Overview of Global and National TB Epidemiology, 2024

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Disclosure and Disclaimer

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Disclosure: I have no real or perceived vested interest that relate to this presentation, nor do I have any relationship with pharmaceutical companies, biomedical device manufacturers, and/or other corporations whose products or services are related to pertinent therapeutic areas. All of the photos represented in this presentation are either stock images or property of my department

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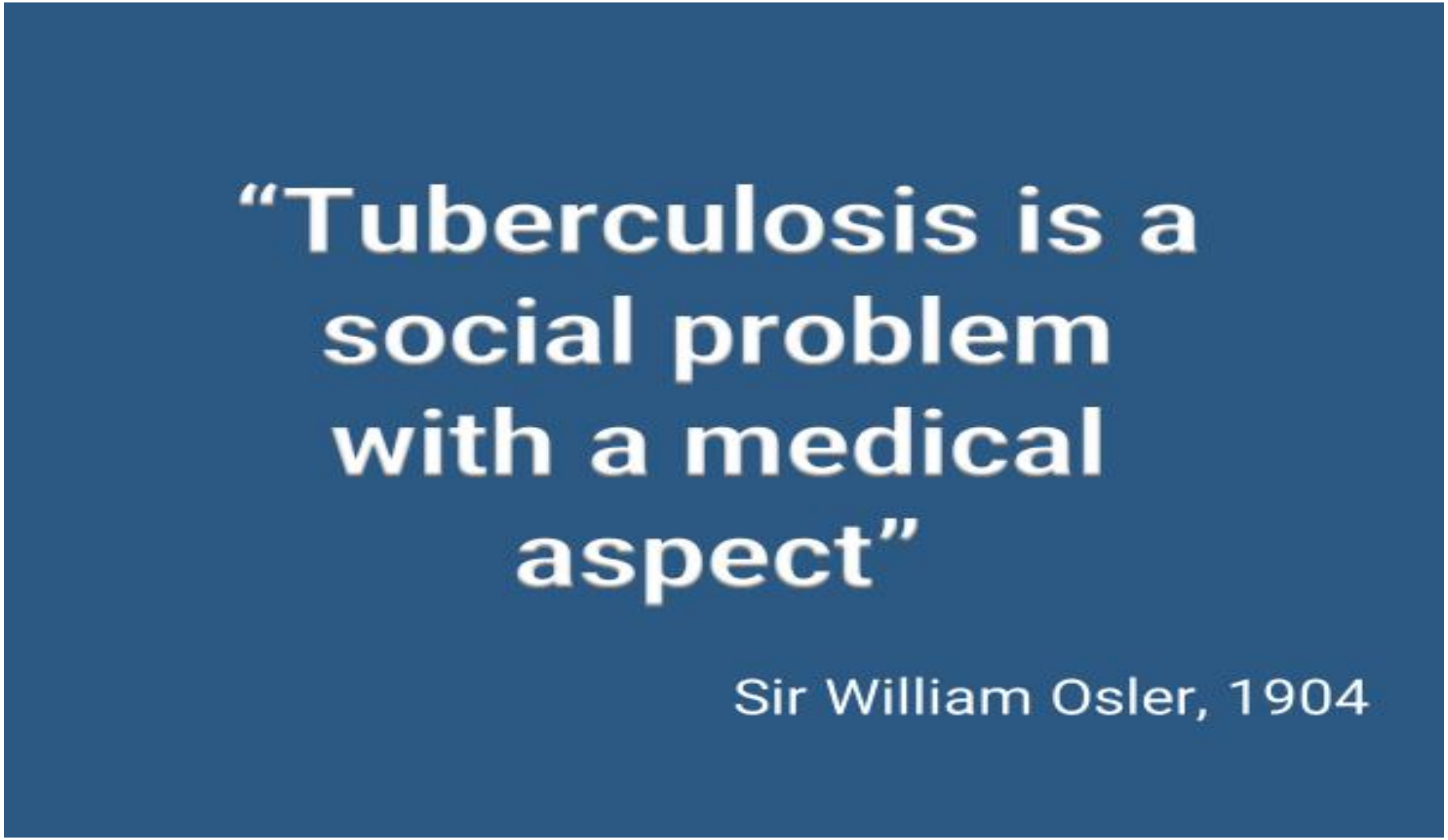
Tuberculosis



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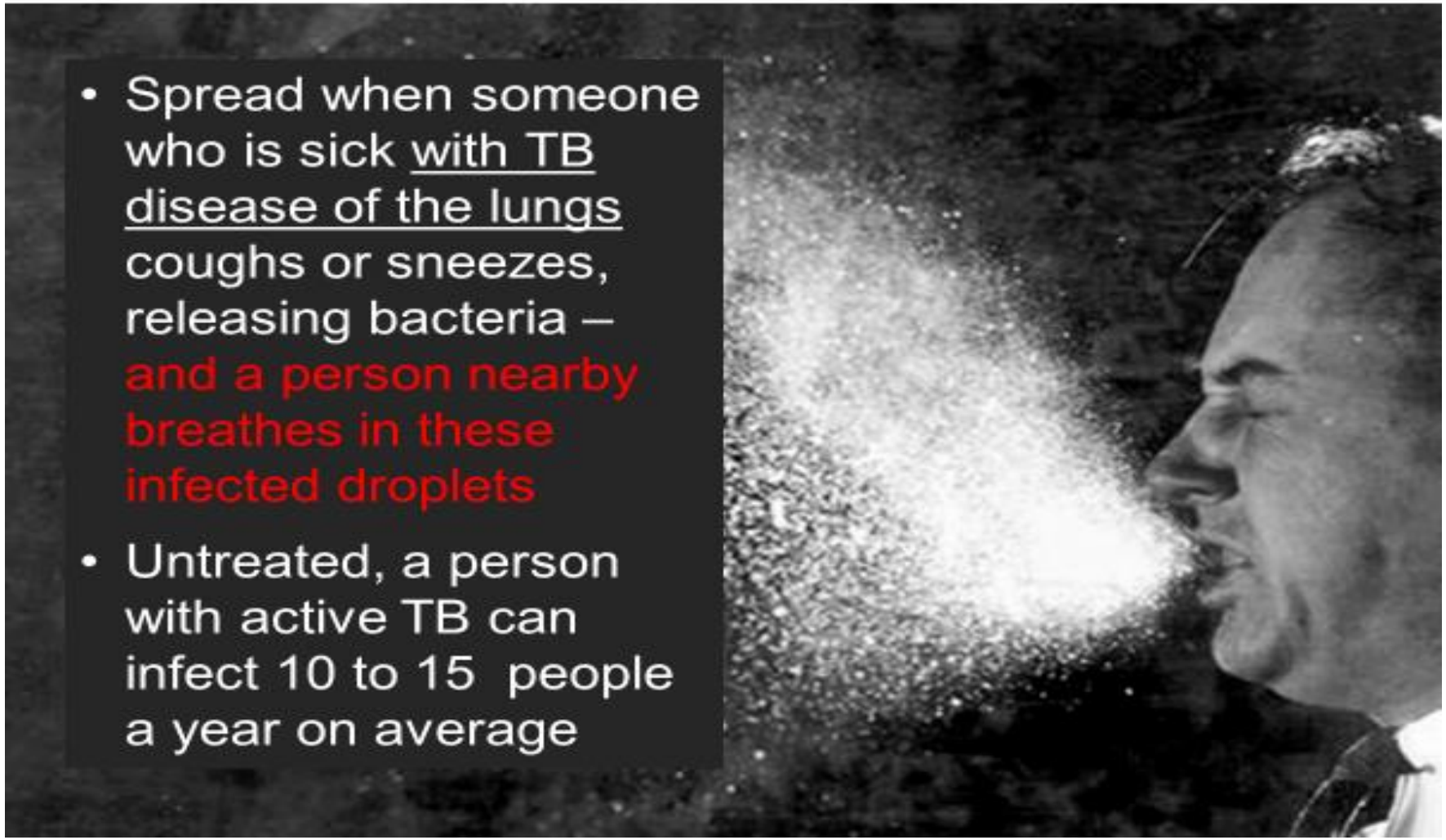
Tuberculosis



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History of Tuberculosis

- The earliest evidence of TB comes from skull fragments, found to be the first specimen of Homo erectus to be discovered in Turkey. The skull fragments bore small lesions that were an indicator of tuberculosis. Recent efforts to date the specimen suggest it is "more than a million years old."

