



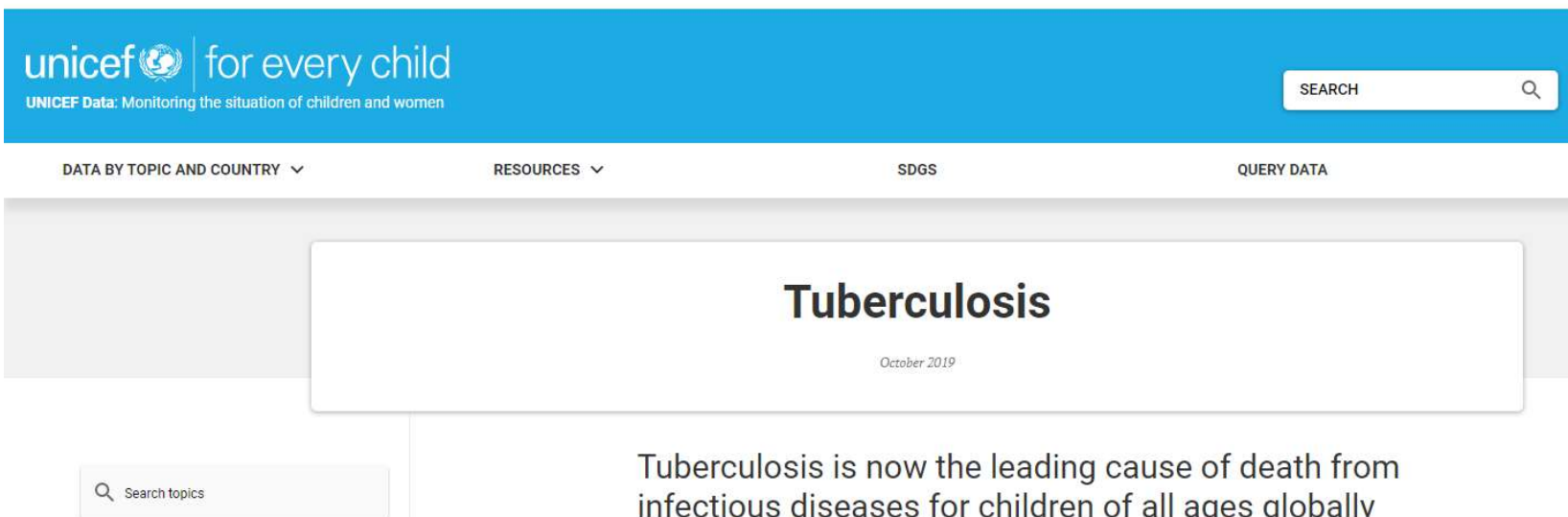

Epidemiology of Pediatric TB

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UT Health NE

Global Pediatric TB



The screenshot shows the UNICEF Data website interface. At the top is a blue header with the UNICEF logo and the text "for every child" and "UNICEF Data: Monitoring the situation of children and women". A search bar is located in the top right corner. Below the header is a navigation bar with four links: "DATA BY TOPIC AND COUNTRY", "RESOURCES", "SDGS", and "QUERY DATA". The main content area features a large white box with the title "Tuberculosis" and the date "October 2019". Below this box is a search bar with the text "Search topics". To the right of the search bar is a large text block stating: "Tuberculosis is now the leading cause of death from infectious diseases for children of all ages globally".

unicef | for every child
UNICEF Data: Monitoring the situation of children and women

SEARCH

DATA BY TOPIC AND COUNTRY ▼ RESOURCES ▼ SDGS QUERY DATA

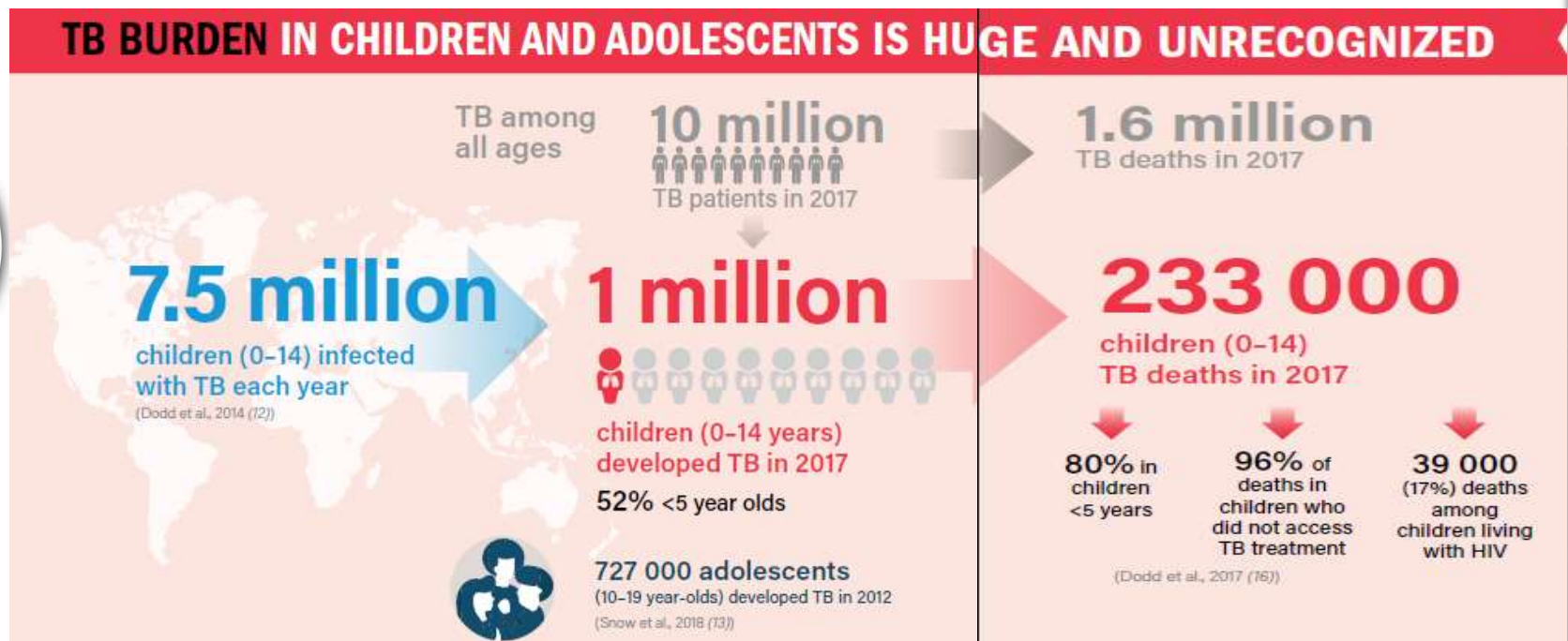
Tuberculosis

October 2019

Search topics

Tuberculosis is now the leading cause of death from infectious diseases for children of all ages globally

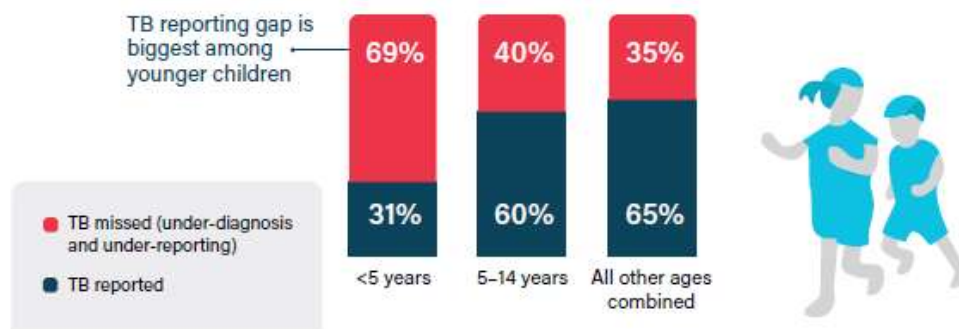
Global Pediatric TB



Global Pediatric TB

CASE DETECTION GAP

% of TB patients that are missed in different age groups



Overall 55% of estimated children with TB (0-14 years) are **not reported** to national TB programmes



TB can be a cause or co-morbidity of common child illnesses, especially pneumonia and malnutrition. More specific tests are needed to improve diagnosis.

(Oliwa et al, 2015 (14); Patel and Detjen, 2017 (15))

PREVENTION GAP

Globally in 2017, **over 75%** (of 1.3 million eligible household contacts under 5 years of age) **did not access preventive therapy**




WHO recommends TB prevention including:

- ✓ Preventive therapy
- ✓ Infection control measures
- ✓ BCG vaccination

In the 158 countries for which data on BCG coverage are available, **120 reported coverage of at least 90% in 2017**


Global Pediatric TB

TB/HIV




Link between HIV and TB in children and adolescents is well known but not acted upon

TB is the most common opportunistic infection in people living with HIV, including children and adolescents




Only around half of eligible children access antiretroviral therapy, which significantly reduces the risk of TB in children living with HIV. (UNAIDS, 2018 (17))




TB preventive therapy is not fully implemented as part of comprehensive HIV care for children and adolescents (UNAIDS, 2018 (17))

Children living with HIV who have severe immune suppression (low CD4 count) have a **5-fold higher** risk of TB compared to children with mild immune-suppression (Dodd et al., 2017 (18))


MDR-TB



An estimated 25 000 children <15 years fell ill with MDR-TB in 2014



Less than 10% of them were diagnosed and had access to treatment (Dodd et al., 2016 (19); Jenkins et al., 2014 (20))



Drug-resistant TB is a major contributor to antimicrobial resistance

US Pediatric Tuberculosis

- Definition of pediatric tuberculosis (TB):
 - TB disease in a person <15 years old
- In 2019:
 - 8,916 TB cases were reported among all age groups
 - 367 (4.1%) were pediatric

