State board.

# Title 18A - EDUCATION

- **18A:40-17. Equipment, materials and services for tuberculosis test**

The board may provide at its expense the equipment, materials, and services necessary to make such determination, or it may contract to use for that purpose, with or without financial reimbursement, the equipment, materials, and services available through a hospital or public health agency approved by the State Department of Health.

# Title 18A - EDUCATION

- **18A:40-18. Exclusion of pupils failing to comply with rules and orders**

Any pupil failing to comply with the rules of the board of education relating to the determination of the presence of tuberculosis or any order issued by a school officer pursuant to such rules may be excluded from school.

# Title 18A - EDUCATION

- **18A:40-9. Failure of parent to remove cause for exclusion; penalty**

If the cause for exclusion under this article is such that it can be remedied, and the parent, guardian or other person having control of the pupil excluded shall fail within a reasonable time to have the cause for the exclusion removed, the parent, guardian or other person shall be proceeded against, and upon conviction, be punishable as a disorderly person.

# Title 18A - EDUCATION

- **18A:40-19. Records and reports of tuberculosis testing; disposition; inspection**

All records and reports of tuberculosis testing conducted by or under the auspices of a board of education shall be the property of the board, and shall be filed with the medical inspector as confidential information except that such records and reports shall be open for inspection by officers of the State Department of Health and of the local board of health, of the municipality in which the pupil resides and of the municipality in which the school is located.

# New Jersey Administrative Code

**II. New Jersey Administrative Code Title 6A Education regulations for tuberculosis: 6A:16-2.2 Required health services**

(c) Each school district shall perform tuberculosis tests on students using methods required by and when specifically directed to do so by the New Jersey Department of Health based upon the incidence of tuberculosis or reactor rates in specific communities or population groups pursuant to N.J.S.A. 18A:40-16.

(d) Each school district shall immediately report by telephone to the health officer of the jurisdiction in which the school is located any communicable diseases identified as reportable pursuant to N.J.A.C. 8:57-1, whether confirmed or presumed.

**6A:16-2.3 Health Services Personnel**

(a) The district board of education shall appoint a school physician pursuant to N.J.S.A. 18A:40-1.

3. The school physician shall provide, at a minimum, the following services:

x. Authorization of tuberculin testing for conditions outlined in N.J.A.C. 6A:16-2.2(c);

(b) The district board of education shall employ a certified school nurse to provide nursing services while school is in session pursuant to N.J.S.A. 18A:40-1 and 3.3.

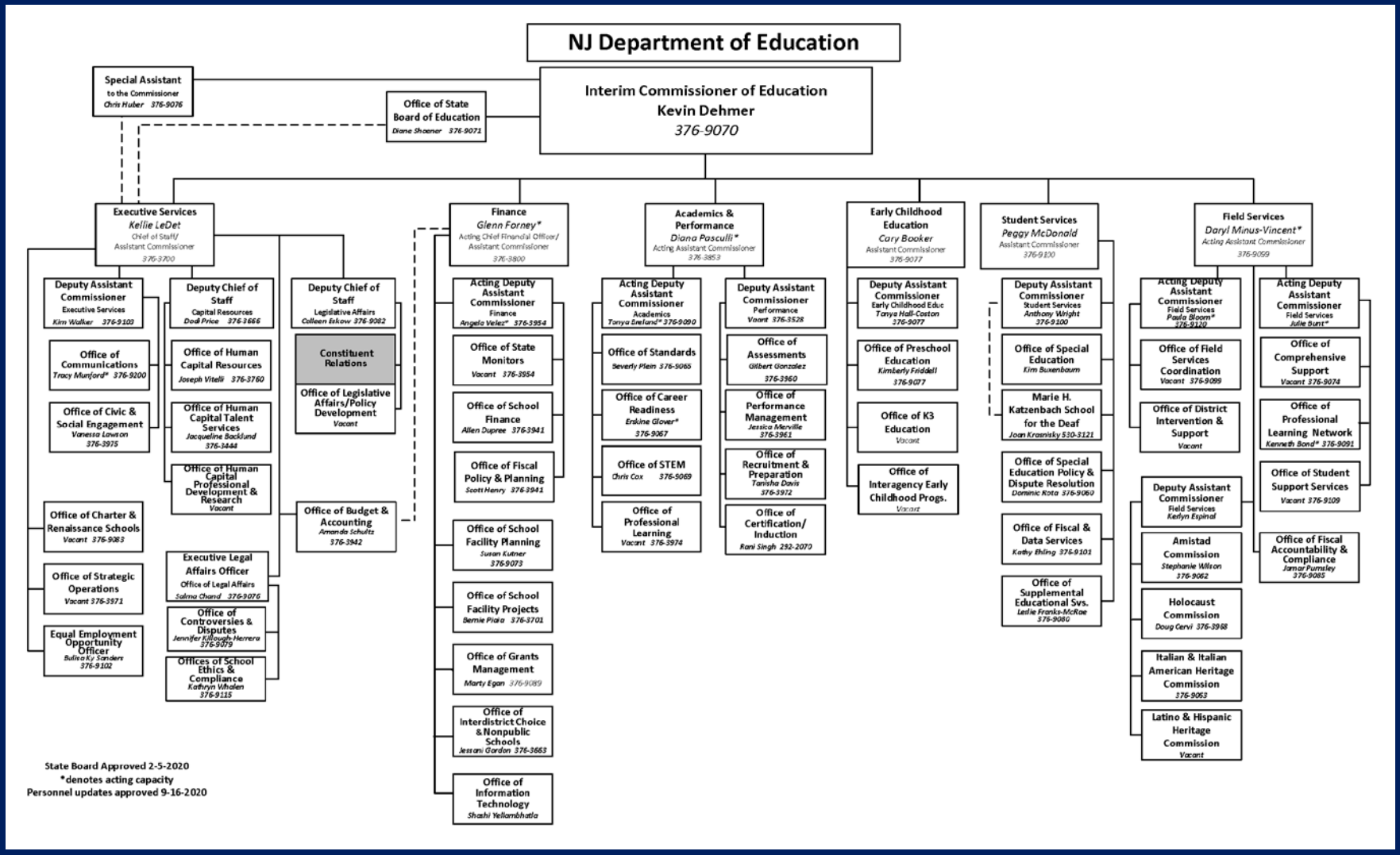
1. The certified school nurse shall work under the direction of the school physician and chief school administrator.