- But the variant that kills humans today—*Mycobacterium tuberculosis* (*M. tb*)—emerged 2000 years ago, when people lived in denser settlements alongside domesticated animals, often reservoirs for TB

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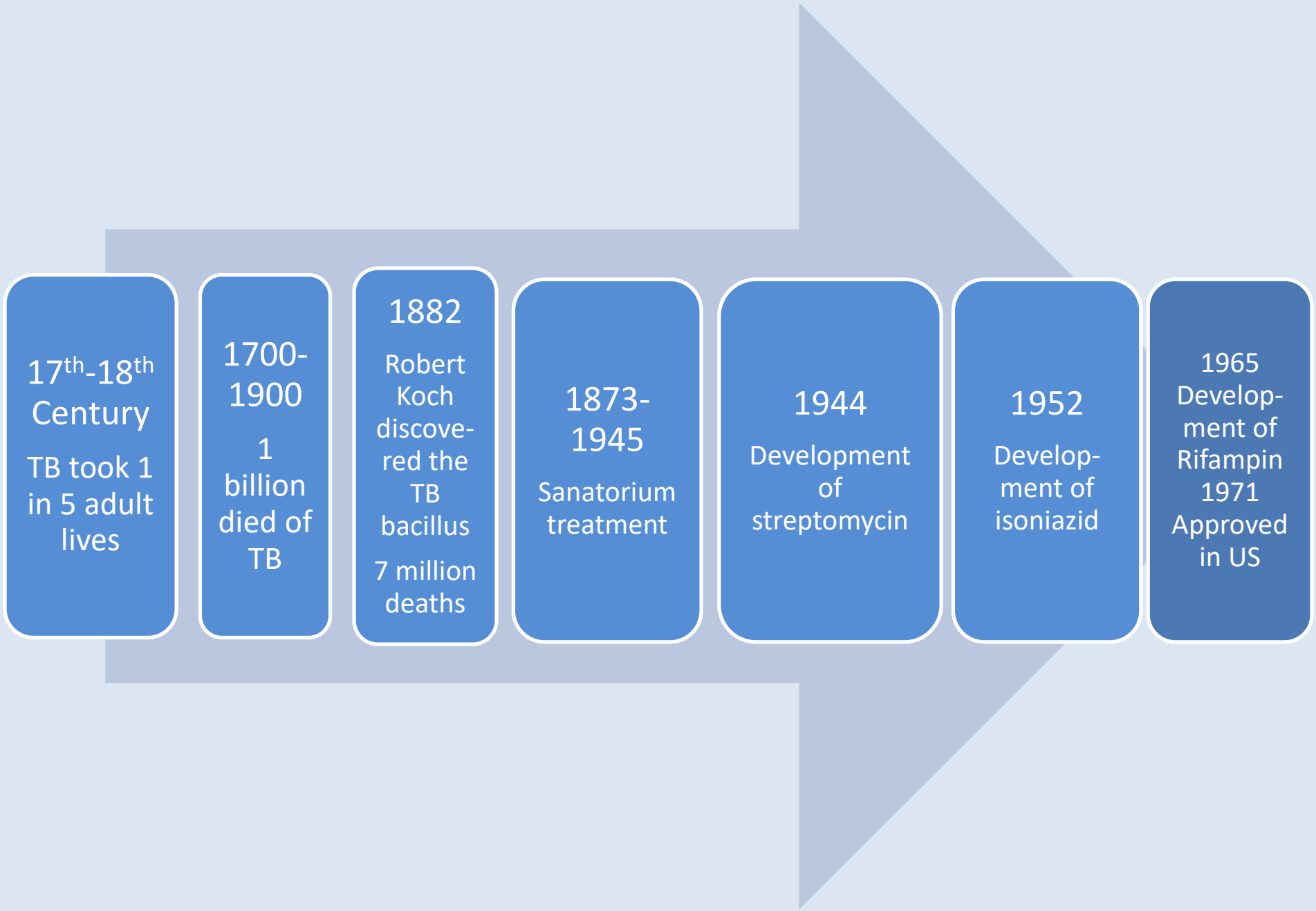
17th-18th Century
TB took 1 in 5 adult lives
1700-1900
1 billion died of TB
1882
Robert Koch discove-red the TB bacillus
7 million deaths
1873-1945
Sanatorium treatment
1944
Development of streptomycin
1952
Develop-ment of isoniazid
1965 Develop-ment of Rifampin 1971 Approved in US

Global Burden of Tuberculosis

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Global Burden of TB, 2022

	Estimated Number of Cases	Estimated Number of Deaths
All forms of TB	10.6 million (9.6 in 2014)	1.6 million*
HIV-Associated TB	1.2 million (12%)	374,000
Multidrug-resistant TB (MDR-TB)	558,000**	~150,000

- Approx. 1/4 of the world (two billion people) is infected with *M. tb*
- Estimated that 53 million lives were saved between 2000 and 2016 through effective diagnosis and treatment of TB and HIV
- In Children 1,000,000 cases and 140,000 deaths a year

*including 0.2 million deaths among PLHIV
**Fewer than 25% of those thought to have MDR TB were detected

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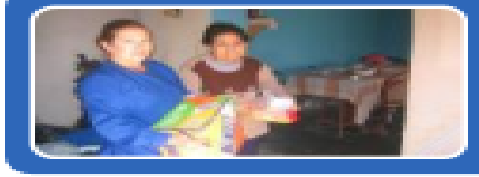
2024 TB World Leader of Infectious Disease Deaths

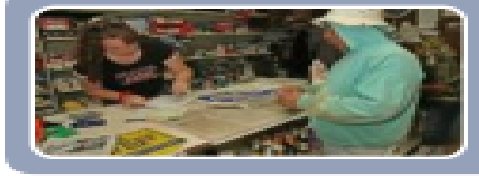
TB causes more deaths among women than all causes of maternal mortality

Every day 20,000 people develop TB disease and 4,400 die (< 14,000 Total Ebola Deaths)



Each year over 10 million people around the world become sick with TB disease.

On average, one person dies of TB every 15 seconds



TB accounts for more than ¼ of all preventable adult deaths in developing countries

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Estimated Impact of TB in the World

- **One in 4 individuals currently living have LTBI**

- **One in 50 individuals currently living have been cured of Active TB**

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HIV and TB Coinfection

- 1/3 of 33 million people living with HIV/AIDS are co-infected with TB (>10 million people)
- Without treatment 90% will die within months
- TB is the leading cause of death among HIV positive people (up to 50% of all patients worldwide)

