

2021

ANNUAL TUBERCULOSIS SURVEILLANCE REPORT

GEORGIA DEPARTMENT OF PUBLIC HEALTH



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DATA SOURCES

1) Surveillance data were obtained from the State Electronic Notifiable Disease Surveillance System (SENDSS) as of October 10th, 2022; 2) Census data were obtained from the U.S. Census Bureau via <https://oasis.state.ga.us/oasis/webquery/qryPopulation.aspx>.

SUGGESTED CITATION

Georgia Department of Public Health, 2021 Georgia Tuberculosis Surveillance Report, Atlanta, Georgia, October 2022.

EXECUTIVE SUMMARY

A total of 222 tuberculosis (TB) cases were reported in Georgia in 2021, representing a 0.9% increase from 220 cases in 2020. The TB case rate (number of TB cases per 100,000 persons) of 2.1 remained the same from 2020 to 2021 (Figure 1).

In 2021, TB incidence by health district ranged from 1.1 cases per 100,000 persons in District 9-1 (Coastal) to 5.5 cases per 100,000 persons in District 3-5 (DeKalb) (Table 2). Five health districts (Districts 3-2, 3-3, 3-4, 3-5, and 7) reported a TB case rate higher than the overall state incidence in 2021 (Figure 4). Three counties (DeKalb, Fulton, and Gwinnett) reported >25 TB cases each in 2021, accounting for 46.4% of reported cases statewide (Table 1).

Of the 222 TB cases reported in Georgia in 2021, 132 (59.5%) were non-U.S.-born (Figure 8). The top four countries of origin for non-U.S.-born persons reported with TB disease in Georgia were India, Mexico, Vietnam, and Guatemala (Figure 9). TB cases among persons born in these four countries accounted for just over half (51.5%) of cases among non-U.S.-born persons in Georgia.

HIV status was reported for 93.2% of Georgia TB cases in 2021. Among the 207 patients with a known HIV status, 6.8% were HIV-positive (Figure 10). Persons living in congregate settings are at high risk for TB exposure. In 2021, 7 (3.2%) of Georgia's total TB cases experienced homelessness in the year before diagnosis and 8 (3.6%) were diagnosed while residing in a correctional facility (Figure 11). In 2021, there were five cases of multidrug-resistant TB (MDR-TB or TB resistant to at least isoniazid and rifampin) diagnosed in Georgia.

The latest year with completed TB contact investigation data was 2020. Among the 2,420 identified contacts of TB cases reported in 2020 in Georgia, 1,559 (64.4%) completed a medical evaluation for TB. Of the 335 contacts diagnosed with latent TB infection (LTBI), 238 (71.0%) started LTBI treatment and of those, 158 (66.4%) completed LTBI treatment.

Though TB incidence in Georgia remained the same from 2020 to 2021, TB incidence in the United States increased by 9.4% to 2.4 cases per 100,000 (Figure 2) from 2020. However, TB case rates in Georgia and the United States as a whole are 13% lower than the pre-pandemic levels. The direct impact of COVID-19 on TB diagnosis is unknown, however it is possible that missed or delayed TB diagnoses, changes in immigration and travel, and infection control practices such as masking and social distancing contributed to these overall changes in TB incidence.

Epidemiologic modeling by the U.S. Centers for Disease Control and Prevention (CDC) projects that the goal of TB elimination will not be attained in this century with the current rates of decline. Current program strategies such as early identification of TB cases, completion of TB treatment by directly observed therapy, and contact investigation should be maintained, but newer strategies such as targeted TB testing among high-risk individuals (e.g., persons born in countries with a high prevalence of TB and persons who live or work in high-risk congregate settings) and treating LTBI should be implemented to accelerate progress toward TB elimination.

TUBERCULOSIS SURVEILLANCE IN GEORGIA

TB is a reportable disease in Georgia. All Georgia physicians, laboratories, and other health care providers are required by law to immediately report clinical and laboratory-confirmed TB cases under their care to Georgia public health authorities. TB cases may be directly reported to a County Health Department, a District Health Office, or to the State TB Program. The TB Epidemiology Section of the Georgia Department of Public Health (GDPH) is responsible for the systematic collection of all reported TB cases in the state. Immediate reporting of TB cases enables public health staff to follow up with patients, administer directly observed therapy (DOT), monitor TB treatment until completion, evaluate and screen individuals exposed to a TB case, and control TB outbreaks.

TB cases in Georgia can be reported electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS), a secure web-based surveillance software developed by GDPH, or by calling, mailing, or faxing a report to public health authorities. Hospital infection control personnel, as well as public health nurses, outreach staff, epidemiologists, and communicable disease specialists involved in disease surveillance are encouraged to report TB through SENDSS and can register to become a SENDSS user by logging into the system's website (<https://sendss.state.ga.us>) and selecting TB from the list of reportable diseases.

Public health authorities collect demographic, clinical, and risk factor data about reported TB cases and their contacts. Cases are counted in the jurisdiction in which they reside at the time of diagnosis. Case counts may change slightly as information is verified. These data are analyzed to describe the distribution of the disease, trends in morbidity, mortality, drug resistance patterns, treatment outcomes, clusters of TB cases, and infection rates among high-risk groups and contacts to TB cases in Georgia. These data are used at the state and local level to guide policy and decision making, set priorities for program interventions, evaluate program performance for the prevention and control of TB in Georgia, and educate key stakeholders and the general public on TB. Georgia's TB surveillance data are transmitted electronically to the U.S. Centers for Disease Control and Prevention (CDC) and become part of the national TB surveillance database.

TUBERCULOSIS CASE DEFINITIONS FOR PUBLIC HEALTH SURVEILLANCE

GDPH utilizes the 2009 Council of State and Territorial Epidemiologists (CSTE) case definition for tuberculosis (Position Statement 09-ID-65) that can be accessed at:

<https://www.ndc.gov/nndss/conditions/tuberculosis/case-definition/2009/>.

Clinical Description

A chronic bacterial infection caused by *Mycobacterium tuberculosis*, usually characterized pathologically by the formation of granulomas. The most common site of infection is the lung, but other organs may be involved.

Clinical Criteria

A case that meets all of the following criteria:

- A positive tuberculin skin test or positive interferon gamma release assay for *M. tuberculosis*
- Signs and symptoms compatible with TB (abnormal chest imaging study or clinical evidence of current disease)
- Treatment with two or more anti-TB medications
- A completed diagnostic evaluation

Laboratory Criteria for Diagnosis

- Isolation of *M. tuberculosis* complex on a culture from a clinical specimen, or
- Demonstration of *M. tuberculosis* complex from a clinical specimen by nucleic acid amplification test

Case Classification

CONFIRMED

A case that meets the clinical case definition or is laboratory confirmed.