Age group	N	Percentage of all cases
0–4 years	215	2.4%
5–14 years	152	1.7%

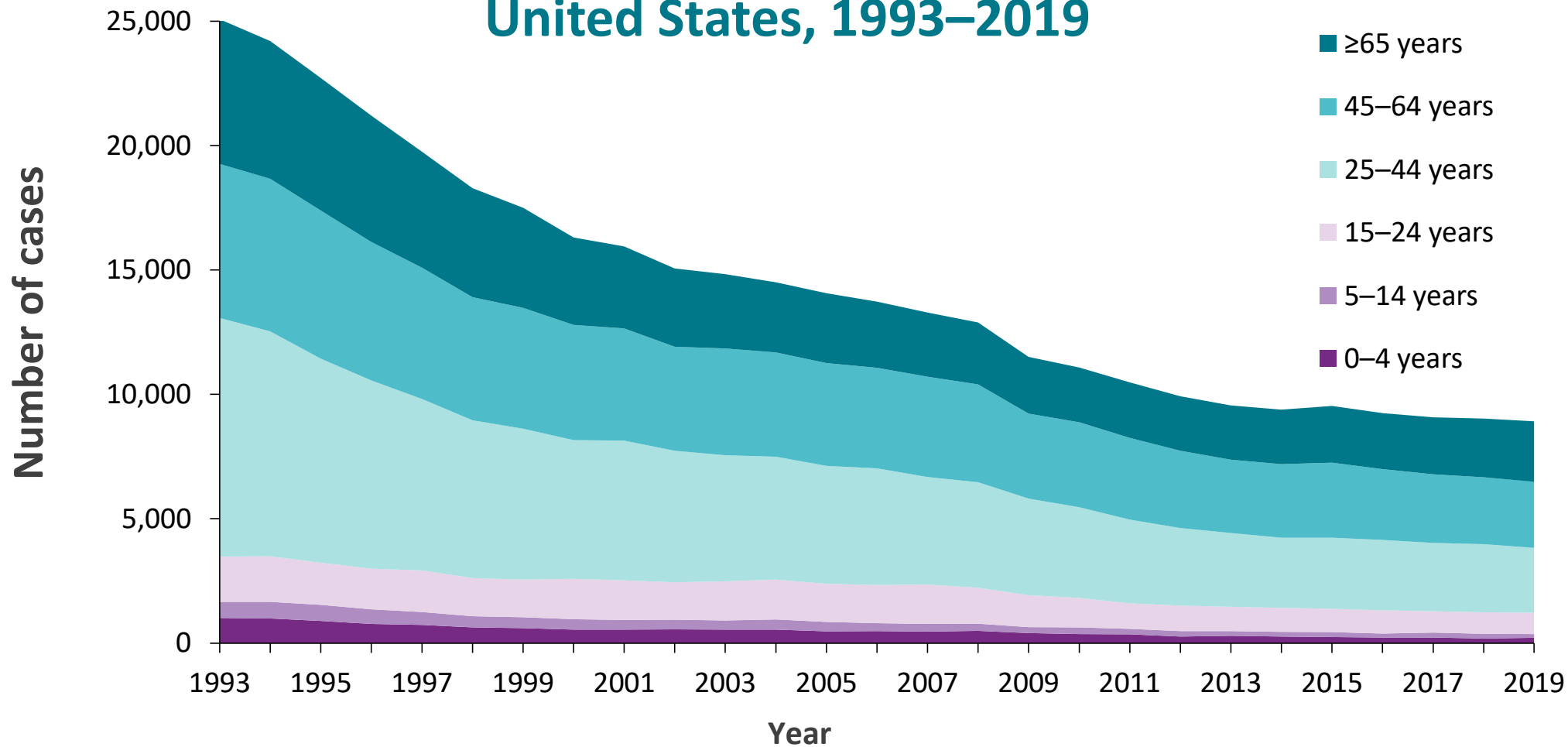


US States with Most Pediatric TB Cases 2019

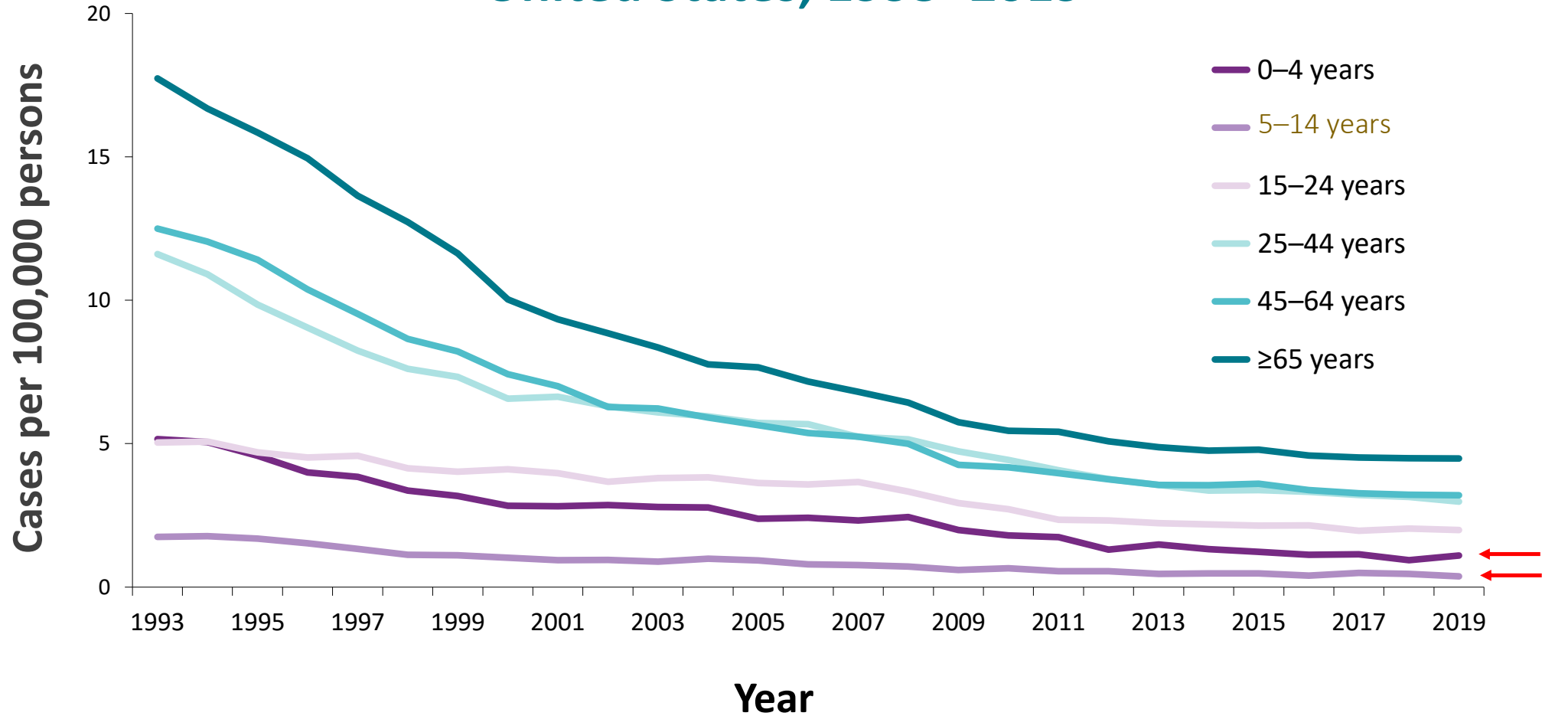
State	Total cases	< 5 y/o	5-14 y/o	Total Pediatric Cases
Texas	1159	43	26	69
California	2113	29	26	55
Florida	558	9	12	21
Georgia	299	13	8	21
Illinois	326	10	8	18



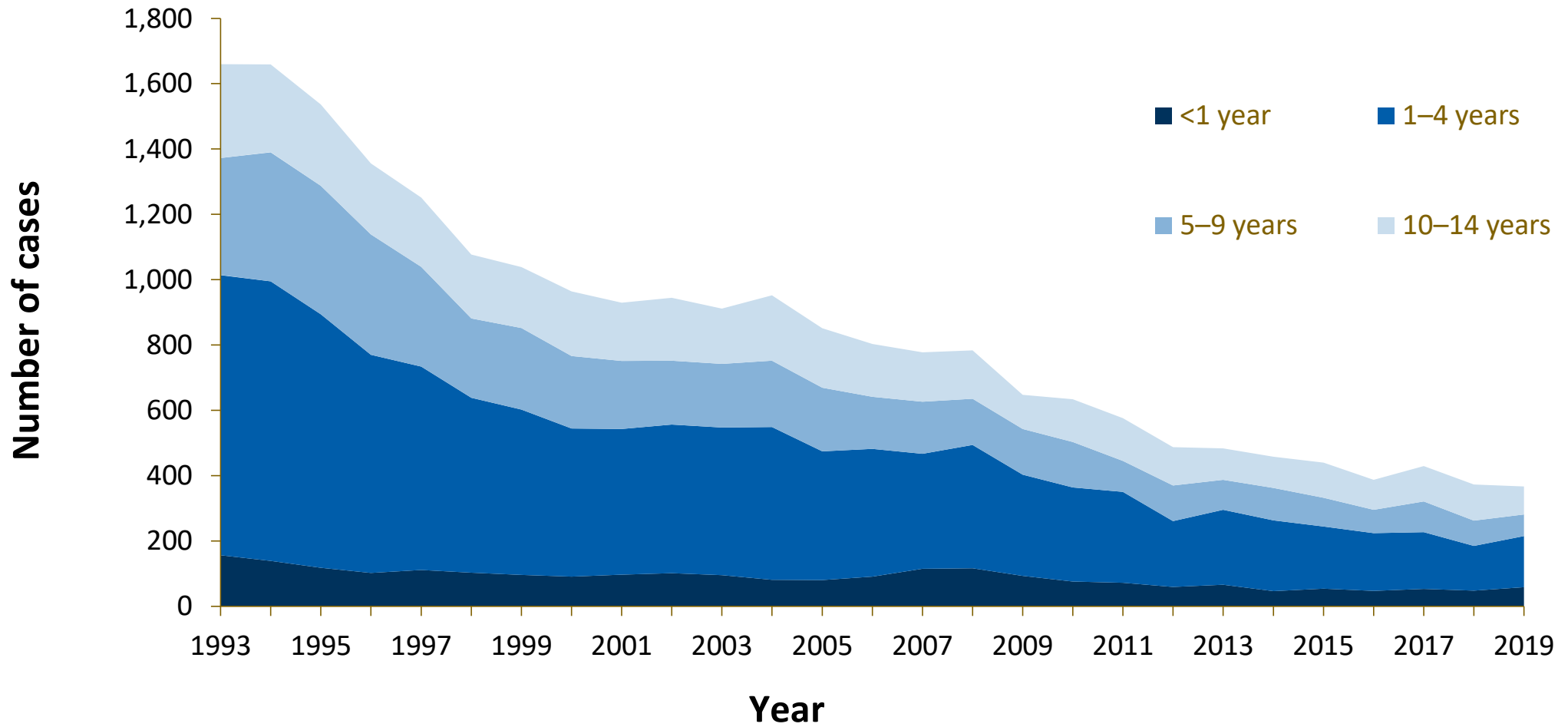
Reported TB Cases by Age Group, United States, 1993–2019