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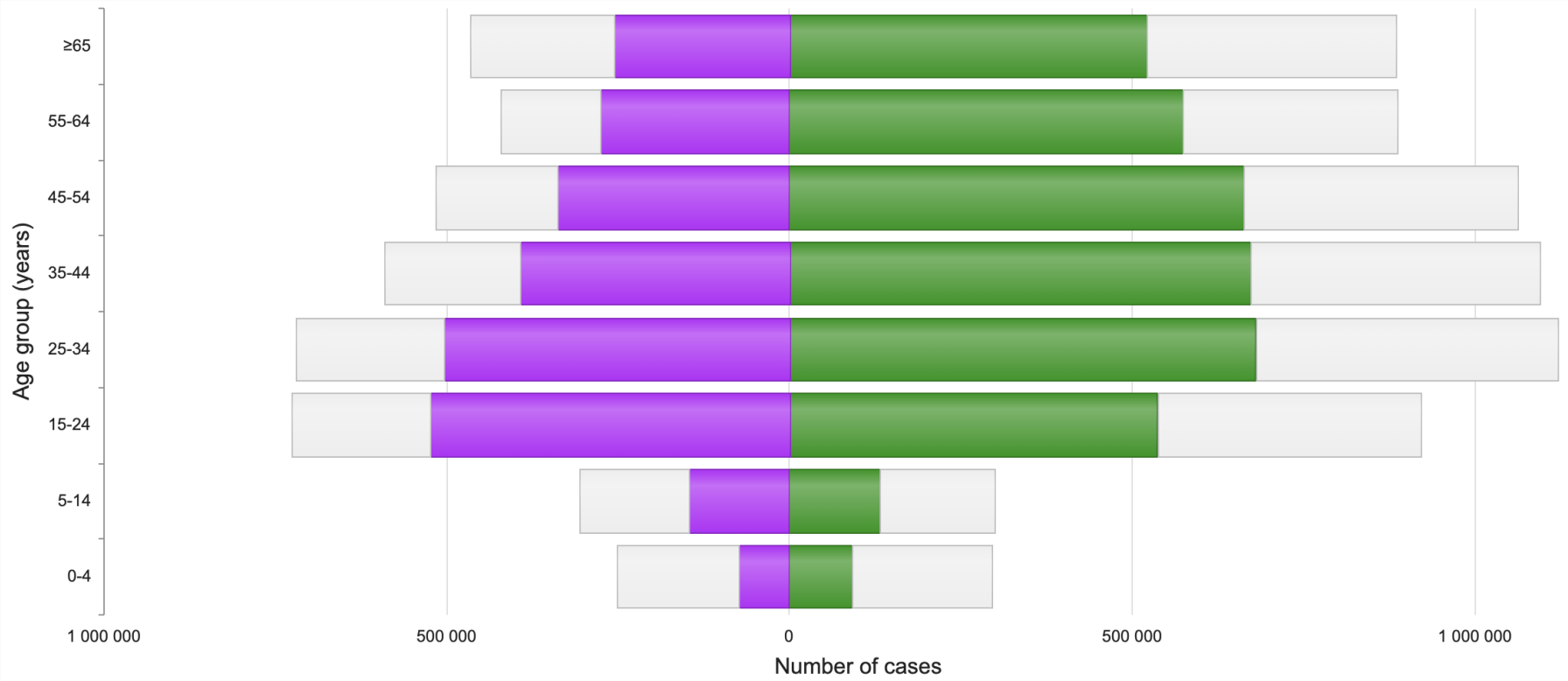
Age Distribution of TB Cases in Women and Men

Fig. 2.1.5 Global estimates of TB incidence numbers and case notifications disaggregated by age and sex (female in purple; male in green), 2021



Source: WHO Global Tuberculosis Report 2022

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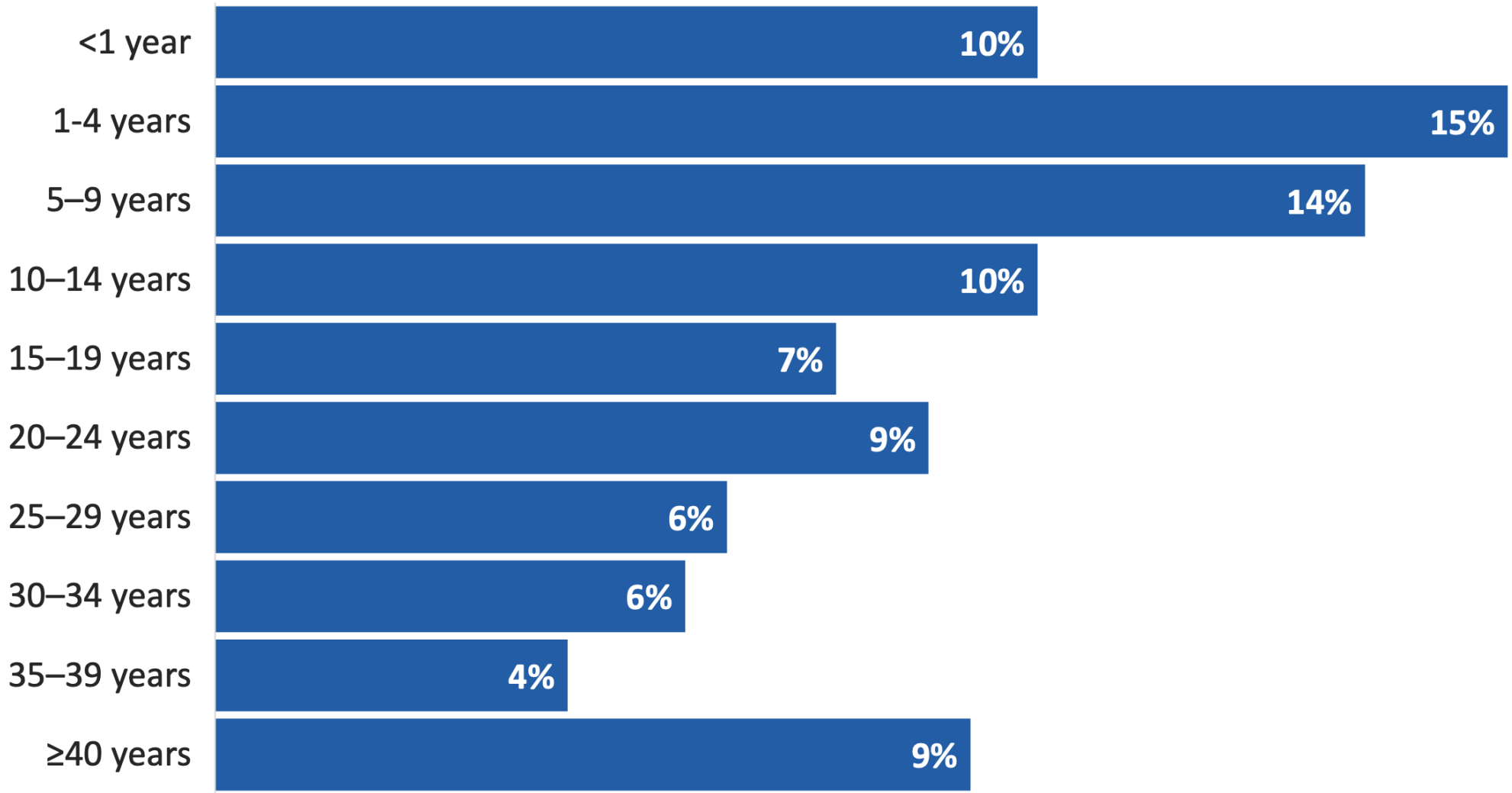
Percentage of TB Cases Among Non-U.S.–Born* Persons by Years Since Initial Arrival in the United States at Diagnosis,† 2021 (N=5,626)



*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 11% of non-U.S.–born persons. These persons were included in the denominator when calculating percentages.

Recent Changes in Panel Physician Screening

Discussion: Differences between; migrants; refugees; asylum seekers; undocumented immigrants

As of Oct 1st 2024 the following changes will be instituted in individuals who will be coming to the US as refugees:

- All individuals 2 years and older will have an IGRA done before coming to US (They will not be offering LTBI treatment however)

- All individuals 15 years of age and older will have a CXR before coming to the US. If abnormal they will have to have three sputums for smear and culture and if positive will need to be treated to completion before coming to the US.

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Who is NOT REQUIRED to be TB Tested before entering the US??

- Student visa holders
- Temporary work visa holders
- Tourist visa holders
- Diplomats
- Undocumented individuals

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Yearly Testing Change

Who No Longer Needs Yearly TB Testing---All of You!!

"Tuberculosis Screening, Testing and Treatment of US Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019"*

"In the absence of known exposure or evidence of ongoing TB transmission, U.S. health care personnel without LTBI should not undergo routine serial TB screening or testing at any interval after baseline (e.g., annually)"

*(MMWR, May17, 2019:Vol. 68 No. 19)

