



Epidemiology of Tuberculosis

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July 16, 2024

TB Intensive
July 16 – 18, 2024
San Antonio, Texas

Kathryn Yoo, MPH has the following disclosures to make:

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



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TB Intensive Training

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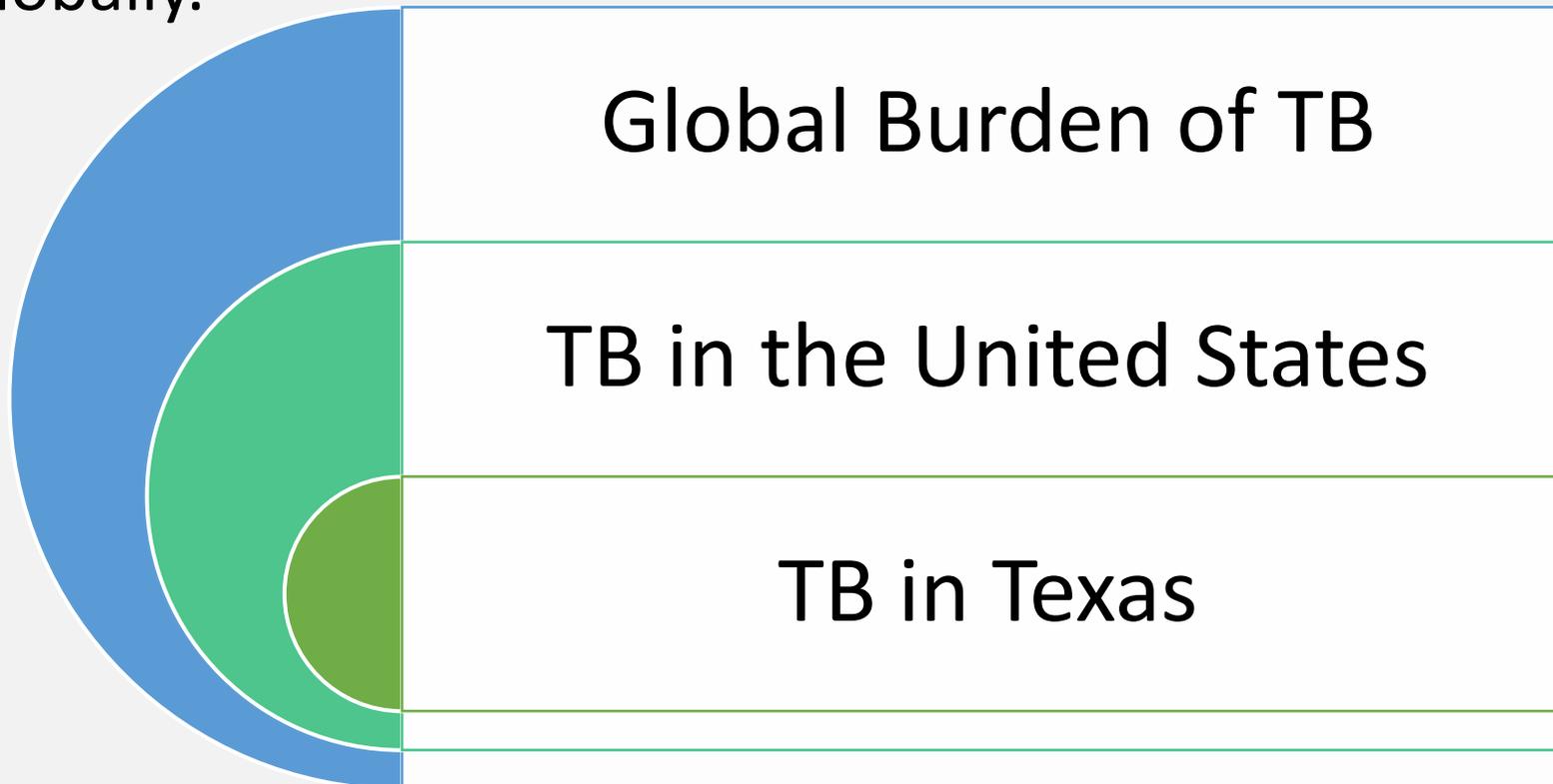
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Objective

To describe the current epidemiology of tuberculosis (TB) in Texas, the United States and globally.



Global Burden of TB

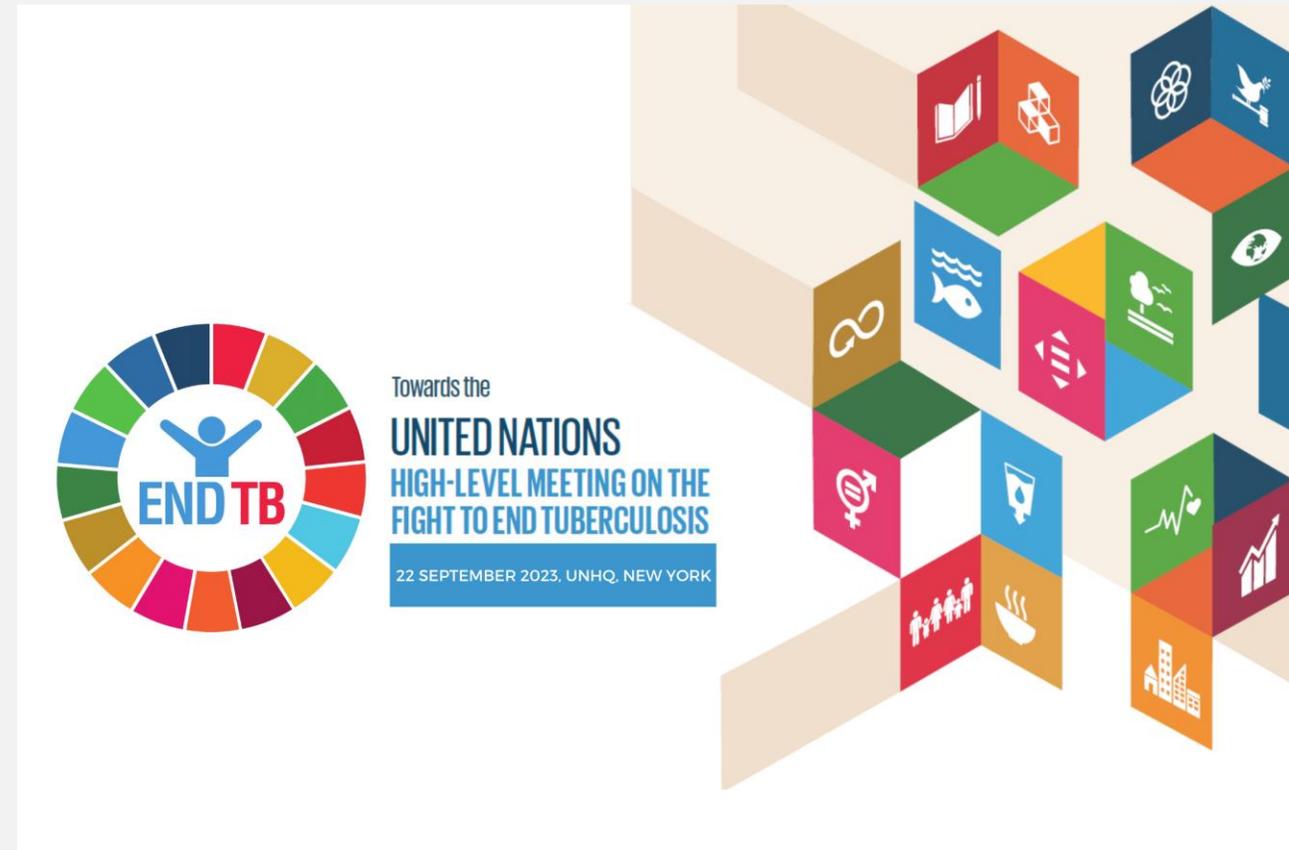


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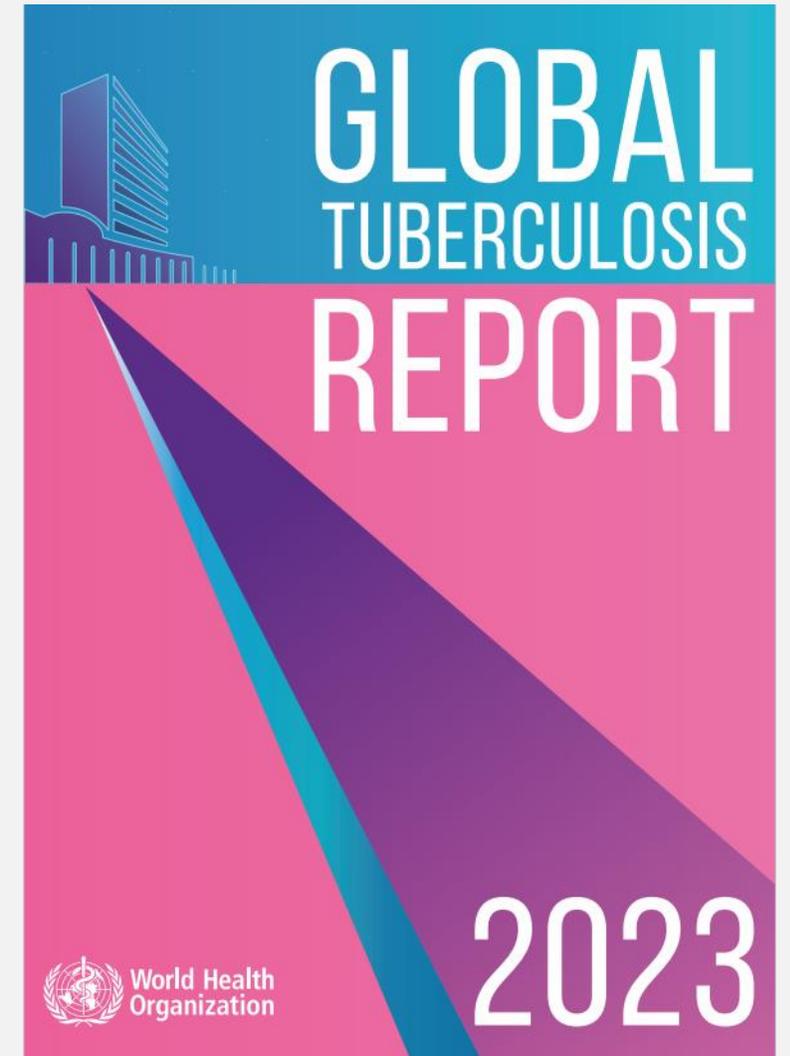
TB is Still a Concern

- In 2018, an estimated **1.7 billion** people, nearly **24%** of the world's population, were infected with *M. tuberculosis*
- An estimated **10.6 million** people fell ill with TB disease in 2022
- **75 million** lives saved since the year 2000 due to global TB elimination efforts
- The United Nations held two High Level Meetings on Tuberculosis in 2018 and 2023



Global TB

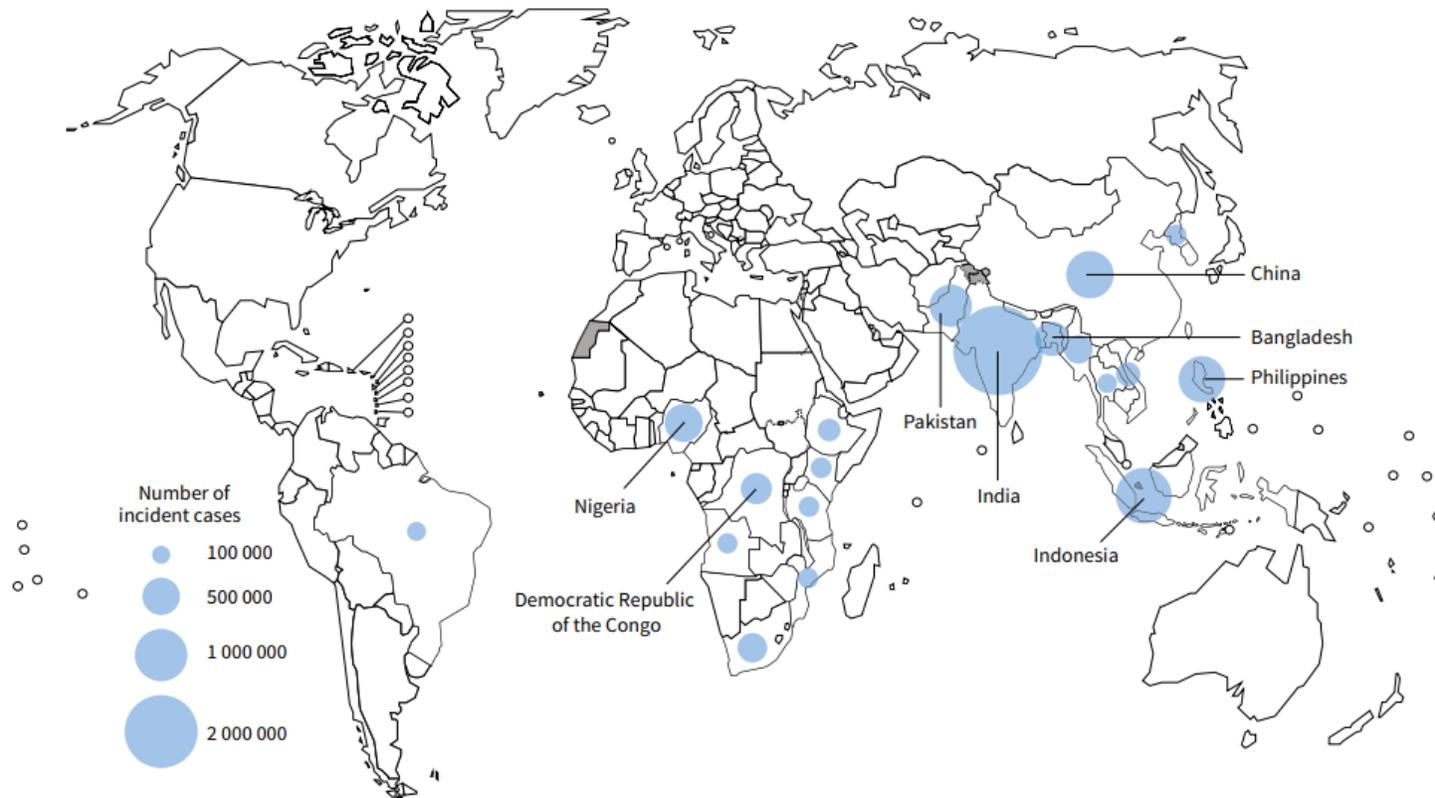
- **7.5 million newly reported cases** of TB globally in 2022
 - Rebound above pre-pandemic levels (7.1 million in 2019)
- Estimated **1.3 million TB deaths** in 2022
- TB is present in all six World Health Organization (WHO) regions
- The World Health Organization 2023 Global TB Report includes:
 - Updated 2022 annual data
 - Comparisons between 2015 and 2022 data
 - Analysis on the impact of the COVID-19



