



Wisconsin Tuberculosis (TB) Program Updates

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Wisconsin Mycobacteriology Laboratory Network Conference

October 8, 2019

Topics

- TB epidemiology: global, U.S., Wisconsin
- Wisconsin TB Program updates
- Reporting latent TB infection (LTBI)
- LTBI surveillance
- TB screening and testing for health care personnel (HCP)

TB EPIDEMIOLOGY: GLOBAL

The Global Burden of TB 2017

	Estimated number of cases	Estimated number of deaths
All forms of TB	10.0 million 10.4 million last year	1.6 million (16%)* 1.7 million last year (16%)
HIV-associated TB	900,000 million (9%) 1.04 million last year (10%)	300,000 (33%) 374,000 last year (36%)
Multidrug-resistant TB & Rifampin resistance	558,000 (5.6%) 600,000 last year (5.8%)	240,000 (43%) 240,000 last year (40%)

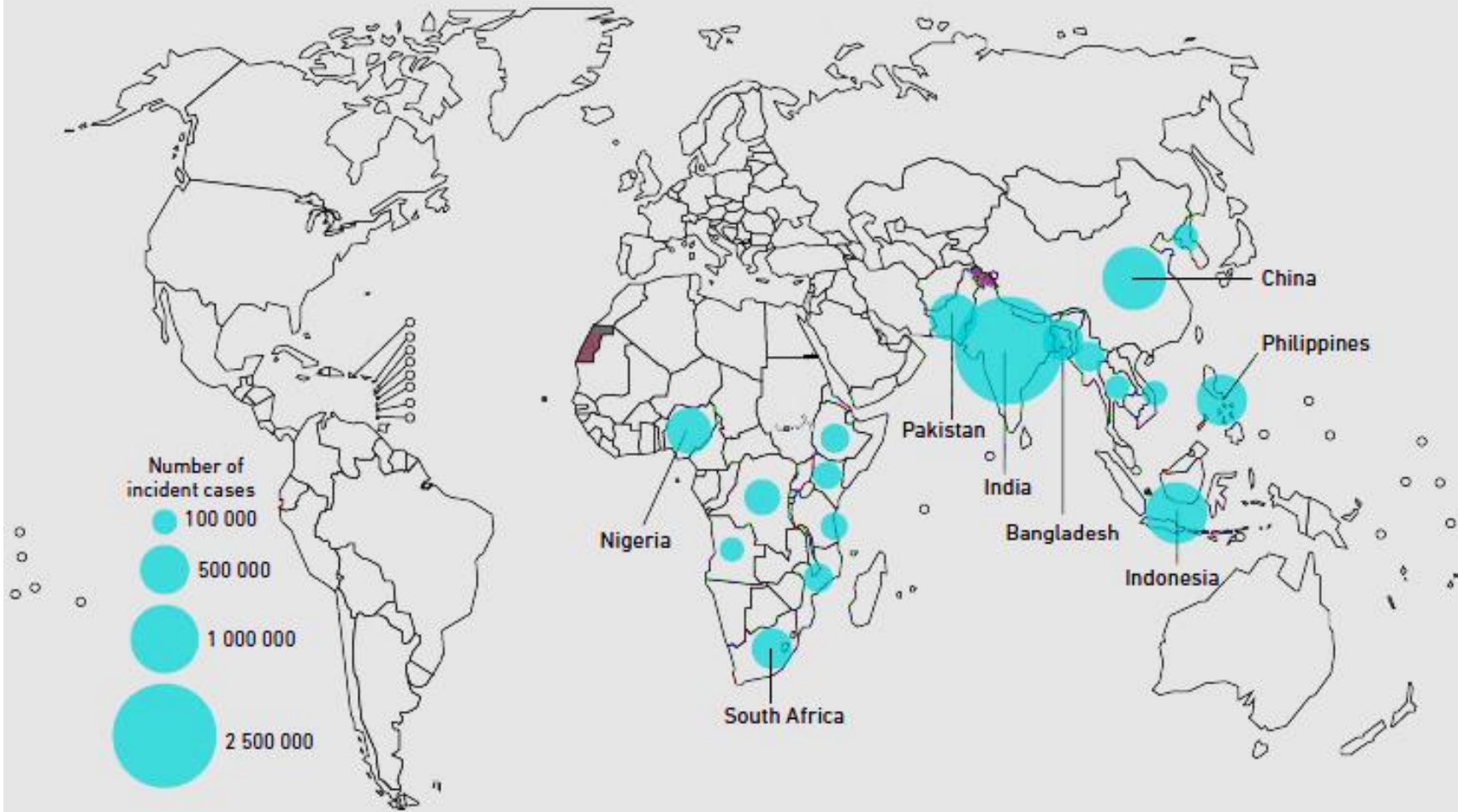
Source: WHO Global Tuberculosis Report 2018

* Including deaths attributed to both HIV/TB

The Global Burden of TB 2017

FIG. 3.3

Estimated TB incidence in 2017, for countries with at least 100 000 incident cases



The Global Burden of MDR-TB 2017

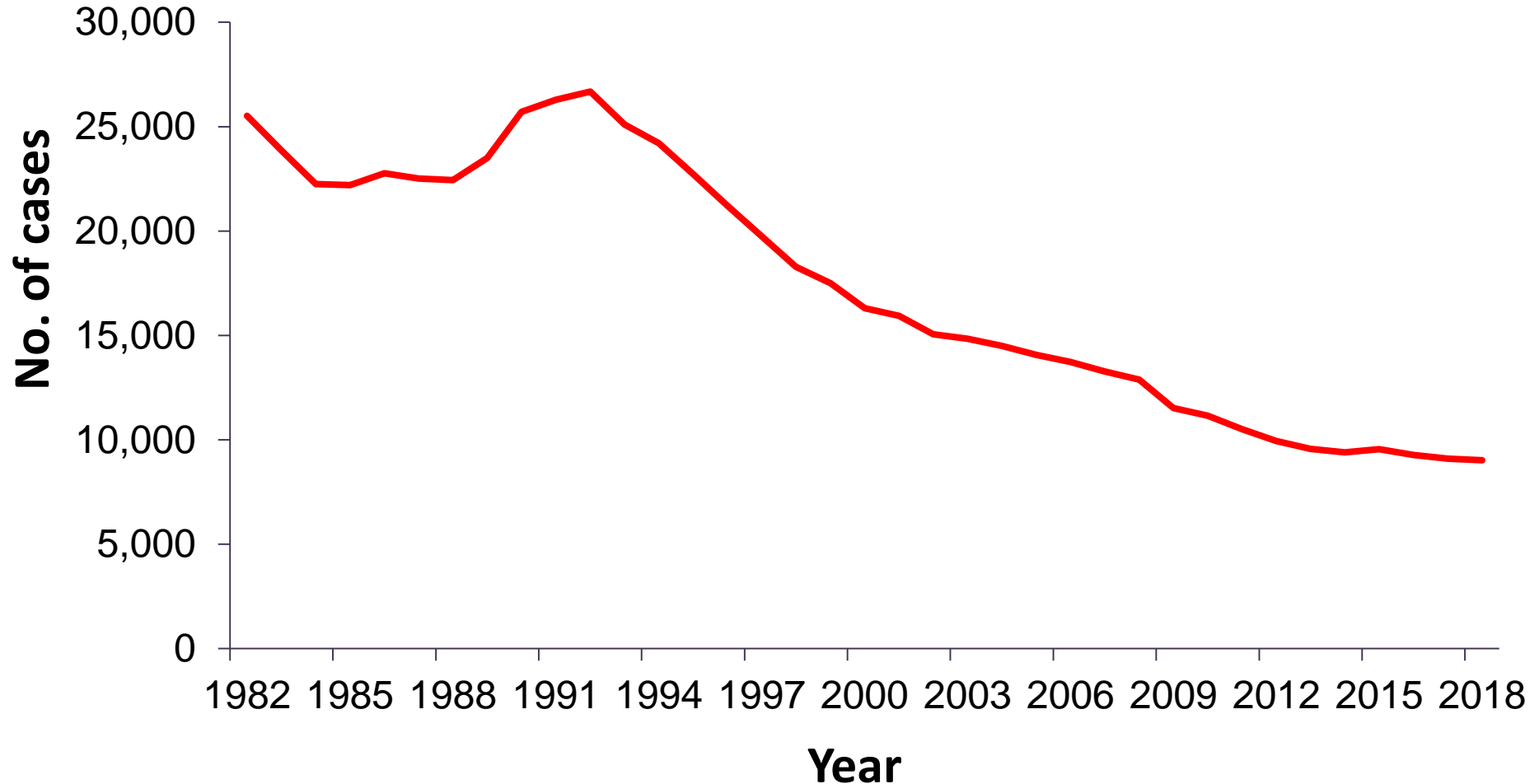
FIG. 3.22

Estimated incidence of MDR/RR-TB in 2017, for countries with at least 1000 incident cases