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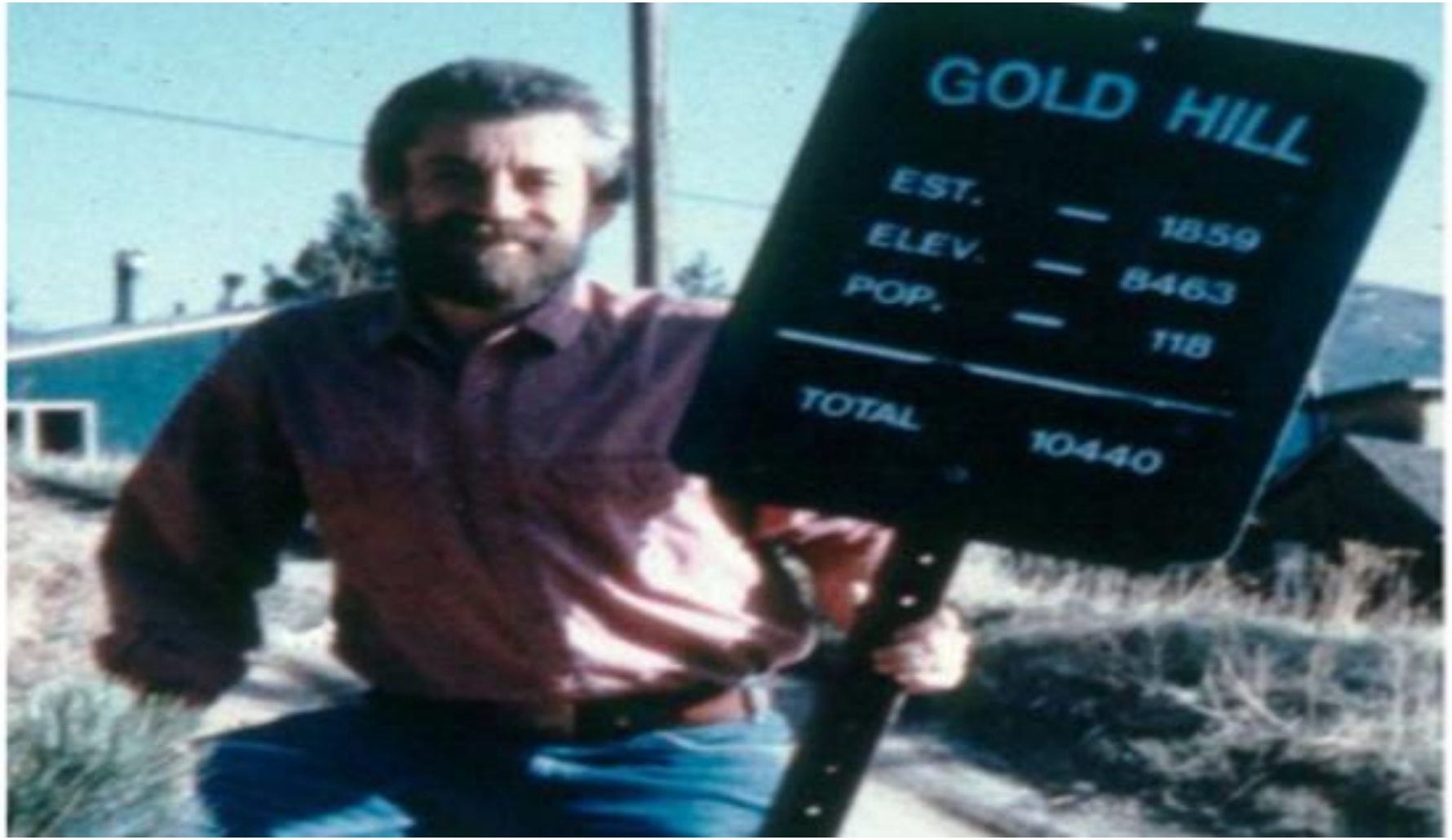
Beware of data



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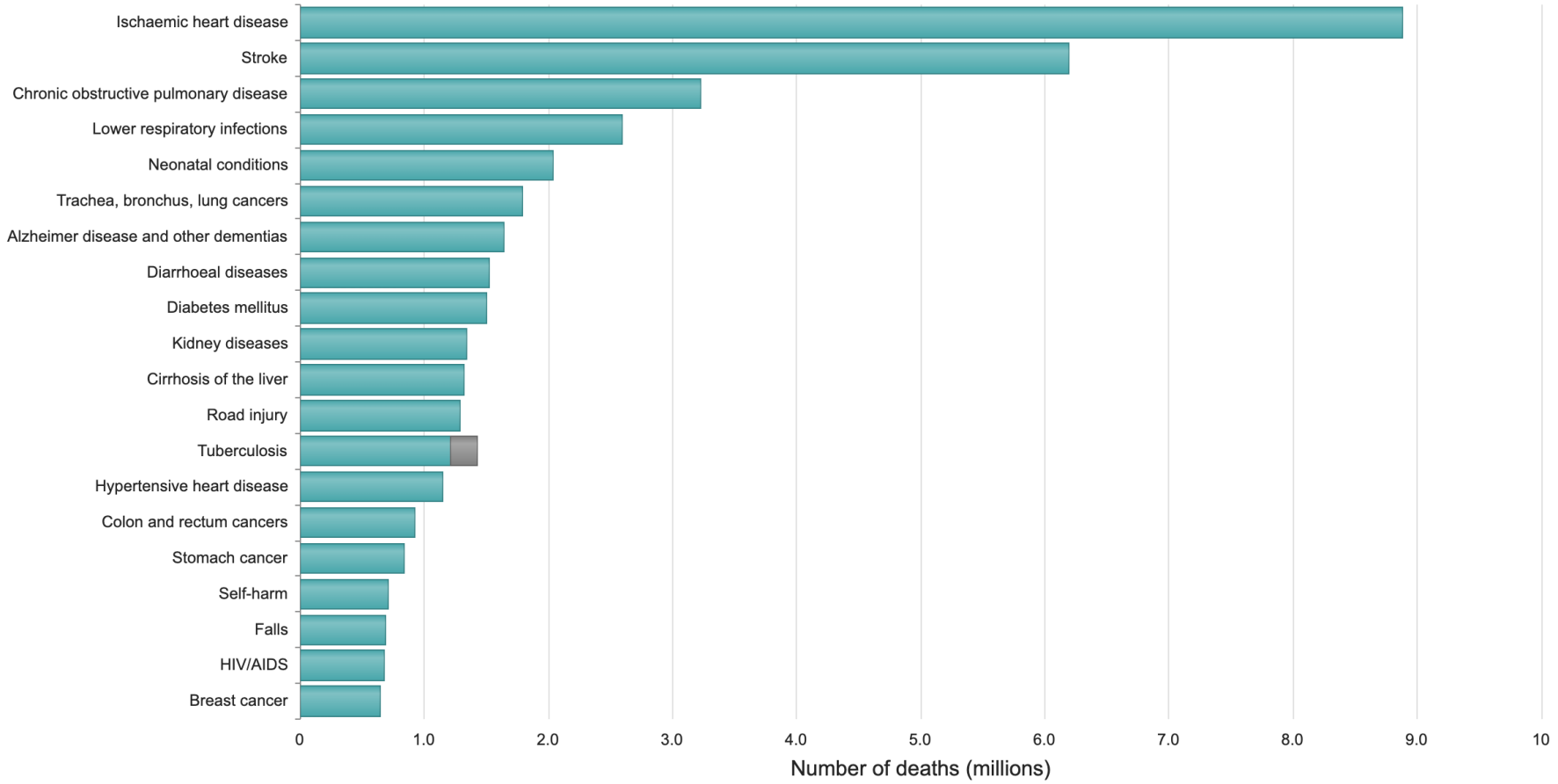
Leading Causes of Death in the World, 2019



WHO Global TB Report 2022

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Burden of TB in the United States