EPIDEMIOLOGY OF TUBERCULOSIS IN GEORGIA

Georgia reported 222 new tuberculosis (TB) cases in 2021. This represents a 0.9% increase from the 220 TB cases reported in 2020 (Figure 1). The number of TB cases in Georgia has decreased by 61.5% since 2001 (Figure 1). The TB incidence rate in Georgia remained the same at 2.1 cases per 100,000 persons in 2020 and in 2021. This is slightly lower than the national incidence rate of 2.4 cases per 100,000 population in 2021 (Figure 2). According to the CDC, Georgia ranked 7th highest in the United States for the number of new TB cases and ranked 16th highest for the TB incidence rate (per 100,000 population) among the 50 reporting states in 2021.

GEOGRAPHIC DISTRIBUTION

Among the 159 counties in Georgia, three counties in the metropolitan Atlanta area reported the highest number of TB cases in 2021: DeKalb (42 cases), Fulton (35 cases), and Gwinnett (26 cases) (Table 1). These three counties accounted for 46.4% of all TB cases reported in Georgia in 2021. Figure 3a shows the geographic distribution of TB cases by county in 2021.

Each of Georgia's 18 Health Districts has oversight responsibility for public health in the counties it serves. In 2021, District 3-5 (DeKalb) had the highest TB incidence rate with 5.5 cases per 100,000 population, followed by District 3-2 (Fulton) with 3.3 cases per 100,000 population, District 3-3 (Clayton) and District 7 (Columbus) each with 2.7 cases per 100,000 population (Table 2).

SEX AND AGE DISTRIBUTION

In 2021, TB cases in Georgia occurred predominantly among males (143 cases, 64.4%), compared to females (78 cases, 35.1%). When stratified by age, the highest proportion of TB cases occurred among persons between the ages of 25 and 44 (73 cases, 32.9%) (Figure 5). Among persons 25-44 years old, 50 cases (68.5%) were male, and 23 cases (31.5%) were female (Figure 5). The 65+ age group had the highest TB incidence rate (2.8 per 100,000), while the lowest incidence rate was among children 5-14 years old (0.6 per 100,000) (Table 6). The TB incidence rate for children younger than 5 years of age, a group more likely to develop life-threatening forms of TB disease, decreased from 1.1 per 100,000 in 2020 to 0.8 per 100,000 in 2021. Young children are more likely than older children and adults to have TB spread through their bloodstream and cause complications and deadlier forms of TB disease, such as TB meningitis or disseminated TB.

RACE/ETHNICITY DISTRIBUTION AND TB DISPARITIES

TB disproportionately affects racial/ethnic minorities in Georgia. In 2021, non-Hispanic Blacks, non-Hispanic Asians, and Hispanics accounted for 34.2%, 31.5%, and 23.4% of TB cases in Georgia (Figure 6), respectively, but only represented 32.0%, 4.5%, and 10.2% of Georgia's population, respectively. Non-Hispanic whites constituted 9.5% of TB cases in 2021. Non-Hispanic Asians had the highest TB incidence rate among race/ethnic groups (14.5 per 100,000), followed by non-Hispanic Native Hawaiian/Pacific Islanders (12.9 per 100,000), Hispanics (4.7 per 100,000), and non-Hispanic Blacks (2.2 per 100,000) (Table 7). The TB incidence rate among non-Hispanic Black persons represents an 92.8% decrease from the non-Hispanic Black TB incidence rate in 1993 (30.6 per 100,000). However, the TB incidence rate among non-Hispanic Blacks was

still more than five times higher than the TB incidence rate among non-Hispanic whites (0.4 per 100,000) in Georgia in 2021 (Table 7).

HIGH-RISK POPULATIONS

NON-U.S.-BORN PERSONS

TB among persons born outside of the United States accounted for 59.5% of TB cases with a known country of origin in Georgia in 2021. More than half of non-U.S.-born cases reported in 2021 came from India (18.2%), Mexico (15.2%), Vietnam (10.6%), and Guatemala (7.6%)—all countries where TB is an endemic disease (Figure 9). Among the 123 non-U.S.-born cases in 2021 with a known year of arrival, 38 (30.9%) were diagnosed in the first five years of their arrival in the United States. This has remained relatively the same as the 34 (30.1%) non-U.S.-born cases diagnosed within the first five years of their arrival in 2020.

In 2021, three counties reported more than half (52.3%) of the total number of non-U.S.-born TB cases in Georgia: DeKalb County (29 cases), Gwinnett County (22 cases), and Fulton County (18 cases).

PERSONS WITH HIV CO-INFECTION

HIV testing should be performed for all TB patients, as TB treatment may change when antiretroviral therapy for HIV is given concurrently. Active TB often accelerates the natural progression of HIV infection. Of the 222 TB cases reported in 2021, 6.3% were HIV-positive, compared to 5.9% in 2020 (Figure 10). Among the 14 TB cases with HIV co-infection in 2021, 50% were Hispanic, 64.3% were male, and 42.9% were between 25 and 44 years old.

HIV status was reported for 93.2% of TB cases in 2021. In the high-risk age group of adults 25-44 years of age, HIV status was reported for 95.9% of patients in 2021, compared to 100% in 2020. Of the 3 TB cases whose HIV status was not reported, HIV testing was not offered to 1 case (33.3%) and two refused testing (66.7%).

PERSONS IN CONGREGATE SETTINGS AND PERSONS WITH SUBSTANCE ABUSE

Persons residing in crowded congregate settings such as homeless shelters, prisons, and nursing homes are at risk for acquiring TB. In 2021, 7 (3.2%) TB cases in Georgia experienced homelessness in the year before TB diagnosis, 8 (3.6%) were residents of correctional facilities at the time of diagnosis, and 2 (0.9%) were residents of long-term care facilities (Table 3, Figure 11). Of the 8 TB cases incarcerated in correctional facilities, 6 (75%) were inmates of state prisons, 1 (12.5%) was an inmate of a local jail, and 1 (12.5%) was an inmate of a federal prison.

Substance abuse is the most reported behavioral risk factor among patients with TB in the United States. TB patients who abuse substances often experience treatment failure and remain infectious longer because treatment failure presumably extends periods of infectiousness. In Georgia, 25 (11.3%) TB cases in 2021 had reported abuse of either illicit drugs or alcohol (Table 3, Figure 11).

TB IN CHILDREN

TB in children is considered a sentinel public health event as it often indicates recent transmission from an infectious adult case. Additionally, potentially lethal forms of TB disease, such as TB meningitis or disseminated TB, can develop in very young children. In 2021, children younger than 15 years old comprised 6.3% of TB cases in Georgia: 5 cases (0.8 per 100,000) were reported in children younger than 5 years old and 9 cases (0.6 per 100,000) were reported in children 5-14 years old (Table 6, Figure 5). There were two cases of TB meningitis in children younger than 15 years old in Georgia in 2021.