3. The role of the certified school nurse shall include, but not be limited to:

i. Carrying out written orders of the medical home and standing orders of the school physician;

iii. Maintaining student health records, pursuant to N.J.S.A. 18A:40-4 and N.J.A.C. 6A:16-2.4;

- vi. Recommending to the school principal exclusion of students who show evidence of communicable disease, pursuant to N.J.S.A. 18A:40-7, 8, and 10;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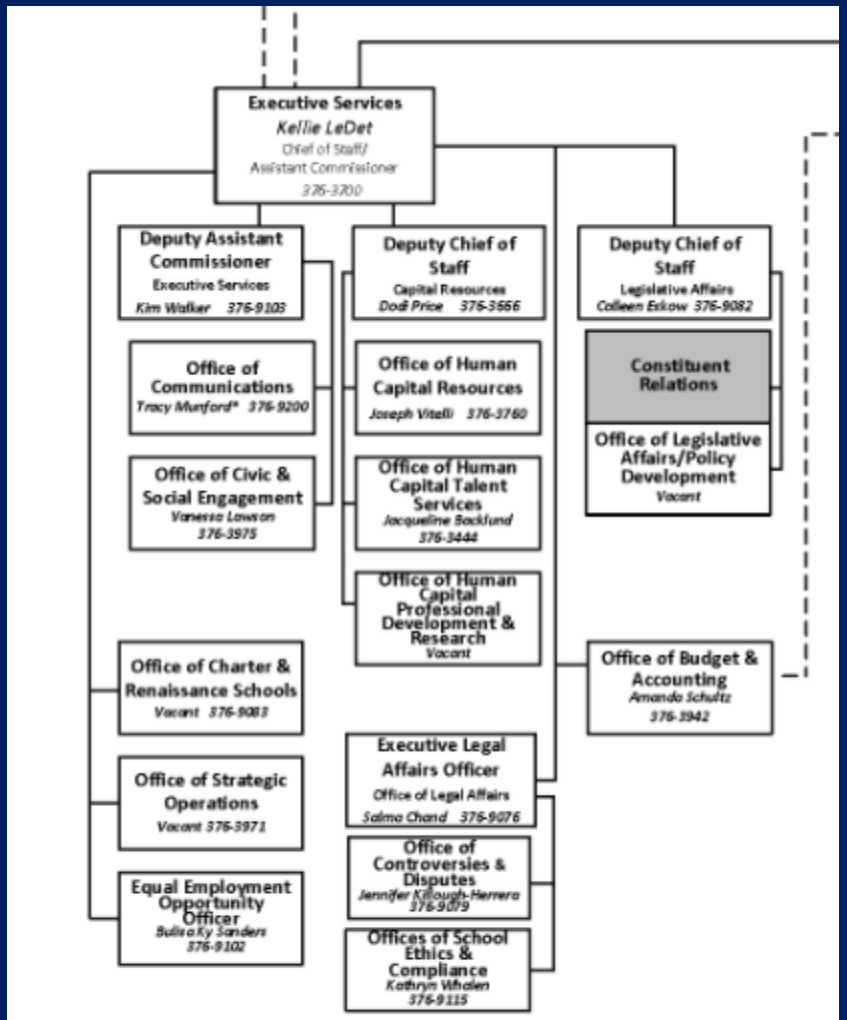