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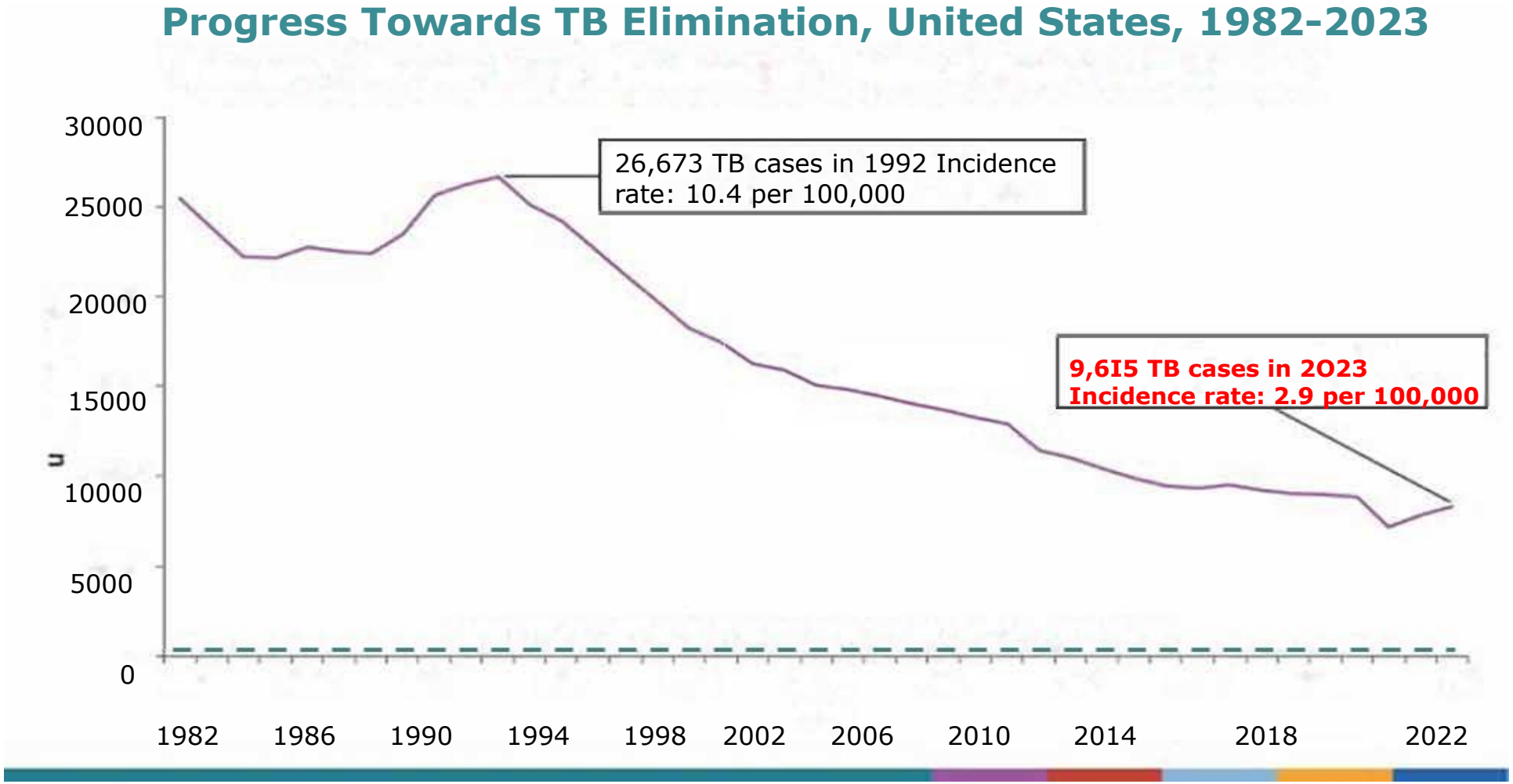
Latest CDC TB Statistics



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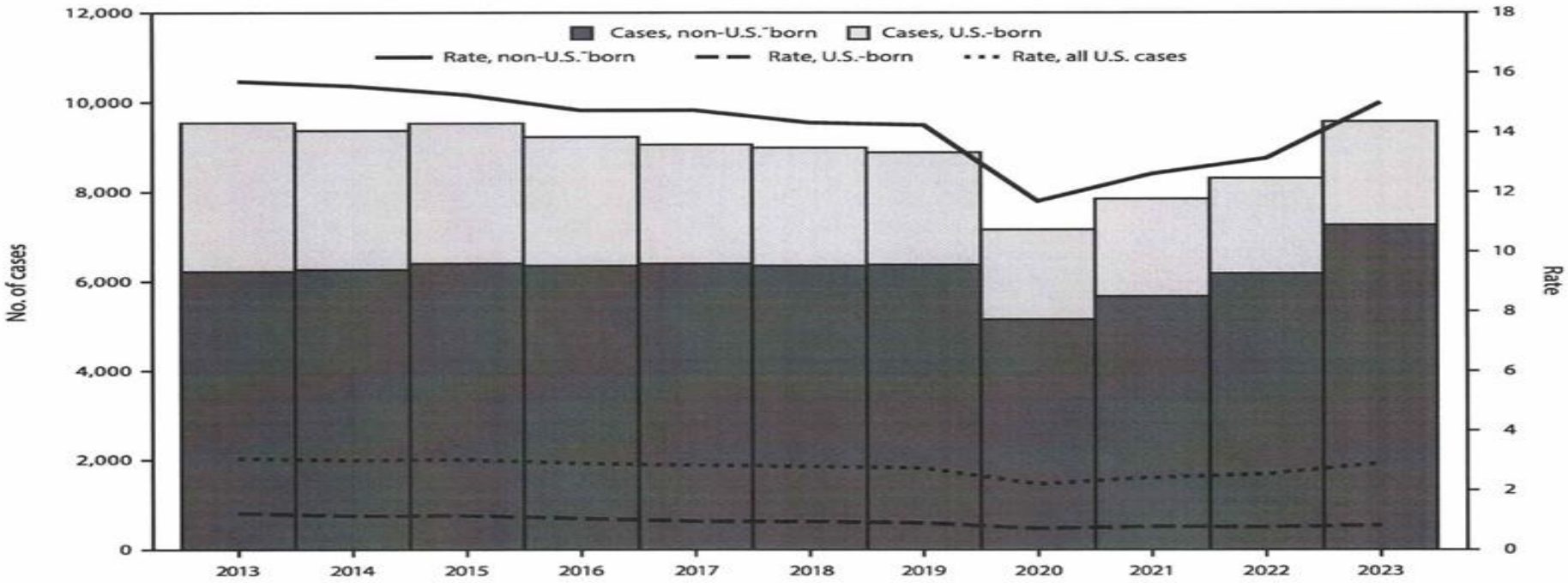
Cases of TB by Birth Origins 2013-2023

FIGURE. Annual number* and rate† of cases of tuberculosis disease, by birth origin§ — United States, 2013–2023



* Case counts are based on data from the National Tuberculosis Surveillance System as of February 17, 2024.
† Annual tuberculosis rate is calculated as cases per 100,000 persons. The Current Population Survey provides the population denominators used to calculate tuberculosis rate according to birth origin. https://www.census.gov/programs-surveys/cps.html (Accessed February 2, 2024).
§ Persons born in the United States or 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. Persons for whom birth origin was unknown (range = 7 [2013] to 42 [2023]) are not included in this figure.

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What are the "Hidden Stats" on TB

- Active TB cases: 9,615
- Contact investigation* identifies average of 17.9 contacts/active case; 1% new active case identified; 20% LTBI; estimated over 172,110 individuals that need to be evaluated, tested and offered preventive treatment if infected
- TB Infection (LTBI) Estimated >13,000,000 with ~10% risk of active TB in lifetime

*ARPE Report US, 2010 (CDC data 2/1/2015)