Persons with latent tuberculosis infection (LTBI) are infected with TB bacteria, but do not have clinical signs and symptoms of TB disease. In Georgia, LTBI in children younger than five years old is a reportable disease. When LTBI in a child less than five years of age is reported, the local health department will initiate a contact investigation to identify the source of infection, recommend treatment, follow up with the child to ensure completion of treatment, and monitor for development of active TB disease. Early identification and treatment of TB infection in children can prevent progression to active disease and aid in identifying previously undiagnosed and untreated cases of active TB.

In 2021, 3 children younger than five years old were reported to have LTBI in Georgia. All (100%) were identified by contact investigations performed by county health department staff.

DIAGNOSIS AND TREATMENT OUTCOMES

INITIAL DIAGNOSIS, TREATMENT, AND DIRECTLY OBSERVED THERAPY

In Georgia, most TB cases are initially diagnosed in a hospital or clinic and are followed up by county health departments after discharge to continue their TB treatment. In 2021, 134 (60.4%) of the 222 TB cases in Georgia were diagnosed and initially reported by a hospital or clinic.

Treatment outcomes were analyzed for eligible 2020 cases as treatment completion data for cases reported in 2021 are not yet available. Eligible cases included persons alive at diagnosis, with an initial drug regimen of one or more drugs prescribed, who did not die within one year of initiating treatment. Ineligible cases included persons with an initial rifampin-resistant isolate, patients with bone and joint disease, meningeal disease, or disease of the central nervous system, or pediatric patients (ages 0–14 years) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment. Persons reported by the Folkston ICE Processing Center are also excluded as treatment outcomes are unknown.

Among the 173 eligible TB cases counted in 2020, a total of 146 (84.4%) completed treatment and 140 (80.9%) completed treatment within 12 months (Table 5; Figure 13). County health department staff provide directly observed therapy (DOT) to TB patients, which entails watching a patient swallow every dose of their

TB treatment medications for at least 6 months. Of the 164 cases with available data on treatment administration data in 2020, 129 (78.7%) received TB treatment entirely by DOT, 34 (20.7%) were treated by a combination of DOT and self-administered therapy, and 1 (0.6%) was totally self-administered (Figure 14).

TB MORTALITY

Ten persons died of TB in Georgia in 2021. The age-adjusted TB mortality rate was 0.1 per 100,000, which accounts for differences in mortality rates that result from age differences in the underlying population. From 2017 to 2021, a median of 14 TB deaths occurred in Georgia, with a range of 10 to 20 deaths per year.

TB AND THE COVID-19 PANDEMIC

TB incidence in Georgia has remained the same in 2021 and 2020 but has increased in the United States as a whole (Figure 2). At the national level, TB incidence increased by 9.4%, from 2.2 per 100,000 persons in 2020 to 2.4 per 100,000 persons in 2021. It is possible that missed or delayed TB diagnoses in the previous two years contributed to this apparent increase in TB. However, the national incidence is still 13% lower than before the COVID-19 pandemic in 2019. It is unknown if this represents a true decrease in TB disease or continued missed diagnosis due to COVID-19. Additionally, TB and COVID-19 present with similar signs and symptoms, including coughing, fever, and difficulty breathing. TB disease should be considered in patients presenting with signs and symptoms consistent with TB (e.g., cough for 2 weeks or more, unintentional weight loss, and hemoptysis), especially in instances where COVID-19 diagnostic tests are negative.

CONTACT INVESTIGATIONS AND LATENT TB INFECTION

PULMONARY TB

Persons with pulmonary or laryngeal TB have a greater potential to infect others with TB, and infectiousness is higher if their sputum smears are positive for acid-fast bacilli (AFB), sputum cultures are positive for *Mycobacterium tuberculosis*, or cavitory lesions are present on chest radiography. In 2021, 169 (76.1%) of the 222 TB cases in Georgia had pulmonary TB. Of the 169 pulmonary TB cases, 121 (71.6%) had sputum cultures that were positive for *Mycobacterium tuberculosis*, 85 (50.3%) were sputum AFB smear-positive, and 25 (14.8%) showed cavitory lesions on chest radiography.

TB CONTACT INVESTIGATIONS AND LATENT TB INFECTION

Public health authorities routinely conduct contact investigations among persons exposed to a TB case to identify secondary TB cases and contacts with latent TB infection (LTBI). TB cases (cases with positive acid-fast bacillus (AFB) sputum-smear results or pulmonary cavities) have the highest priority for investigation. During a contact investigation, public health staff conduct in-person interviews to ask recent contacts

whether they have TB-like symptoms, administer a TB skin test (TST) or interferon gamma release assay (IGRA), repeat the TST or IGRA 8-10 weeks after the last exposure to the index (first) TB case if the initial TST or IGRA is negative, and have a chest radiology exam performed if the TST or IGRA is positive. Persons with LTBI have a positive TST or IGRA but are asymptomatic and have a normal chest radiology exam. They are not contagious but have a 10% chance of developing TB disease if they do not receive treatment for LTBI.

A total of 2,420 contacts were identified from the contact investigations of TB cases reported in 2020 (the latest year with complete contact investigation data). Among these, 1,559 (64.4%) were completely evaluated for TB. Of the completely evaluated contacts, 335 (21.5%) had LTBI and 12 (<1%) had TB disease. Among the 335 contacts with LTBI, 238 (71.0%) started LTBI treatment. Of the contacts who started LTBI treatment, 158 (66.4%) completed LTBI treatment, 19 (8.0%) chose to stop LTBI treatment, 9 (3.8%) were lost to follow-up, 3 (1.3%) had adverse side effects, 4 (1.7%) moved elsewhere, 1 (<1%) discontinued treatment due to provider decision, and none developed active TB disease.

DRUG RESISTANCE AND MOLECULAR EPIDEMIOLOGY

DRUG RESISTANCE

Among the 178 culture-positive TB cases in Georgia in 2021, 154 (86.5%) were tested for initial drug susceptibility to three of the first-line anti-TB medications: isoniazid (INH), rifampin (RIF), and ethambutol (EMB). Of the 152 tested isolates from cases with no previous history of TB, 8 (5.3%) had primary resistance to INH (resistance to INH only) and 1 (0.7%) had primary resistance to RIF (resistance to RIF only).

There were 5 reported cases of multidrug-resistant TB (MDR-TB, i.e. TB resistant to at least INH and RIF) in 2021, two of which were contacts to prior MDR-TB cases. This number has more than doubled from the 2 cases of multidrug-resistant TB in 2020. From 2017-2021, the percentage of TB cases with primary INH resistance (INH-R) in Georgia ranged from 5.3% to 9.3%, with an average of 2.6 MDR-TB cases per year (Figure 12). MDR-TB cases often require longer and more complicated treatment, which can be costly for patients and TB programs. Patients treated for MDR-TB can experience serious side effects including hearing loss, hepatitis, kidney impairment, and psychological changes. The average cost of treating a person with TB disease increases with greater drug resistance. On average, the direct cost of treating a patient with drug-susceptible TB in 2020 was \$20,000, compared to \$568,000 for a patient with the extensively drug resistant (XDR-TB, i.e. TB resistant to isoniazid and rifampin, a fluoroquinolone and a second-line injectable, bedaquiline, or linezolid). Funding mechanisms are in place to assist patients with treatment costs but can add additional strain to TB programs. More information about drug-resistant TB can be found at <https://www.cdc.gov/tb/topic/drtb>.