TB Case Rates by Age Group, United States, 1993–2019

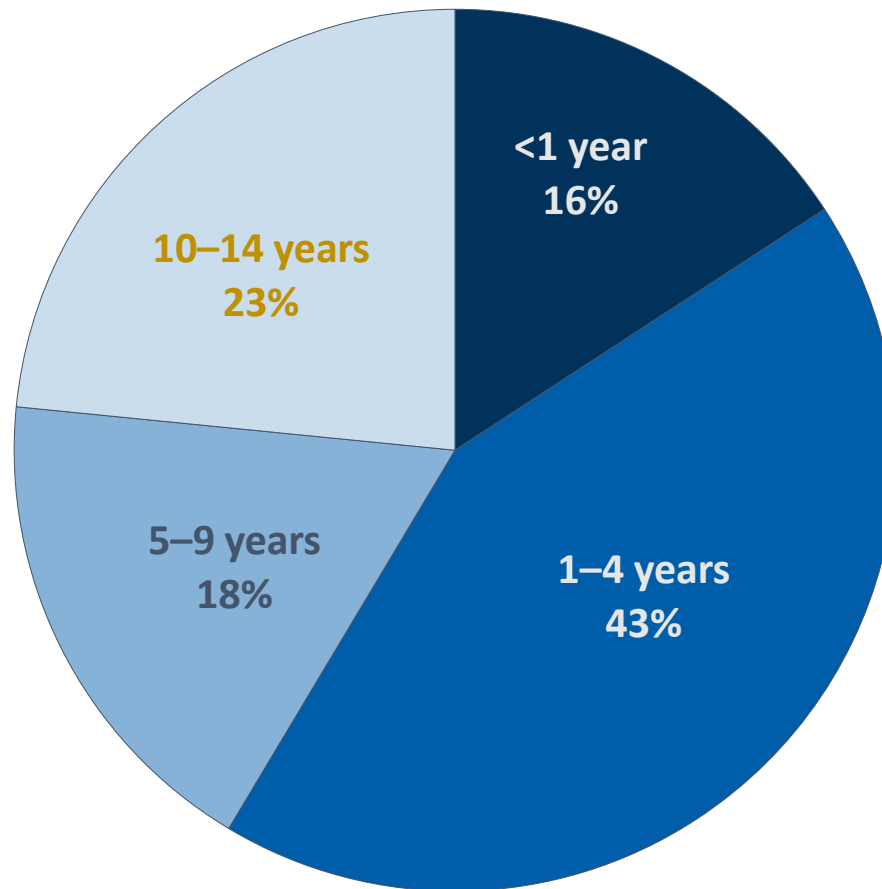


Pediatric TB Cases by Age Group, 1993–2019

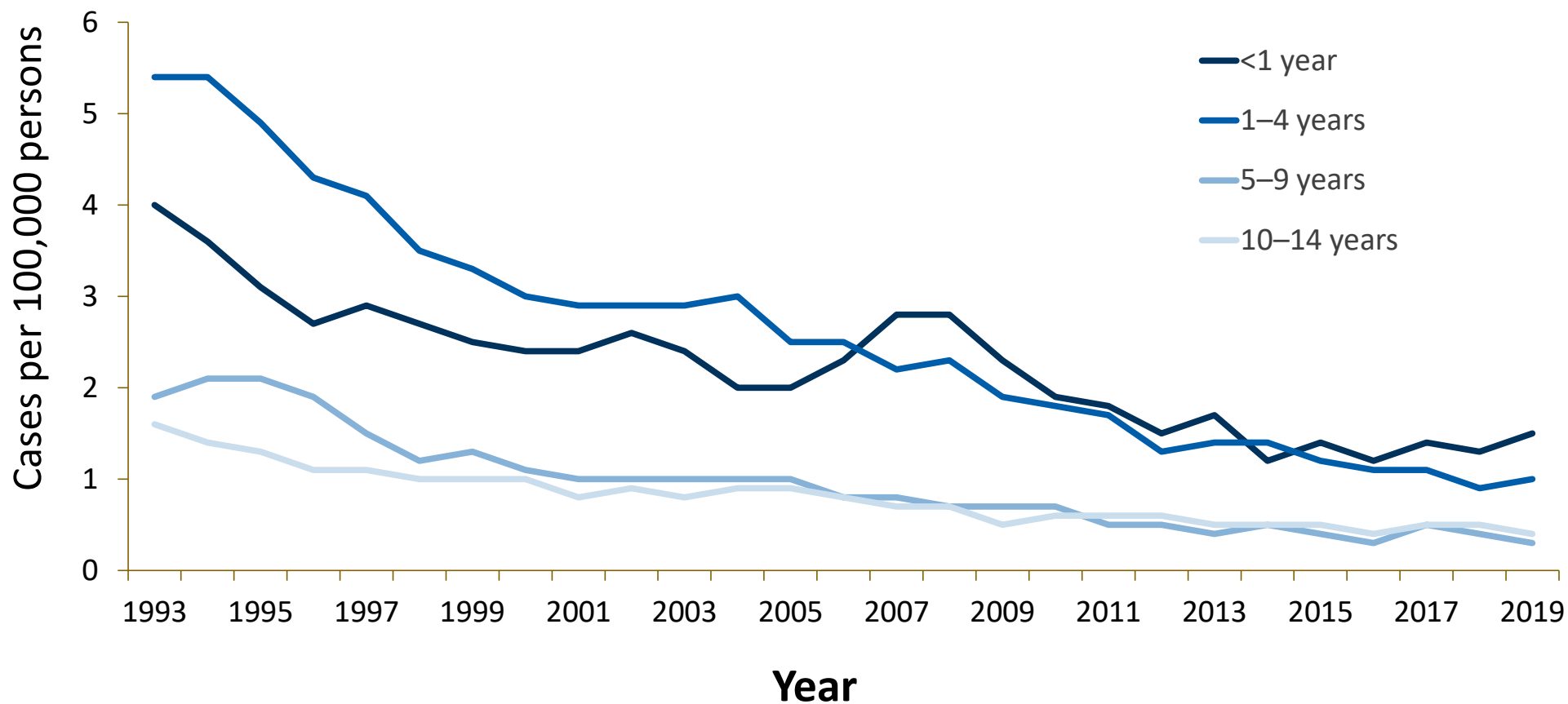


Pediatric TB Cases by Age Group, 2019

(N=367)



Pediatric TB Case Rates by Age Group, 1993–2019



Distribution of Sex by Age Group, United States, 2019

Males (N=5,361)

Females (N=3,555)

Age Group



0-4 years (N=215)

5-14 years (N=152)

15-24 years (N=850)

25-44 years (N=2,612)

45-64 years (N=2,665)

≥65 years (N=2,422)