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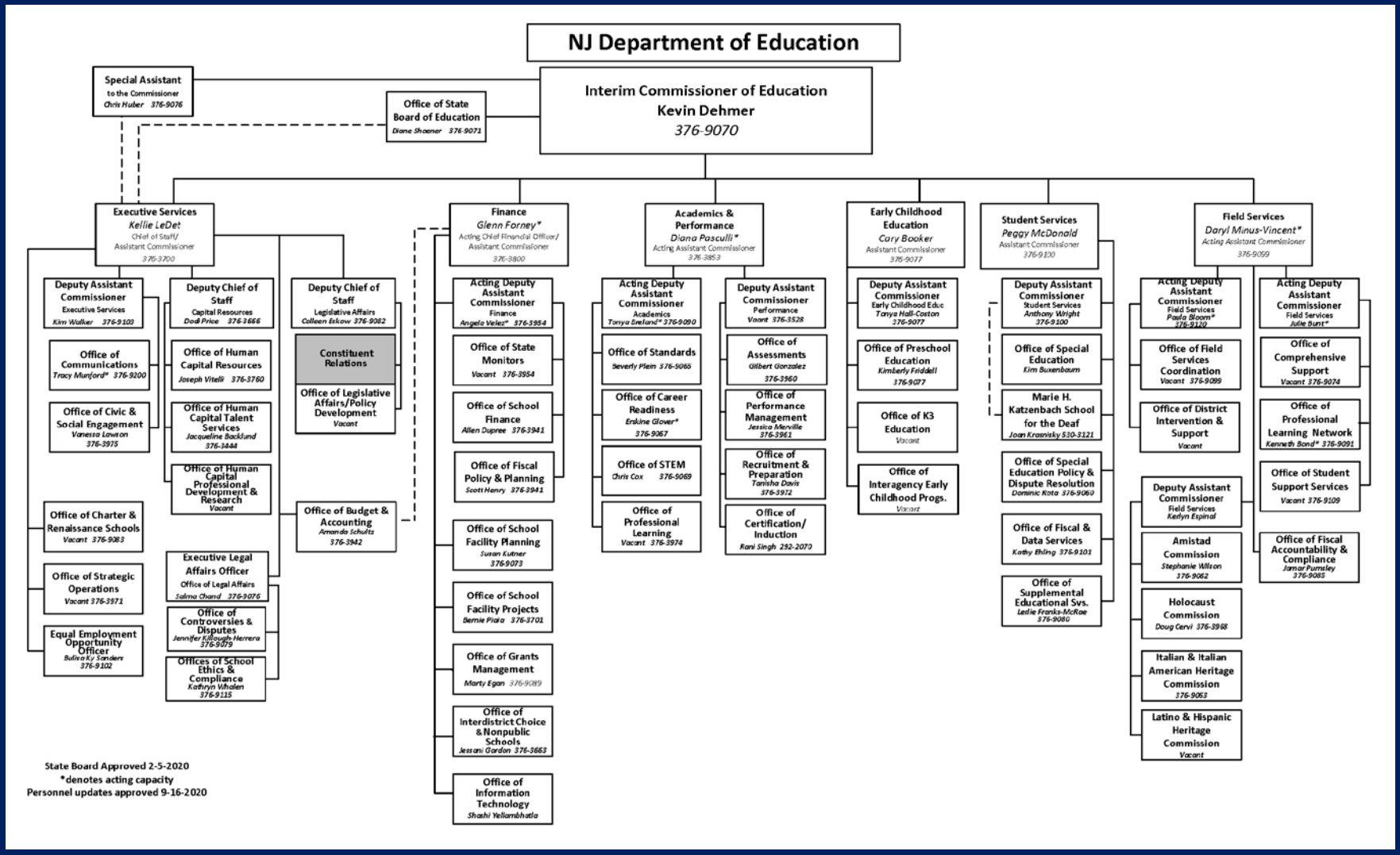
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