MOLECULAR EPIDEMIOLOGY

TB genotyping is a laboratory method that determines the genetic relatedness of TB strains among different patients with culture-positive TB disease. Identical genotypes among persons with TB disease suggest recent person-to-person transmission. The state TB program routinely analyzes TB genotype clusters, which are comprised of two or more TB cases with identical genotypes, to identify recent TB transmission, describe risk factors for transmission, identify possible sources of transmission, and determine ways to stop transmission.

From 2019-2021, there were 32 two-case clusters, 8 three-case clusters, 9 four-case clusters, 2 five-case clusters, and 8 clusters with six or more cases in Georgia (Figure 15). Figure 16 displays the number of genotype cluster alerts by alert level. According to the CDC, alert level is determined by the log likelihood ratio statistic (LLR) for a given cluster, identifying higher than expected geospatial concentrations for a TB genotype cluster in a specific county, compared to the national distribution of that genotype. The Tuberculosis Genotyping Information Management System (TB GIMS) generates alert level notifications based on the LLR: "No alert" is indicated if the LLR is between $0 \leq 5$, "medium" is for clusters with LLRs between $5 \leq 10$, and "high" alert is for clusters with LLRs ≥ 10 . LOTUS (Large Outbreak of Tuberculosis in the United States) alerts are generated when clusters of ≥ 10 genotype-matched cases within a 3-year period that related by recent transmission are identified. Between 2019-2021, Georgia received 31 medium alerts, 14 high alerts, and 2 LOTUS alerts (Figure 16).

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TABLE 1: TB Cases and Case Rates by County, Georgia, 2020-2021

TABLE 2: TB Cases and Case Rates by Health District, Georgia, 2020-2021

TABLE 3: Percentage of TB Cases with Known TB Risk Factors by Health District, Georgia, 2021

TABLE 4: Primary Resistance to First-Line Anti-TB Medications, Georgia, 2021

TABLE 5: Completion of TB Treatment and Completion of TB Treatment within 12 Months by Health District, Georgia, 2020

TABLE 6: TB Cases and Case Rates by Age Group, Georgia, 2017-2021

TABLE 7: TB Cases and Case Rates by Race/Ethnicity, Georgia, 2017-2021

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FIGURE 2: TB Case Rates, United States and Georgia, 2001-2021

FIGURE 3A: TB Cases by County, Georgia, 2021

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FIGURE 4: TB Case Rates by Health District, Georgia, 2021

FIGURE 5: TB Cases by Age and Sex, Georgia, 2021

FIGURE 6: TB Cases by Race/Ethnicity, Georgia, 2021

FIGURE 7: TB Case Rates Among Non-Hispanic Black and Non-Hispanic White Persons, Georgia, 2001-2021

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FIGURE 15: Number of TB Genotype Clusters by Cluster Size, Georgia, 2019-2021

FIGURE 16: Tuberculosis Genotype Cluster Alerts by TB GIMS Alert Level, Georgia, 2019-2021

TABLE 1: TB CASES AND CASE RATES* BY COUNTY, GEORGIA, 2020-2021

COUNTY	2020		2021	
	CASES	RATE*	CASES	RATE*
Appling	0	0.0	0	0.0
Atkinson	0	0.0	0	0.0
Bacon	0	0.0	0	0.0
Baker	<5	--	0	0.0
Baldwin	<5	--	<5	--
Banks	0	0.0	0	0.0
Barrow	<5	--	0	0.0
Bartow	<5	--	<5	--
Ben Hill	0	0.0	0	0.0
Berrien	<5	--	0	0.0
Bibb	0	0.0	5	3.2
Bleckley	0	0.0	0	0.0
Brantley	0	0.0	<5	--
Brooks	<5	--	<5	--
Bryan	0	0.0	0	0.0
Bulloch	<5	--	0	0.0
Burke	0	0.0	0	0.0
Butts	0	0.0	0	0.0
Calhoun	0	0.0	0	0.0
Camden	0	0.0	<5	--
Candler	0	0.0	0	0.0
Carroll	<5	--	0	0.0
Catoosa	<5	--	<5	--
Charlton [^]	0	0.0	0	0.0
D. Ray James Correctional Facility/ Folkston ICE Processing Center [‡]	<5	--	0	0.0
Chatham	8	2.8	<5	--
Chattahoochee	0	0.0	0	0.0
Chattooga	0	0.0	0	0.0
Cherokee	<5	--	<5	--
Clarke	<5	--	<5	--
Clay	0	0.0	0	0.0
Clayton	13	4.4	8	2.7

COUNTY	2020		2021	
	CASES	RATE	CASES	RATE
Clinch	0	0.0	0	0.0
Cobb	13	1.7	19	2.5
Coffee	<5	--	0	0.0
Colquitt	<5	--	<5	--
Columbia [^]	<5	--	<5	--
Augusta State Medical Prison [‡]	<5	--	5	--
Cook	0	0.0	0	0.0
Coweta	<5	--	<5	--
Crawford	0	0.0	0	0.0
Crisp	<5	--	0	0.0
Dade	0	0.0	0	0.0
Dawson	0	0.0	<5	--
Decatur	<5	--	0	0.0
Dekalb	38	5.0	42	5.5
Dodge	0	0.0	0	0.0
Dooly	0	0.0	0	0.0
Dougherty	6	6.9	0	0.0
Douglas	0	0.0	0	0.0
Early	0	0.0	0	0.0
Echols	0	0.0	0	0.0
Effingham	0	0.0	0	0.0
Elbert	0	0.0	0	0.0
Emanuel	0	0.0	0	0.0
Evans	0	0.0	0	0.0
Fannin	0	0.0	0	0.0
Fayette	<5	--	<5	--
Floyd	<5	--	<5	--
Forsyth	<5	--	7	2.7
Franklin	0	0.0	0	0.0
Fulton	28	2.6	35	3.3
Gilmer	0	0.0	0	0.0
Glascok	0	0.0	0	0.0
Glynn	0	0.0	<5	--
Gordon	<5	--	<5	--
Grady	0	0.0	<5	--
Greene	0	0.0	0	0.0
Gwinnett	26	2.8	26	2.7
Habersham	<5	--	<5	--
Hall	5	2.4	<5	--
Hancock	0	0.0	0	0.0