50%

51%

44%

44%

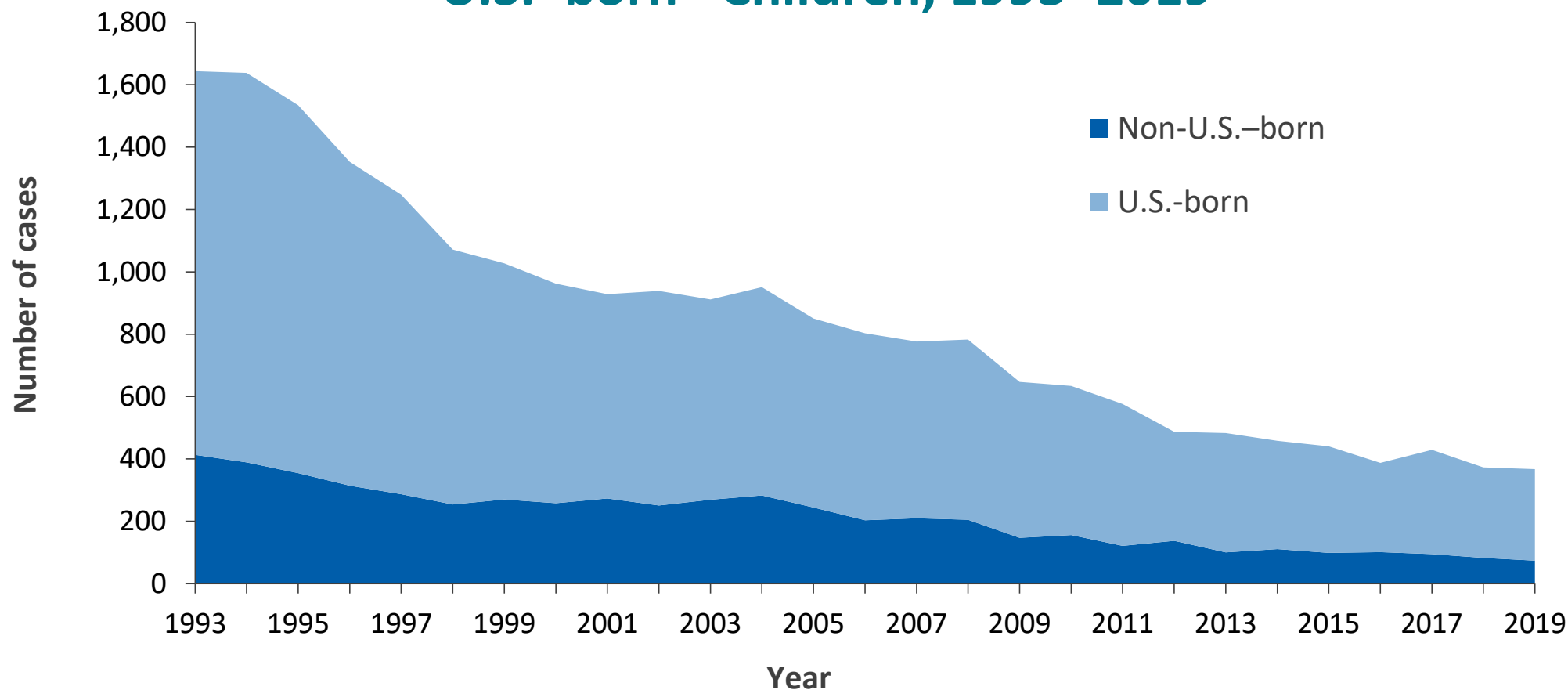
35%

38%

80% 60% 40% 20% 0%

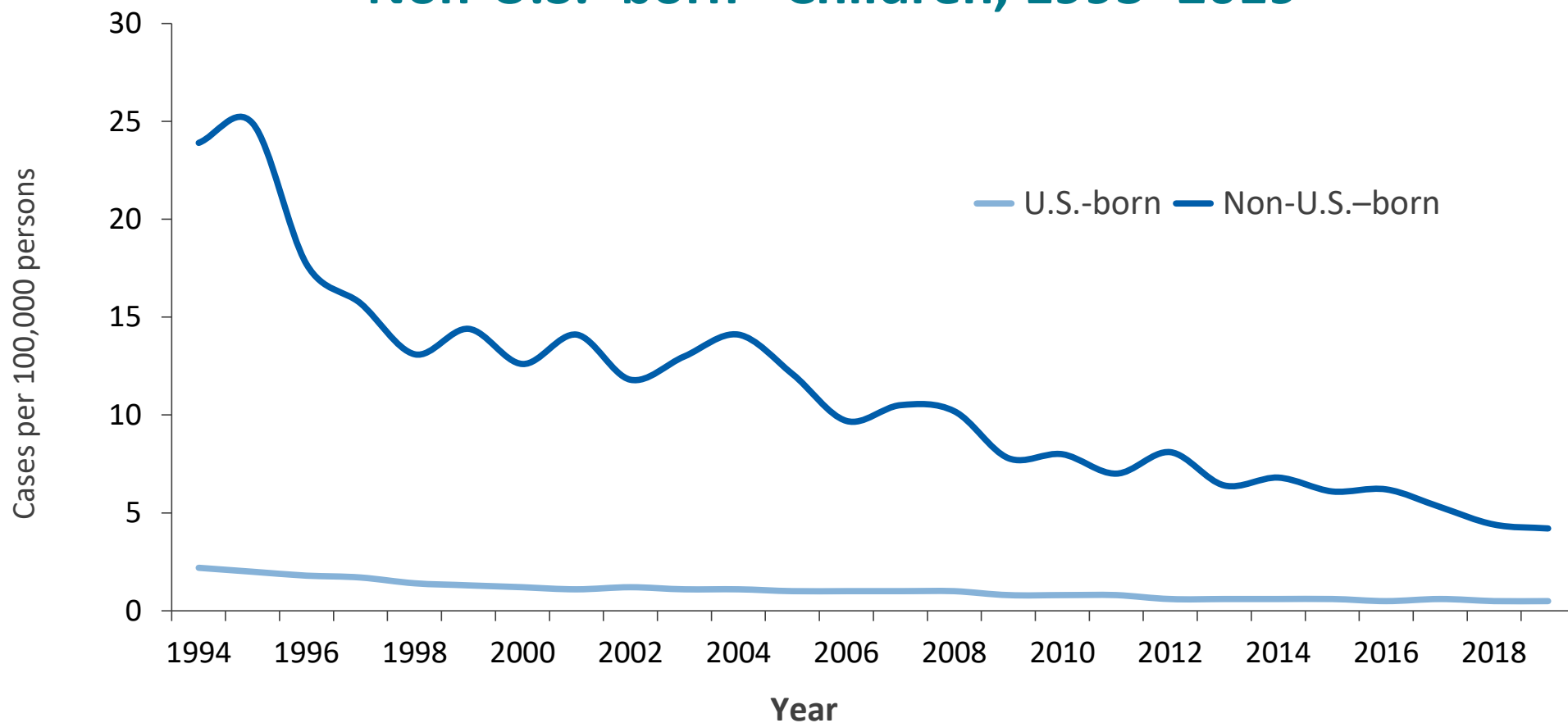
0% 20% 40% 60% 80%

Number of Pediatric TB Cases among U.S.-born and Non-U.S.-born* Children, 1993–2019



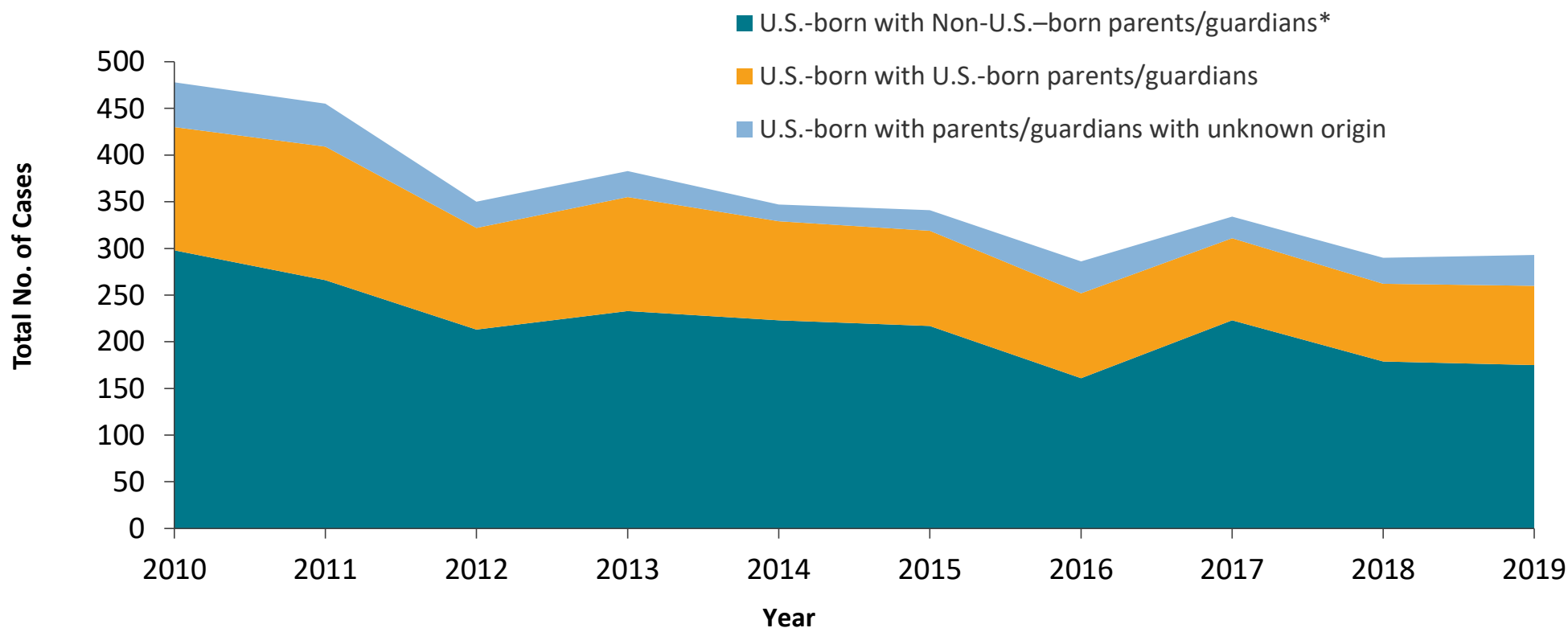
*Non-U.S.-born refers to persons born outside the United States or its territories or not born to a U.S. citizen

Pediatric TB Case Rates for U.S.-born and Non-U.S.-born* Children, 1993–2019



*Non-U.S.-born refers to persons born outside the United States or its territories or not born to a U.S. citizen

Number of U.S. Pediatric TB Cases among U.S.-Born Children by Parent/Guardian Status, 2010–2019



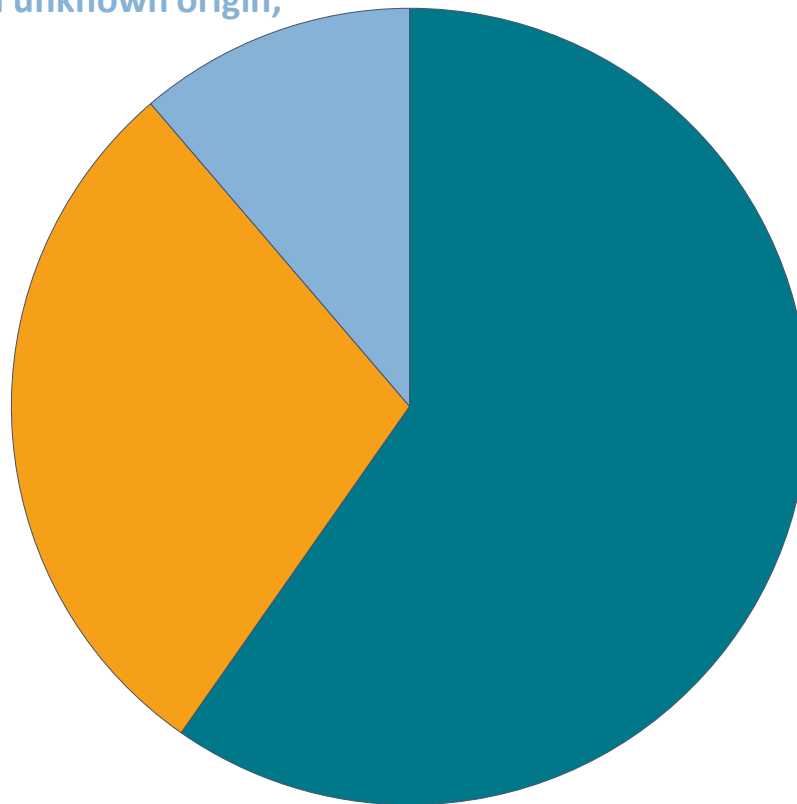
*At least one parent/guardian was non-U.S.-born

Number of Pediatric TB Cases among U.S.-born Children by Parent/Guardian Status, 2019 (N=293)