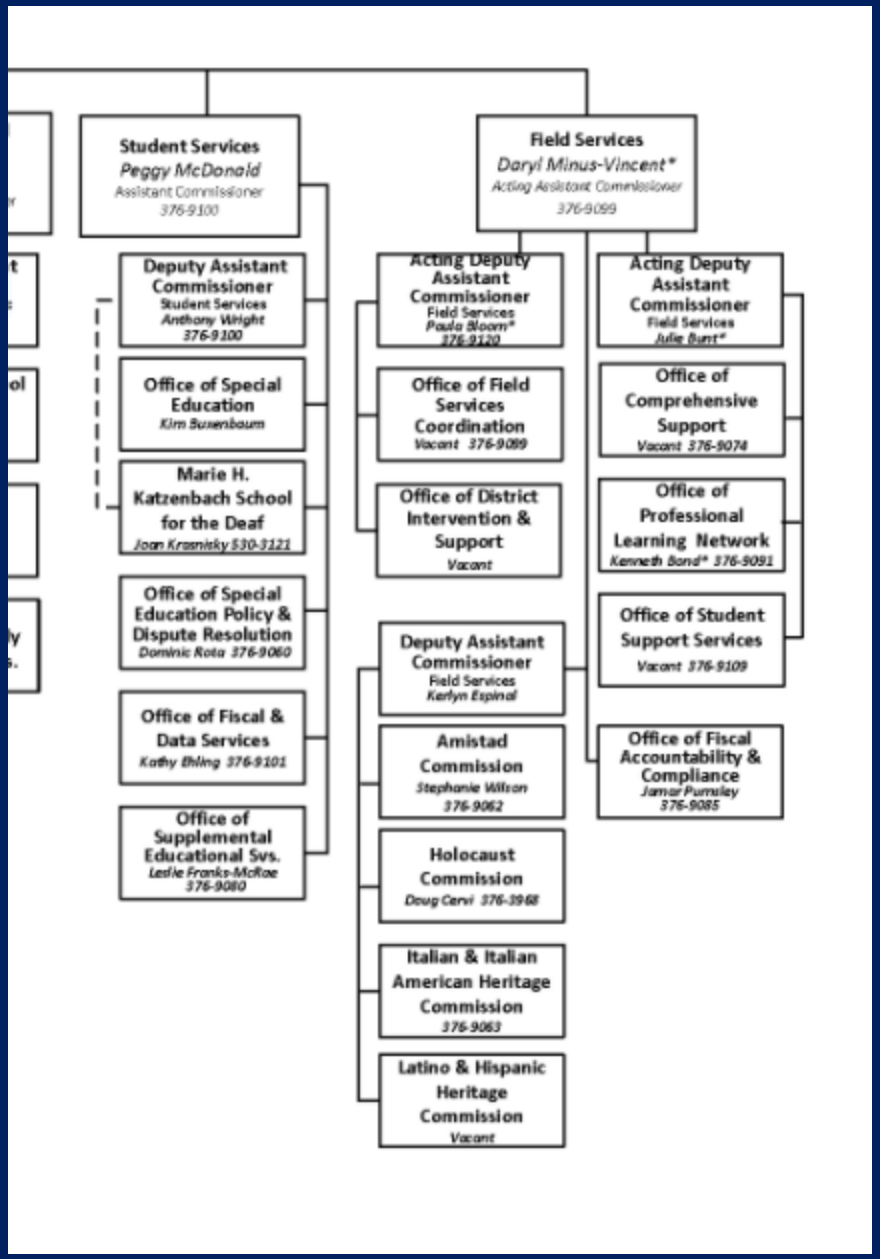
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# Other Resources