COUNTY	2020		2021	
	CASES	RATE	CASES	RATE
Haralson	0	0.0	0	0.0
Harris	0	0.0	<5	--
Hart	0	0.0	0	0.0
Heard	0	0.0	<5	--
Henry	<5	--	8	3.3
Houston	<5	--	<5	--
Irwin [^]	0	0.0	0	0.0
Irwin County Detention Center [‡]	0	0.0	0	0.0
Jackson	0	0.0	0	0
Jasper	0	0.0	0	0
Jeff Davis	<5	--	0	0
Jefferson	0	0.0	0	0
Jenkins [^]	0	0.0	0	0
Jenkins Correctional Center [‡]	0	0.0	<5	--
Johnson	0	0.0	0	0.0
Jones	0	0.0	0	0.0
Lamar	<5	--	<5	--
Lanier	0	0.0	0	0.0
Laurens	0	0.0	<5	--
Lee	0	0.0	0	0.0
Liberty	0	0.0	<5	--
Lincoln	0	0.0	0	0.0
Long	0	0.0	0	0.0
Lowndes	<5	--	0	0.0
Lumpkin	0	0.0	0	0.0
Macon	<5	--	0	0.0
Madison	0	0.0	0	0.0
Marion	0	0.0	0	0.0
Mcduffie	0	0.0	0	0.0
Mcintosh	0	0.0	0	0.0
Meriwether	0	0.0	0	0.0
Miller	0	0.0	0	0.0
Mitchell	<5	--	0	0.0
Monroe	0	0.0	0	0.0
Montgomery	0	0.0	0	0.0
Morgan	0	0.0	0	0.0
Murray	<5	--	<5	--
Muscogee	<5	--	8	3.9
Newton	<5	--	0	0.0
Oconee	0	0.0	0	0.0

COUNTY	2020		2021	
	CASES	RATE	CASES	RATE
Oglethorpe	0	0.0	0	0.0
Paulding	<5	--	<5	--
Peach	<5	--	0	0.0
Pickens	0	0.0	0	0.0
Pierce	0	0.0	0	0.0
Pike	0	0.0	0	0.0
Polk	0	0.0	<5	--
Pulaski	0	0.0	0	0.0
Putnam	0	0.0	0	0.0
Quitman	0	0.0	0	0.0
Rabun	0	0.0	0	0.0
Randolph	0	0.0	0	0.0
Richmond	<5	--	<5	--
Rockdale	<5	--	0	0.0
Schley	0	0.0	0	0.0
Screven	0	0.0	0	0.0
Seminole	0	0.0	0	0.0
Spalding	0	0.0	0	0.0
Stephens	0	0.0	0	0.0
Stewart [^]	0	0.0	0	0
Stewart Detention Center	0	0.0	<5	--
Sumter	0	0.0	0	0
Talbot	0	0.0	<5	--
Taliaferro	0	0.0	0	0.0
Tattnall	0	0.0	<5	--
Taylor	0	0.0	0	0.0
Telfair	0	0.0	0	0.0
Terrell	<5	--	0	0.0
Thomas	0	0.0	0	0.0
Tift	0	0.0	<5	--
Toombs	<5	--	0	0.0
Towns	0	0.0	0	0.0
Treutlen	0	0.0	0	0.0
Troup	0	0.0	<5	--
Turner	0	0.0	0	0.0
Twiggs	0	0.0	0	0.0
Union	0	0.0	0	0.0
Upson	0	0.0	0	0.0
Walker	<5	--	<5	--
Walton	0	0.0	<5	--

COUNTY	2020		2021	
	CASES	RATE	CASES	RATE
Ware	<5	--	0	0.0
Warren	0	0.0	0	0.0
Washington	0	0.0	0	0.0
Wayne	0	0.0	0	0.0
Webster	0	0.0	0	0.0
Wheeler	0	0.0	0	0.0
White	0	0.0	<5	--
Whitfield	<5	--	<5	--
Wilcox	0	0.0	<5	--
Wilkes	<5	--	0	0.0
Wilkinson	<5	--	0	0.0
Worth	0	0.0	0	0.0
TOTAL	220	2.1	222	2.1

*Rate per 100,000 population; ^Reported cases and calculated rates in these counties exclude cases from corresponding prisons and detention centers; †Denominators for prisons and detention centers are unknown

Note: In counties where one to four cases were reported, "<5" is used to represent the number of reported cases, and the case rate is not calculated.

Data Sources: 1) Case counts were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) data as of October 10th, 2022; 2) Rates were calculated using population estimates obtained from the U.S. Census Bureau via <https://oasis.state.ga.us/oasis/webquery/qryPopulation.aspx>.

TABLE 2: TB CASES AND CASE RATES* BY HEALTH DISTRICT, GEORGIA, 2020-2021

HEALTH DISTRICT	2020		2021	
	CASES	RATE*	CASES	RATE*
1.1 Rome	11	1.6	9	1.3
1.2 Dalton	<5	--	7	1.4
2.0 Gainesville	12	1.6	14	1.9
3.1 Cobb	13	1.4	19	2.1
3.2 Fulton	28	2.6	35	3.3
3.3 Clayton	13	4.4	8	2.7
3.4 Lawrenceville	29	2.5	26	2.2
3.5 Dekalb	38	5.0	42	5.5
4.0 LaGrange	11	1.2	16	1.8
5.1 Dublin	0	0.0	<5	--
5.2 Macon	7	1.3	7	1.3
6.0 Augusta [^]	7	1.4	<5	--
Augusta State Medical Prison [‡]	<5	--	5	--
Jenkins Correctional Center [‡]	0	0	<5	--
7.0 Columbus [^]	5	1.4	10	2.7
Stewart Detention Center	0	0.0	<5	--
8.1 Valdosta	<5	--	<5	--
Irwin County Detention Center	0	0	0	0
8.2 Albany	16	4.7	<5	--
9.1 Coastal	8	1.3	7	1.1
9.2 Waycross [^]	5	1.3	<5	--
D. Ray James Correctional Facility/ Folkston ICE Processing Center [‡]	<5	--	0	0
10.0 Athens	5	0.9	<5	--
TOTAL	220	2.1	222	2.1

*Rate per 100,000 population; [^]Reported cases and calculated rates in these health districts exclude cases from corresponding prisons and detention centers; [‡]Denominators for prisons and detention centers are unknown.

Note: In districts where one to four cases were reported, "<5" is used to represent the number of reported cases, and the case rate is not calculated.

Data Sources: 1) Case counts were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) data as of October 10th, 2022; 2) Rates were calculated using population estimates obtained from the U.S. Census Bureau via <https://oasis.state.ga.us/oasis/webquery/qryPopulation.aspx>.