Parents/guardians with unknown origin,
11%

Non-U.S.-born
parents/guardians*, 60%

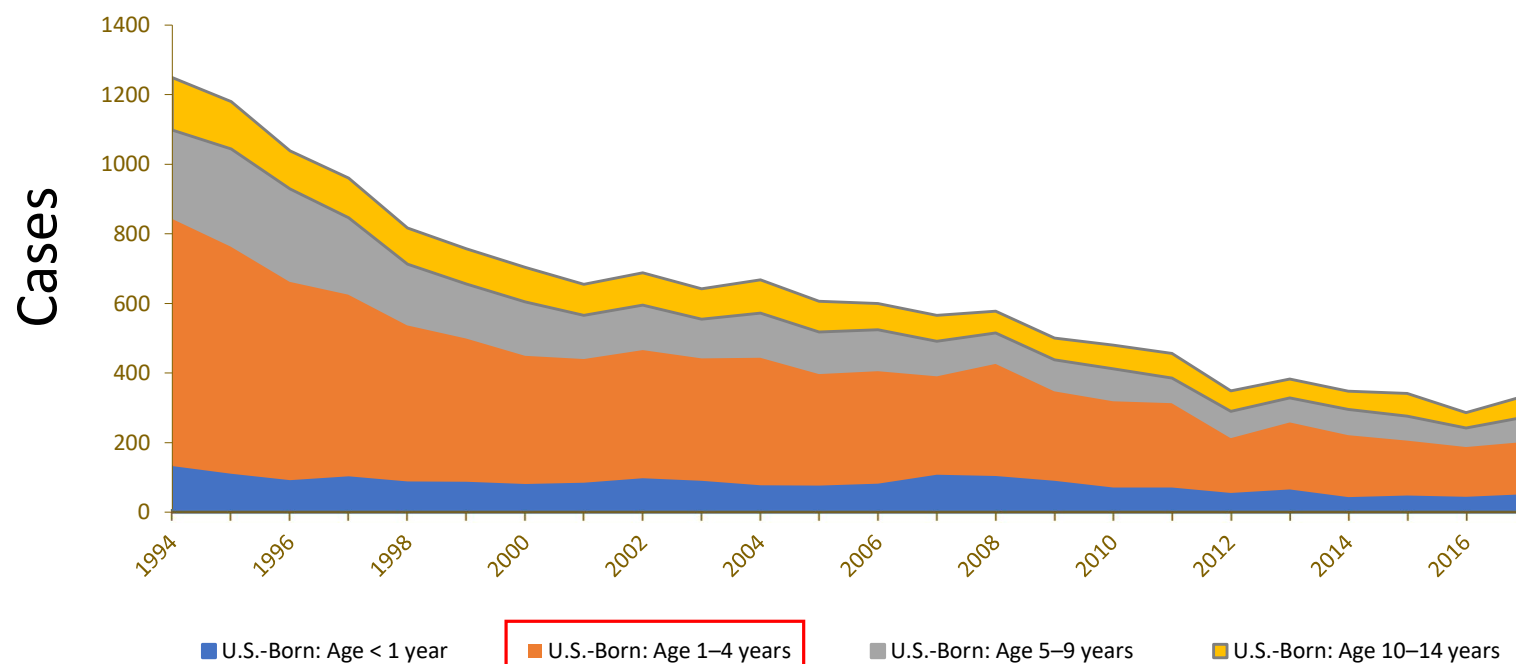
U.S.-born parents/guardians, 29%



*At least one parent/guardian was non-U.S.-born.

Pediatric TB Cases among U.S.-Born Children, by Age Group, 1994–2017

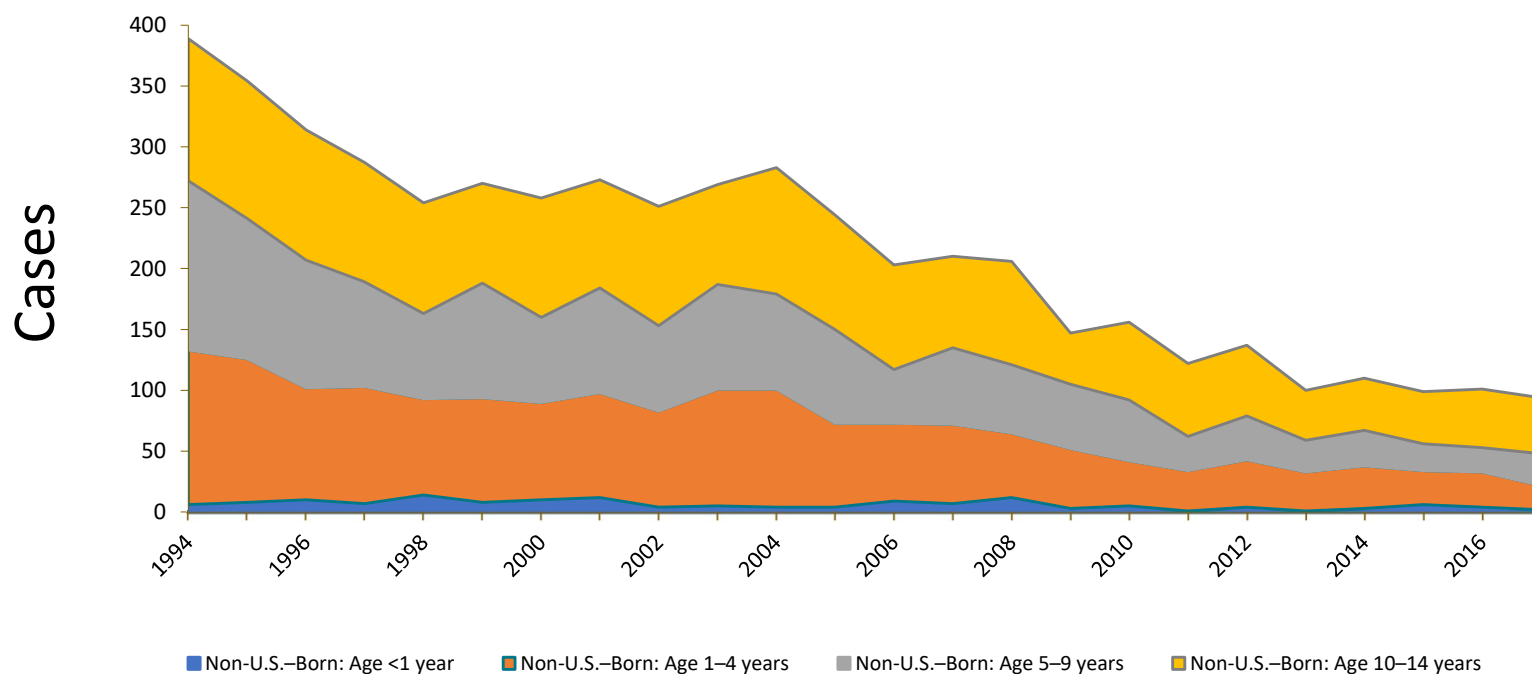
N=15,186



*Non-U.S.-born refers to persons born outside the United States or its territories or not born to a U.S. citizen

Pediatric TB Cases among Non-U.S.–Born* Children, by Age Group, 1994–2017

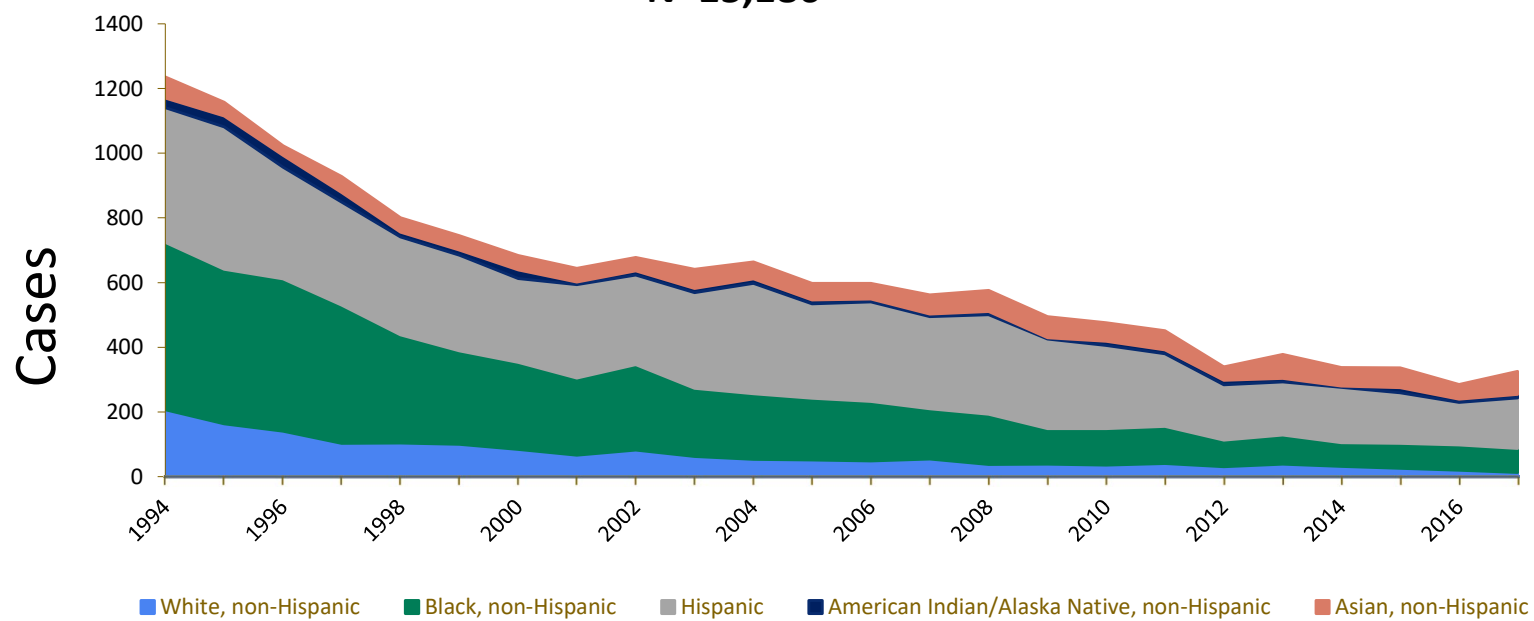
N=5,131



*Non-U.S.–born refers to
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U.S.-Born Pediatric TB Cases by Race-Ethnicity, 1994–2017