**New Jersey State School Nurses Association**
Document: *School Nursing Practice in New Jersey's Public Schools*
www.njssna.org

**CDC Yellow Book (Health Information for International Travel)**
https://wwwnc.cdc.gov/travel/page/yellowbook-home

**American College Health Association**
Document: *Tuberculosis Screening and Targeted Testing of College and University Students*
https://www.acha.org/

**CDC TB Fact Sheets**:

- *Targeted Tuberculin Testing and Interpreting Tuberculin Skin Test Results*
- *Tuberculosis Information for Employers in Non-Healthcare Settings*
- *Tuberculosis: General Information*
- *Tuberculosis and Pregnancy*
- *Tuberculin Skin Testing*

# Thank You!

New Jersey Dept. of Health
Division of HIV, STD & TB Services
Tuberculosis Program
PH: (609) 826-4878
FX: (609) 826-4879
www.nj.gov/health/hivstdtb/tb/

RUTGERS
Global Tuberculosis Institute
NEW JERSEY MEDICAL SCHOOL

# Targeted Testing and Treatment in Schools

November 13, 2020

Suzanne Tortoriello, APN-C

# Polling question #1

Have you had a pediatric case in your school?

- Yes
- No

# Significance of Tuberculosis in Children

- A case of tuberculosis in a child is considered a “sentinel healthcare event” representing recent transmission of TB within the community

# Global: Epidemiology of TB Disease in Children and Adolescents

- 1.1 million cases of TB disease in children
- Approximately 230,000 tuberculosis-related deaths in children <15 years of age in 2018

Source: WHO Global TB Report 2019

# Summary of Epidemiology of TB

- TB in children
  - Highest risk for disease:
    - <5 years of age
    - Non-U.S.-born children
      - 60% of cases develop within 18 months of arrival in US
      - Most common countries of birth: Mexico, Philippines, India
        - » Varies depending on immigration patterns
    - Racial and ethnic minorities

Source: CDC Reported Tuberculosis in the United States, 2018

# Definitions

- Latent TB infection:
  - *M. tuberculosis* infection with a
    - Positive tuberculin skin test (TST) or interferon-gamma release assay (IGRA)
    - No physical findings of disease
    - Chest radiographs: normal or evidence of a healed infection (calcified lesion)

- Tuberculosis (TB) disease:
  - *M. tuberculosis* infection
    - Positive TST or IGRA test
    - Symptoms and signs of disease – pulmonary, extrapulmonary or both
    - Radiographic manifestations of disease

Source: Redbook AAP 2018

# Polling question #2

As a school nurse, have you assessed a child for symptoms related to TB?

- Yes
- No

# Symptom Assessment for the School Nurse

- Children with risk factors
- Chronic respiratory illness and cough that is not improving
- Weight loss
- Fatigue
- Multiple absences

# Polling question #3

Can children <12 years of age who have TB, transmit it to others?

- Yes
- No
- Unsure

# Infectiousness

- Children have few tubercle bacilli in lungs, therefore, are rarely infectious
- Children less than 12 years of age usually lack the pulmonary force to produce airborne bacilli
- For a case of childhood TB infection, it is likely that an adolescent or adult transmitted TB bacilli to the child
  - It is important to find the source case

# Polling question #4

As a school nurse, do you believe targeted testing for children is sufficient?

- Yes
- No
- Unsure

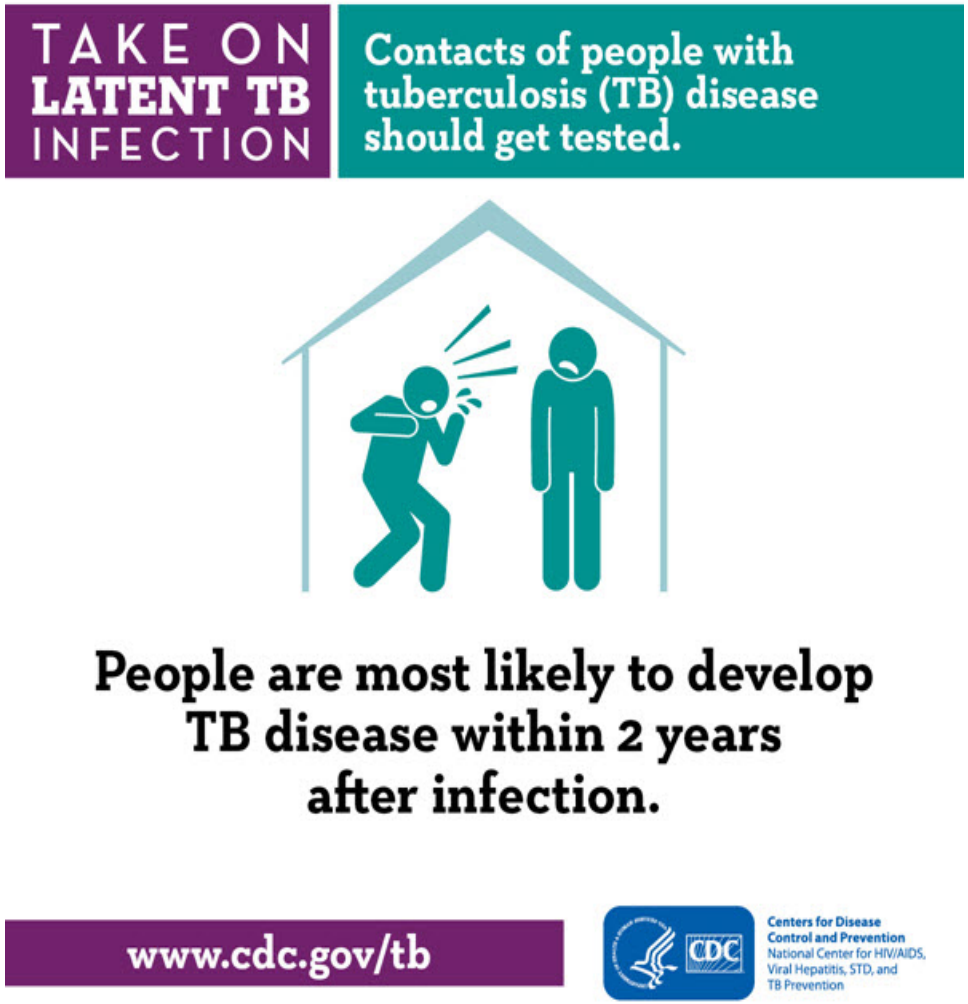
# Targeted TB Testing and Treatment of LTBI