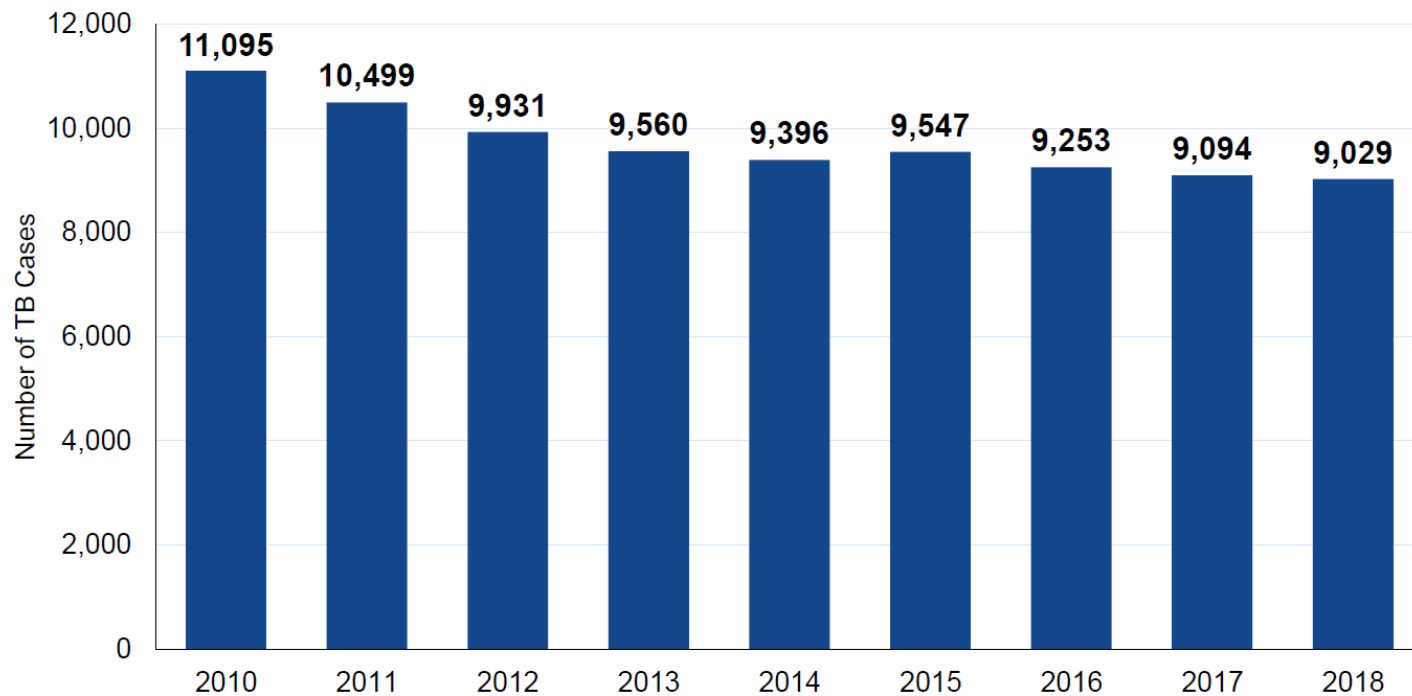
TB EPIDEMIOLOGY: UNITED STATES

Reported Tuberculosis (TB) Cases United States, 1982–2018*



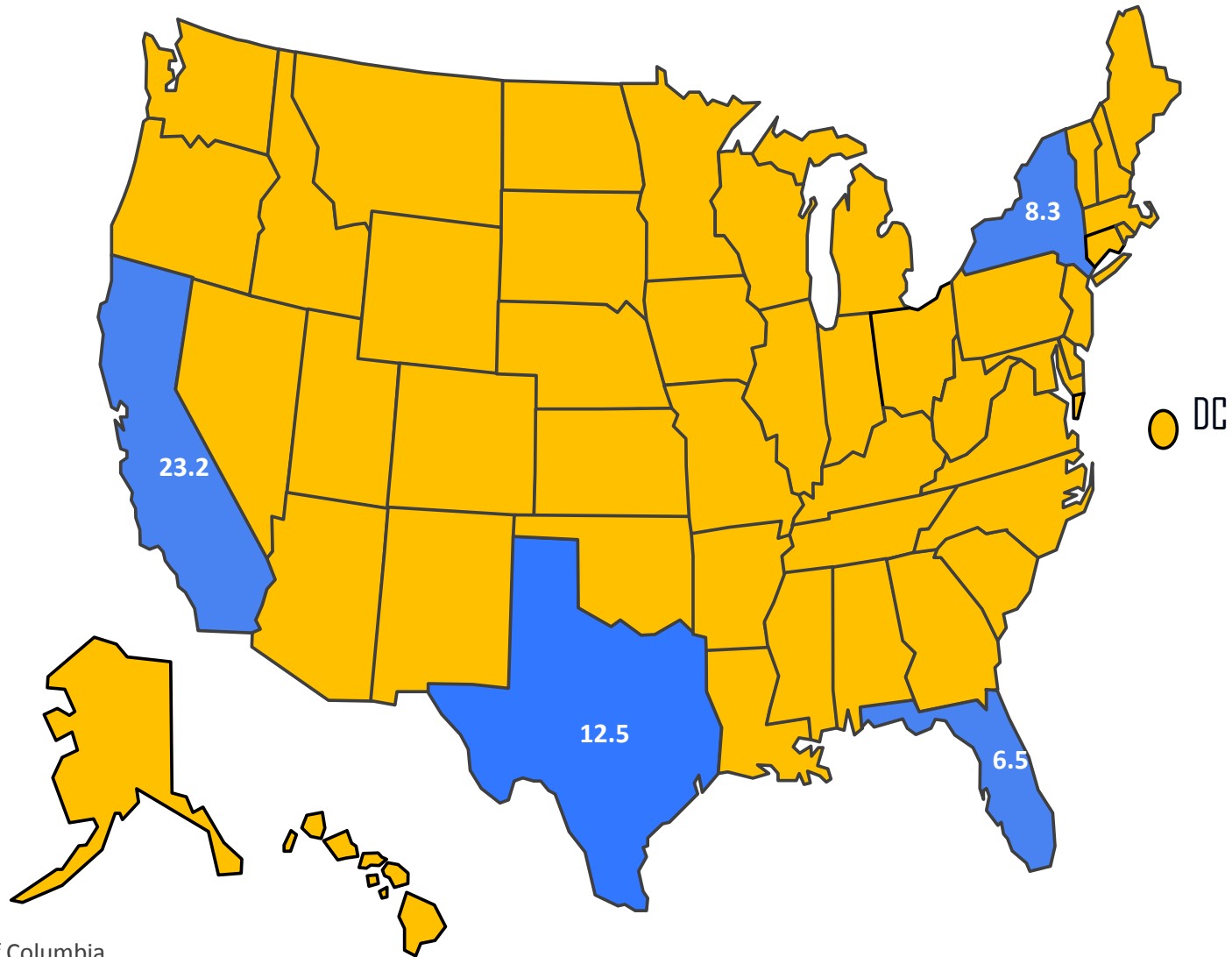
*As of March 22, 2019

Tuberculosis Case Counts* — United States, 2010–2018



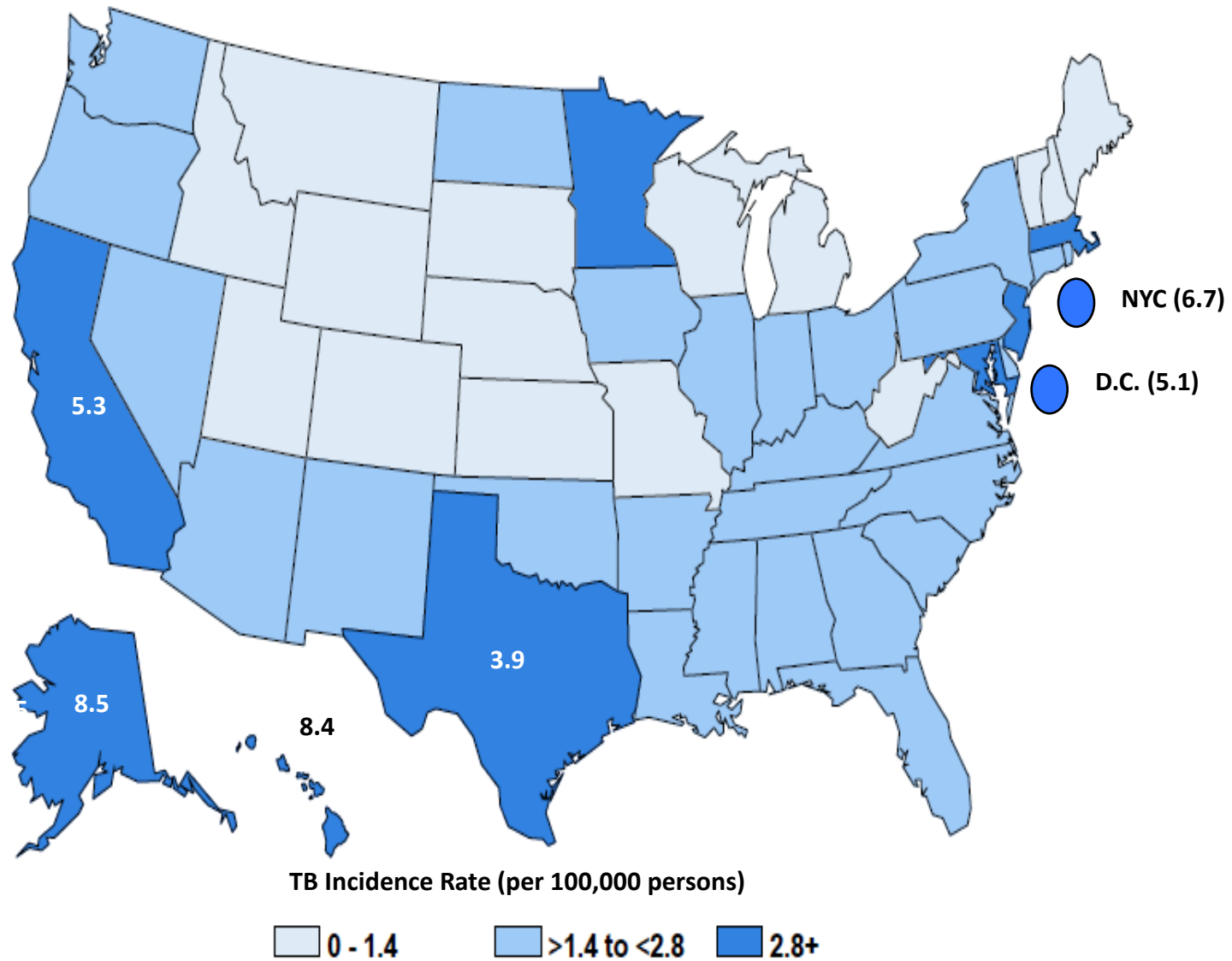
Based on provisional NTSS data as of February 11, 2019