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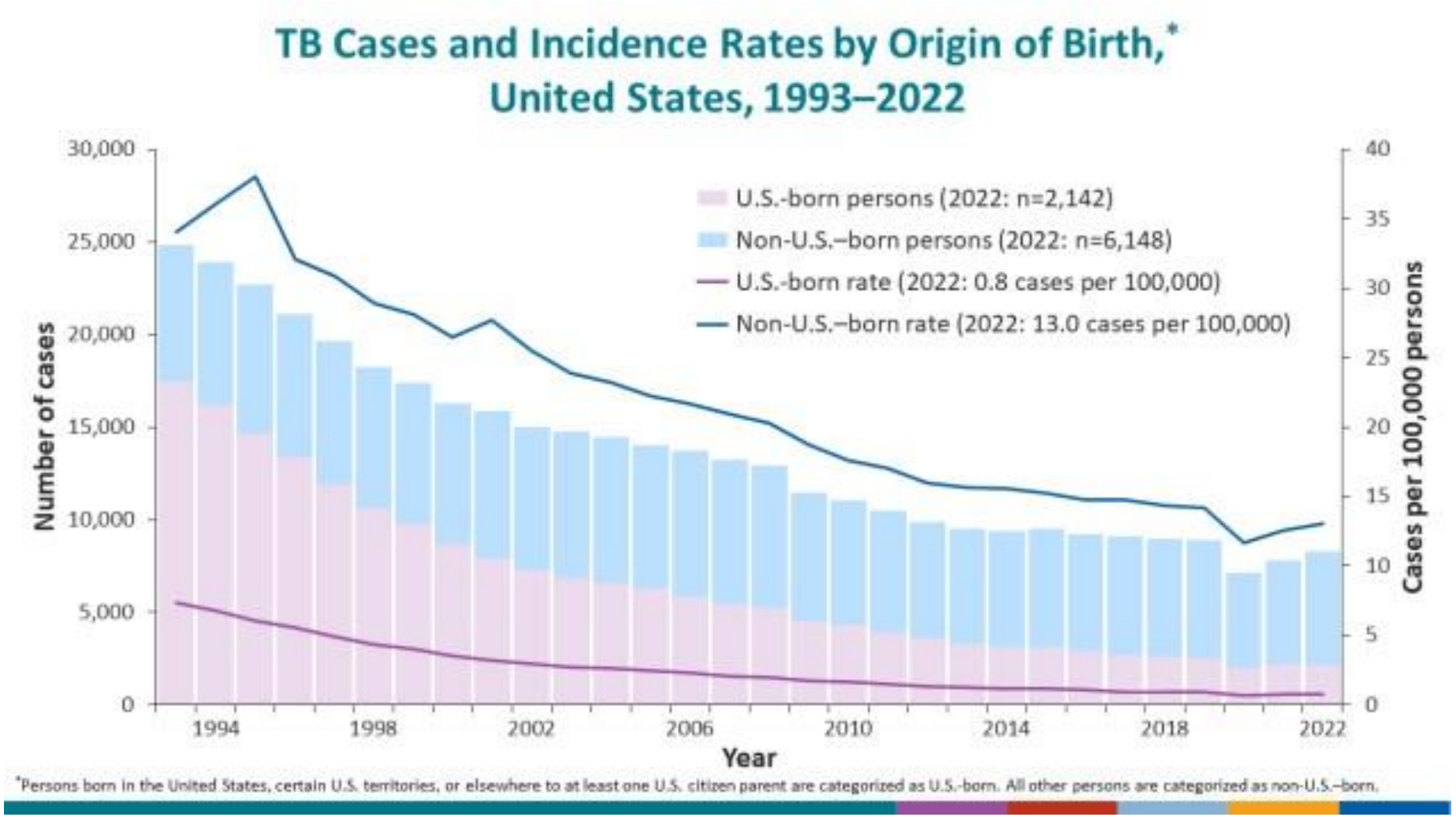
TB Cases and Incidence Rates by Origin of Birth



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TB Cases and Incidence During Covid Pandemic

No. of TB cases*				
2019	2020	2021	2022	2023
8,900	7,173	7,860	8,300	9,615

TB incidence†				
2019	2020	2021	2022	2023
2.71	2.16	2.37	2.50	2.90

2019-2020 20% ↓

2020-2021 9% ↑

2021-2022 6% ↑

2022-2023 16% ↑

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TB Statistics Not Uniformly Distributed in the US in 2023

- US overall saw an increase of **16%** from 2022-2023 (18% FB/9% USB)
- East Coast States (GTBI) saw an increase of **24.7%** from 2022-2023
- Texas saw an increase of only **12%** from 2022-2023
- Florida saw an increase of only **16%** from 2022-2023

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2023 East Coast (GTBI) States TB Stats

State	2022	2023	#Change	%Change
Connecticut	67	66	-1	**-1.50%**
Delaware	13	21	8	62%
District of Columbia	15	26	11	**73%**
Indiana	99	130	31	31%
Maine	17	26	9	52%
Maryland	157	198	41	26%
Massachusetts	154	224	70	45%
Michigan	120	149	29	24%
New Hampshire	11	14	3	27%
New Jersey	289	330	41	14%
New York	709	894	185	26%
Ohio	146	193	47	32%
Pennsylvania	173	216	43	25%
Vermont	3	3	0	**0%**
West Virginia	11	15	4	36%
Totals	**2196**	**2739**	**543**	**24.70%**

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I need a break from all these stats!!!!!!!!!!!

This probably made someone unhappy.

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Tuberculosis in Pennsylvania

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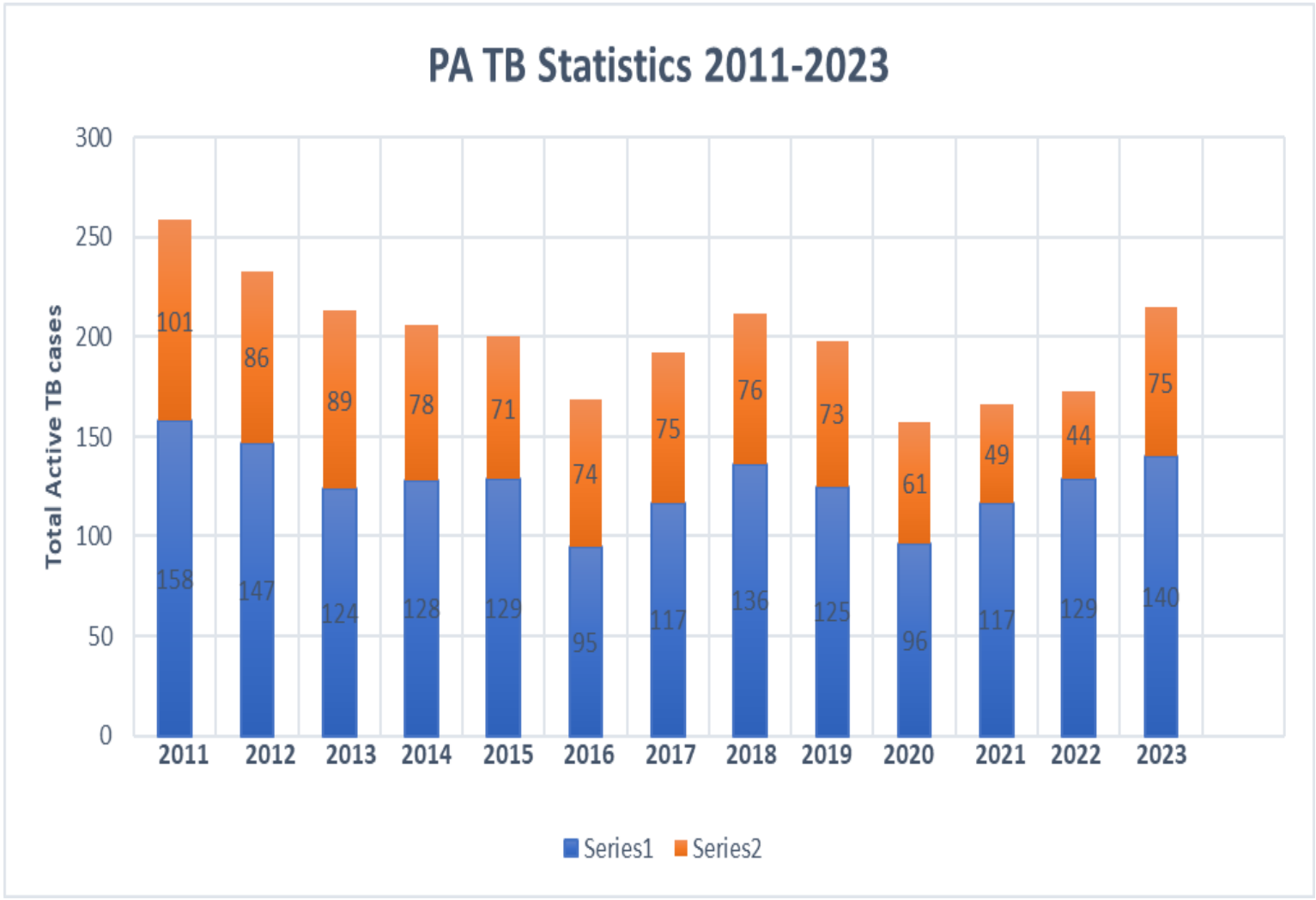
PA TB Statistics 2011-2023



Philadelphia

PA w/o Philadelphia

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Pediatric TB case counts Pennsylvania

Year	Total	0-5 yrs	6-10 yrs	11-15 yrs
2018	212	0	0	0
2019	198	1	0	
2020	157	0	1	0
2021	166	0	0	0
2022	173	2	1	0
2023	215	1	0	5