Global Distribution of TB

FIG. 12

Estimated number of incident TB cases in 2022, for countries with at least 100 000 incident cases^a

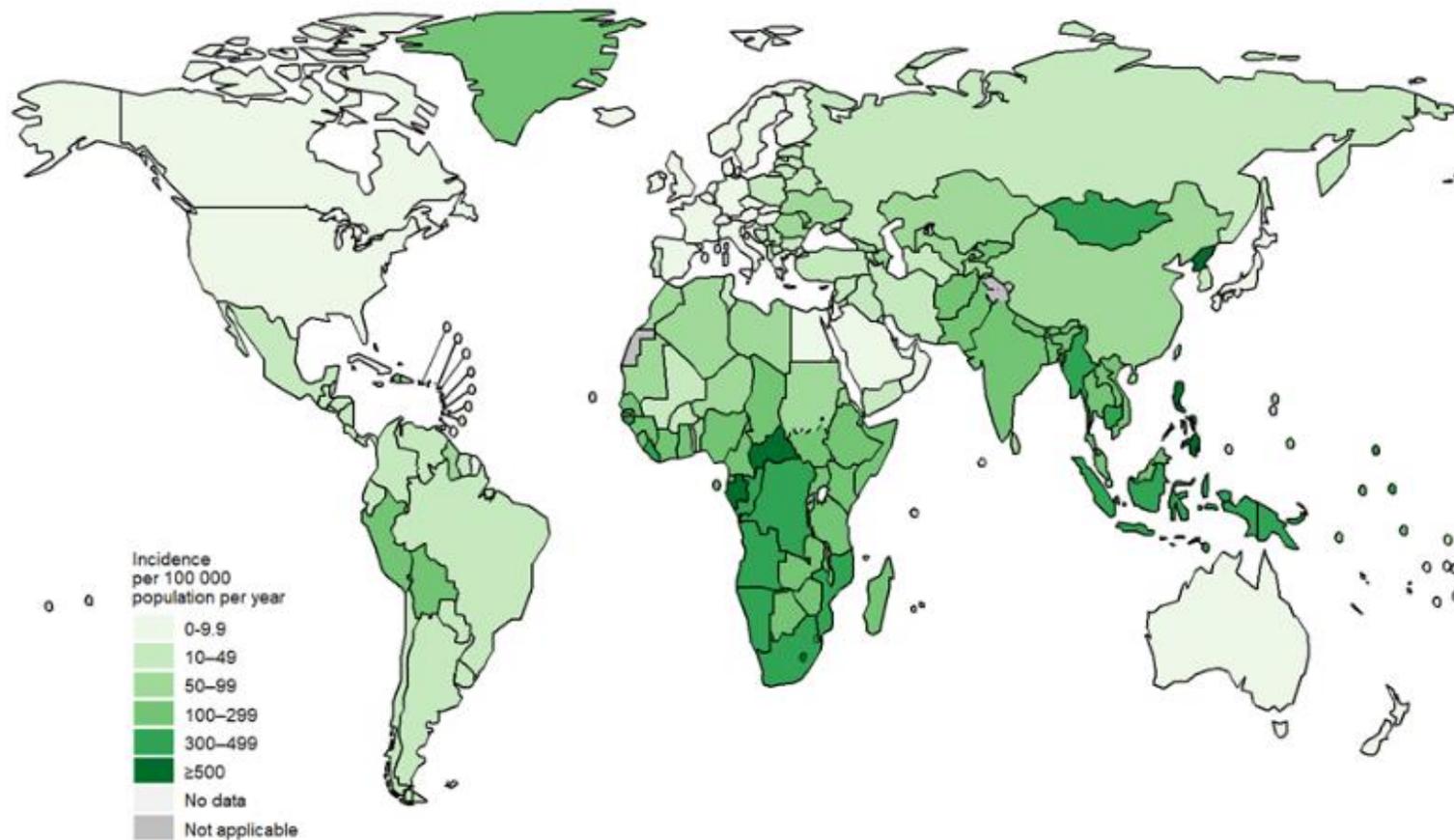


^a The eight countries ranked in order from first to last in terms of numbers of cases, and that accounted for about two thirds of global cases in 2022, are India, Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh and the Democratic Republic of the Congo.

TB Incident Rates

Global Perspective

Fig. 1.1.3 Estimated TB incidence rates, 2022

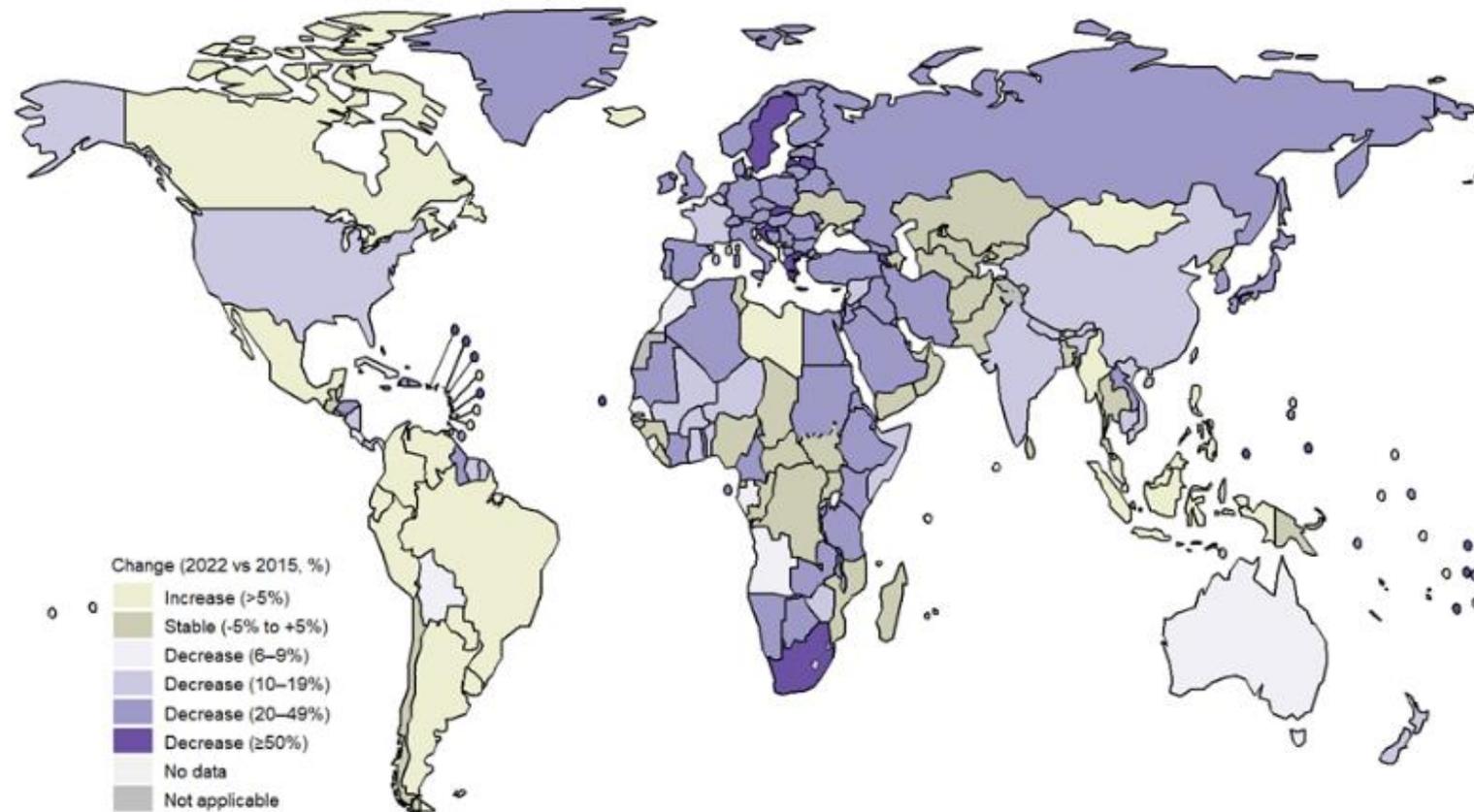


TB Incident Rates

Global Perspective

Fig. 1.1.8 Change (%) in estimated TB incidence (new cases per 100 000 population), 2022 compared with 2015

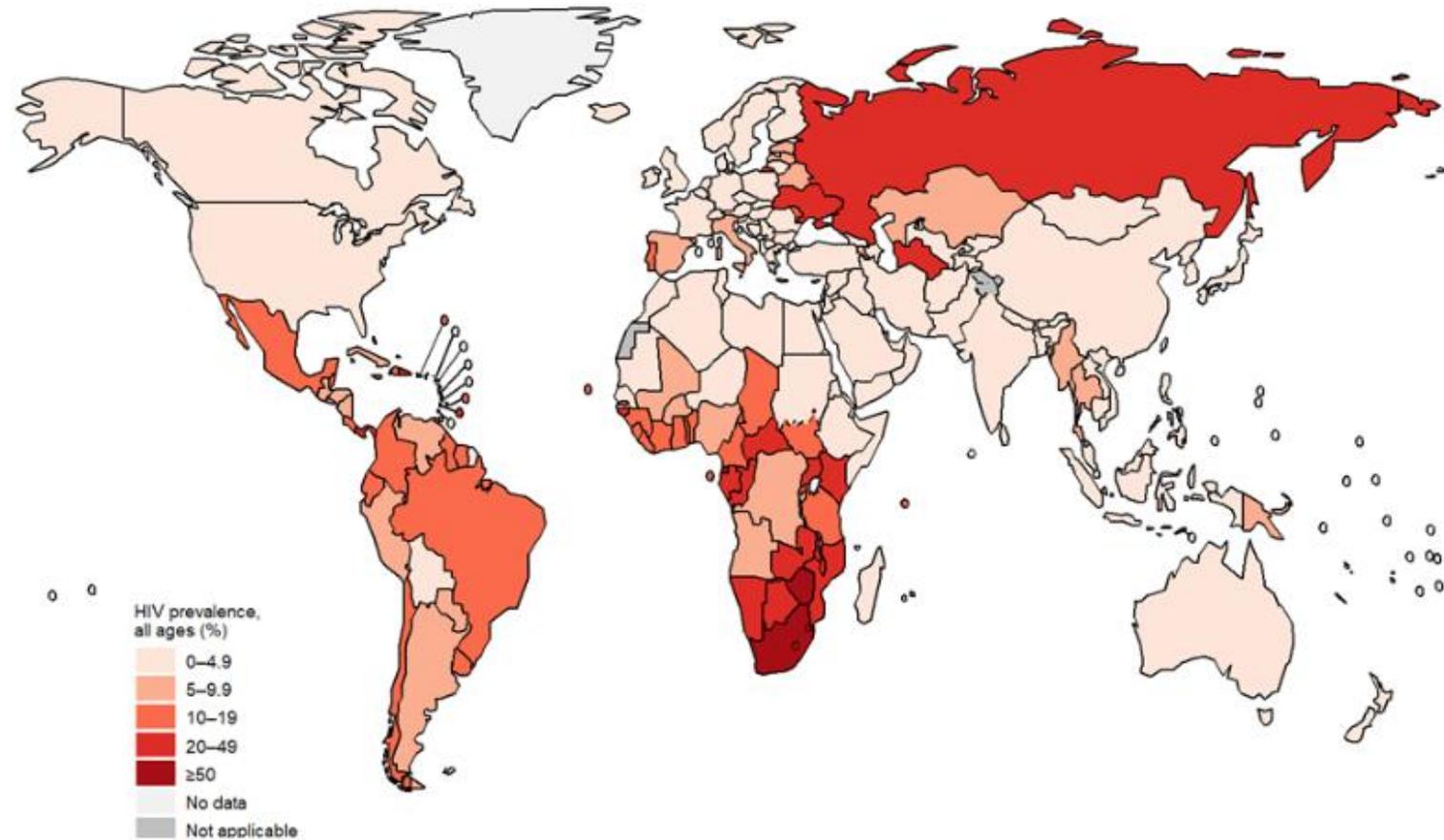
The last two categories (decrease 20–49%, and decrease $\geq 50\%$) distinguish the countries that have made the most progress towards the second (2025) milestone of the End TB Strategy, which is a 50% reduction between 2015 and 2025.