Percentage of TB Cases by State, United States, 2018

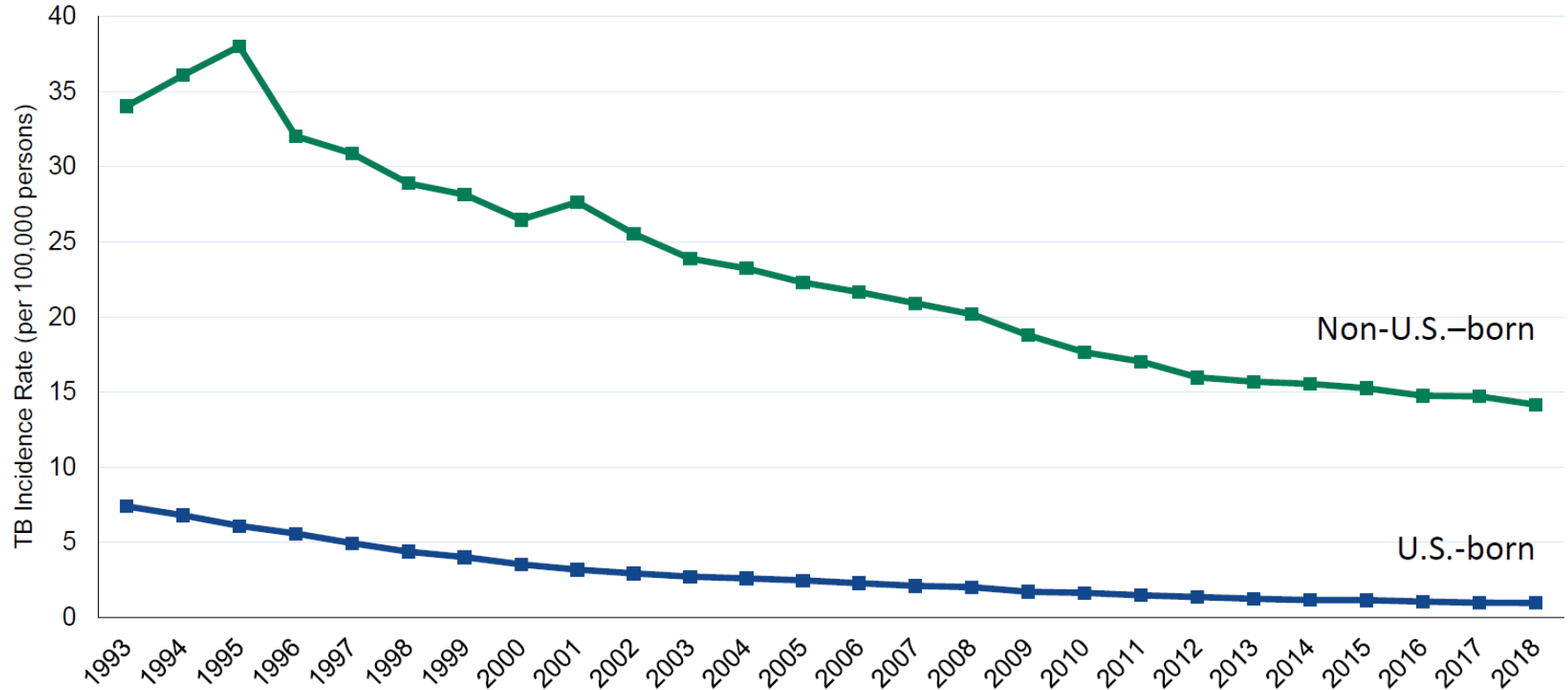


DC, District of Columbia

Tuberculosis Case Rates by Reporting Area United States, 2018



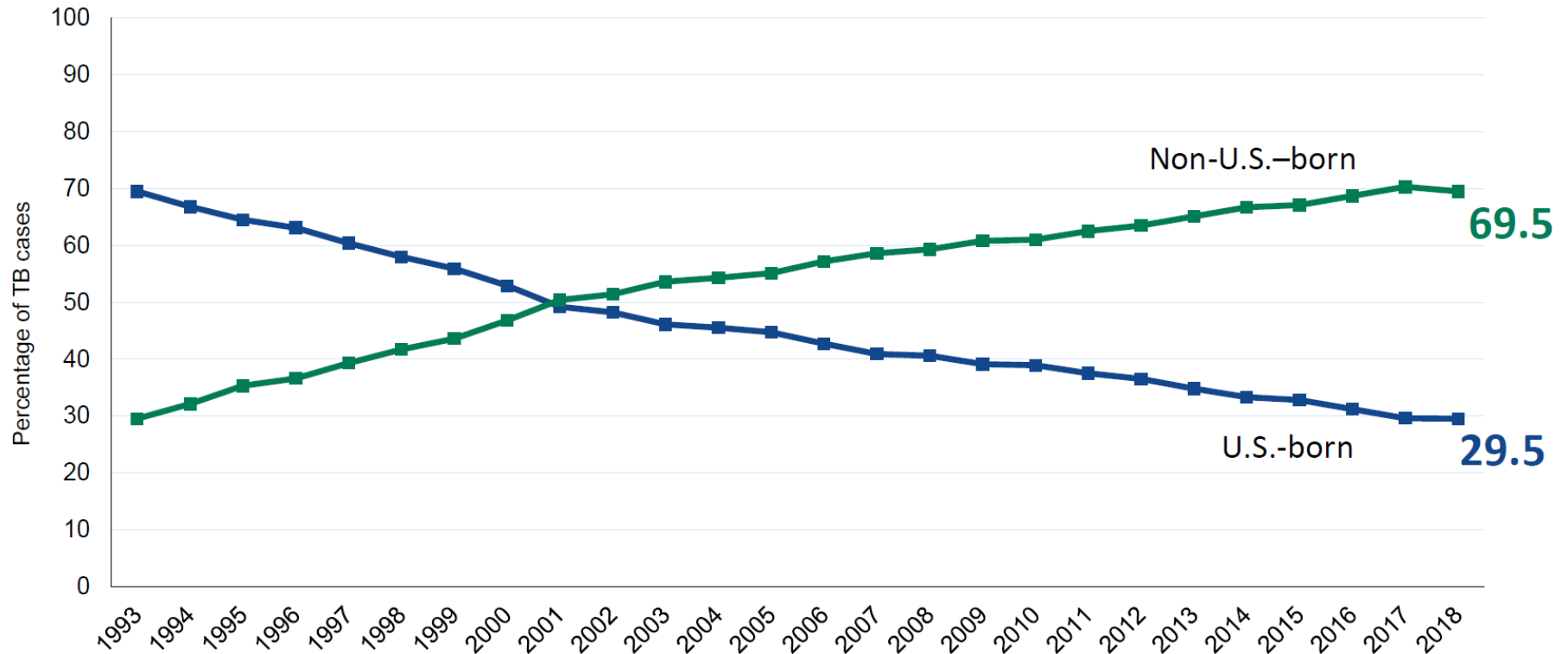
Tuberculosis Incidence Rates by Country of Birth* — United States, 1993–2018