TABLE 3: PERCENTAGE OF TB CASES WITH KNOWN TB RISK FACTORS BY HEALTH DISTRICT, GEORGIA, 2021

HEALTH DISTRICT	NON-U.S.-BORN (%)	HOMELESS IN PAST YEAR (%)	CORRECTIONAL FACILITY (%)	LONG-TERM CARE FACILITY (%)	SUBSTANCE ABUSE (%)
1.1 Rome	33.3	0.0	0.0	0.0	0.0
1.2 Dalton	57.1	0.0	0.0	0.0	0.0
2.0 Gainesville	85.7	0.0	0.0	0.0	7.1
3.1 Cobb	57.9	0.0	0.0	0.0	21.1
3.2 Fulton	52.9	5.7	0.0	0.0	22.9
3.3 Clayton	87.5	0.0	0.0	0.0	12.5
3.4 Lawrenceville	84.6	7.7	3.8	0.0	7.7
3.5 Dekalb	67.4	2.4	0.0	0.0	4.8
4.0 LaGrange	41.2	0.0	0.0	6.3	0.0
5.1 Dublin	50.0	0.0	0.0	0.0	0.0
5.2 Macon	28.6	0.0	0.0	14.3	14.3
6.0 Augusta	30.0	0.0	60.0	0.0	0.0
7.0 Columbus	36.4	18.2	9.1	0.0	18.2
8.1 Valdosta	100.0	0.0	0.0	0.0	0.0
8.2 Albany	100.0	0.0	0.0	0.0	50.0
9.1 Coastal	42.9	0.0	0.0	0.0	14.3
9.2 Waycross	50.0	0.0	0.0	0.0	100.0
10.0 Athens	0.0	0.0	0.0	0.0	0.0
TOTAL	59.5	3.2	3.6	0.9	11.3

Data Source: Data were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) as of October 10th, 2022.

TABLE 4: PRIMARY RESISTANCE TO FIRST-LINE ANTI-TB MEDICATIONS, GEORGIA, 2021

	ISONIAZID		RIFAMPIN		ETHAMBUTOL	
	CASES	PERCENT*	CASES	PERCENT*	CASES	PERCENT*
GEORGIA	15 [^]	9.9	6	3.9	2 [^]	1.3

*Percent of cases with completed drug susceptibility testing and no prior treatment with anti-TB medications (N=152)

[^]Includes 5 cases with multi-drug resistance

Data Source: Data were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) as of October 10th, 2022.

TABLE 5: COMPLETION OF TB TREATMENT AND COMPLETION OF TB TREATMENT WITHIN 12 MONTHS BY HEALTH DISTRICT, GEORGIA, 2020 (N=173)*‡

HEALTH DISTRICT	COMPLETION OF TB TREATMENT (%)	COMPLETION OF TB TREATMENT WITHIN 12 MONTHS (%)
1.1 Rome	100.0	100.0
1.2 Dalton	100.0	66.7
2.0 Gainesville	87.5	87.5
3.1 Cobb	70.0	70.0
3.2 Fulton	95.7	87.0
3.3 Clayton	63.6	54.5
3.4 Lawrenceville	88.0	88.0
3.5 DeKalb	75.0	75.0
4.0 LaGrange	88.9	77.8
5.1 Dublin	--	--
5.2 Macon	100.0	100.0
6.0 Augusta	87.5	87.5
7.0 Columbus	66.7	66.7
8.1 Valdosta	100.0	66.7
8.2 Albany	100.0	100.0
9.1 Coastal	100.0	100.0
9.2 Waycross [‡]	50.0	50.0
10.0 Athens	25.0	25.0
TOTAL	84.4	80.9

*Denominator includes persons alive at diagnosis, with initial drug regimen of one or more drugs prescribed, who did not die within one year of initiating treatment; denominator excludes persons with initial rifampin-resistant isolate, patients with bone and joint disease, meningeal disease, or disease of the central nervous system, or pediatric patients (ages 0–14 years) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment.

[‡] Denominator excludes persons reported by the Folkston ICE Processing Center as treatment outcomes are unknown.

Data Source: Data were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) as of October 10th, 2022.

TABLE 6: TB CASE RATES* BY AGE GROUP, GEORGIA, 2017-2021

AGE (YEARS)	2017 (N=293)	2018 (N=271)	2019 (N=298)	2020 (N=220)	2021 (N=222)
<5	2.0	0.9	2.0	1.1	0.8
5-14	0.6	0.7	0.5	0.2	0.6
15-24	1.8	1.4	2.1	1.2	1.5
25-44	3.6	3.6	3.2	3.0	2.5
45-64	3.5	2.3	3.7	2.5	2.5
65+	3.6	4.9	3.8	2.2	2.8

*Rate per 100,000 population

Data Source: Data were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) as of October 10th, 2022.

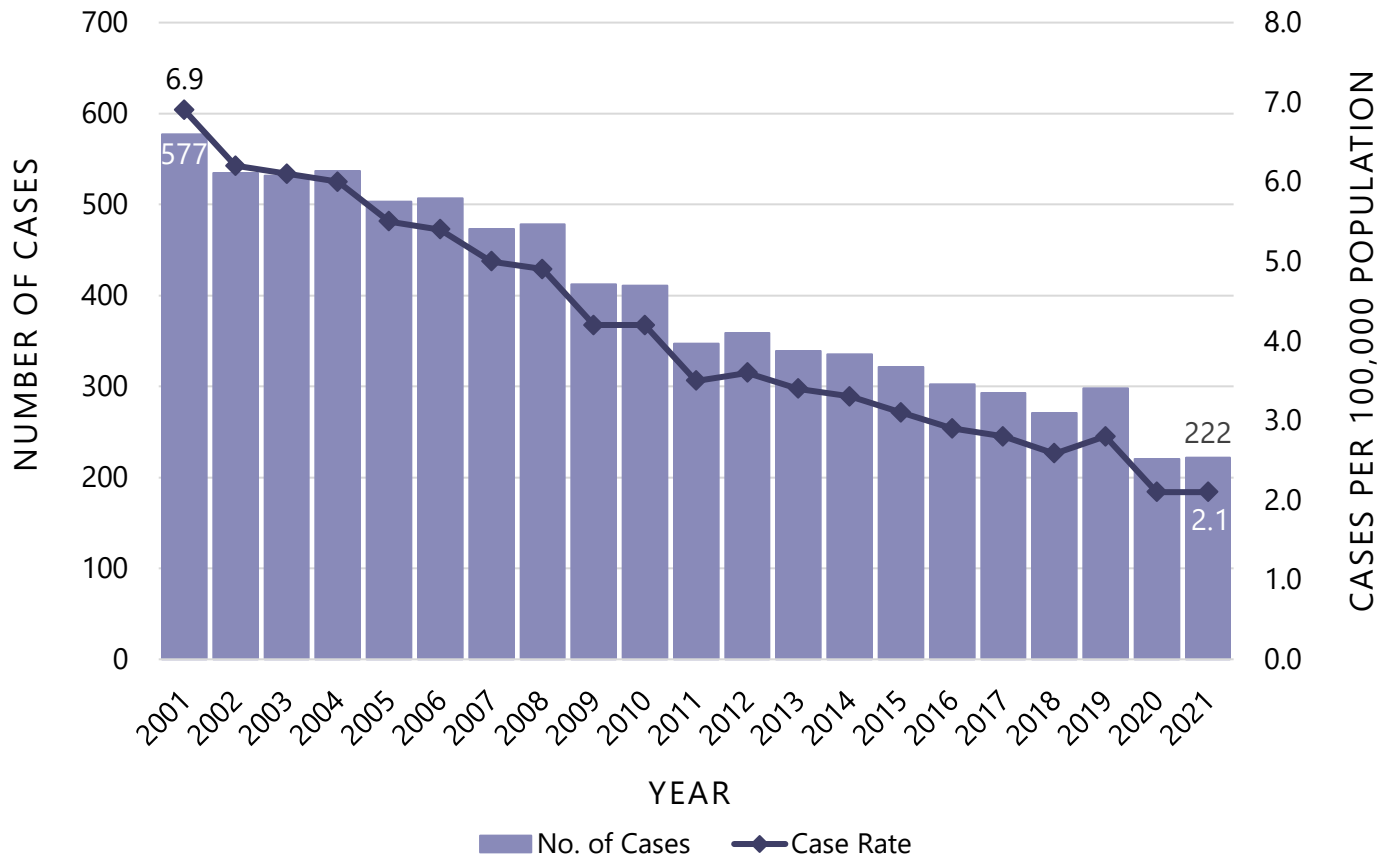
TABLE 7: TB CASE RATES* BY RACE/ETHNICITY, GEORGIA, 2017-2021