TB among HIV-positive persons

Global Perspective

Fig. 1.1.4 Estimated HIV prevalence in people with a new or relapse episode of TB, 2022

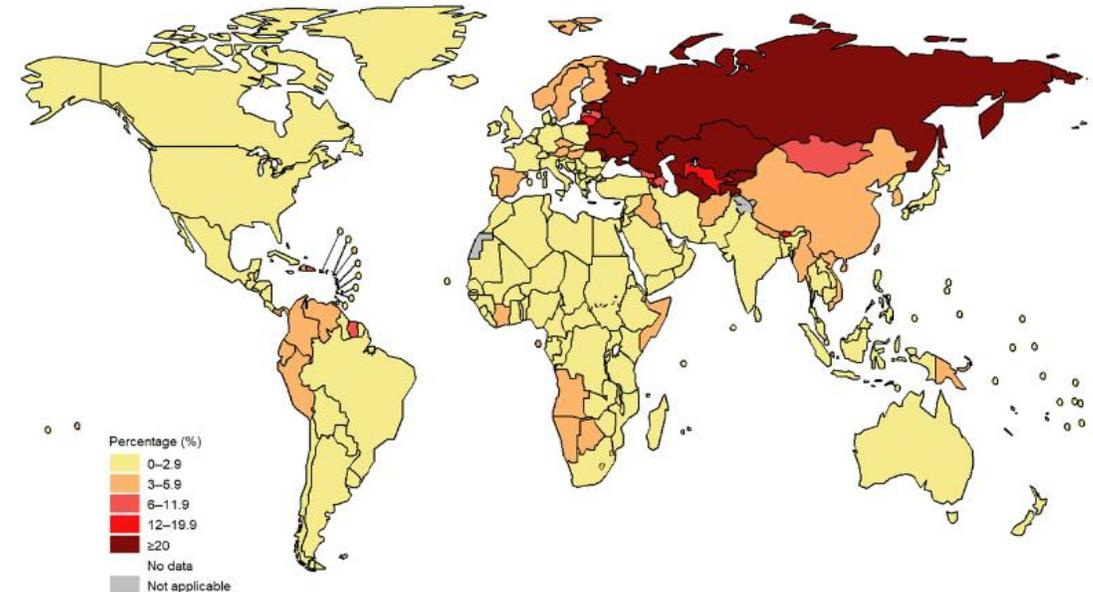


Drug Resistant TB

Global Perspective

- There were an estimated **410,000 cases** of MDR/RR-TB globally in 2022
 - 3.3% of newly diagnosed cases
 - 17% of persons previously treated
- Globally MDR/RR-TB caused an estimated **160,000 deaths** in 2022

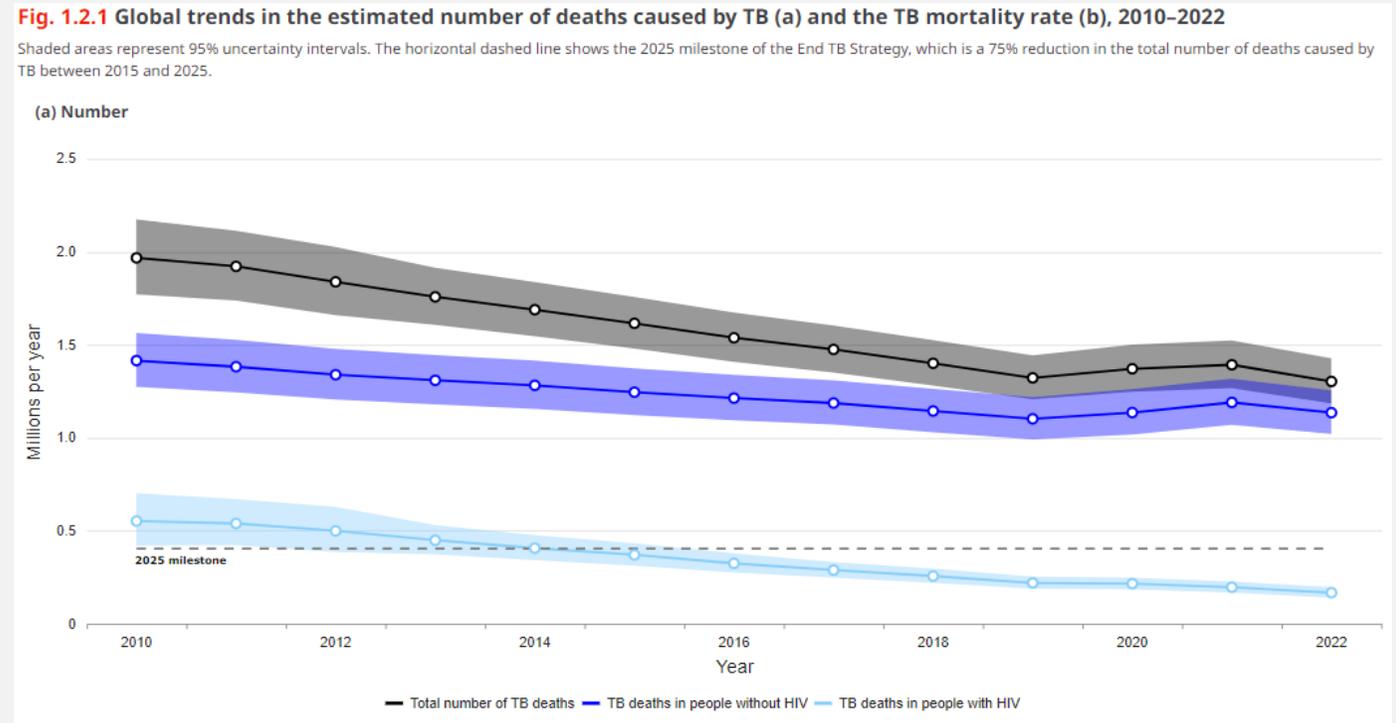
Fig. 1.3.6 Percentage of people with TB who had MDR/RR-TB, for those with no previous history of TB treatment, 2022



TB Mortality

Global Perspective

- There were an estimated **1.13 million** deaths among HIV-negative TB cases globally in 2022
- There were an estimated **167,000** deaths among HIV-positive TB cases globally in 2022
- WHO Africa (**53%**) and South-East Asia (**27%**) Regions accounted for the majority of total TB deaths in 2022

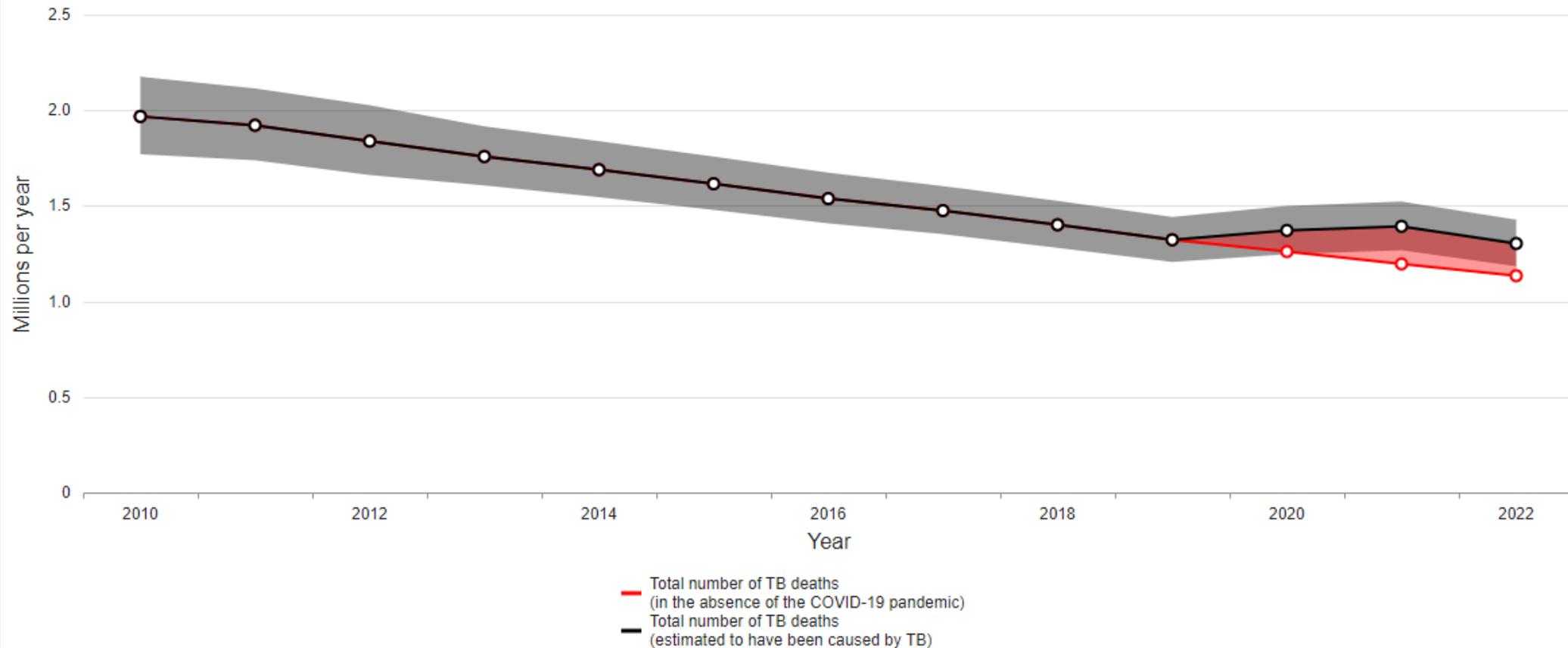


TB Mortality

Global Perspective

Fig. 1.2.2 Excess number of deaths caused by TB during the COVID-19 pandemic and its aftermath, 2020–2022

The black shaded area represents the 95% uncertainty interval of the actual number of deaths estimated to have been caused by TB; the red line shows a counterfactual of the estimated number of deaths that would have been caused by TB in the absence of the COVID-19 pandemic; the red shaded area shows the excess number of deaths caused by TB due to disruptions associated with the COVID-19 pandemic.



TB in the United States



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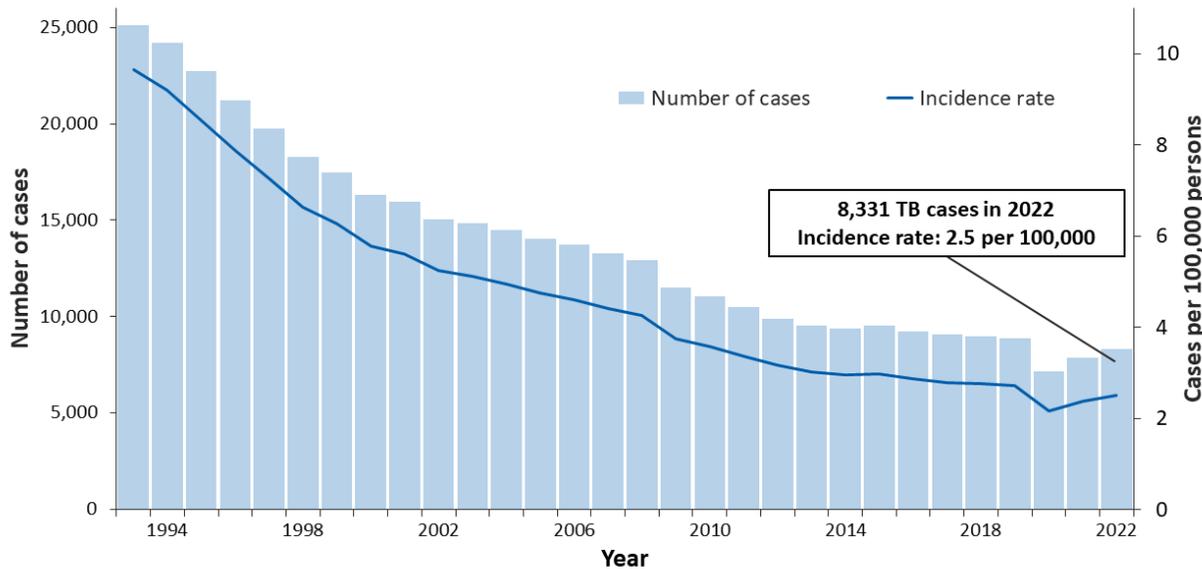
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TB in the United States

- **9,615** TB cases were provisionally reported in by the 50 U.S. states and the District of Columbia in 2023
 - This represents a **15% increase** from 2022
 - 40 states and the District of Columbia reported an increase in incident TB cases from 2022 to 2023
- Up to **13 million** people are estimated to be living with TB Infection in the US