*Based on provisional NTSS data as of February 11, 2019

<https://www.cdc.gov/tb/default.htm>

Percentage of Tuberculosis Cases by Country of Birth* — United States, 1993–2018

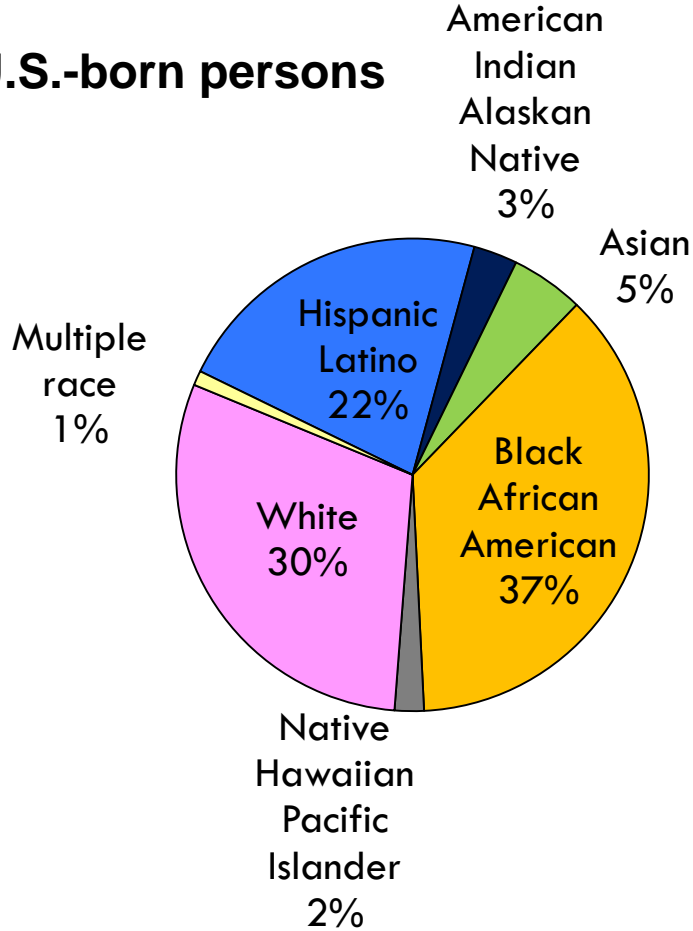


Based on provisional NTSS data as of February 11, 2019

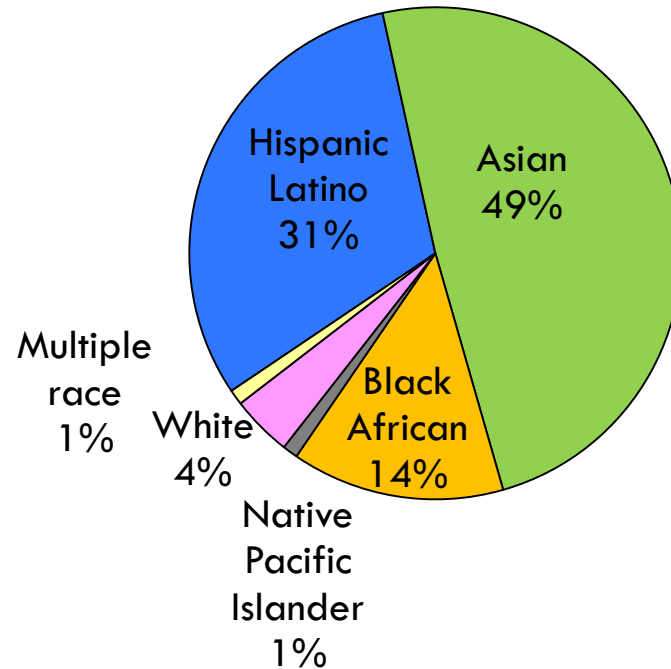
<https://www.cdc.gov/tb/default.htm>

Reported TB Cases by Origin and Race/Ethnicity*, United States, 2017

U.S.-born persons



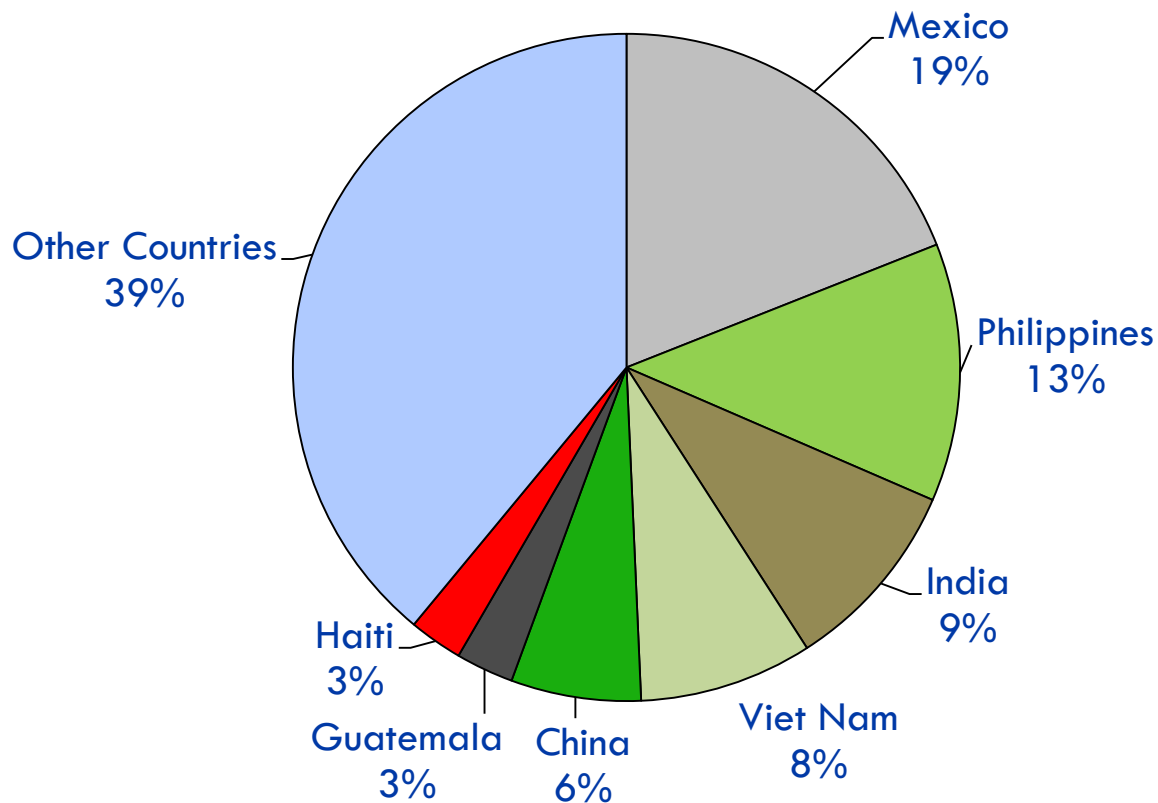
Non-U.S.-born persons§



* All races are non-Hispanic; multiple race indicates two or more races reported for a person, but does not include persons of Hispanic/Latino origin.

§ American Indian/Alaska Native accounted for <1% of cases among non-U.S.-born persons and are not shown.

Countries of Birth Among Non-U.S.–Born Persons Reported with TB, United States, 2017

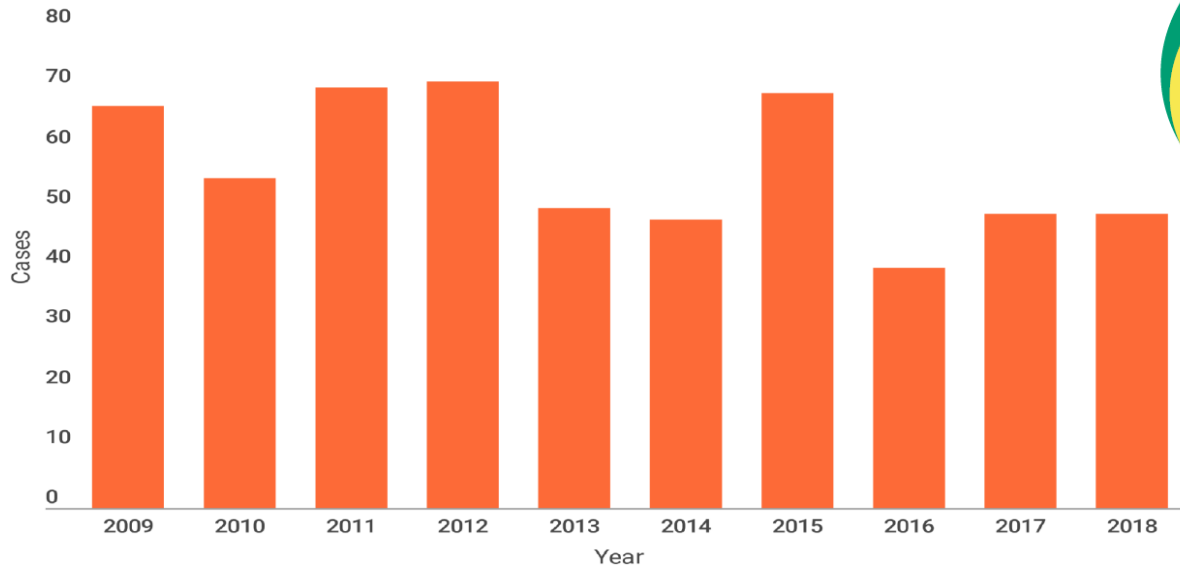


*Percentages are rounded.

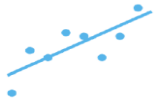
TB EPIDEMIOLOGY: WISCONSIN

Tuberculosis Disease in Wisconsin

Tuberculosis Cases, Wisconsin 2009-2018



49
cases of tuberculosis
were reported in
Wisconsin in 2018



Case average

Wisconsin has had an average of 57 TB cases per year during the past 10 years.



Multi-drug resistance

Wisconsin's rate of multi-drug resistant TB is one of the highest in the U.S. Wisconsin treated 20 patients with MDR-TB in the past 10 years.

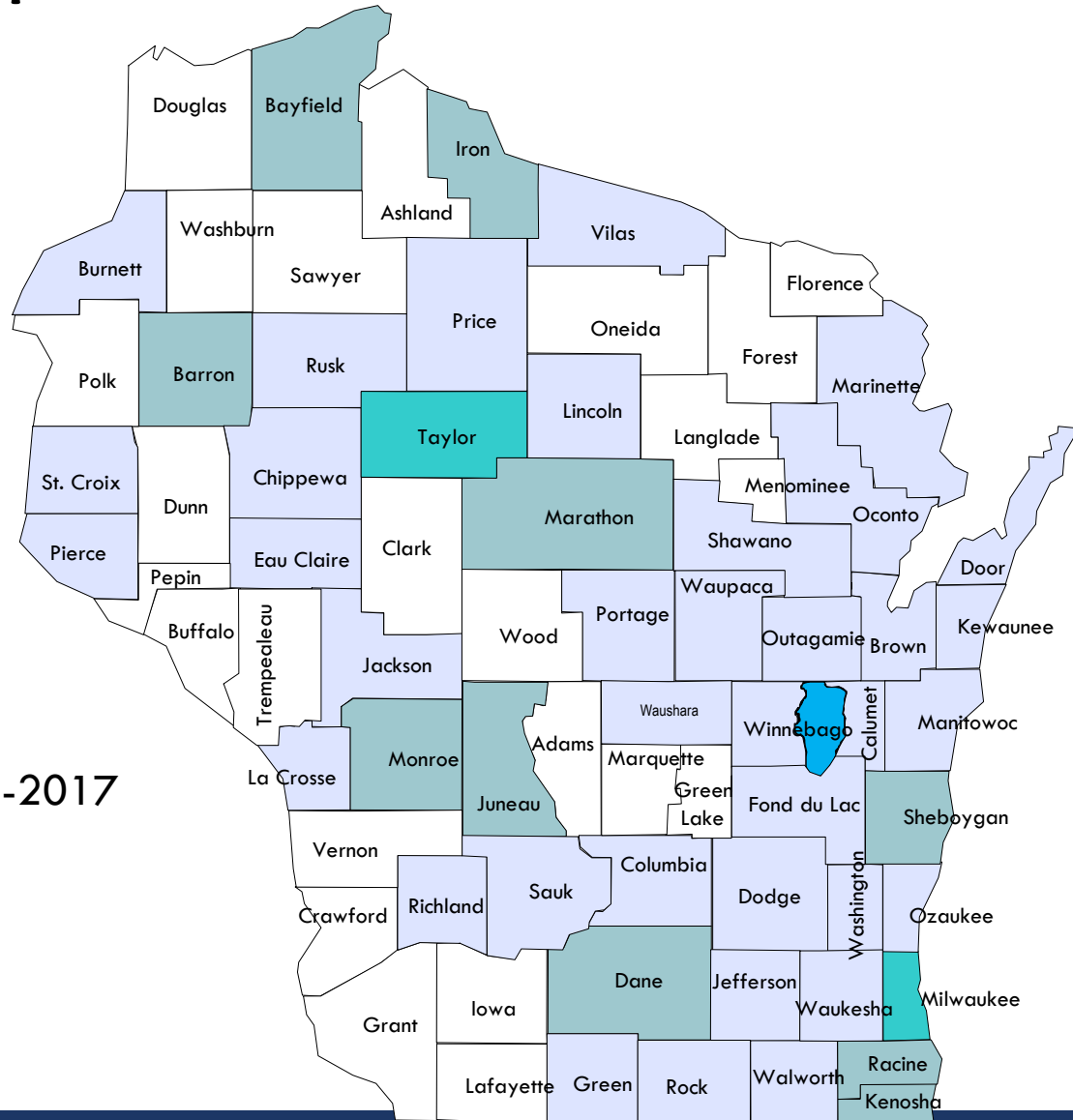


Deaths

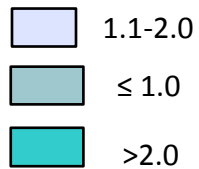
In 2018, nine people died from TB or complications of the disease.