RACE/ETHNICITY	2017 (N=293)	2018 (N=271)	2019 (N=298)	2020 (N=220)	2021 (N=221 [^])
Asian, non-Hispanic	16.5	15.8	16.1	10.4	14.5
All races, Hispanic	4.1	5.8	5.7	4.4	4.7
American Indian/Alaskan Native, non-Hispanic	0.0	0.0	4.1	0.0	0.0
Black, non-Hispanic	4.6	3.1	3.9	2.8	2.2
Multiracial, non-Hispanic	0.5	1.0	1.0	0.0	0.5
White, non-Hispanic	0.5	0.7	0.6	0.5	0.4
Native Hawaiian/Pacific Islander, non-Hispanic	0.0	0.0	0.0	13.2	12.9

*Rate per 100,000 population; ^Case count excludes 1 case with unknown race/ethnicity

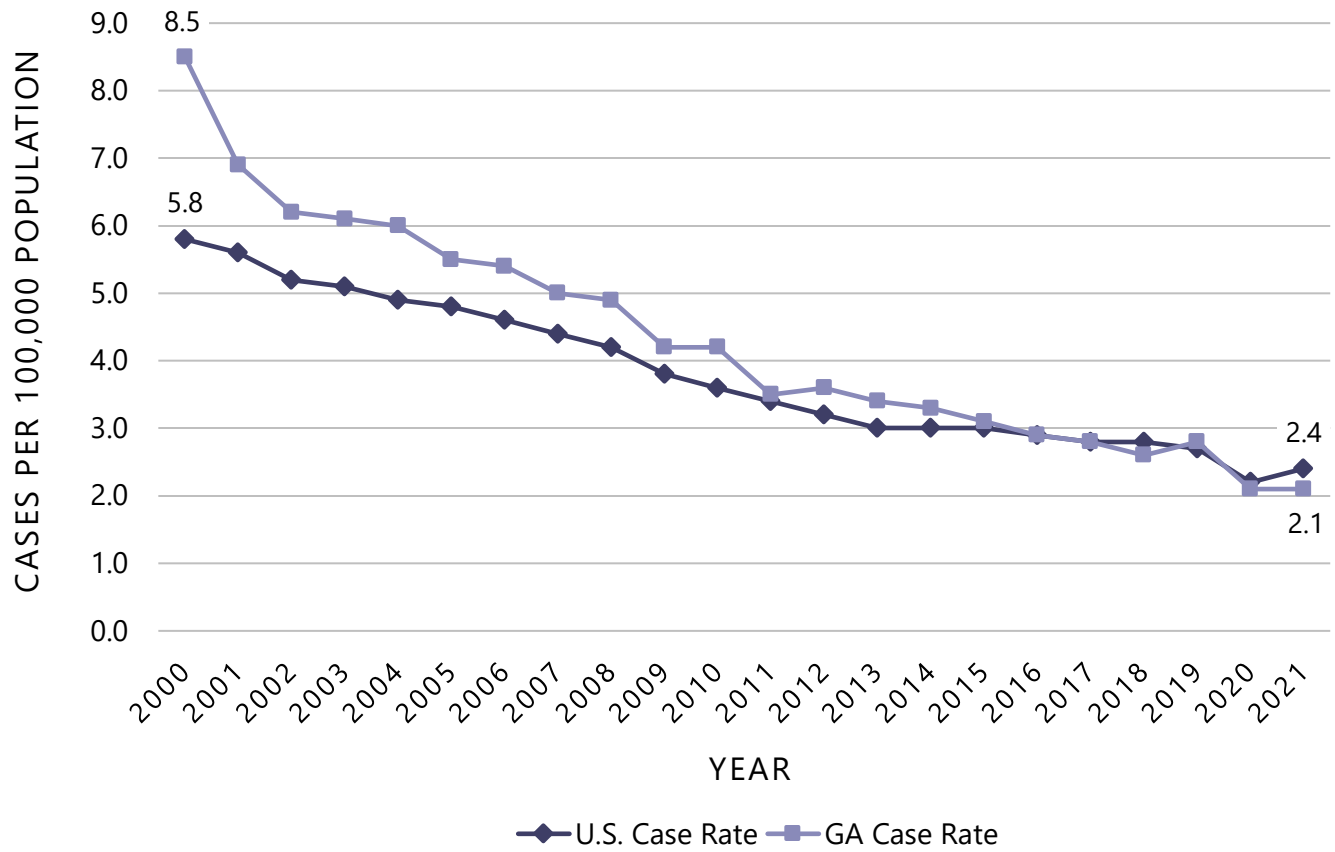
Data Source: Data were obtained from State Electronic Notifiable Disease Surveillance System (SENDSS) as of October 10th, 2022.