Incidence of TB in the United States

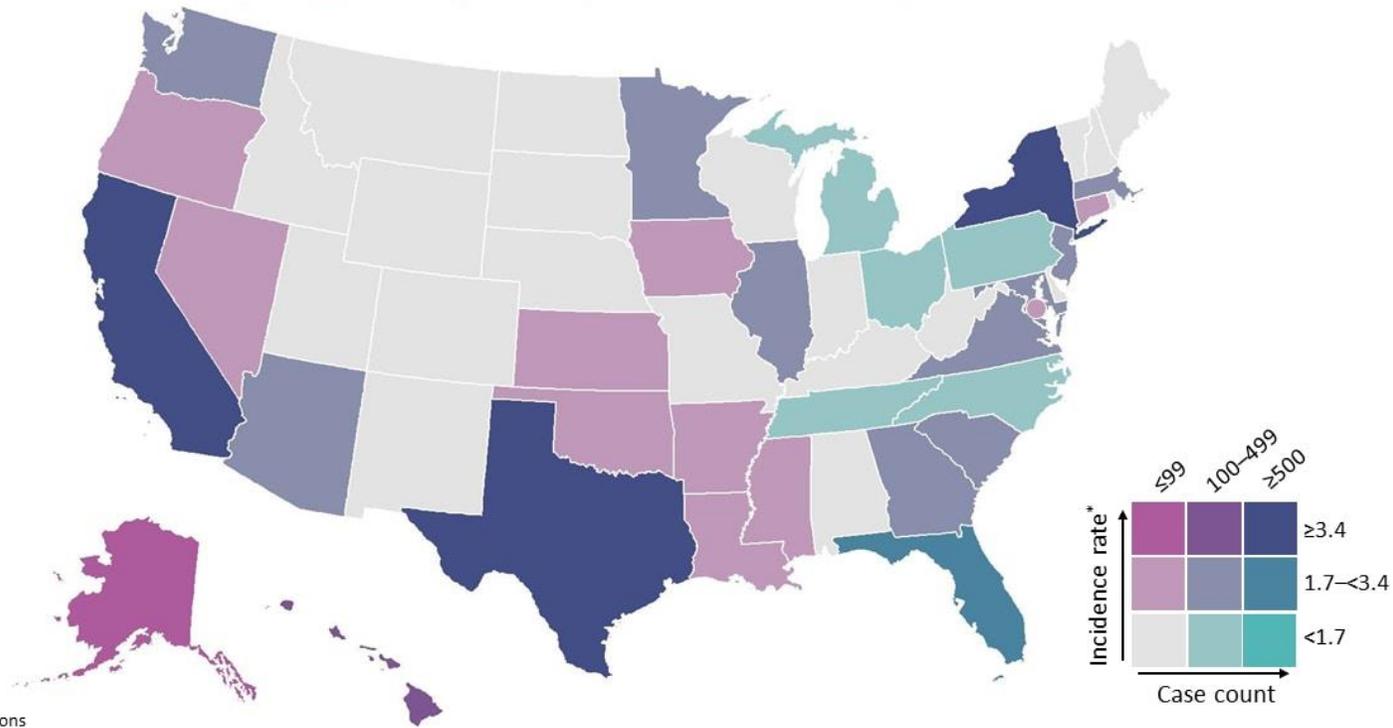
TB Cases and Incidence Rates, United States, 1993–2022



- **8,331** TB cases were reported in 2022
 - This represents a **5.9% increase** from 2021
- The United States is a low-incidence country
 - Incidence rate in the U.S. in 2022 was **2.5 cases per 100,000** persons (**5.5% increase** from 2021)

Where is TB Found in the US?

TB Cases and Incidence Rates*
by Reporting Area, United States, 2022



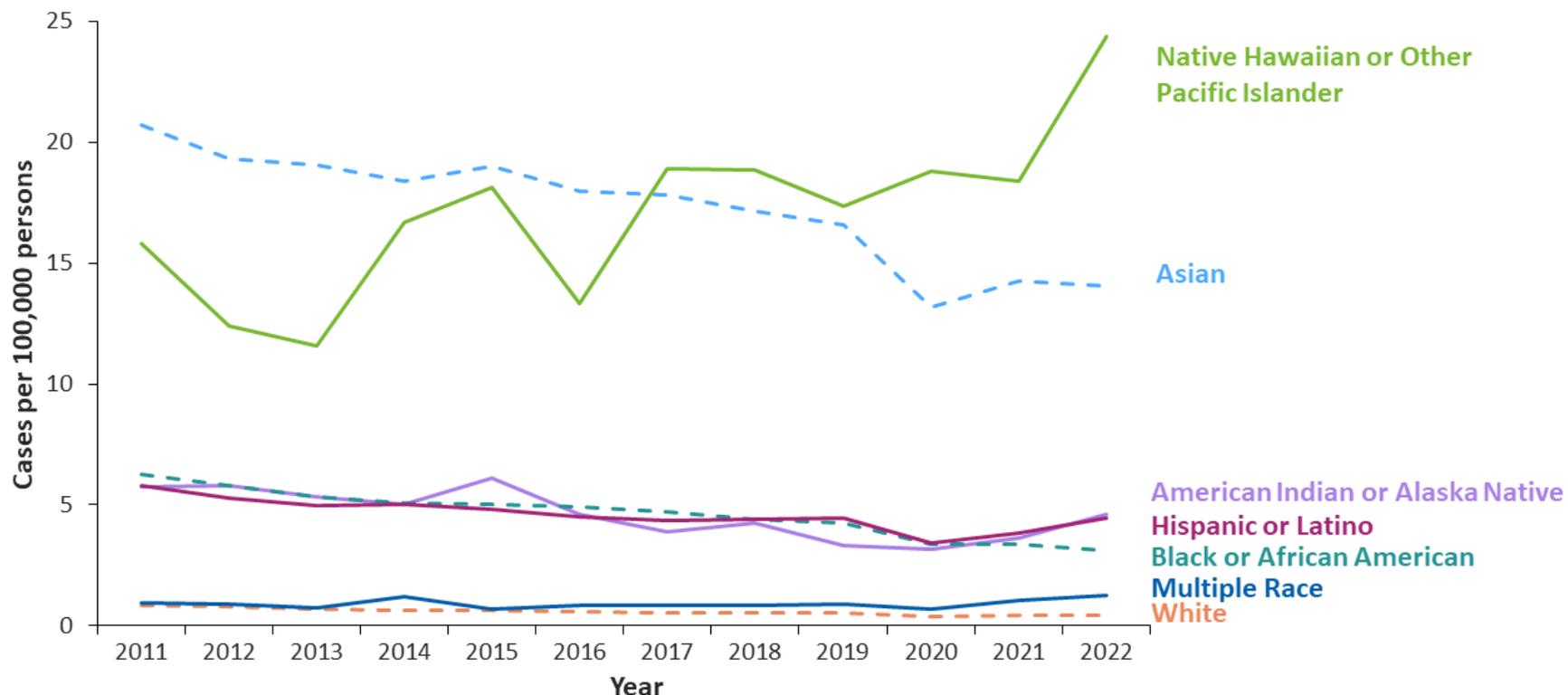
*Cases per 100,000 persons

- California (22%), Texas (13%), New York (9%), and Florida (6%) account for about half of all TB cases in the US
- 8 states, including Texas, have incidence rates higher than the national rate

TB Demographics in the United States

Race/Ethnicity

TB Incidence Rates by Race/Ethnicity,* United States, 2011–2022



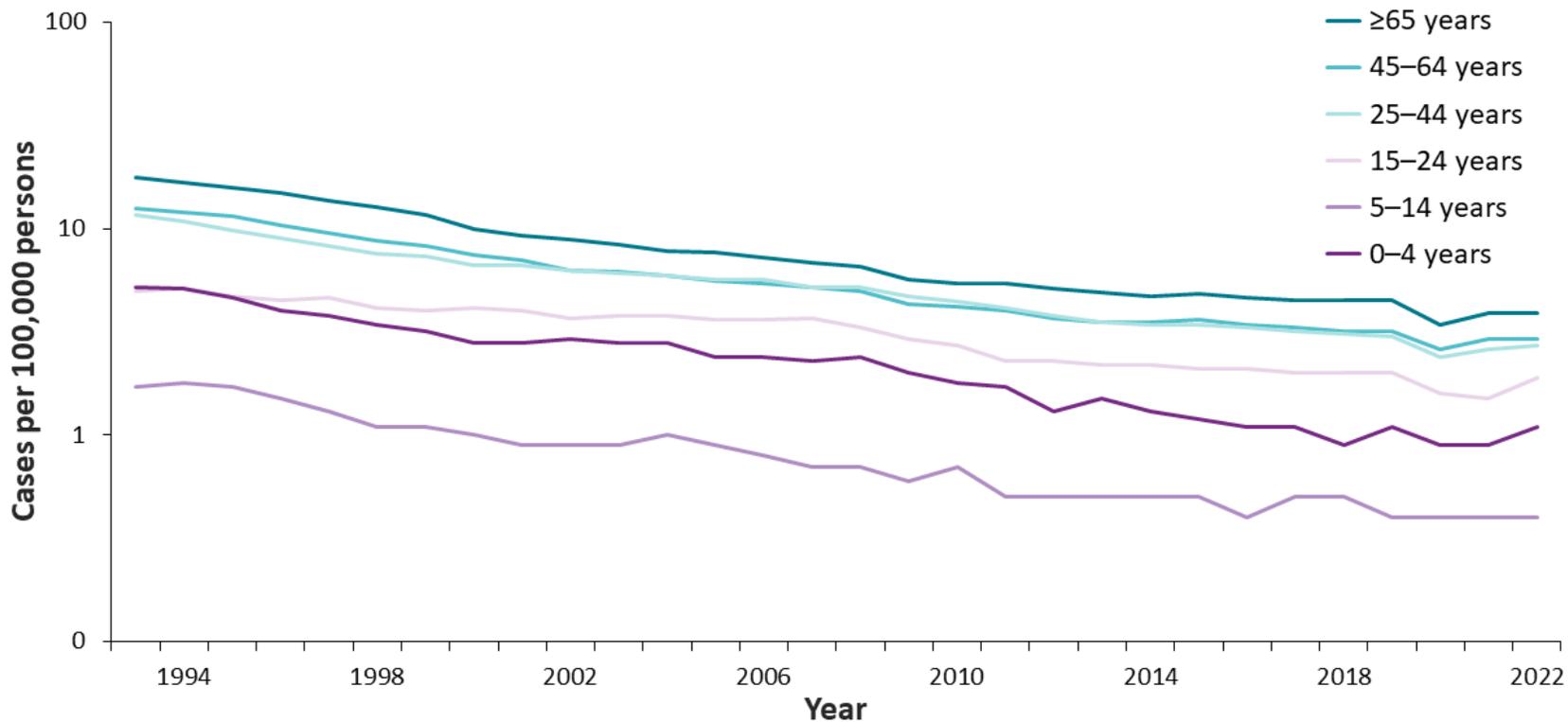
*Persons who identified as Hispanic or Latino were categorized as "Hispanic," regardless of self-reported race. Persons who did not identify as Hispanic or Latino were categorized by self-reported race; if more than one race was reported, the person was categorized as "Multiple race."

- Non-Hispanic Asian persons (**34.3%**) and Hispanic or Latino persons of all races (**33.9%**) represent the largest proportion of TB cases in the U.S.
- In the U.S., incidence of TB is highest among Native Hawaiian or Other Pacific Islander (**24.4** cases per 100,000 persons) and Asian persons (**14.1** cases per 100,000 persons)

TB Demographics in the United States

Age

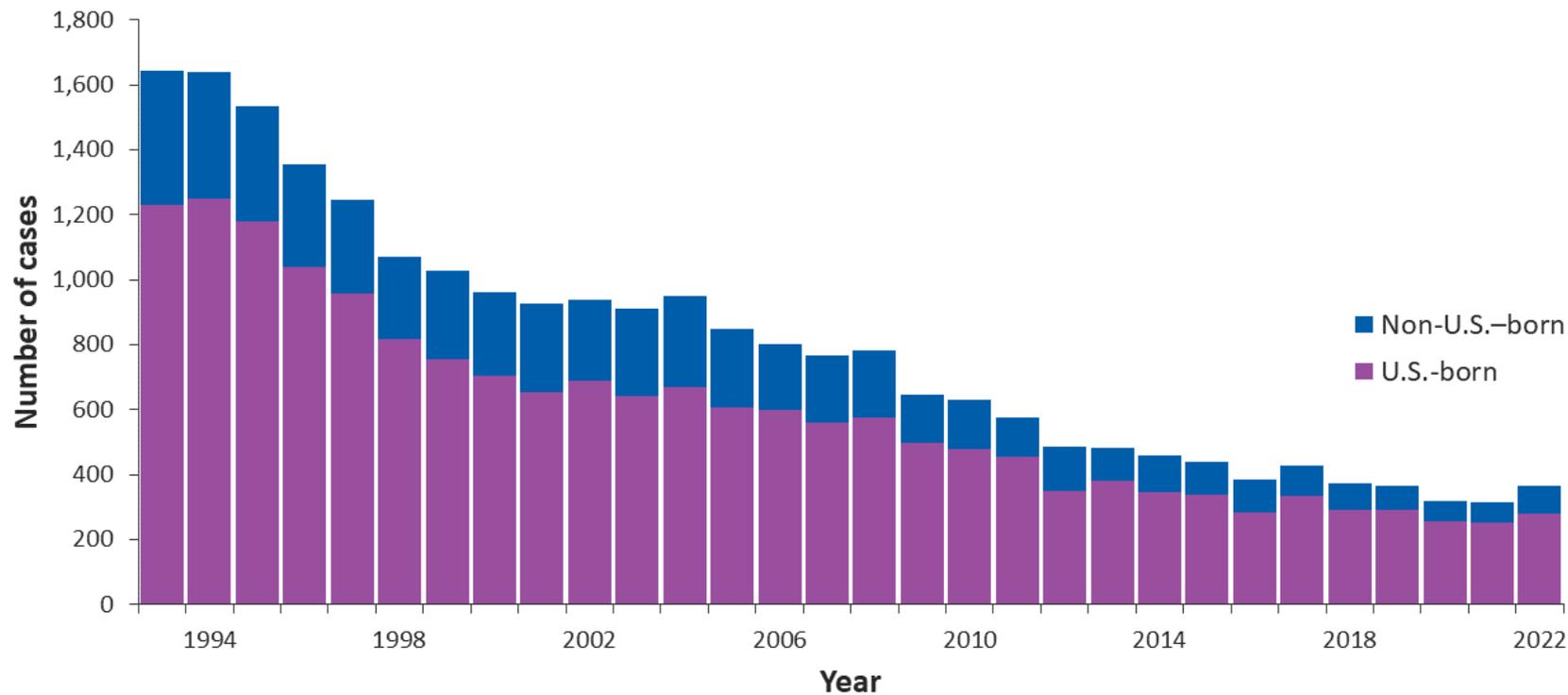
TB Incidence Rates by Age Group, United States, 1993–2022