- Identifies persons at high risk of infection with *M. tuberculosis*
- Identifies persons at high risk of progressing to disease should they be infected
- Reduces unnecessary testing, evaluations and treatments

Slide courtesy Dr. George McSherry

# Important facts

- Highest risk of TB disease is during the first 6 months after exposure
- Risk is still elevated for up to 2 years later
- Always ask about recent travel or visitors



# AAP Recommendations: Targeted Tuberculin Testing

- Risk of exposure to TB should be assessed at routine healthcare evaluations
- Only children with an increased risk of acquiring TB infection or disease should be considered for testing
- Frequency of testing should be according to the degree of risk of acquiring infection
- “Screening” is an inefficient way to manage tuberculosis

# AAP Recommendations: Questions for Determining Risk of LTBI in Children in the U.S.

- Has a family member or contact had TB disease?
- Has a family member had a positive TST?
- Was your child born in a high-risk country (countries other than the U.S., Canada, Australia, New Zealand, or Western and Northern European countries)?
- Has your child traveled to a high-risk country? How much contact did your child have with the resident population?

Source: Redbook AAP 2018

# Targeted Tuberculin Testing Risk Assessment Questionnaire

- Depending on local epidemiology and priorities, other possible questions include:
  - Does your child spend time with anyone who has been in jail or a shelter, uses illegal drugs or has HIV?
  - Has your child had raw milk or eaten unpasteurized cheese?
  - Is there a household member born outside the US?
  - Is there a household member who has traveled outside the US?

Source: Pediatrics 2004; 114:1175, supplement

# TST and IGRA

- IGRAs (QuantiFERON®-TB Gold Plus and T-Spot®.*TB*) are the preferred tests in asymptomatic children <4 years of age who have received the BCG vaccine

- TST preferred, IGRA acceptable
  - Children <2 years of age
    - Positive result of either test is considered significant

- IGRA preferred, TST acceptable
  - Children ≥2 years of age who have received the BCG vaccine
  - Children ≥2 years of age who are unlikely to return for TST reading

Source: Red Book 2018

# Limitations

- TST and IGRA by themselves cannot distinguish between infection and disease

- In circumstances of moderate to high clinical suspicion for TB disease, negative results in either/or TST and IGRA do not exclude the diagnosis

- Children with a positive IGRA result should be considered infected with MTB complex
  - TST results may be confounded by previous BCG administration (age-dependent) and infection with non-tuberculosis mycobacteria

- Indeterminate IGRA results do not exclude TB infection and may necessitate repeat testing
  - Should not be used to make clinical decisions

- IGRAs consistently perform well in children ≥ 2 years of age, and some data support their use for even younger children

Source: Red Book 2018

# Polling question #5

Why is the BCG vaccine given?