TB Case Rates*

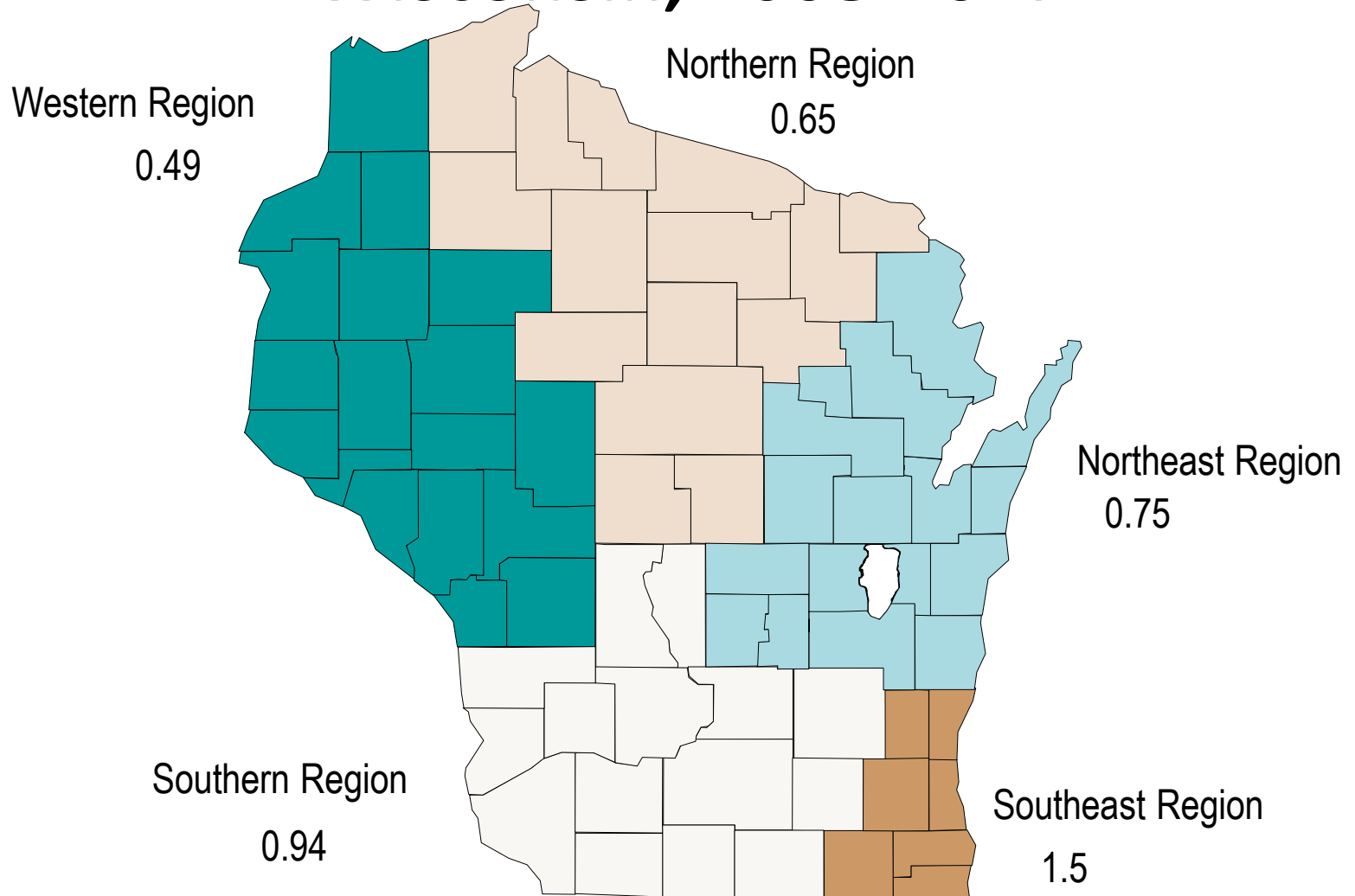
Wisconsin, 2008-2017



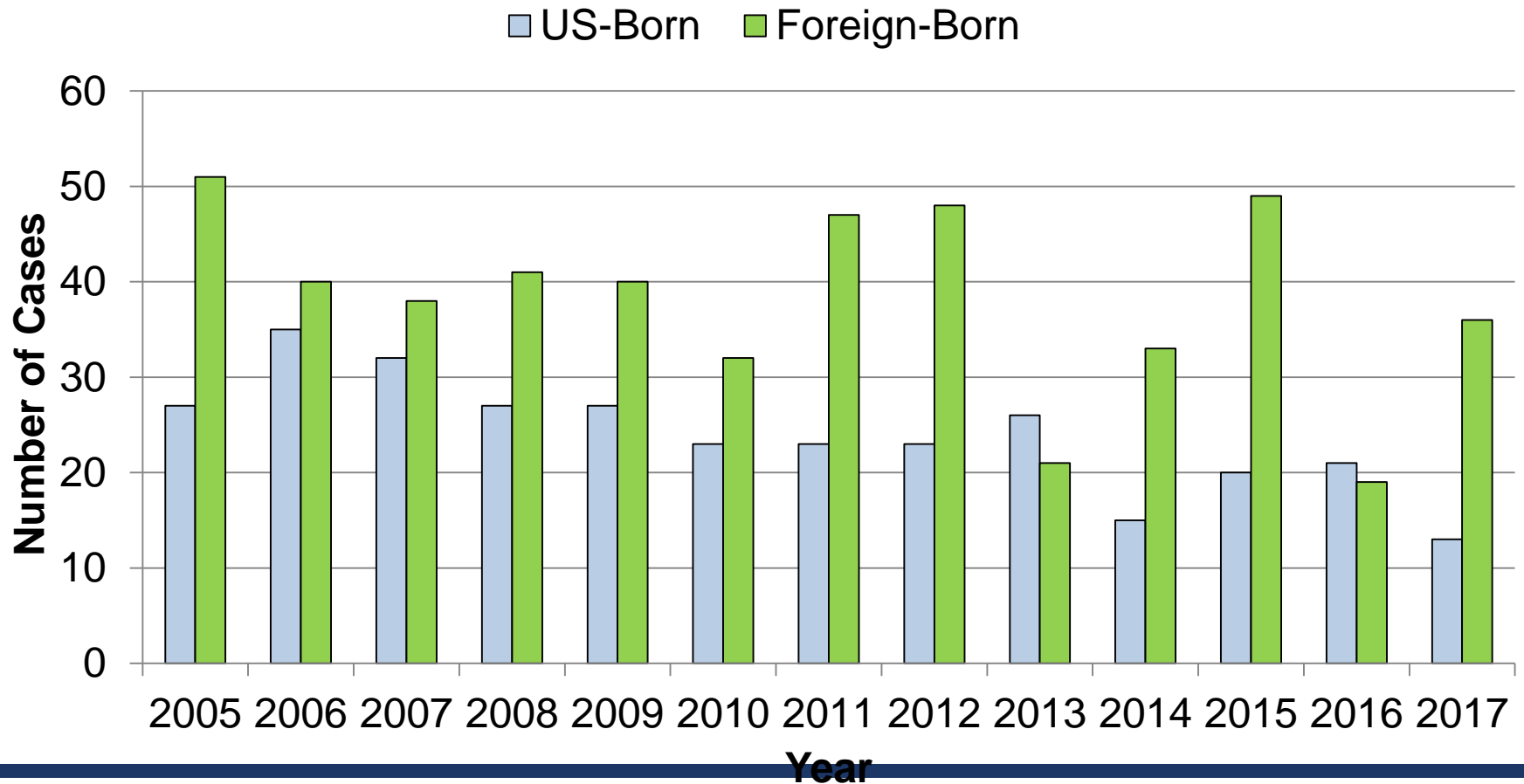
*10 year averages, rates 2008-2017



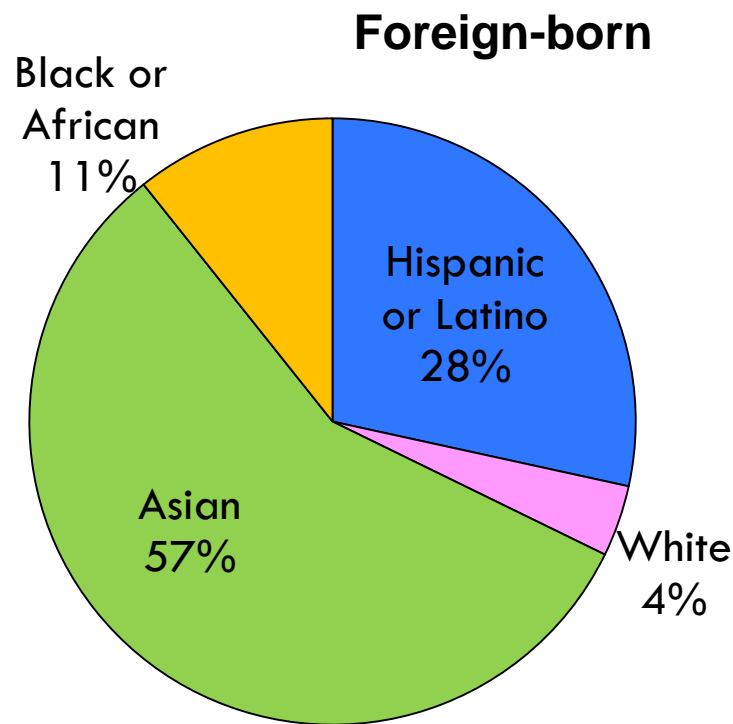
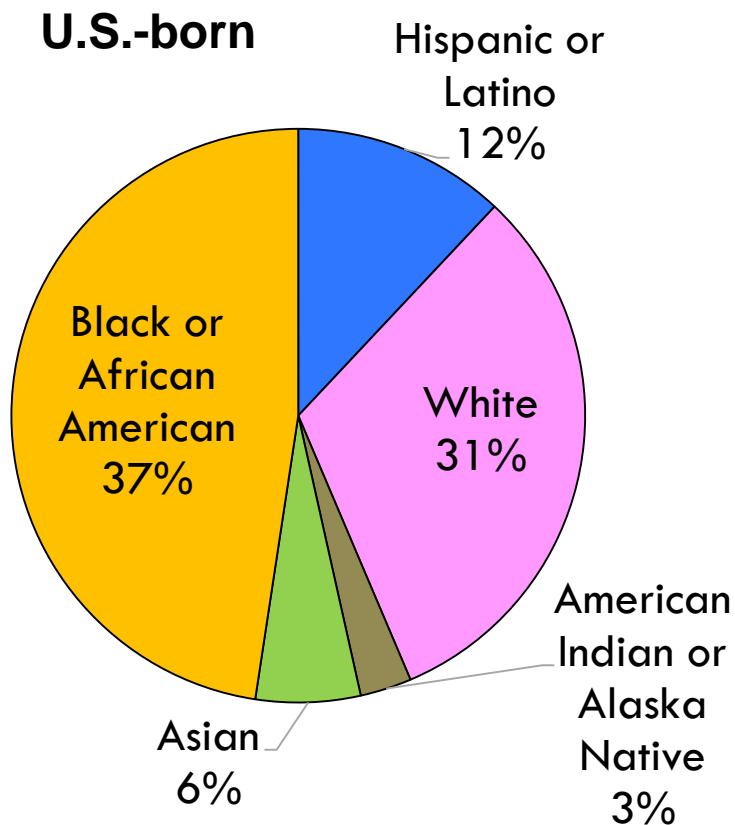
Average TB Incidence rates by Regions in Wisconsin, 2008-2017