- Adults aged 25-64 years accounted for nearly **60%** of all TB cases in 2022
- Incidence rate is highest among adults 65 years of age or older (**3.9** cases per 100,000 persons)

Pediatric TB in the United States

Pediatric* TB Cases by Origin of Birth,† United States, 1993–2022



*Children less than 15 years old

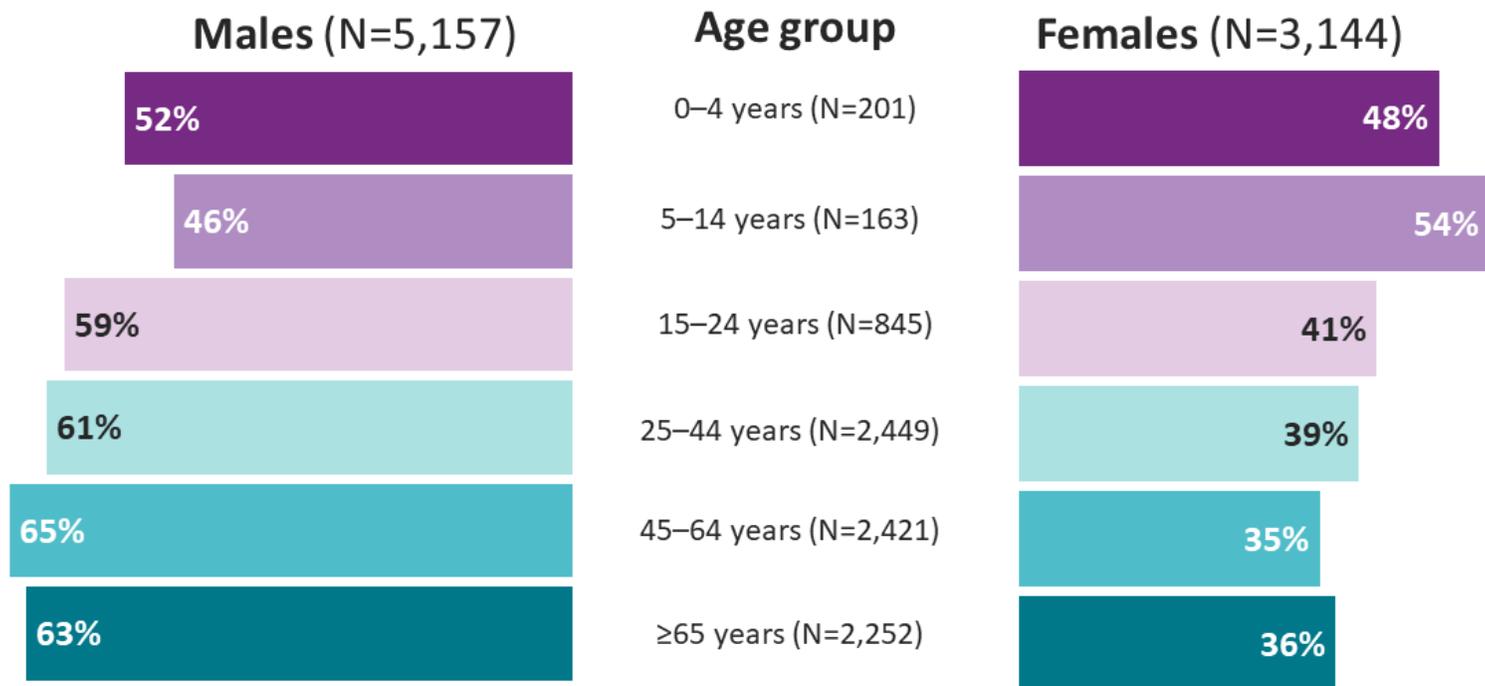
†Persons born in the United States, certain U.S. territories, or elsewhere to at least one U.S. citizen parent are categorized as U.S.-born. All other persons are categorized as non-U.S.-born.

- TB disease in children under 15 years of age (pediatric TB) is a marker for recent transmission
- **50%** of all pediatric cases in 2022 occurred in children 0-4 years of age
- **22.5%** of pediatric cases occurred in non-U.S.-born persons

TB Demographics in the United States

Sex

Percentage of TB Cases by Sex and Age Group, United States, 2022

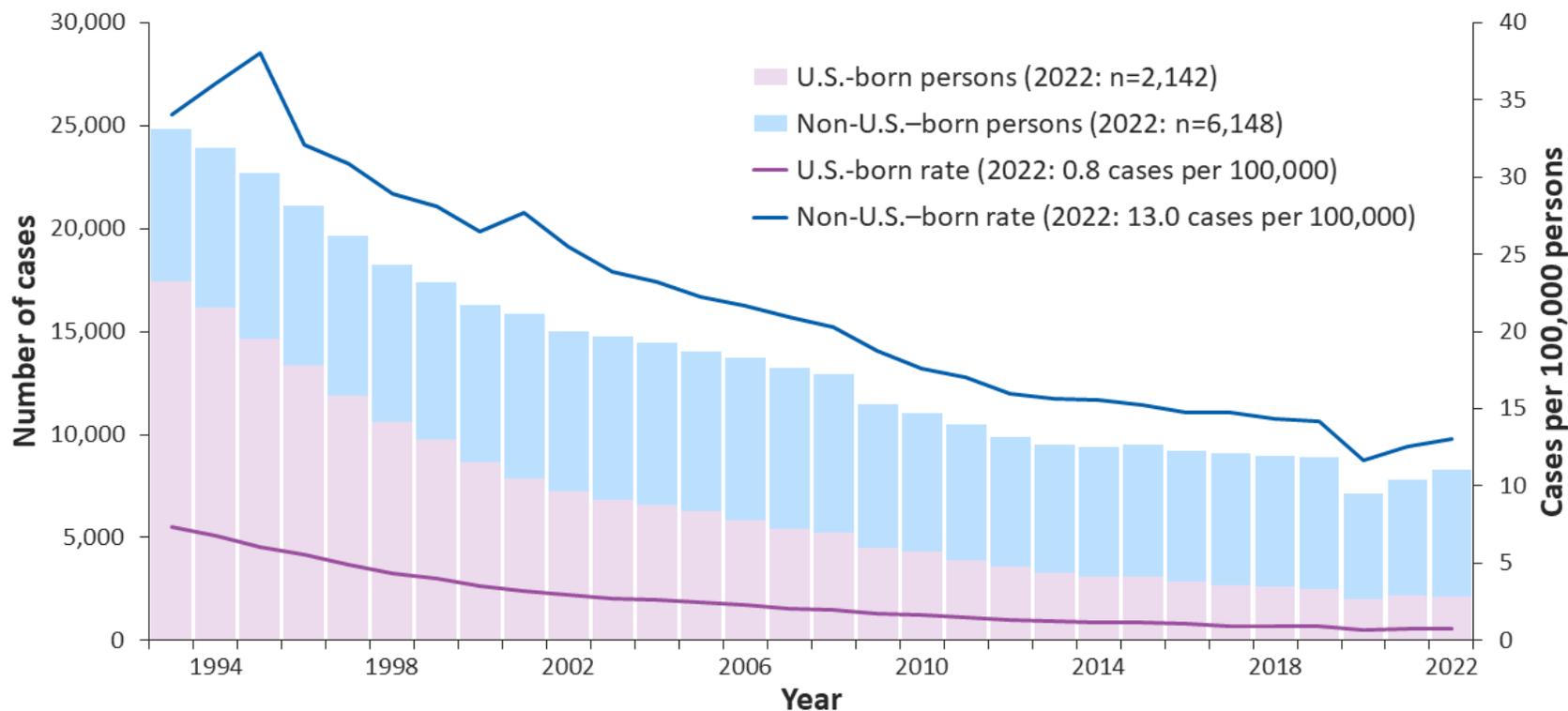


- In 2022, persons with male sex at birth accounted for **61.9%** of TB cases
- Among U.S. born persons, incidence rate for males was higher than females in every age group, except age group 5-14 years

TB Demographics in the United States

Origin of Birth

**TB Cases and Incidence Rates by Origin of Birth,*
United States, 1993–2022**

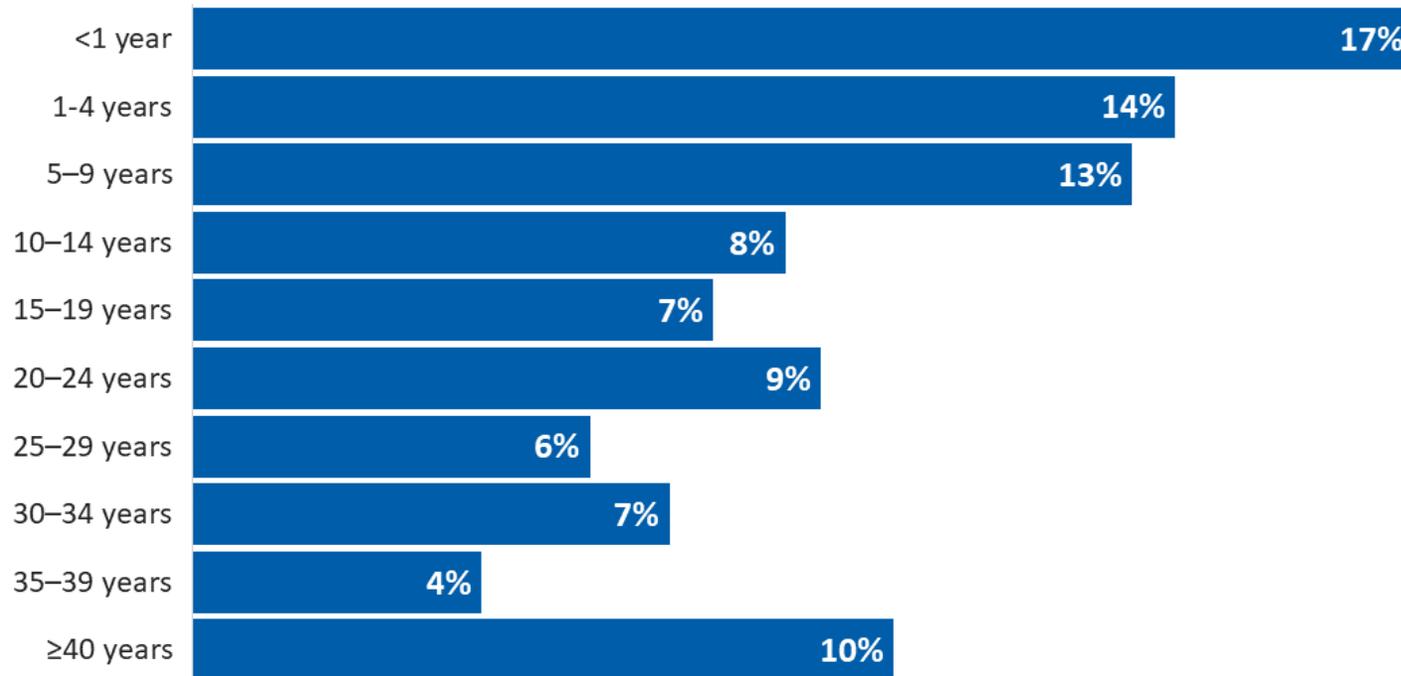


*Persons born in the United States, certain U.S. territories, or elsewhere to at least one U.S. citizen parent are categorized as U.S.-born. All other persons are categorized as non-U.S.-born.

- **73.8%** of TB cases in 2022 were among non-US-born persons
- In 2022, the incidence rate among non-U.S.-born persons was **13.0** compared to **0.8** cases per 100,000 population among U.S.-born persons
- **53%** of non-U.S. born cases in 2021 were born in Mexico, the Philippines, India, Vietnam, and China

Non-U.S.-Born TB Cases in 2022

Percentage of TB Cases Among Non-U.S.-Born* Persons by Years Since Initial Arrival in the United States at Diagnosis,† 2022 (N=6,148)

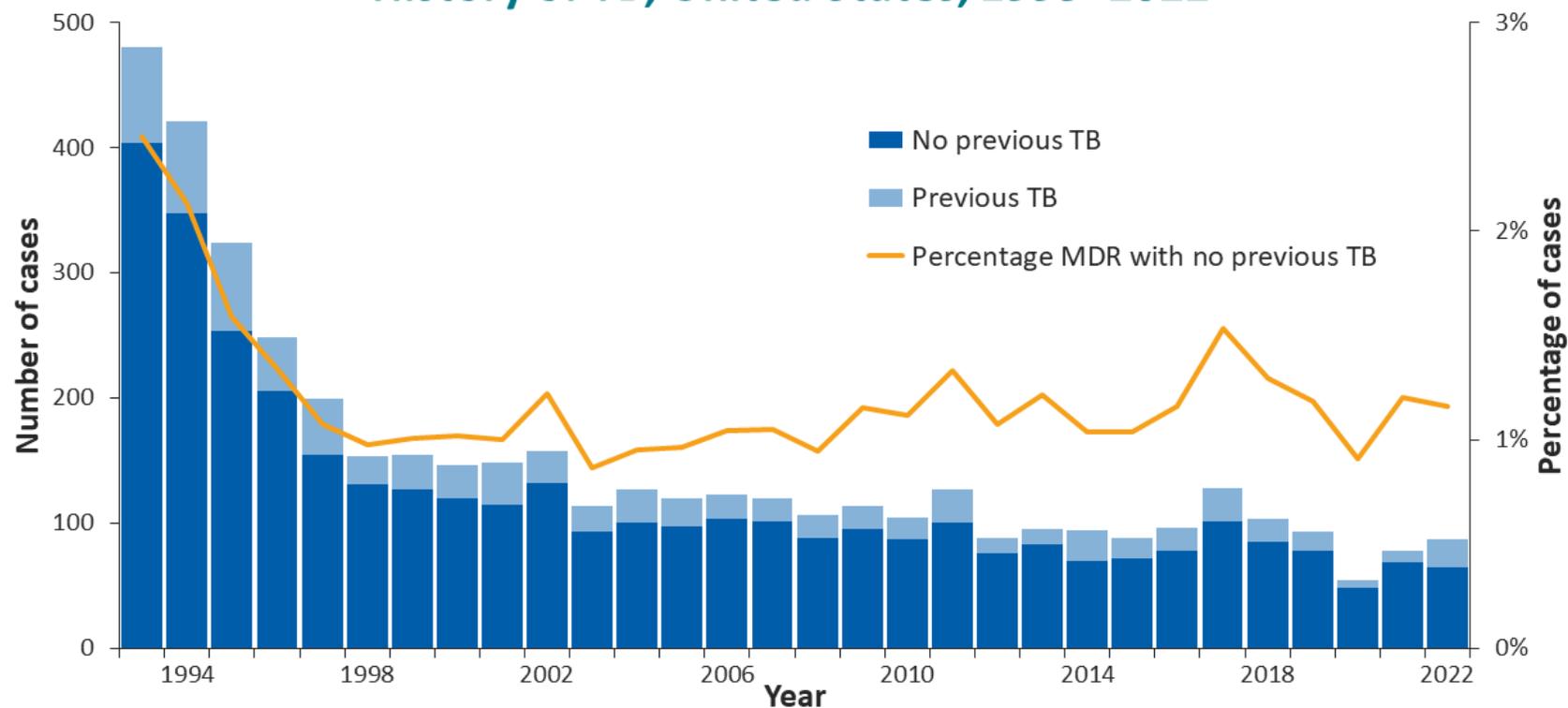


*Persons born in the United States, certain U.S. territories, or elsewhere to at least one U.S. citizen parent are categorized as U.S.-born. All other persons are categorized as non-U.S.-born.
†The number of years since initial arrival in the United States at diagnosis was unknown or missing for 7% of non-U.S.-born persons. These persons were included in the denominator when percentages were calculated.