- To provide lifetime protection from TB infection
- To prevent infants from developing severe forms of TB
- To prevent the transmission of TB
- Unsure

# Special Considerations

- Immunizations
  - TST should be administered:
    - Before the measles, mumps, rubella (MMR) vaccine or Varicella vaccine
    - Simultaneously with the MMR vaccine or Varicella vaccine
    - Or at least 4-6 weeks after the vaccine
- BCG Vaccine
  - History of BCG vaccine is not a contraindication for testing for TB
  - If a child is at risk for TB, a TB test should be performed regardless of BCG vaccination history

# Mycobacteriologic Diagnosis of Tuberculosis

- Adults: 70-90% have a sputum that is (+) for *M. tuberculosis*

- Children:
  - Tubercle bacilli are relatively few in number
  - Sputum generally cannot be obtained from children <10 years old
  - Gastric aspirates in children with pulmonary TB
    - 30-40 % sensitive in children
    - 60-70% sensitive in infants
  - Bronchoalveolar lavage (BAL): Sensitivity may be less than gastric aspirates
    - This is an invasive procedure not normally performed in children

# Making the Diagnosis in Infants & Children

- Is the child a contact to a TB case?
- Is the child presenting to medical provider with chronic respiratory symptoms including cough, wheezing, decrease in activity, decrease in appetite and weight loss?
- Often times diagnosis is missed because providers didn't think of TB as part of a differential
- Important to make link to foreign-born-parents, grandparents even if child is non-U.S.-born

**Establishing a definitive diagnosis of TB disease in children is often associated with great difficulty!!**

# Treatment of TB in Children & Adolescents - 1

- If INH resistance rate >4% or if other risk for resistance include 4 drugs in initial regimen:
  - Isoniazid (10 mg/kg/day, range 10-15, max. 300)
  - Rifampin (15 mg/kg/day, range 10-20, max. 600)
  - Pyrazinamide (20-30 mg/kg/day)
  - Ethambutol (15-25 mg/kg/day)

- Treatment complicated by child unfriendly preparations of the medications
- Doses are counted
- There are pediatric formulations that are not yet available in the United States
- Pills may be crushed and dissolved, then mixed with food or juice to make them more palatable for children

# Treatment of TB in Children & Adolescents - 2

- Directly observed therapy (DOT)
- Follow susceptibility studies of *M. tb* isolate (index and/or child isolate)
  - Important to be familiar with resistance patterns in the community
- In some types of extrapulmonary TB or coinfection with HIV, the length of treatment is extended 9-12 months

# Treatment Regimens for LTBI

| Drugs | Months of Duration | Interval | Minimum Doses |
|---|---|---|---|
| INH-RPT | 3* | Weekly | 12 |
| RIF | 4* | Daily | 120 |
| INH | 6 | Daily | 180 |
| INH | 9 | Daily | 270 |

***Preferred regimens**

# Treatment Option 1 – Rifapentine + INH (3HP)

- Dosing:
  - INH: 15mg/kg rounded to nearest 50 or 100mg (900mg max dose) once a week
  - Rifapentine (3HP) – only for children ≥2 years of age

| | |
|---|---|
| 10-14kg | 300mg |
| 14-25kg | 450mg |
| 25.1-32kg | 600mg |
| 32.1-49.9kg | 750mg |
| >50kg | 900mg |

**Completion: 12 doses within 16 weeks**

# Treatment Option 1 – Precautions

- Not recommended in children <2 years of age
- Not recommended for HIV-infected persons taking antiretroviral medications
- May reduce effectiveness of hormonal contraceptives
- Causes orange staining of urine
- Can cause liver toxicity, flu-like symptoms, or allergic reaction
- These reactions are rare, especially in children

# Treatment Option 1 – Important Considerations

- Adherence to treatment is most important, considering this is a 12 dose regimen
- Directly observed therapy ensures adherence, but is not always feasible
- Give an observed dose at time of visit
- Provide family with a Medication Tracker so doses given at home can be documented. This should be brought to each visit
- Give dosage packets for a single month

# Treatment Option 2 – Rifampin (4R)

- Dosing:
  15-20 mg/kg/day PO (max 600mg dose)
  Formulations: 150mg, 300mg capsules

- Give on an empty stomach
- Nausea, vomiting, abdominal pain, orange discoloration of secretions or urine, rash; contact lenses staining, thrombocytopenia, pruritus, influenza like reaction
- Monitor with oral contraceptive pills (decreased effectiveness)

**Completion: 120 doses within 6 months**

# Treatment Option 3 – Isoniazid (6H)

- Dosing:
  10-15 mg/kg/day PO daily (max 300mg dose)
  Formulations: scored tablets 100mg, 300mg, 100mg/ml

- Mild liver toxicity, peripheral neuritis, hypersensitivity

- 6-month duration

- Ensure index case has an INH susceptible isolate; if not, use alternative drugs