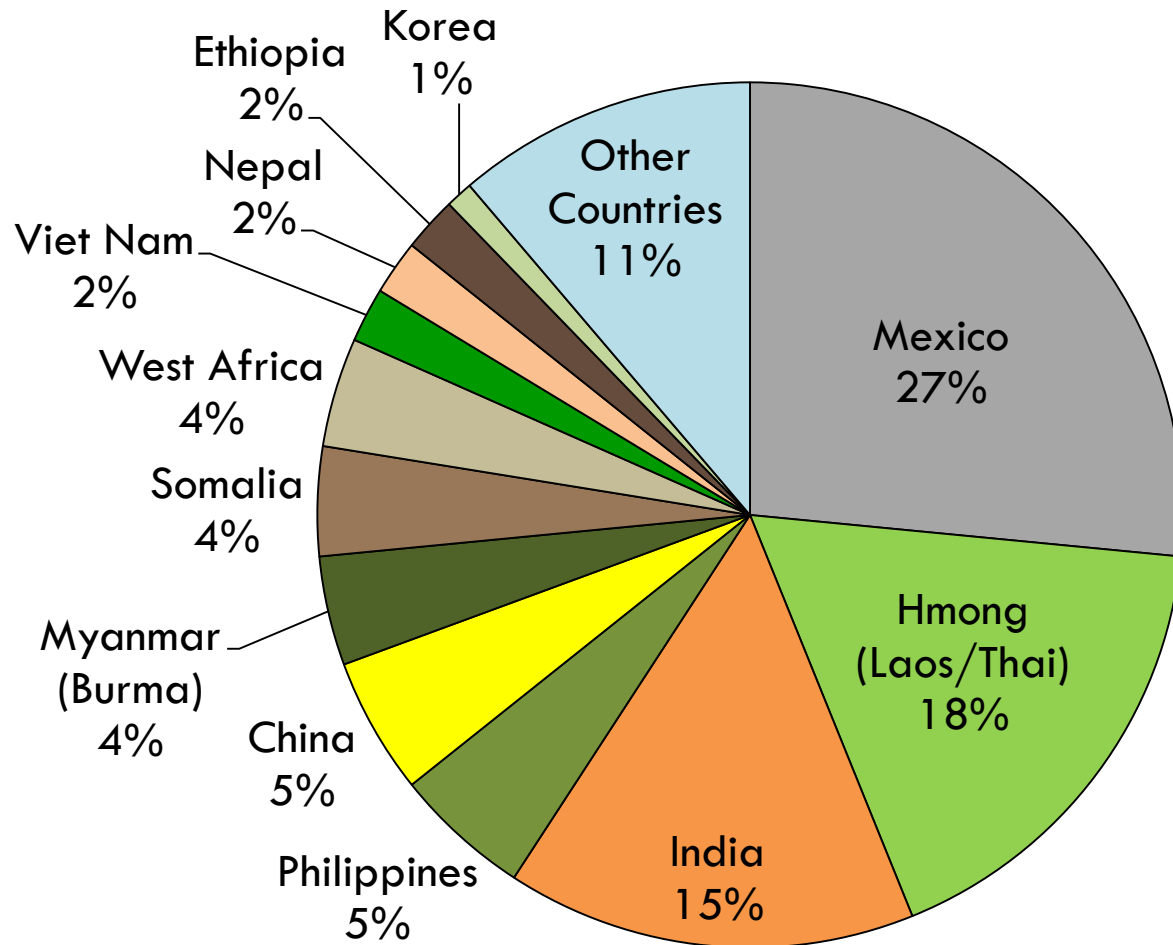
Number of TB Cases in U.S.-born vs. Foreign-born Persons, Wisconsin, 2005–2017



Reported TB Cases by Origin and Race/Ethnicity, Wisconsin, 2005-2017



Countries of Birth of Foreign-born Persons Reported with TB, Wisconsin, 2005-2017



Wisconsin TB Summary

- 49 new patients were identified with TB in 2018.
- The 10-year average number of cases is 57 cases per year.
- Wisconsin TB incidence for 2018 (0.86) is below the national rate.
- There were two patients with MDR-TB in 2018, one died before treatment could be started.
- TB rates continue to be very low for homeless, long-term care, and correctional populations in Wisconsin.

WISCONSIN TB PROGRAM UPDATES

Wisconsin TB Program Updates

- LTBI reporting and follow-up
- LTBI surveillance data
- New CDC guidance for TB screening and testing of health care personnel (HCP)

REPORTING LTBI IN WISCONSIN

A person with latent TB infection:

- Usually has a skin test or blood test result indicating TB infection
- Has a normal chest X-ray and a negative sputum test
- Has a small number of TB bacteria in his/her body that are alive but inactive
- Does not feel sick
- Cannot spread TB bacteria to others
- Should receive treatment for latent TB infection to prevent TB disease

Reporting LTBI in Wisconsin

- LTBI is a category II reportable condition as of July 1, 2018.
- According to Wis. Admin. Code § [DHS 145.04\(1\)](#), laboratories, health care facilities, teachers, principals, or nurses serving a school or daycare center, and any person who knows or suspects that a person has a communicable disease must report.

LTBI Reporting and Investigation Protocol

<https://www.dhs.wisconsin.gov/publications/p02303.pdf>



Wisconsin Department of Health Services
Division of Public Health
P-02303 (Rev 06/2018)

Communicable Disease Case Reporting and Investigation Protocol LATENT TUBERCULOSIS INFECTION (LTBI)

I. IDENTIFICATION AND DEFINITION OF CASES

A. **Clinical Description:** Tuberculosis (TB) is a bacterial disease caused by organisms in the *Mycobacterium tuberculosis* complex (*M. tuberculosis*, *M. bovis*, *M. africanum*, *M. canettii*, *M. microti*, *M. caprae* and *M. pinnipedii*). There are two forms of TB, latent and active (pulmonary and/or extrapulmonary).

Latent TB infection (LTBI): Infection can be established following exposure to a patient with active TB disease expelling aerosolized droplets containing viable bacteria. People with initial infection generally do not feel sick, have no outward clinical manifestations, and cannot spread the bacteria to others. Some people with LTBI will develop active TB disease during their lifetime. LTBI is characterized by microscopic lesions in the lungs that commonly heal without leaving residual changes other than occasional small pulmonary or tracheobronchial lymph node calcifications.

Active TB disease: Clinical illness can develop following *M. tuberculosis* complex infection and is facilitated by certain risk factors. Disease can be pulmonary, extrapulmonary or both. Active pulmonary disease is frequently communicable until it is appropriately treated. Cough, fever, fatigue, night sweats, and weight loss are common symptoms associated with pulmonary TB. In most cases, cough is initially nonproductive and later accompanied by production of purulent sputum. Signs and symptoms such as hemoptysis and hoarseness associated with laryngeal TB are sometimes prominent in advanced stages. Chest radiography reveals pulmonary infiltrates and cavitations. With prolonged pulmonary disease, fibrotic changes with volume loss are seen. Extrapulmonary TB occurs in 15 percent to 30 percent of cases and may affect any organ or tissue. Symptoms of extrapulmonary TB depend on the area affected.

B. **Clinical Criteria for a Case of LTBI:** Clinical criteria alone are not sufficient to classify a case of LTBI. Clinical criteria that are indicative of possible LTBI include no clinical evidence compatible with TB Disease:

- No signs or symptoms consistent with TB disease; **and**
- Chest imaging (chest radiograph or CT scan) without abnormalities consistent with TB disease, **or**
- Chest imaging is abnormal and could be consistent with TB disease, but the disease has been clinically ruled out.

C. Laboratory Criteria:

Diagnostic tests for TB infection include tests that detect a person's immunologic response to *Mycobacterium* antigens which include the clinically-administered tuberculin skin test (TST), laboratory-performed interferon gamma release assays (IGRA), and microbiologic (culture-based) testing for the detection of *M. tuberculosis* complex. Currently available nucleic acid amplification tests are not sufficiently sensitive to exclude a diagnosis of TB in acid-fast bacilli (AFB) smear-negative patients suspected to have TB. Laboratory criteria alone are not sufficient to confirm a case of LTBI. Laboratory (immunologic and microbiologic) test results that are indicative of possible LTBI:

- Immunologic: a positive IGRA test **or** an accurately interpreted positive TST, and
- Microbiologic: *M. tuberculosis* complex was **not** isolated from culture of a clinical specimen, if a specimen was collected.

D. Wisconsin Surveillance Case Definition:

- **Suspected:** A case that meets the laboratory (immunologic and microbiologic) criteria, but lacks sufficient clinical information.
- **Confirmed:** A case that meets clinical **and** laboratory (immunologic and microbiologic) criteria.

Reporting TB and LTBI in Wisconsin (Wis. Admin. Code § DHS 145)

	TB Disease	LTBI
Category	1	2
Initial report (suspect or confirmed)	Immediately report by phone to patient's local health officer	Within 72 hours, complete case report form (F-02265 or F-44151) or enter data into WEDSS
Additional report	Within 24 hours, complete case report form (F-44151) or enter data into WEDSS	

Health Care Providers: Reporting LTBI in Wisconsin

Health care providers or infection preventionists will do one of the following:

- Enter IGRA and/or clinical results directly into WEDSS
- Enter IGRA and/or clinical results into WEDSS to create a “WebReport” (in file cabinet).
- Fax IGRA and/or clinical results to the local health department

Laboratory Reporting of IGRA Results

Laboratories will do one of the following:

- Transmit IGRA results into WEDSS via electronic laboratory report (ELR).
- Fax IGRA results (laboratory report) to the submitter and/or local health department.