- **30.6%** of non-US-born persons with TB disease in 2022 were diagnosed **within five years** of arrival in the U.S.
- **34.6%** of non-US-born persons with TB disease in 2022 were diagnosed after being in the U.S. for **at least 20 years**

Drug-resistant TB in the United States

Number and Percentage of Multidrug-Resistant (MDR)* TB Cases† by History of TB, United States, 1993–2022



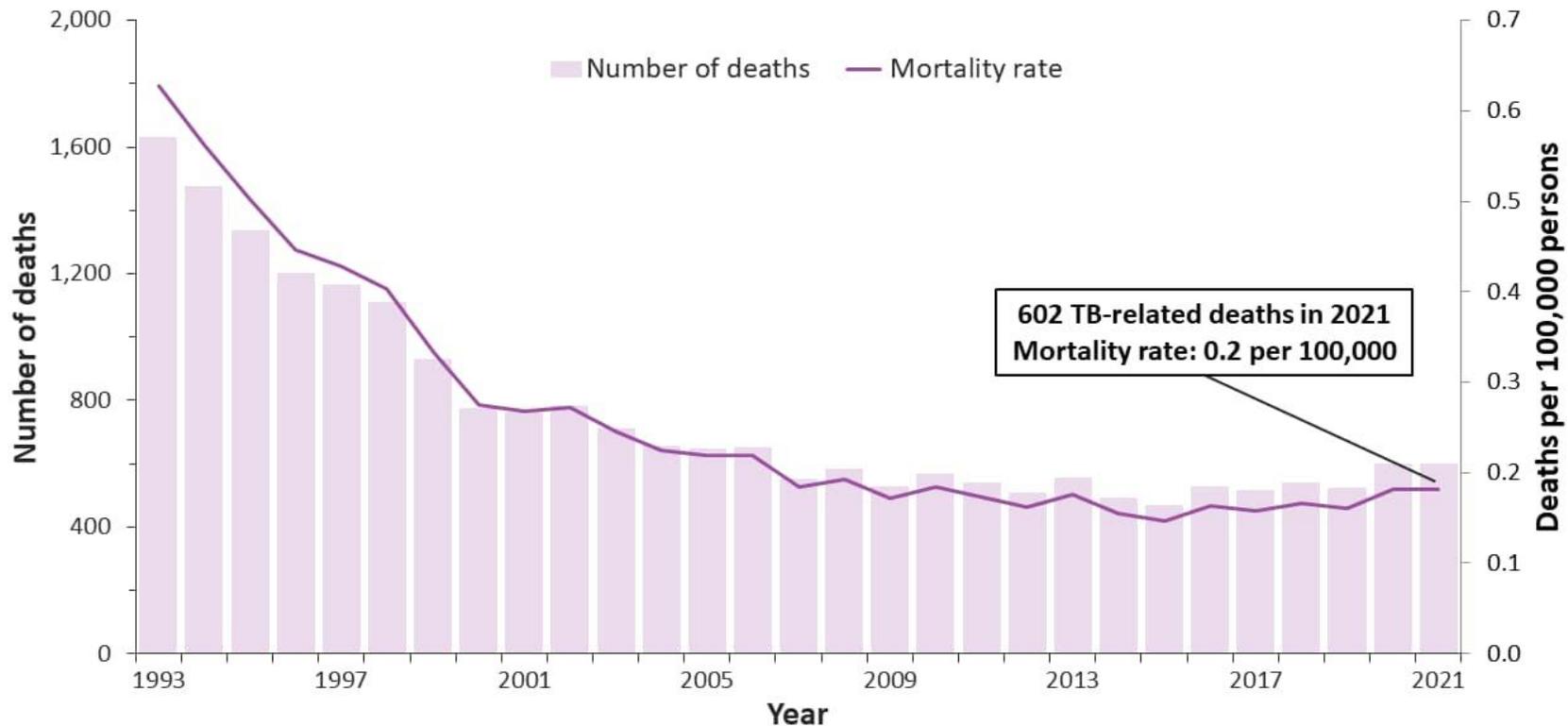
- **87** TB cases were reported as MDR TB in 2022

*Persons with isolates resistant to at least isoniazid and rifampin among persons with isolates tested with at least isoniazid and rifampin

†Excludes persons with unknown origin of birth

TB Mortality in the United States

TB-Related Deaths* and Mortality Rates, United States, 1993–2021



*National Vital Statistics System Underlying Cause of Death (based on deaths reported through 2021)

- **602** TB-related deaths were reported in the U.S. in 2021
- This represents a **0.3% increase** from 2020

TB in Texas



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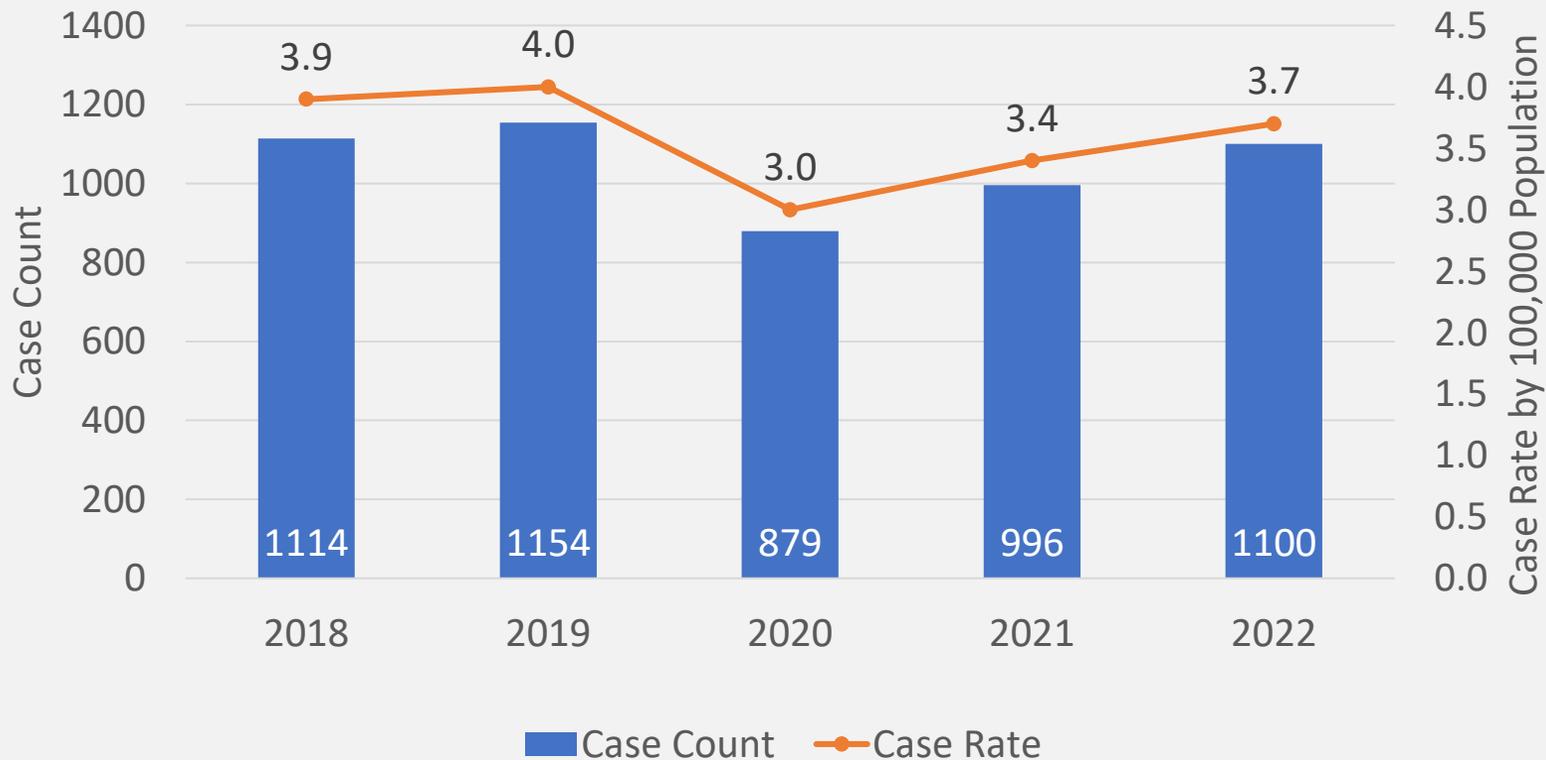
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The Big Picture

- Texas has the second highest number of TB cases in the U.S.¹
 - **1100 cases** reported in 2022
- Texas has the fourth highest incidence of TB in the U.S.¹
 - **3.66 cases per 100,000** persons in 2022
- Prevalence of TB infection in Texas is estimated to be 1.08 million people²