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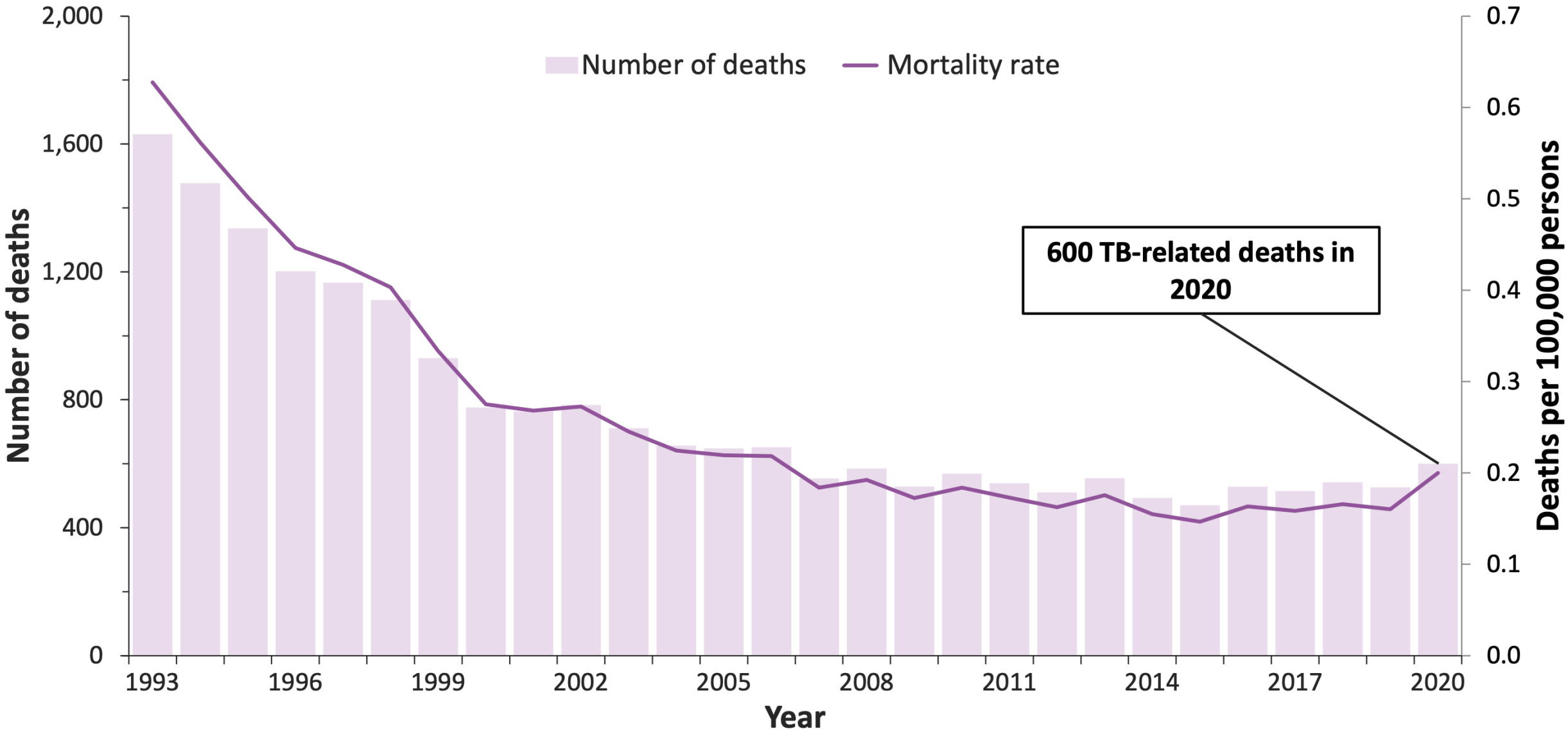
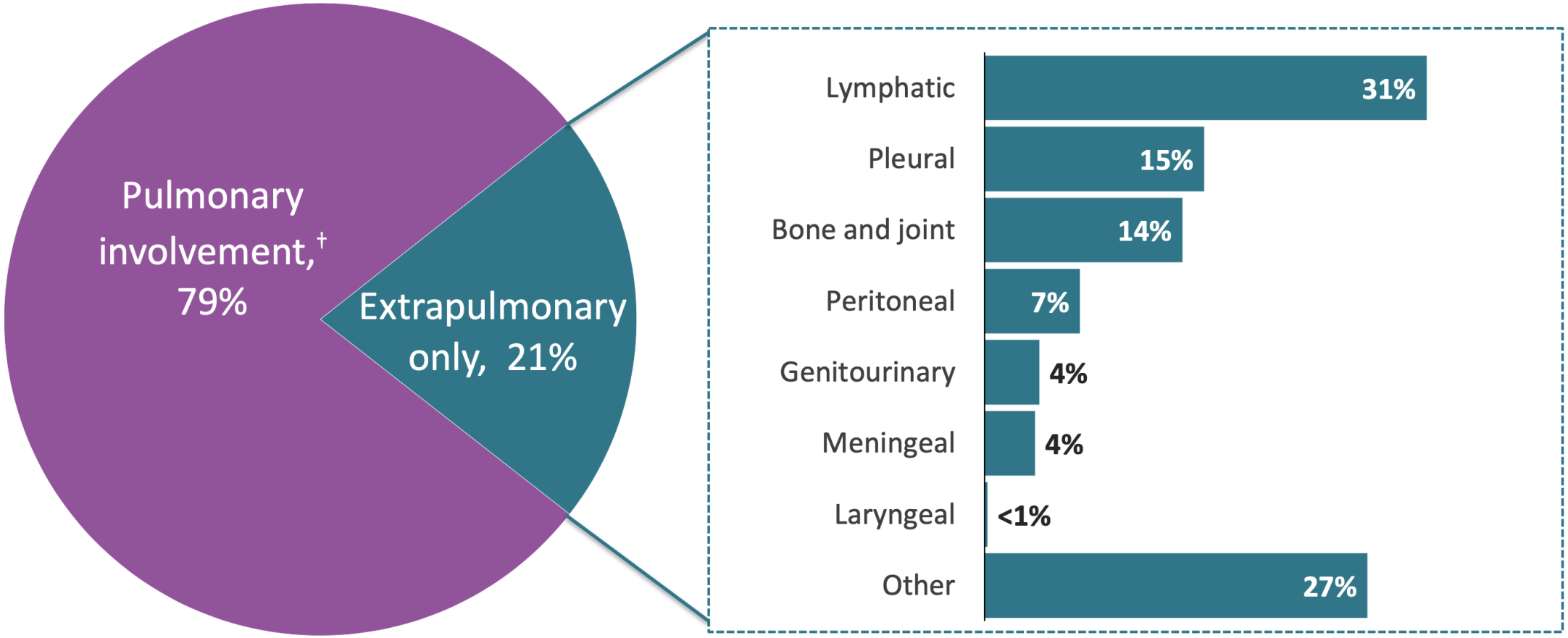
TB-Related Deaths* and Mortality Rates, United States, 1993–2020



Percentage of TB Cases by Site of Disease,* United States, 2021



*Patients may have more than one disease site but are counted in mutually exclusive categories for surveillance purposes.
†Any pulmonary involvement which includes cases that are pulmonary only and both pulmonary and extrapulmonary.