**Completion: 270 doses within 1 year**

# Assessing for Adverse Reactions

- Generally, children tolerate TB medications well and adverse reactions are rare
- It is important to monitor for such reactions and consult with the healthcare provider
- Medications should be stopped immediately if the child develops
  - Nausea
  - Vomiting
  - Anorexia
  - Abdominal pain
  - Jaundice
- Tell parents to seek advice from the child's healthcare provider if any of these symptoms occur

# Directly Observed Therapy (DOT)

- DOT is the watching of the ingestion of anti-TB medications by a trained outreach worker or healthcare worker

- Can be supervised by:
  - Physician
  - Health Department Nurse
  - Trained Outreach Worker
  - School Nurse

- Should *not* be supervised by:
  - Parents or other close family member

# TB in Children-Summary

- TB is more prevalent in adults
- In children, TB is more serious than in adults
- Young children, especially under the age of 4, have difficult fighting off infections and can have serious forms of TB if left untreated
- Treating LTBI can prevent the child from getting active TB disease in the future

# Words of Caution

- Fortunately, TB rates have decreased dramatically over recent years primarily due to excellent surveillance by public health professionals

- The drop in cases has caused TB to be missed in the differential diagnosis of children when they present with ill symptoms to emergency departments or to their primary care provider

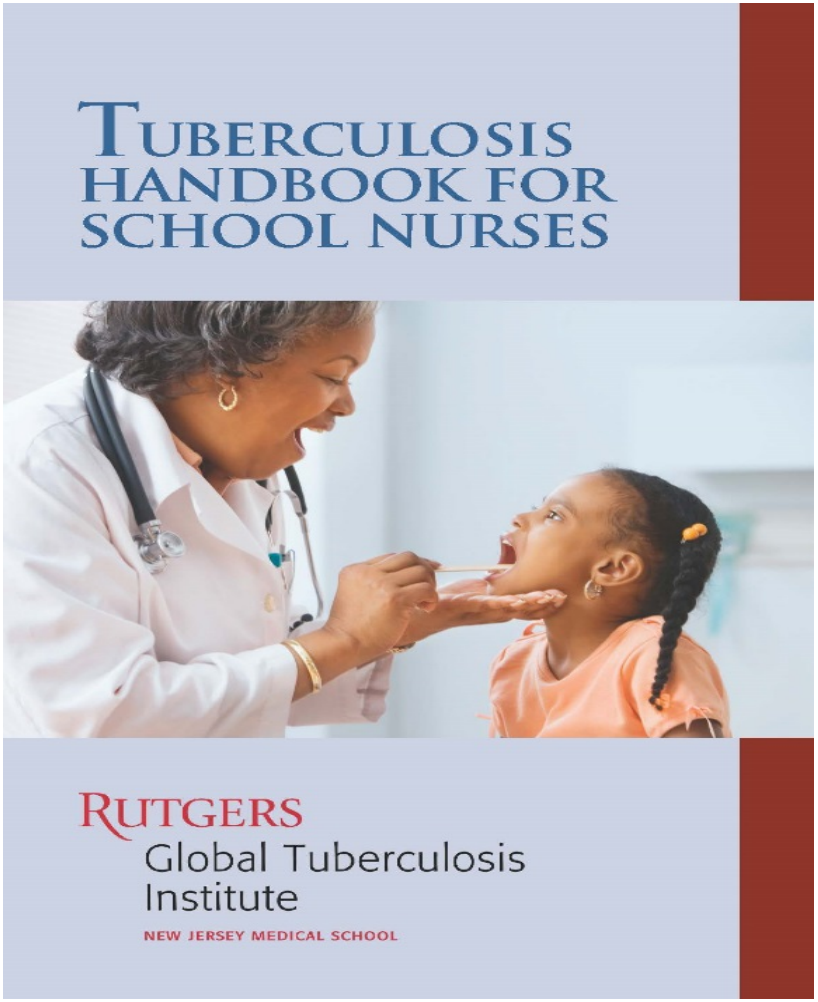
- Important to consider the link to non-U.S.-born parents or grandparents from endemic countries which is sometimes missed when a sick child presents for medical evaluation

# The Role of the School Nurse

- Assessment of students
- Referral for testing and evaluation
- Assess for possible side effects of drug treatment
- Encouragement for follow-up in clinic visits
- Liaison with medical provider to coordinate care
- School nurses are our partners in the community who bridge the gap between children, their families, and the child's healthcare provider.

**Thank you!**

# TB Handbook for School Nurses

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**Thank you for your participation!**