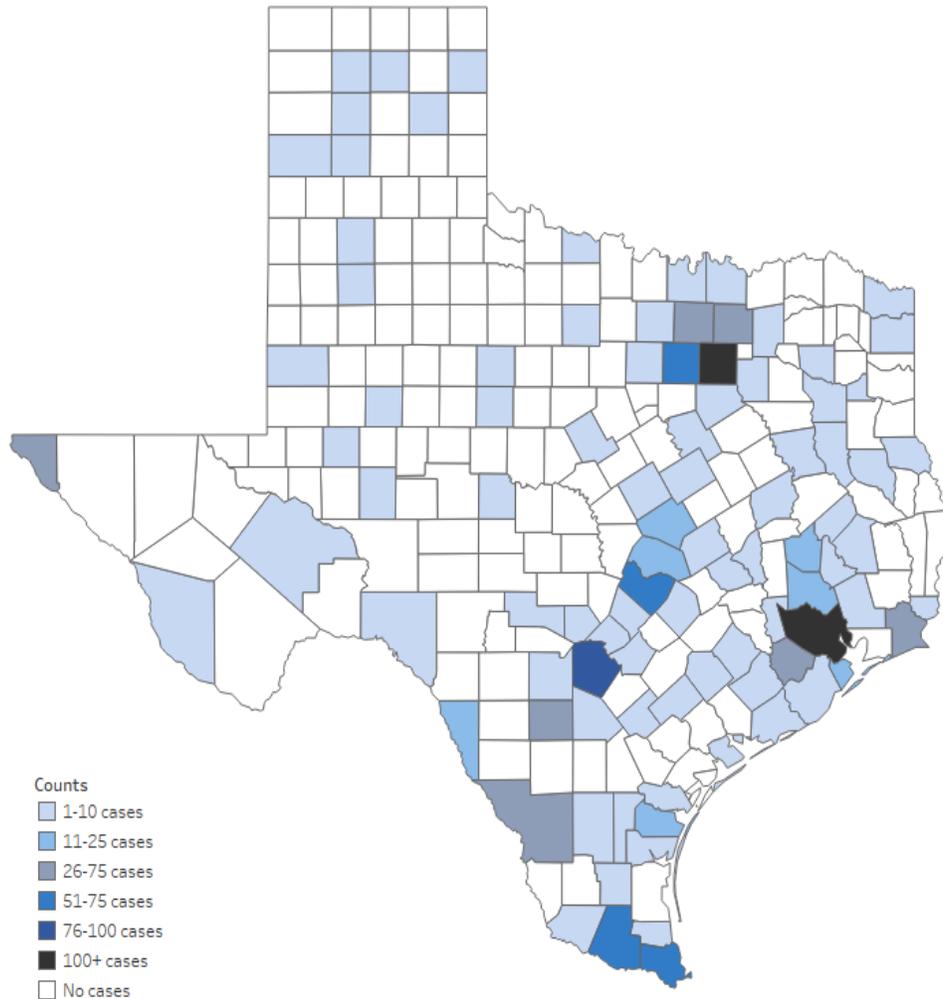
Incidence of TB in Texas, 2017 – 2022

Texas TB Cases and Rates by Report Year, 2018 - 2022



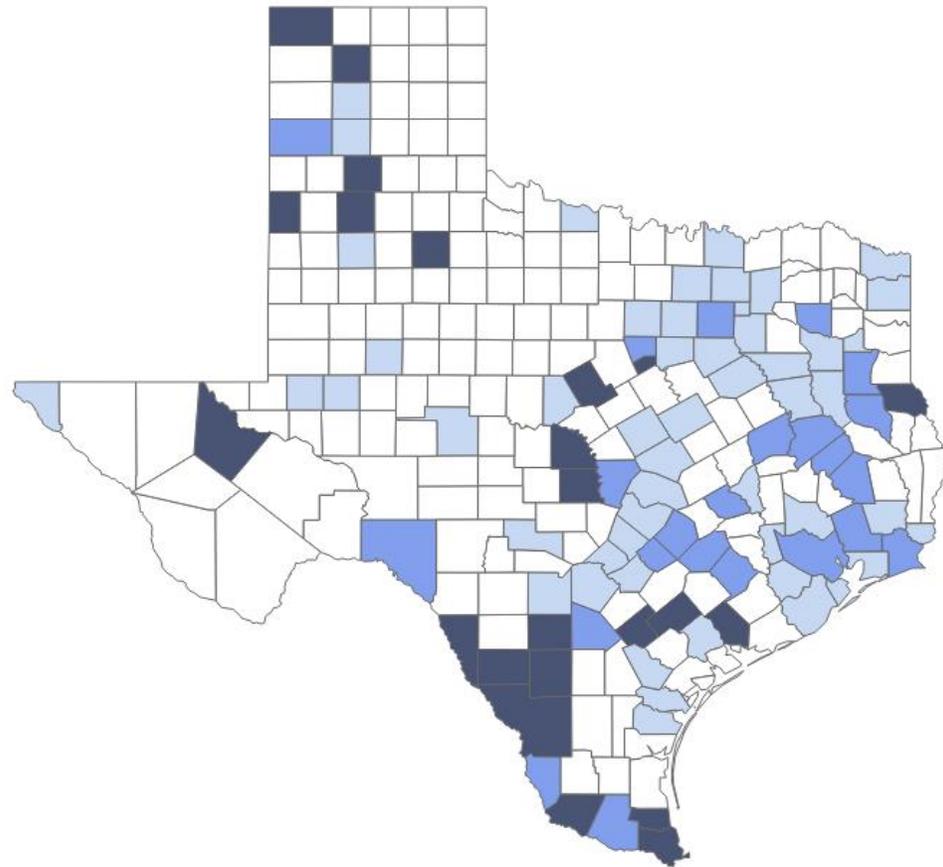
- TB case counts and rates in 2020 were impacted by the COVID-19 pandemic
- In 2022 the case count and rate continued rebounding to pre-pandemic levels

Where is TB Found in Texas?



County	Case Count, 2022
Harris	266
Dallas	121
Bexar	62
Tarrant	52
Hidalgo	49
Travis	48
Frio	47
Cameron	45
Collin	35
Webb	32
El Paso	27
Denton	23
Montgomery	22
Fort Bend	20
Jefferson	15
Texas	1100

Incidence of TB in Texas Counties, 2022



TB Case Rate per 100,000 Population

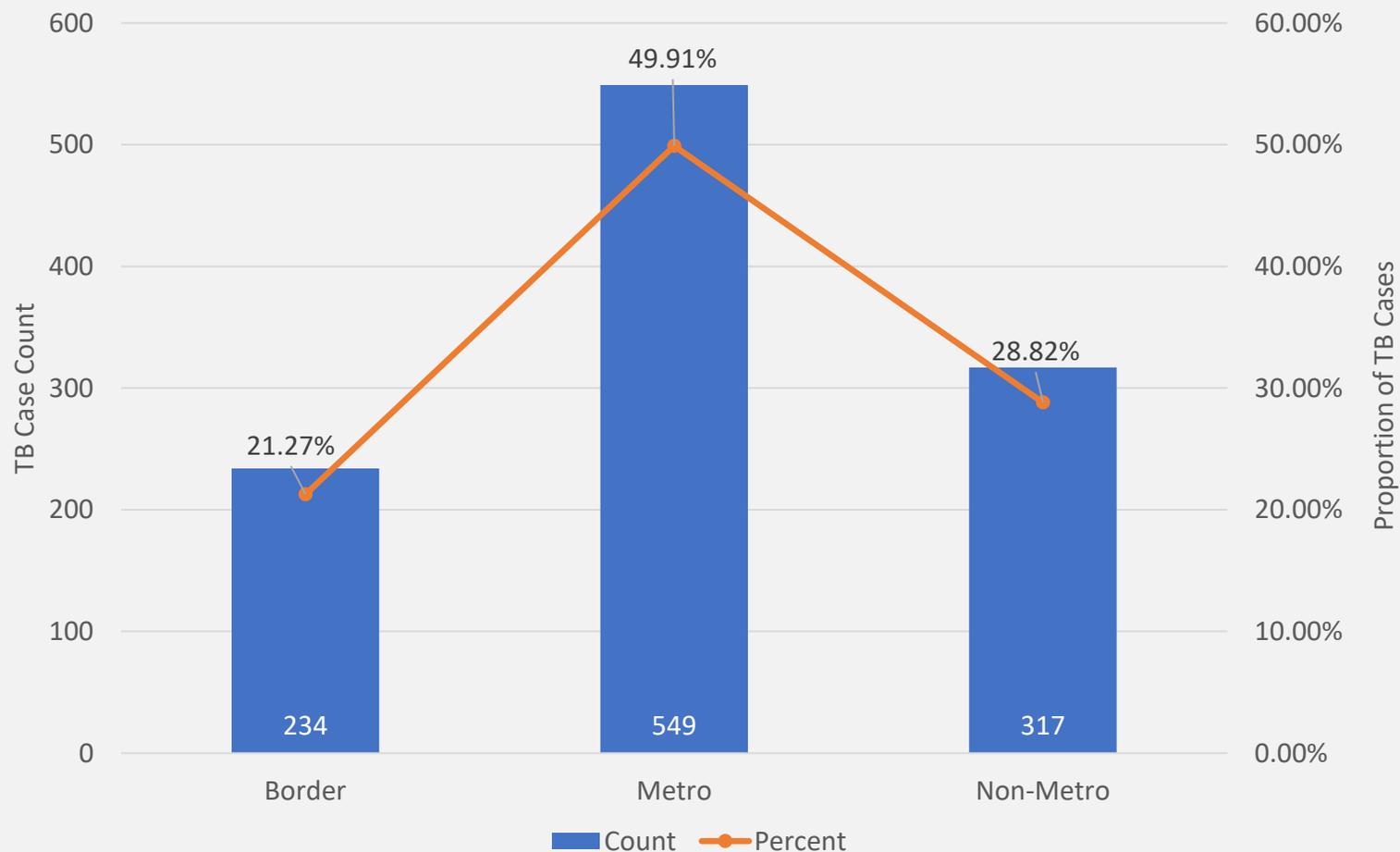
0
 0-3.6
 3.7-7.4
 7.4+

County	Case Count	Rate per 100,000 Population
Frio	47	263.82
Dickens	1	57.94
San Saba	2	34.34
Dallam	2	27.62
Maverick	15	25.93
Willacy	5	24.82
Karnes	3	20.22
Shelby	4	16.66
Hale	5	15.71
Reeves	2	15.50
La Salle	1	15.14
Bailey	1	14.75
Swisher	1	14.53
Comanche	2	14.41
Jackson	2	13.21
Webb	32	11.95

TB in Texas

Geographic Area

TB Case Counts and Proportion by Geographic Area, 2022



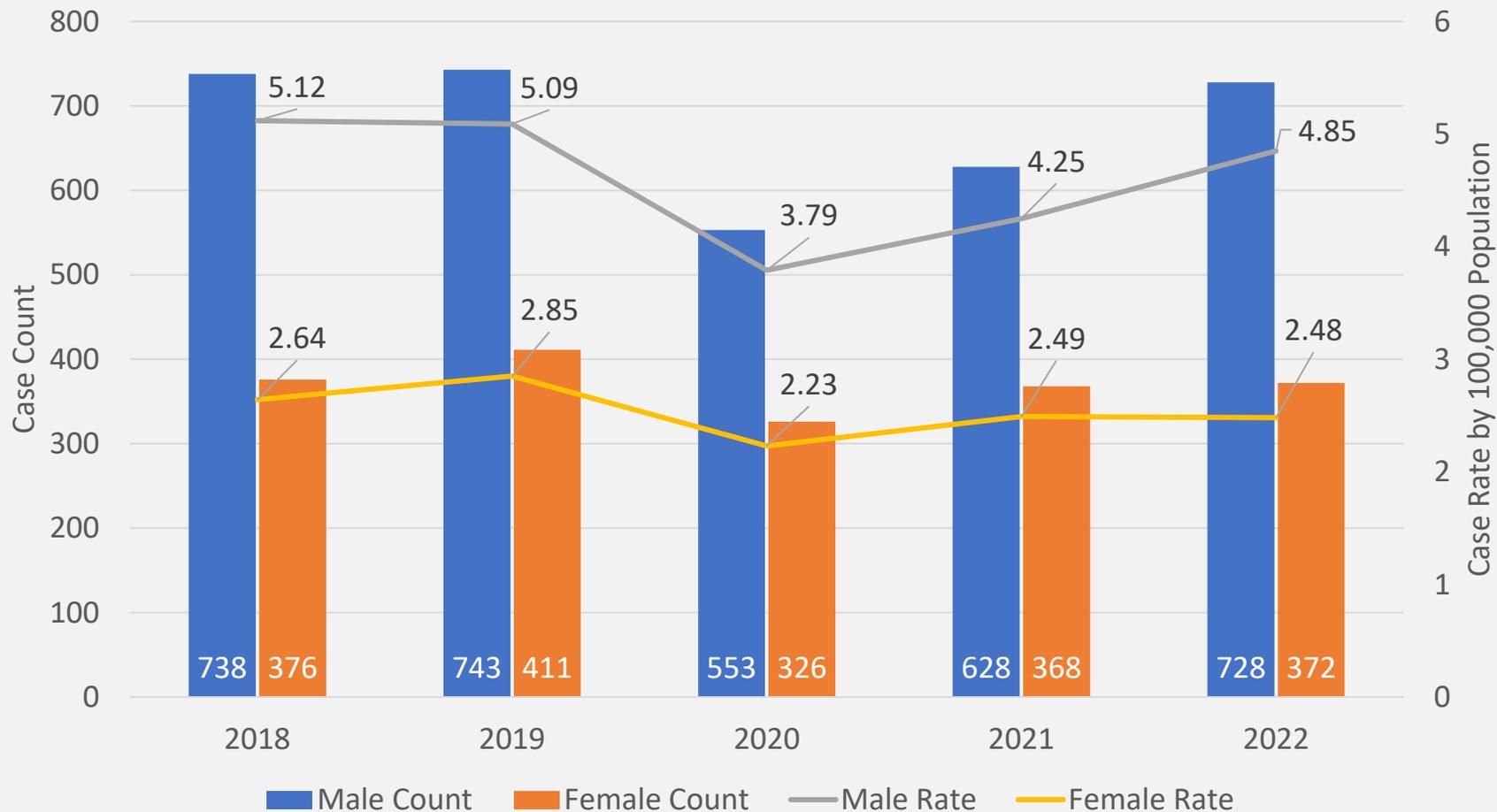
- The majority of TB cases in Texas are reported from large metropolitan areas
- Incidence rate (IR) is higher in counties along the Texas - Mexico border region
 - This area accounts for approximately 9% of the Texas population but represents 21.27% of all TB cases

Source: DSHS TB Program

TB Demographics in Texas

Sex at Birth

TB Case Count and Rate by Sex at Birth, 2018-2022

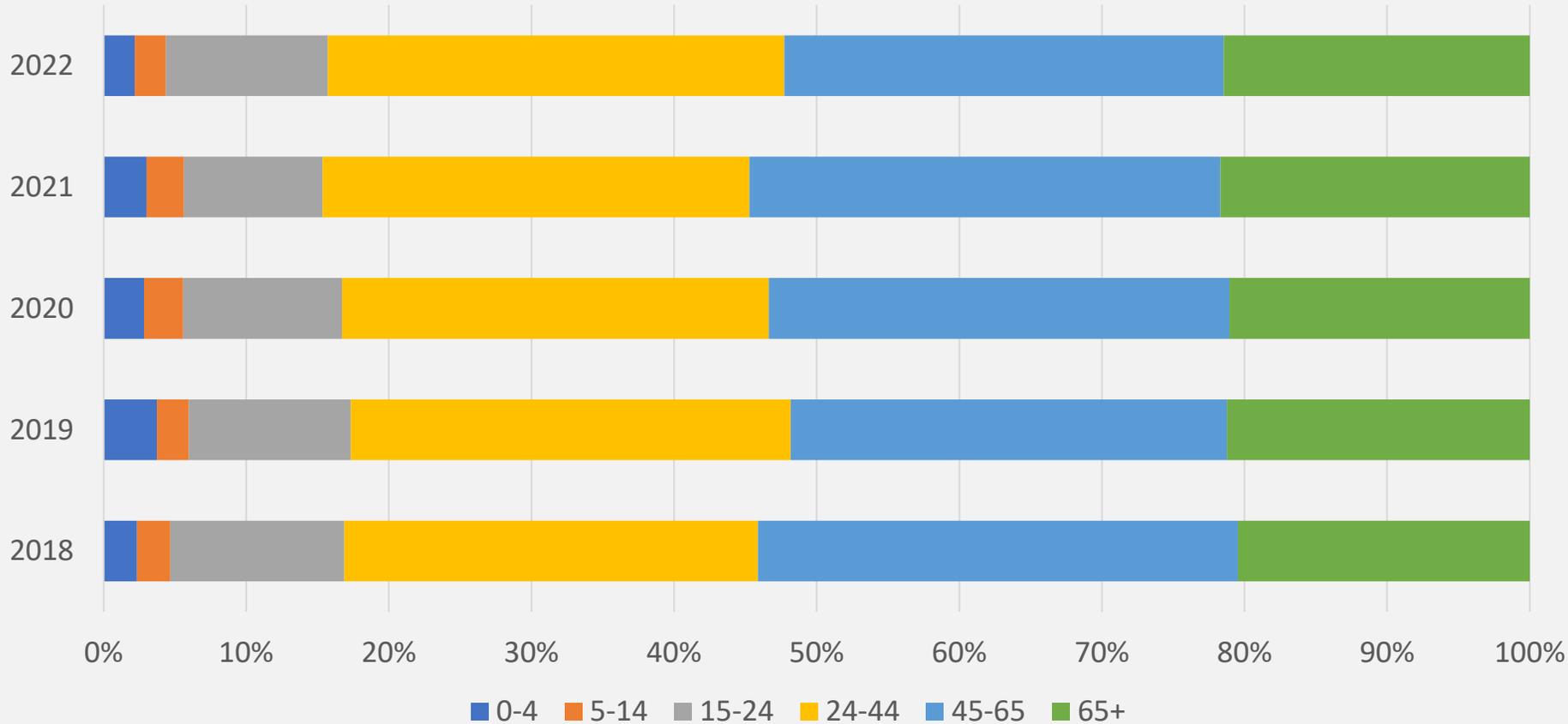


- Number of cases and incidence rates are higher among persons with male sex at birth
 - Consistent among all age groups
 - **66%** of 2022 TB cases in Texas were among males