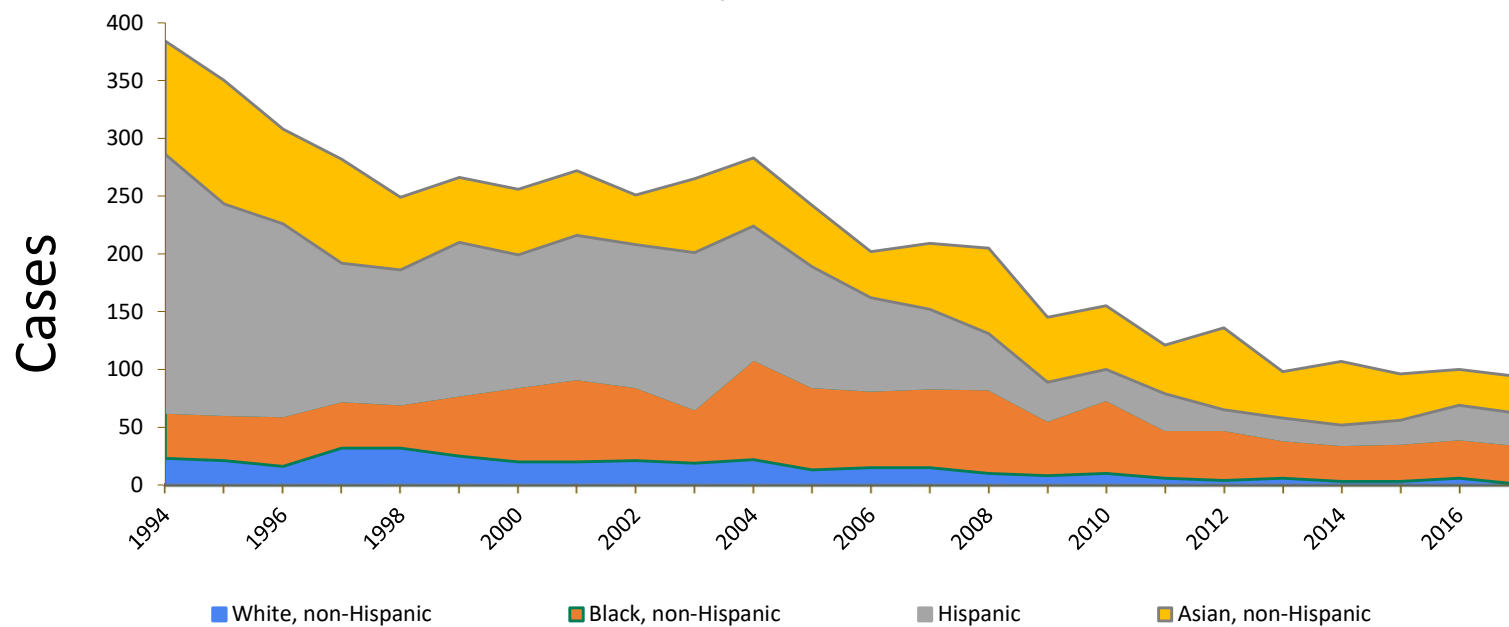
N=15,186



Note: Multiple race/ethnicity and unknown not shown; Native Hawaiian and Other Pacific Islander combined with Asian
Graph begins in 1994 to match the availability of population data

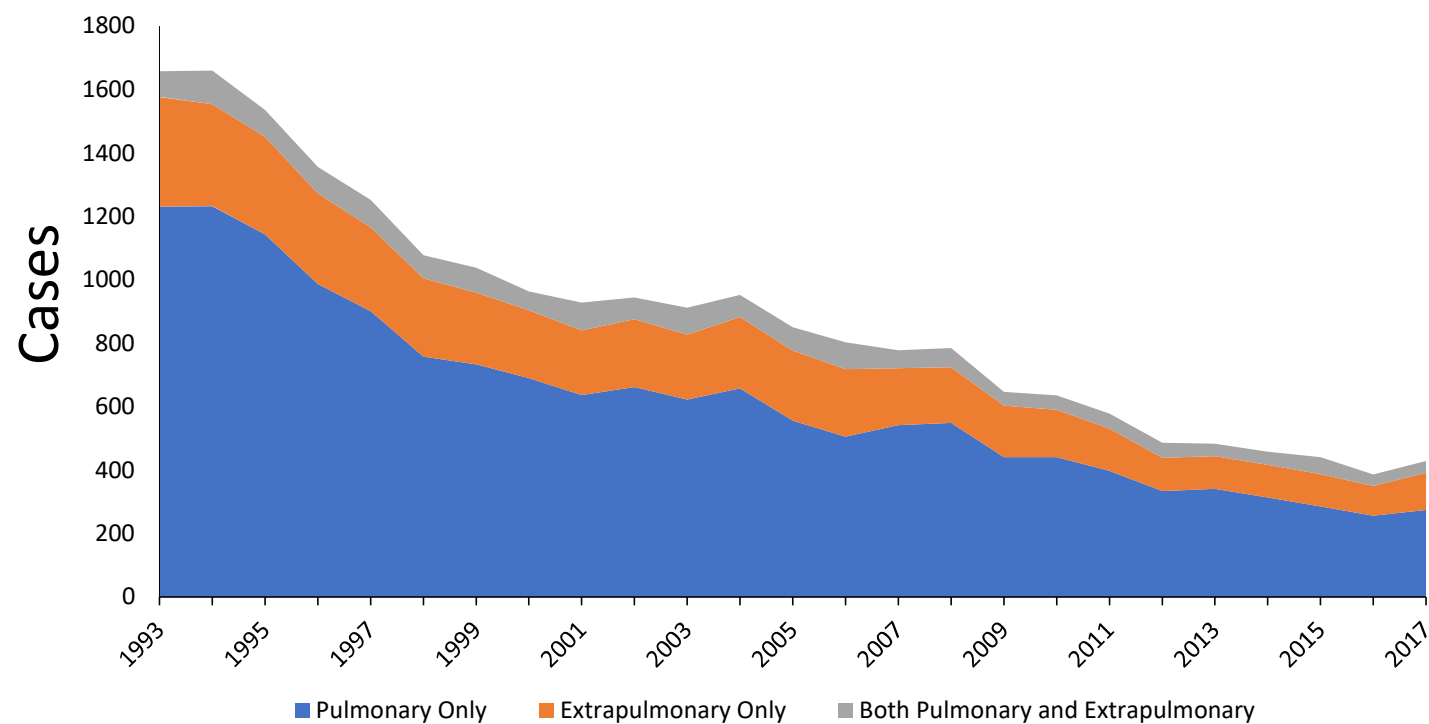
Non-U.S.–Born* Pediatric TB Cases by Race-Ethnicity, 1994–2017

N=5,131

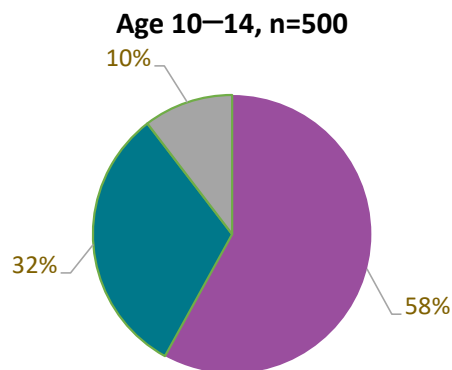
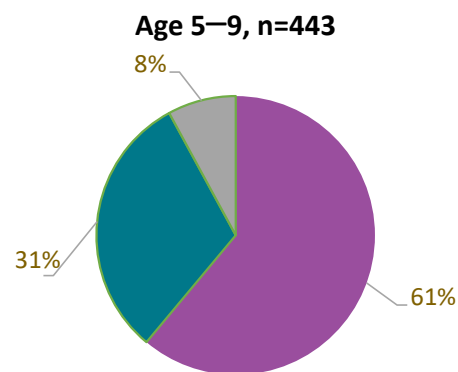
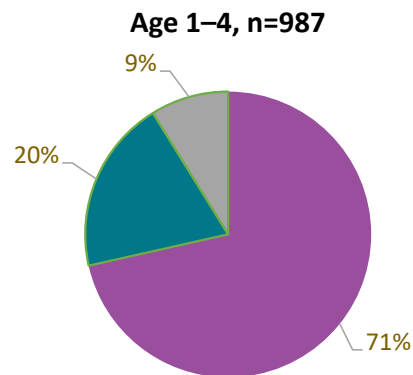
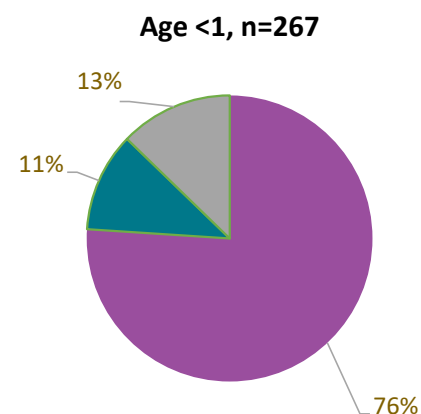


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U.S. Pediatric TB Cases by Site of Disease, 1993–2017