Request that laboratories report numeric IGRA results (i.e., Nil, Mitogen-nil, TB Ag1-nil, TB Ag2-nil)

Memo Requesting Numeric IGRA Results January, 2019

STATE OF WISCONSIN
Department of Health Services
Division of Public Health



1 West Wilson Street
PO Box 2659
Madison WI 53701-2659
Telephone: 608-266-1568
Fax: 608-261-6392
TTY: 888-701-1253

Date: January 22, 2019

DPH Numbered Memo BCD-2019-02
January 2019

To: The Wisconsin Clinical Laboratory Network

From: Julie Tans-Kersten, Director, Wisconsin Tuberculosis Program

Laboratory Reporting of Latent Tuberculosis Infection (LTBI) Test Results

PLEASE DISTRIBUTE WIDELY

LTBI Reporting

Recent changes to Wis. Admin. Code ch. DHS 145 have designated latent tuberculosis infection (LTBI) as a reportable condition in Wisconsin, effective July 1, 2018. LTBI shall be reported by fax, mail, or electronic reporting to the patient's local health officer or to the local health officer's designee on an Acute and Communicable Disease Case Report ([F- 44151](#)) or by other means, or by entering the data into the Wisconsin Electronic Disease Surveillance System (WEDSS) within 72 hours of the identification of a case or suspected case.

LTBI Case Definition

Wisconsin has adopted the LTBI case definition that was established by the Council of State and Territorial Epidemiologists in June 2017. The definition includes clinical and laboratory (immunologic and microbiologic) criteria.

- Laboratory criteria include a positive interferon gamma release assay (IGRA) or positive tuberculin skin test (TST) and a negative culture for *M. tuberculosis* complex, if a specimen was collected.
- Clinical criteria include no signs or symptoms consistent with tuberculosis (TB) disease and chest imaging (chest radiograph or CT scan) without abnormalities consistent with TB disease. If chest imaging is abnormal, TB disease has been clinically ruled out.

A suspected case of LTBI meets laboratory criteria but lacks sufficient clinical information. A confirmed LTBI case meets clinical and laboratory criteria.

Laboratory Reporting Requirements

- Report immunologic test results consistent with LTBI (e.g., positive IGRA results, such as QuantiFERON-TB Gold Plus or T-SPOT TB).
- All relevant immunologic results **including nil, mitogen, and TB antigen numeric values for IGRA**, millimeters of induration for TST, **and interpretation** shall be reported.
- Laboratories will transmit IGRA results into WEDSS via electronic laboratory report or will fax laboratory results directly to the patient's local health officer.

Importance of IGRA Numeric Results

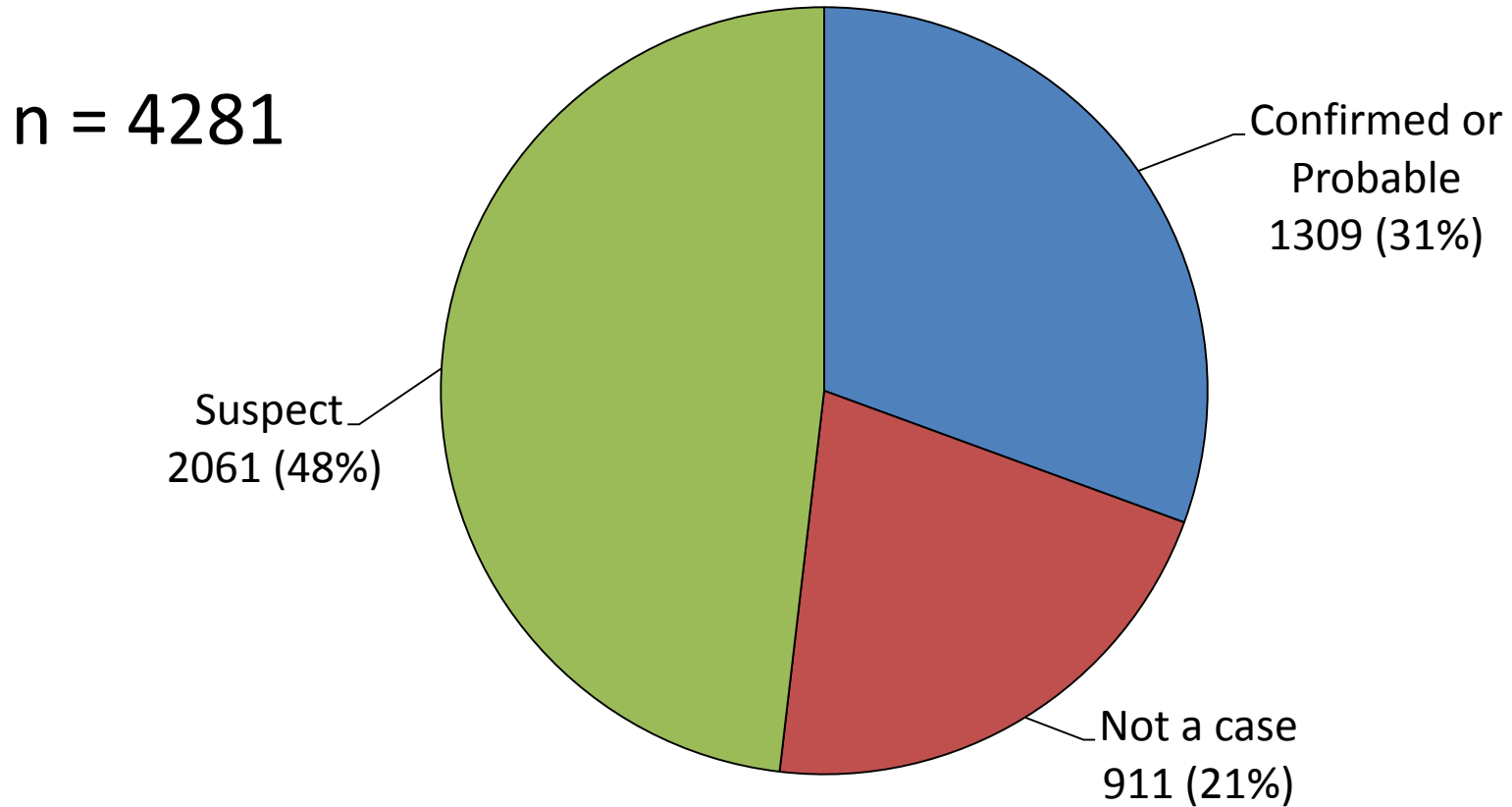
Multiple papers have reported variability and high reversion rates (from positive to negative) in serial QuantiFERON results; much work has been done to determine a retesting zone.^{1,2,3,5,6,7} The Thanassi study recommends that clinicians retest low-risk individuals with initial QuantiFERON results less than

Recommendations for LTBI Follow-Up

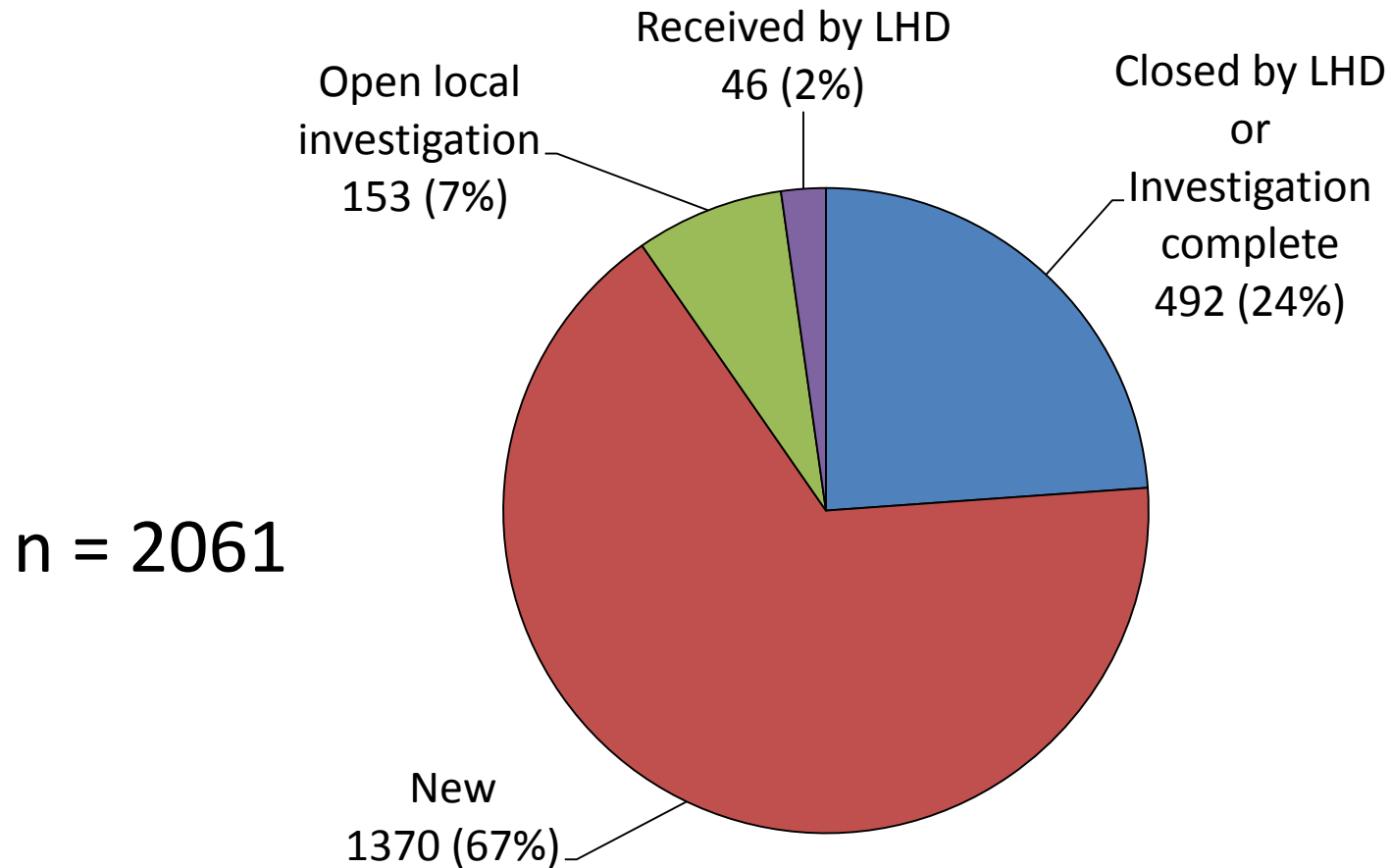
Priority	Description
High	<ul style="list-style-type: none">• Exposed to someone with known infectious TB and/or part of an ongoing contact investigation• Immigrant or refugee born in a high TB prevalence country• Likely to be infected and HIV positive
Medium	<ul style="list-style-type: none">• Part of a locally identified high-risk group• Likely to be infected and risk for progression (other than HIV positive)
Low	<ul style="list-style-type: none">• Tested due to requirement of law, statute or institution• Health care worker testing (upon hire and annually)• Tested due to medical treatment (biologic, transplant)