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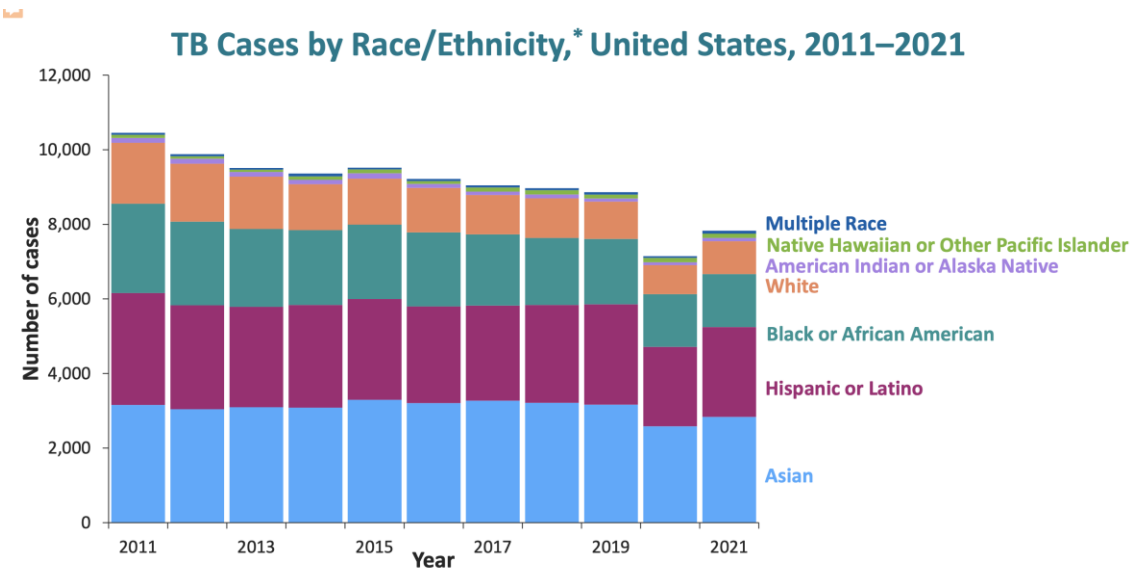
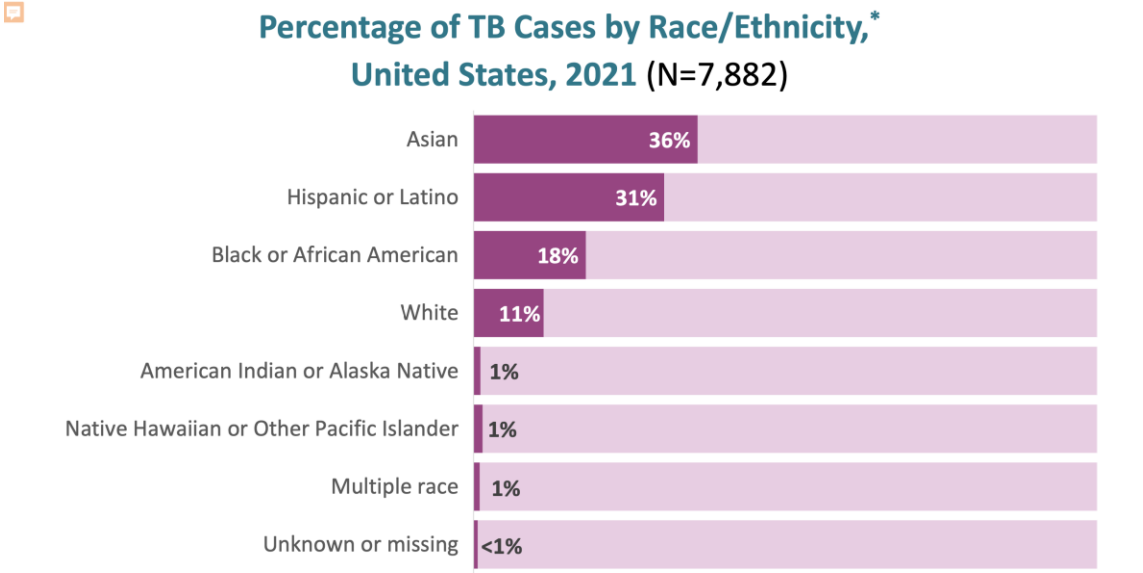
TB Cases by Race and Ethnicity, U.S.



*Persons who identified as Hispanic or Latino were categorized as "Hispanic or Latino," 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."



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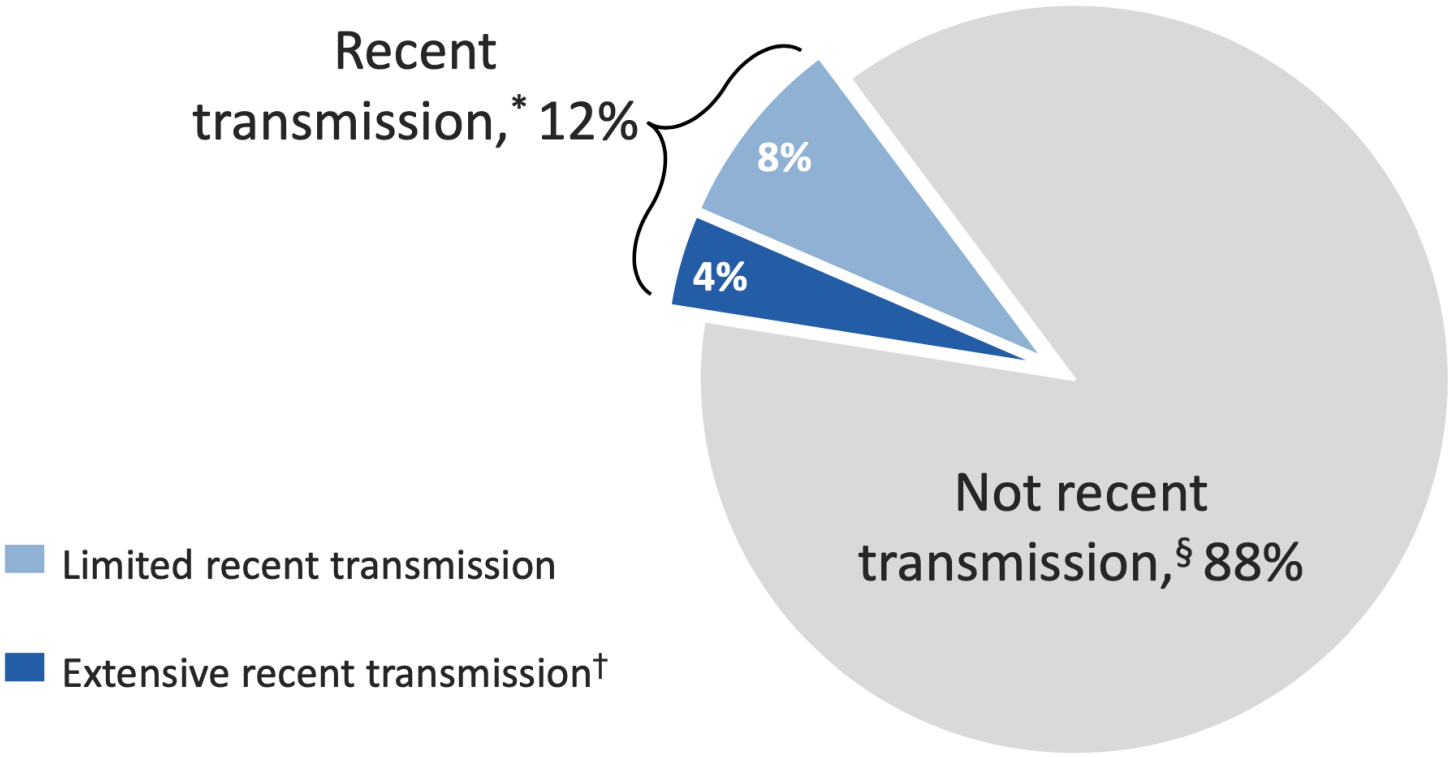
Genotyped TB Cases Estimated to be Attributed to Recent Transmission, United States, 2020–2021 (N=11,404)



* A TB case is designated as attributed to recent transmission if a plausible source case can be identified in a person who i) has the same *M. tuberculosis* genotype, ii) has an infectious form of TB disease, iii) resides within 10 miles of the TB case, iv) is 10 years of age or older, and v) was diagnosed within 2 years before the TB case.

† A TB case is designated as attributed to extensive recent transmission when the criteria above for recent transmission are met, and furthermore the case belongs to a plausible transmission chain of six or more cases. Otherwise, the case is designated as attributed to limited recent transmission.

§ Cases not attributed to recent transmission may be misclassified in children <5 years old or indeterminate in persons with a recent U.S. arrival due to limitations of the plausible-source case method.

Epidemiology of TB 2024: Conclusions

- Globally, TB incidence rates have declined only gradually over the past 20 years

- The COVID-19 pandemic set back TB control efforts sharply in 2020 and led to an increase in TB mortality globally for the first time in many years

- TB rates in the United States after 27 years of declining TB cases, the number of TB cases declined considerably in 2020 to 7,171, coinciding with the COVID-19 pandemic (4); however, TB case counts and rates increased in 2021 and 2022 and now have rebounded post-pandemic to pre-pandemic levels and more in 2023 to 9,165 returning to 2013 levels

- Non-US-born persons account for the majority of cases (76%) of active TB in the US and almost all cases (85%) in this segment of the population are due to reactivation and not community transmission

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Consultations Available

ezuroweste@outlook.com

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