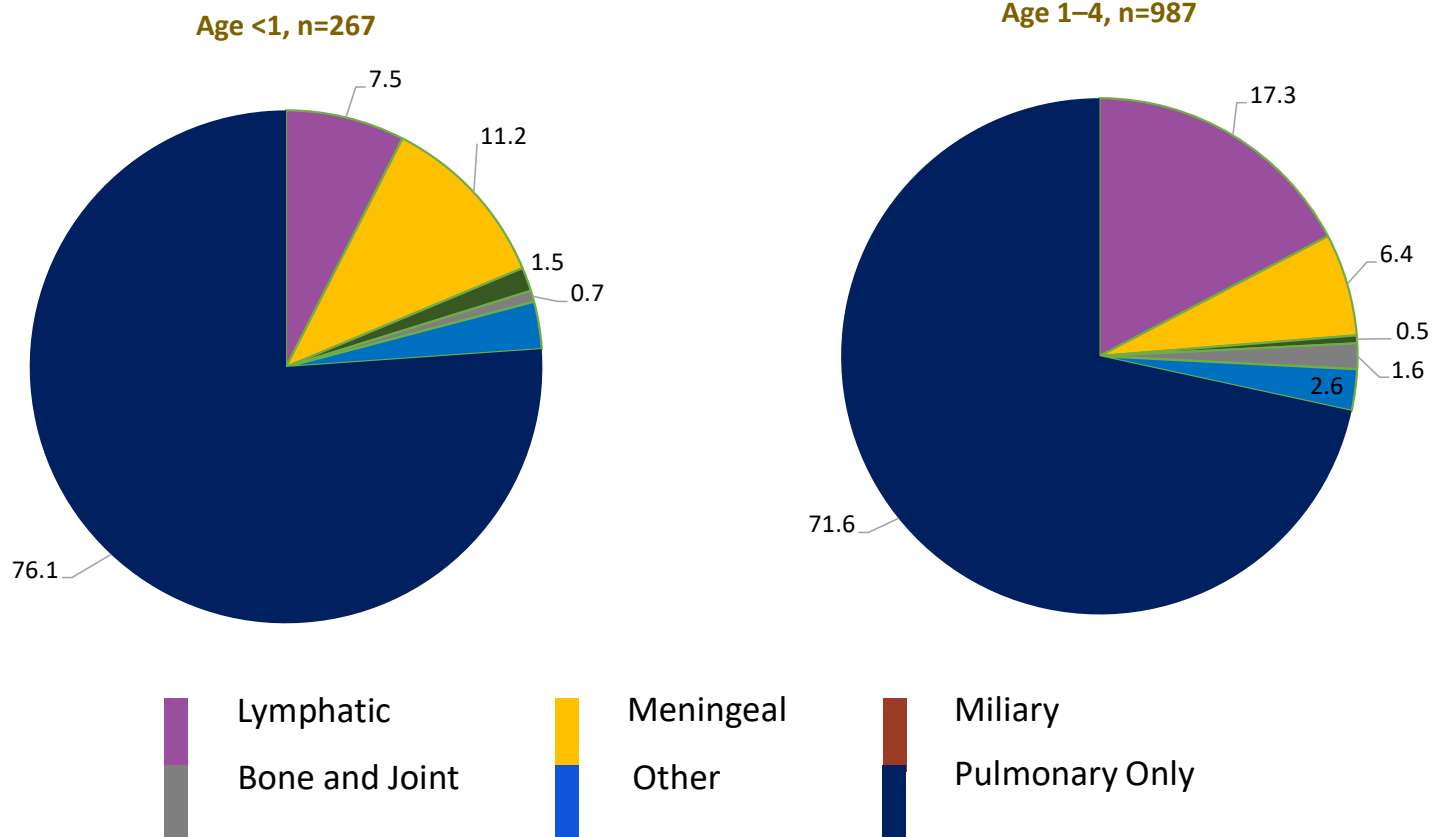


U.S. Pediatric TB Cases by Site of Disease and Age Group, Summed and Averaged Over 2013–2017

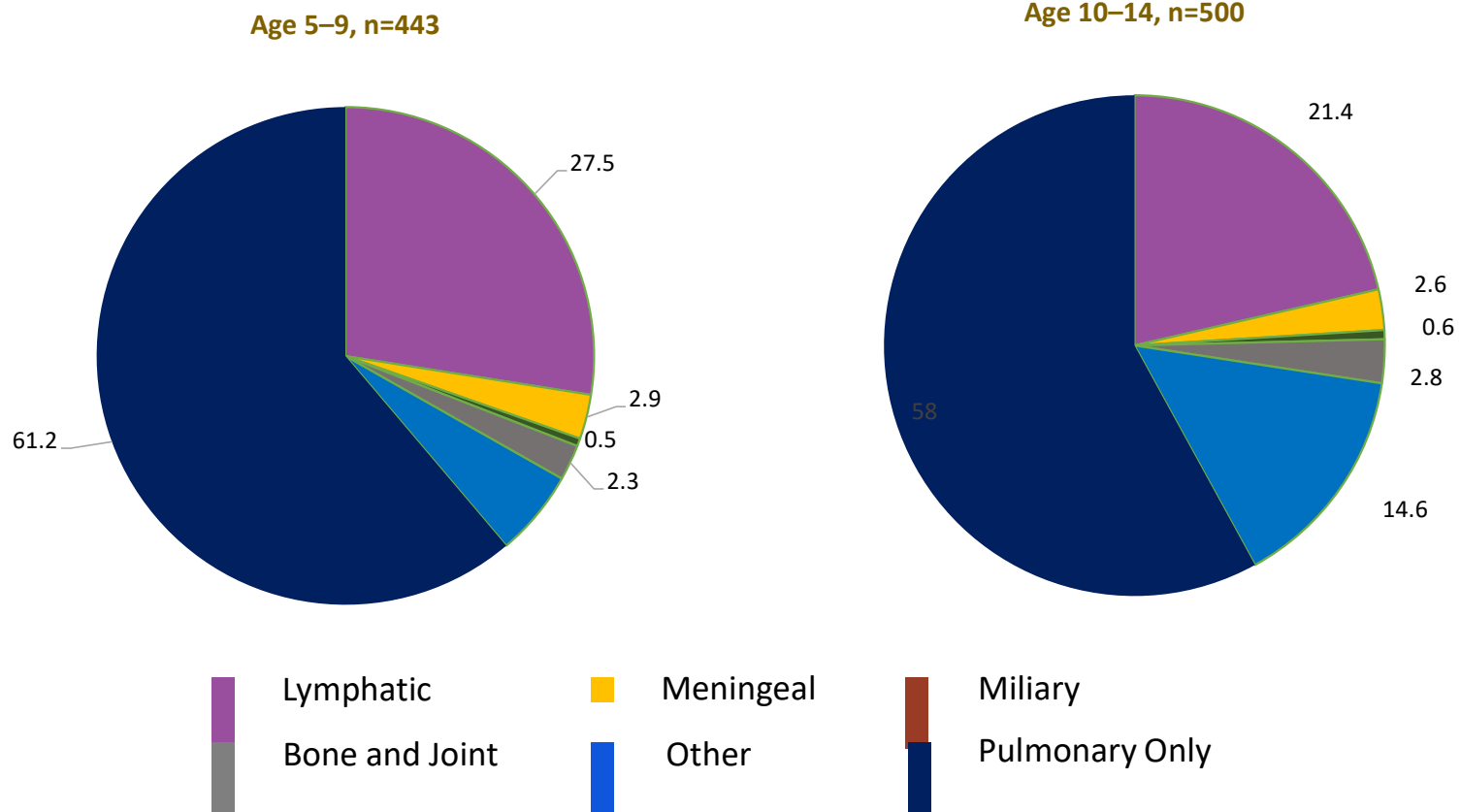


- Pulmonary Only
- Extrapulmonary Only
- Both Pulmonary and Extrapulmonary

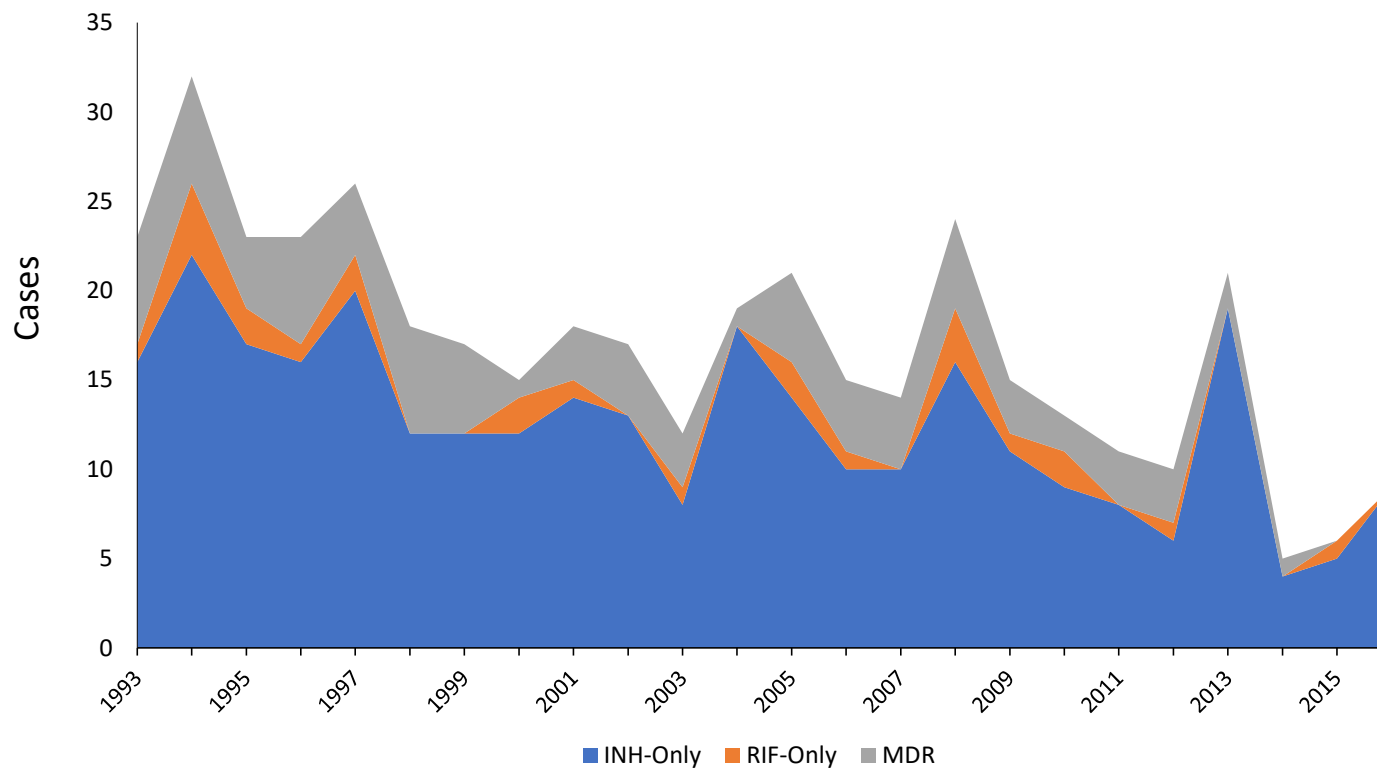
Percentage of TB Cases in Children with Any Extrapulmonary Involvement by Age Group (Age <5), Summed and Averaged Over 2013–2017



Percentage of TB Cases in Children with Any Extrapulmonary Involvement by Age Group (Ages 5–14), Summed and Averaged Over 2013–2017