TB Demographics in Texas

Age

Percent of TB Cases by Age Group (in Years) at Diagnosis, 2018-2022



- Adults aged 25-64 years represent the largest proportion of TB cases in Texas
- Lowest incidence group are children 5-14 years old (**0.57 per 100,000**) in 2022
- Highest incidence of TB is among adults over 65 years of age (**5.86 per 100,000**) in 2022

Source: DSHS TB Program

TB Demographics in Texas, 2023

Race/ Ethnicity

Texas TB Case Rates by Race and Ethnicity, 2022



- Non-Hispanic Native-Hawaiian Native or other Pacific Islanders (**14.01 per 100,000**) and Asians (**12.51 per 100,000**) have the highest incidence of TB in Texas
- The TB incidence rates in Texas for non-Hispanic Black or African American, Hispanic or Latino (all races), and non-Hispanic White persons are higher than the national rates for each of these groups

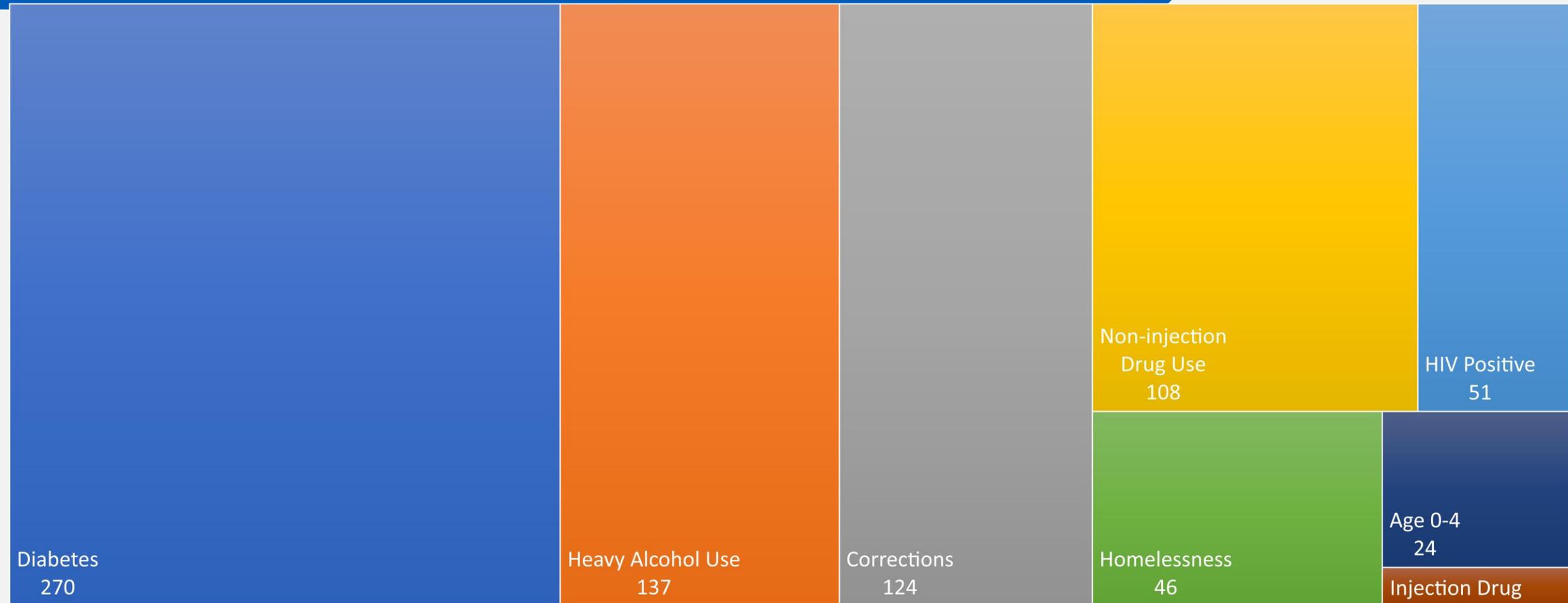
TB Demographics in Texas, 2022

Origin of Birth

- In 2022, **66%** of Texas TB cases were born outside the U.S.
- Nearly **60 different countries** were represented among Texas TB cases in 2022

Country of Birth	Case Count	Percent
Mexico	265	36.40
Viet Nam	66	9.07
India	53	7.28
Honduras	50	6.87
Guatemala	34	4.67
Philippines	30	4.12
El Salvador	21	2.88
Colombia	19	2.61
Peru	16	2.20
Afghanistan	15	2.06

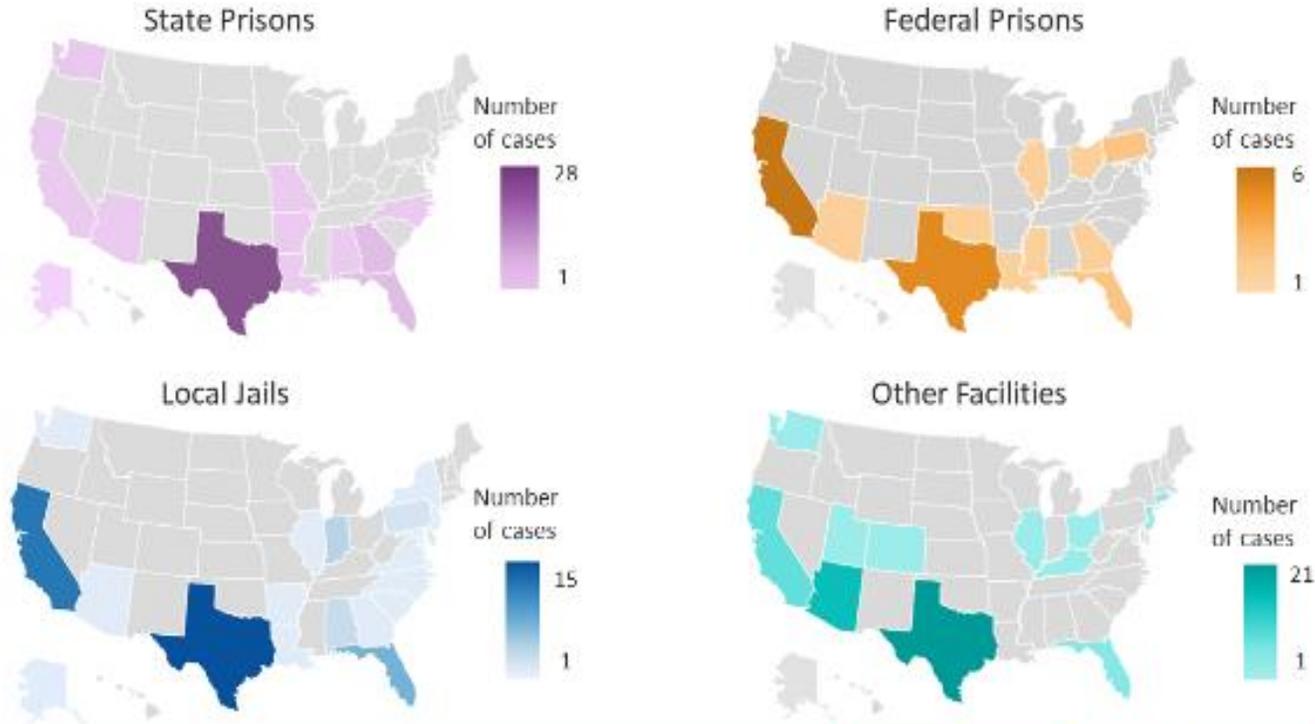
Important Risk Factors for TB in Texas, 2022



■ Diabetes ■ Heavy Alcohol Use ■ Corrections ■ Non-injection Drug Use ■ HIV Positive ■ Homelessness ■ Age 0-4 ■ Injection Drug Use

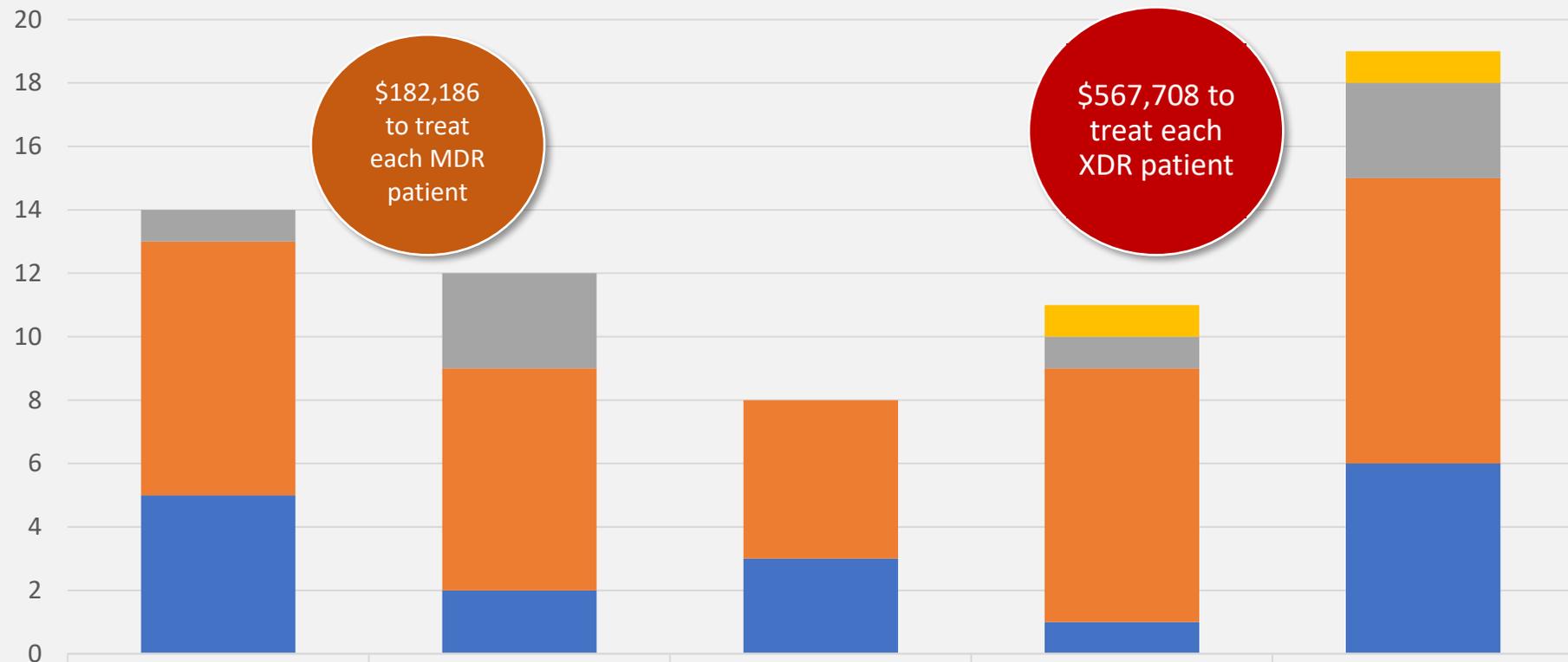
TB in Correctional Settings, 2021

TB Cases Among Correctional Facility Residents Aged ≥15 Years
by Type of Facility, United States, 2021



- **8%** of Texas TB cases in 2021 were incarcerated at diagnosis
- Texas accounted for **38.1%** of all TB cases reported from correctional facilities in the U.S. in 2021

Drug Resistant TB in Texas, 2018-2022



	2018	2019	2020	2021	2022
Extensive Multi-Drug Resistance (XDR)	0	0	0	1	1
Pre-extensive Multi-Drug Resistance (Pre-XDR)	1	3	0	1	3
Multi-Drug Resistance (MDR)	8	7	5	8	9
Rifampin Resistance	5	2	3	1	6

For More Information



Global TB: WHO Global Tuberculosis Report, 2023



TB in the US: CDC Reported Tuberculosis in the United States, 2022



TB in Texas: Visit our website www.texastb.org or email TBEpi@dshs.Texas.gov

Questions?

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