LTBI SURVEILLANCE DATA

Number of LTBI Reports in WEDSS by Resolution Status, 2018



Number of “Suspected LTBI” Reports in WEDSS, 2018



Top Ten Counties Reporting LTBI (of 90 jurisdictions)

County	Number of LTBI Reported	Percentage of Total (n= 4281)
Milwaukee	1583	36.9%
Dane	615	14.3%
Waukesha	289	6.7%
Brown	169	3.9%
Racine	169	3.9%
Barron	128	3%
Kenosha	113	2.6%
Washington	99	2.3%
Outagamie	83	1.9%
Wood	80	1.8%
All Others (80 jurisdictions)	953	22.2%

Top Ten Reporting Sources (of 356 sources)

Reporting Source	Number of LTBI Reported	Percentage of Total (n= 4281)
Dynacare Laboratories	1071	25%
Aurora Consolidated Laboratories	655	15.3%
LabCorp	262	6.1%
Wheaton Franciscan Laboratory	234	5.4%
Marshfield Laboratory	150	3.5%
Quest Diagnostics Wood Dale	145	3.3%
Mayo Clinic Rochester	128	2.9%
Barron County	109	2.5%
UW Hospital and Clinics	92	2.1%
Columbia St. Mary's Laboratory	88	2%

New Guidance for TB Screening and Testing of HCP!

Morbidity and Mortality Weekly Report

Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019

Lynn E. Sosa, MD^{1,2}; Gibril J. Njie, MPH³; Mark N. Lobato, MD²; Sapna Bamrah Morris, MD³; William Buchta, MD^{4,5}; Megan L. Casey, MPH⁶; Neela D. Goswami, MD³; MaryAnn Gruden, MSN⁷; Bobbi Jo Hurst⁷; Amara R. Khan, MPH³; David T. Kuhar, MD⁸; David M. Lewinsohn, MD, PhD⁹; Trini A. Mathew, MD¹⁰; Gerald H. Mazurek, MD³; Randall Reves, MD^{2,11}; Lisa Paulos, MPH^{2,12}; Wendy Thanassi, MD^{2,13}; Lorna Will, MA²; Robert Belknap, MD^{2,11}

New Guidance for TB Screening and Testing of HCP

- What does the new guidance say?
- Does this guidance apply to personnel that work in mycobacteriology/TB laboratories?

New Guidance for TB Screening and Testing of HCP!

- MMWR 2019:

https://www.cdc.gov/mmwr/volumes/68/wr/mm6819a3.htm?s_cid=mm6819a3_x

- Video: Dr. Sapna Morris of CDC Division of TB Elimination:

<https://www.medscape.com/viewarticle/914019>

TB Screening and Testing of HCP

- 2019 MMWR vol. 68 no. 19:
 - Update guidance for HCP screening, testing, treatment, and education
- 2005 MMWR vol. 54 no. RR-17 Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings:
 - Facility risk assessments
 - Infection control practices

TB Screening and Testing of HCP

- Wisconsin statutes and administrative codes (e.g., DHS 124, DHS 132, DHS 133, DHS 83)
 - Requirements upon hire for employees
 - Periodic (annual screening and testing)
- To be published by early 2020: Tuberculosis Screening, Testing and Treatment of U.S. Health Care Personnel: American College of Occupational and Environmental Medicine (ACOEM) and National TB Controller's Association (NTCA) Joint Task Force on Implementation of the 2019 MMWR Recommendations

New MMWR 2019 Guidance: TB Screening and Testing of HCP

Three step process upon hire:

- Individual risk assessment
- Symptom evaluation
- TB testing with an interferon-gamma release assay (IGRA) or a tuberculin skin test (TST) for persons without documented prior TB disease or latent TB infection (LTBI)

New MMWR 2019 Guidance: TB Screening and Testing of HCP

Annual testing is not recommended.

- A systematic review found a low percentage of U.S. HCP have a positive TB test at baseline and upon serial testing.
- No routine serial TB testing is recommended at any interval after baseline in the absence of a known exposure or ongoing transmission.

New MMWR 2019 Guidance: TB Screening and Testing of HCP

- Encourage treatment for all health care personnel with untreated LTBI, unless treatment is contraindicated.
- Annual symptom screening for health care personnel with untreated LTBI
- Annual TB education of all health care personnel
 - TB risk factors
 - Signs and symptoms of TB disease
 - TB infection and control policies and procedures

**DOES THE NEW GUIDANCE APPLY
TO LABORATORY PERSONNEL?**

Does the new guidance apply to laboratory personnel?

- 2019 MMWR does not mention “laboratory”.
- 2005 MMWR includes laboratory personnel in definition of “health care workers”, now called health care personnel (HCP).
- If in a care setting, laboratory personnel are included in new guidance.
- If in a care setting, your occupational health department will be trying to determine what level of TB screening/testing is appropriate for laboratory personnel in your facility.

Does the new guidance apply to laboratory personnel?

- The ACOEM/NTCA document (unpublished) will recommend that laboratorians that manipulate specimens or cultures that may contain *M. tuberculosis* complex may warrant further consideration for inclusion in serial screening or testing programs (reference is 2012 MMWR Biosafety Blue Ribbon Panel).

TB Screening and Testing Guidance that Applies to Laboratory Personnel

CDC MMWR 2012. 61 (01); 1-101. Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories: Recommendations of a CDC-convened Biosafety Blue Ribbon Panel³

- Laboratorians who handle specimens in which *M. tuberculosis* is a suspected pathogen and/or perform diagnostic testing for *M. tuberculosis* **must undergo at least annual testing** for tuberculosis infection.
- More frequent screening for TB may be necessary if a laboratory incident with risk of exposure to tuberculosis or a documented conversion occurs.

WISCONSIN TB PROGRAM RECOMMENDATIONS

Wisconsin TB Program Recommendations for Screening and Testing New HCPs

- HCP should be tested upon hire using IGRA or tuberculin skin test.
 - Include TB risk assessment questionnaire and symptom evaluation
- Initial screening and testing can:
 - Serve as a baseline should an exposure occur and a TB contact investigation be necessary.
 - Facilitate detection and treatment of LTBI or TB disease in HCP before employment begins.

Wisconsin TB Program Recommendations for Annual (Serial) Testing of HCPs

Most U.S. healthcare facilities are considered low risk for TB.

HCP (General):

- TB testing at any interval after baseline in the absence of a known exposure or ongoing transmission is not recommended.

Laboratory Personnel:

- Laboratorians who handle specimens in which *M. tuberculosis* is a suspected pathogen and/or perform diagnostic testing for *M. tuberculosis* must undergo at least annual testing for tuberculosis infection.³

Wisconsin TB Program Recommendations for Annual (Serial) Testing of HCPs

- Instead of annual testing, Wisconsin facilities should:
 - Provide annual TB education:
 - TB risk factors
 - Signs and symptoms of TB disease
 - LTBI treatment options
 - TB infection and control policies and procedures
 - The Wisconsin Department of Health TB Program recommends that facilities should include an individual TB risk assessment questionnaire as part of annual training as a standard of practice.

Wisconsin TB Program Recommendations for HCP Exposures and Risks

- If exposure occurs or risk status changes, further testing and evaluation must be performed (do not wait for annual screening).
- It is important to recognize non-occupational exposures to TB and risk factors to TB progression.
- HCPs should be educated on risks of TB and the signs and symptoms of TB disease. They should seek medical evaluation if these occur.

Resources

<https://www.cdc.gov/tb/topic/infectioncontrol/healthCarePersonnel-resources.htm>

In May 2019, CDC and the National TB Controllers Association issued

TUBERCULOSIS

TESTING + TREATMENT OF U.S. HEALTH CARE PERSONNEL

UPDATED RECOMMENDATIONS FOR TUBERCULOSIS (TB) SCREENING, TESTING, AND TREATMENT

for health care personnel in the United States.

What are the updated recommendations?

Before starting a new job in a health care setting, all workers and volunteers should receive

- TB individual risk assessment
- Symptom screening
- TB test

An annual TB test is not recommended unless there is a known exposure or ongoing transmission.

All health care personnel should receive TB education every year.

Treatment for latent TB infection (LTBI) is strongly encouraged for health care personnel diagnosed with LTBI.

Shorter treatment regimens should be used.

Who is affected by the new recommendations?

Individuals who work or volunteer in health care settings

Health care settings include

- Inpatient and outpatient settings
- Laboratories
- Emergency medical services
- Medical settings in prisons or jails
- Home-based health care settings
- Long-term care facilities

What if my state's regulations are different?

Follow your state's guidance.

For TB regulations in your area, please contact your state or local TB control program.

Where can I get more information? www.cdc.gov/tb

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

Acknowledgements

- WSLH: for sponsoring and coordinating the annual WMLN conference
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<https://www.dhs.wisconsin.gov/tb/index.htm>

Questions?



Resources

- Centers for Disease Control and Prevention (2019). Tuberculosis screening, testing, and treatment of U.S. health care personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. *MMWR 2019: 68*(No. 19).
- Centers for Disease Control and Prevention. (2005) Guidelines for preventing the transmission of mycobacterium tuberculosis in health-care settings. *MMWR 2005: 54*(No. RR-17).
- Centers for Disease Control and Prevention. (2012) Guidelines for safe work practices in human and animal medical diagnostic laboratories. *MMWR 2012: 61* (01): 1-101.
- Wisconsin Tuberculosis Program TB Risk Assessment Questionnaire Screen: <https://www.dhs.wisconsin.gov/forms/f02314.pdf>