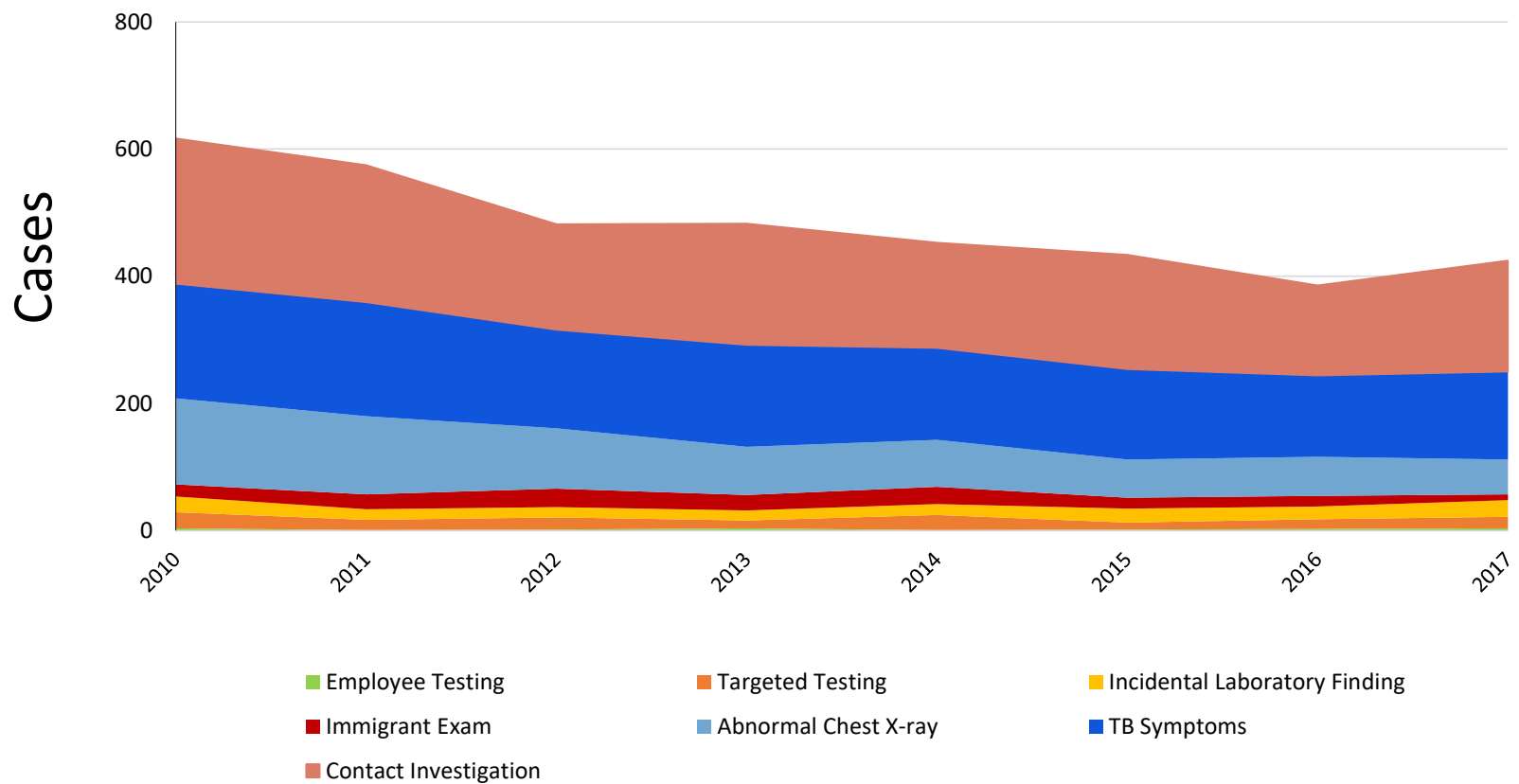


Number of U.S. Pediatric TB Cases with Drug Resistance, 1993–2016



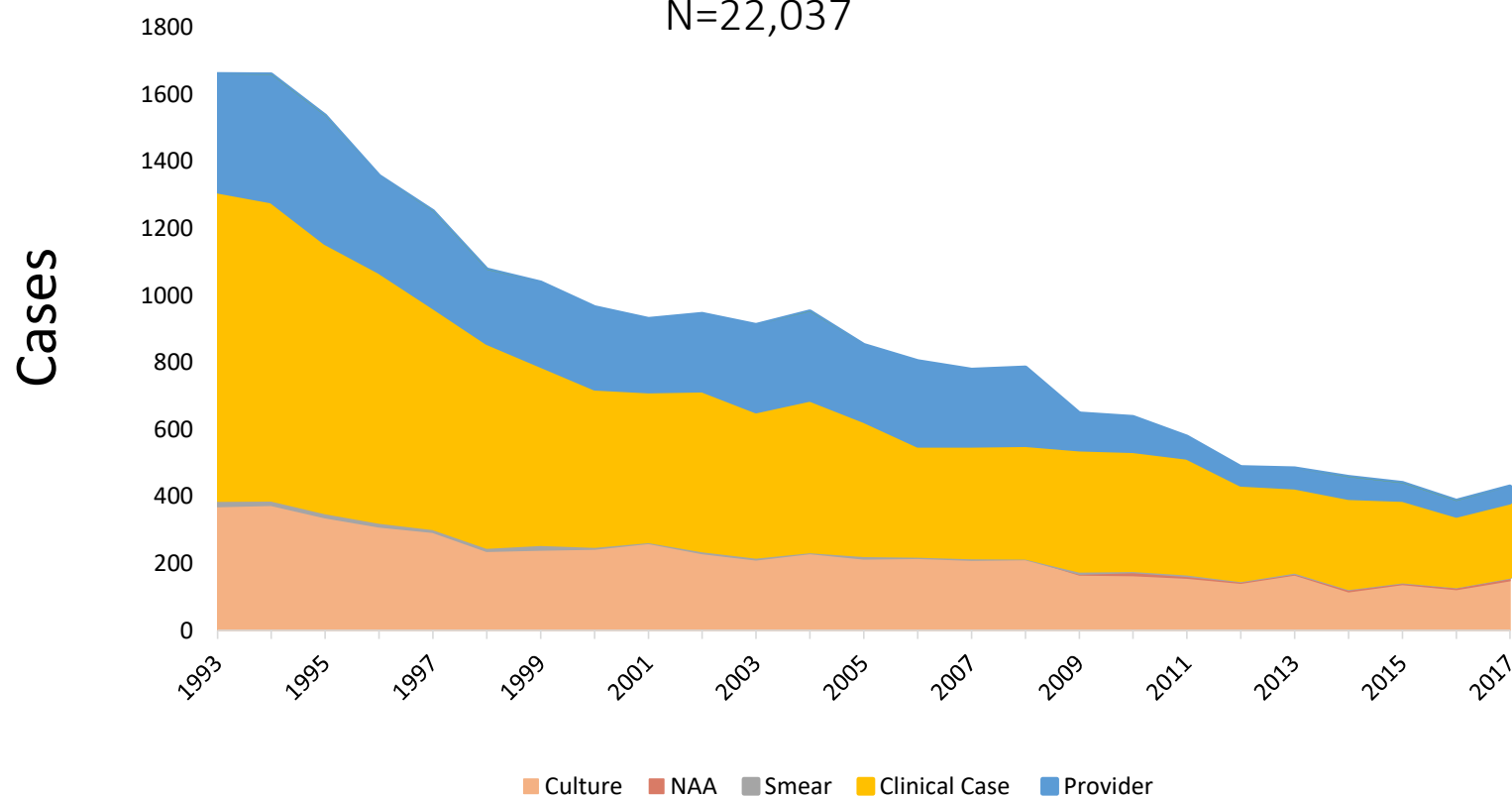
MDR TB = resistance to at least isoniazid and rifampin

U.S. Pediatric TB Cases by Reason Evaluated, 2010*–2017



U.S. Pediatric TB Cases by Case Verification Criteria, 1993–2017

N=22,037



Importance of Contact Investigation

Risk and Timing of Tuberculosis Among Close Contacts of Persons with Infectious Tuberculosis

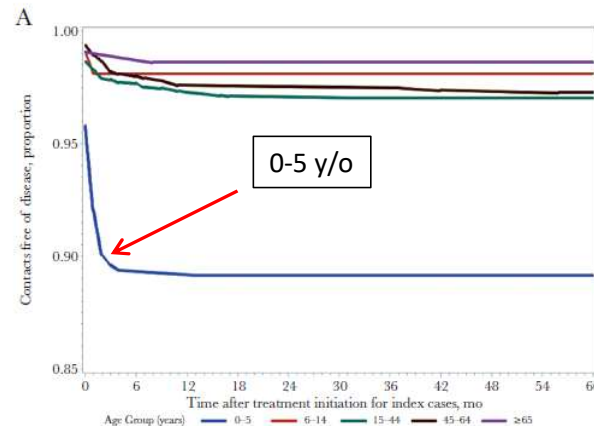
Mary R. Reichler,¹ Awal Khan,¹ Timothy R. Sterling,² Hui Zhao,¹ Joyce Moran,^{3,4} James McAuley,^{5,6} Patricia Bessler,¹ and Bonita Mangura,⁷; the Tuberculosis Epidemiologic Studies Consortium Task Order 2 Team^a

¹National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia; ²Vanderbilt University Medical Center, Nashville, Tennessee; ³New York City Department of Health and ⁴Charles P. Felton Tuberculosis Center, New York, New York; ⁵Respiratory Lung Association and ⁶Rush University, Chicago, Illinois; and ⁷New Jersey Medical School National Tuberculosis Center, Newark, New Jersey

Table 1. Characteristics of 158 Contacts With a Diagnosis of Tuberculosis

Characteristic	Overall, No. (%) (n = 158)	Coprevalent, No. (%) (n = 81)	Incident, No. (%) (n = 77)
Age, y			
0–5	49 (31)	29 (36)	20 (26)
6–14	8 (5)	6 (7)	2 (3)
15–24	26 (16)	11 (14)	15 (19)
25–44	42 (27)	25 (31)	17 (22)
45–64	28 (18)	8 (10)	20 (26)
≥65	3 (2)	2 (2)	1 (1)

Contacts free of disease, proportion



- US and Canada
- 158 of 4490 contacts (4%) developed TB disease
- Standard policy was followed for screening....but not all for prevention of progression to active disease

Take home points

- Pediatric TB cases, unlike adult TB cases, are more likely to be US born than non-US born
- Contact investigations have been, and still are, important in the detection of pediatric TB, especially in small children
- Pediatric TB is greatly under counted globally
- Failure to address TB in children happens at many levels