FIGURE 1: TB CASES AND CASE RATES*, GEORGIA, 2001-2021



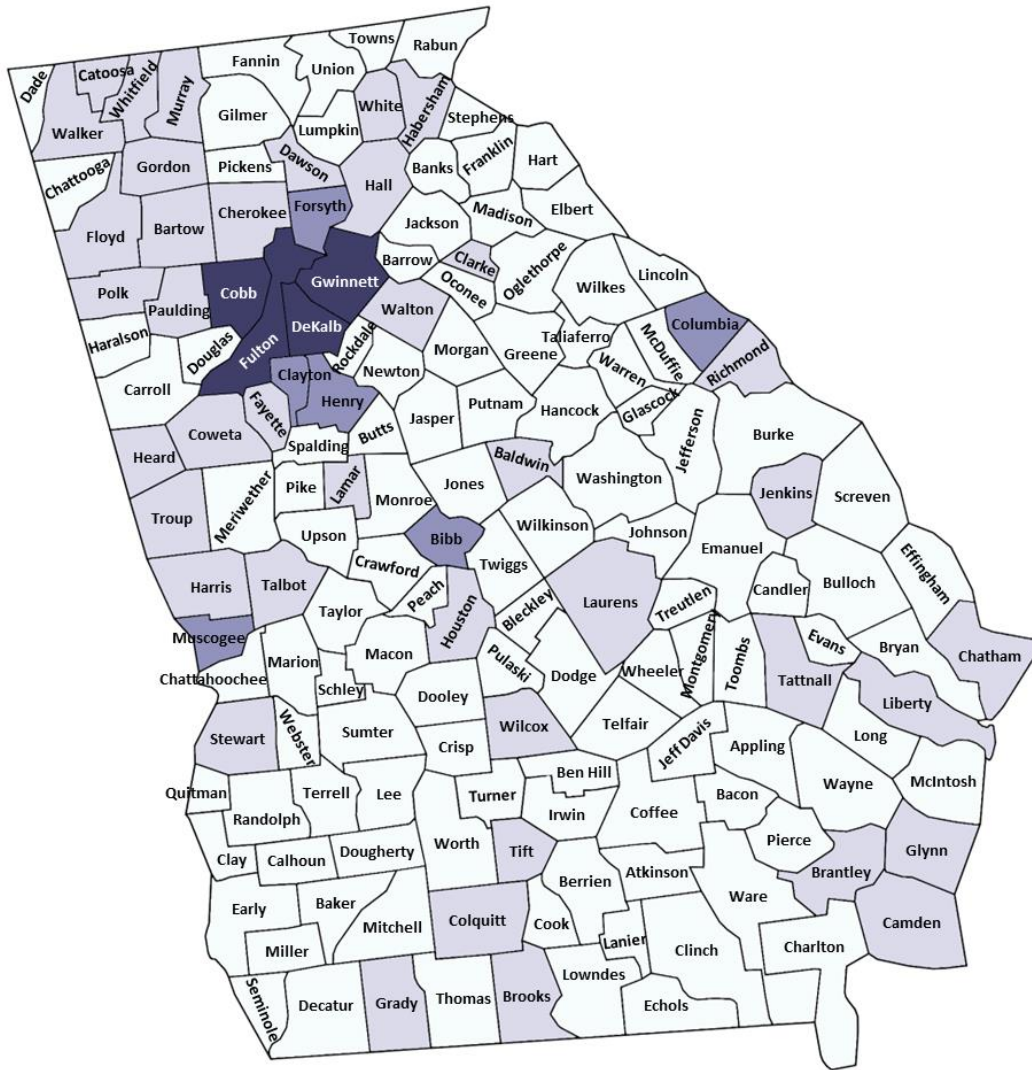
*Rate per 100,000 population

FIGURE 2: TB CASE RATES*, UNITED STATES, 2001-2021



*Rate per 100,000 population

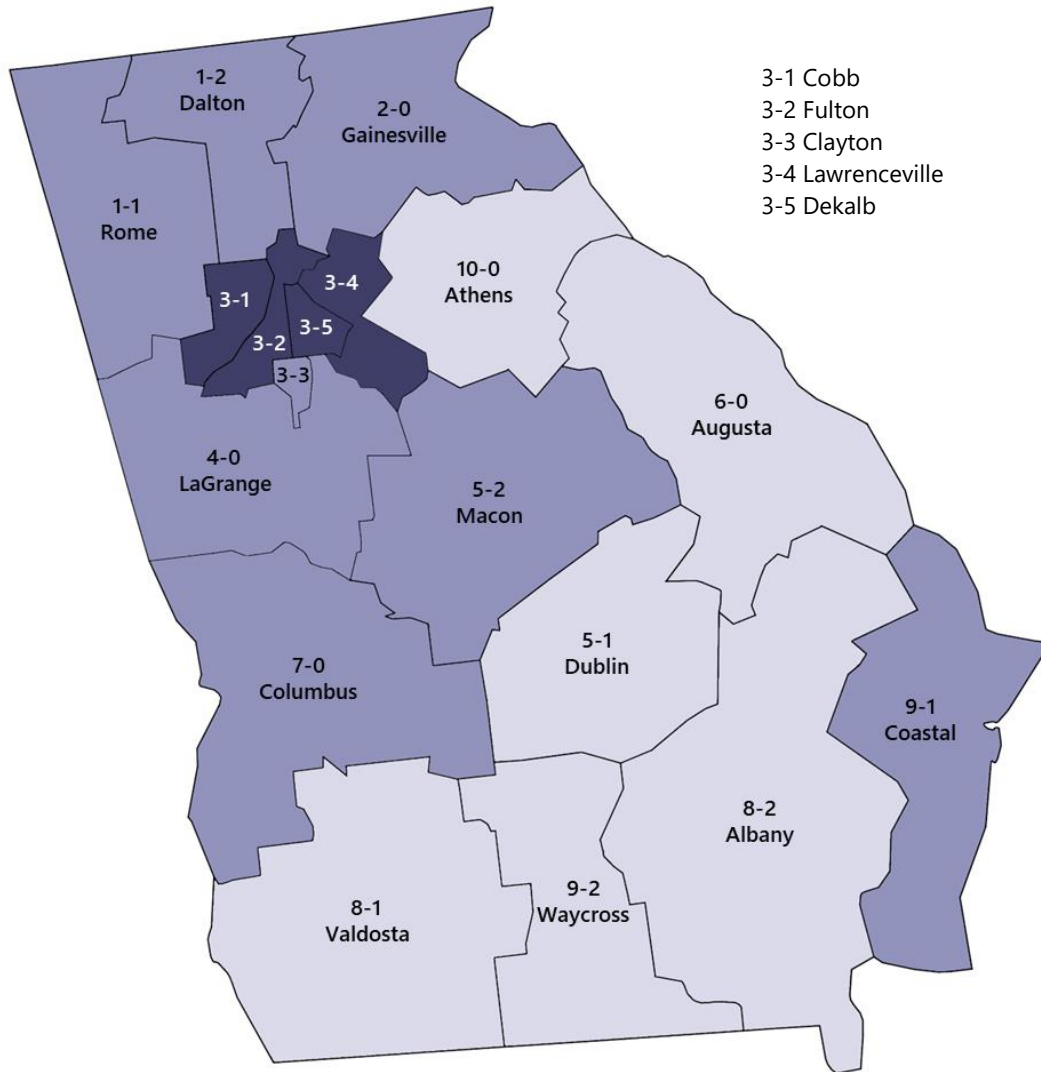
FIGURE 3A: TB CASES BY COUNTY, GEORGIA, 2021 (N=222)



NUMBER OF TB CASES

- High: >18
- Medium: 5-18
- Low: 1-4
- None

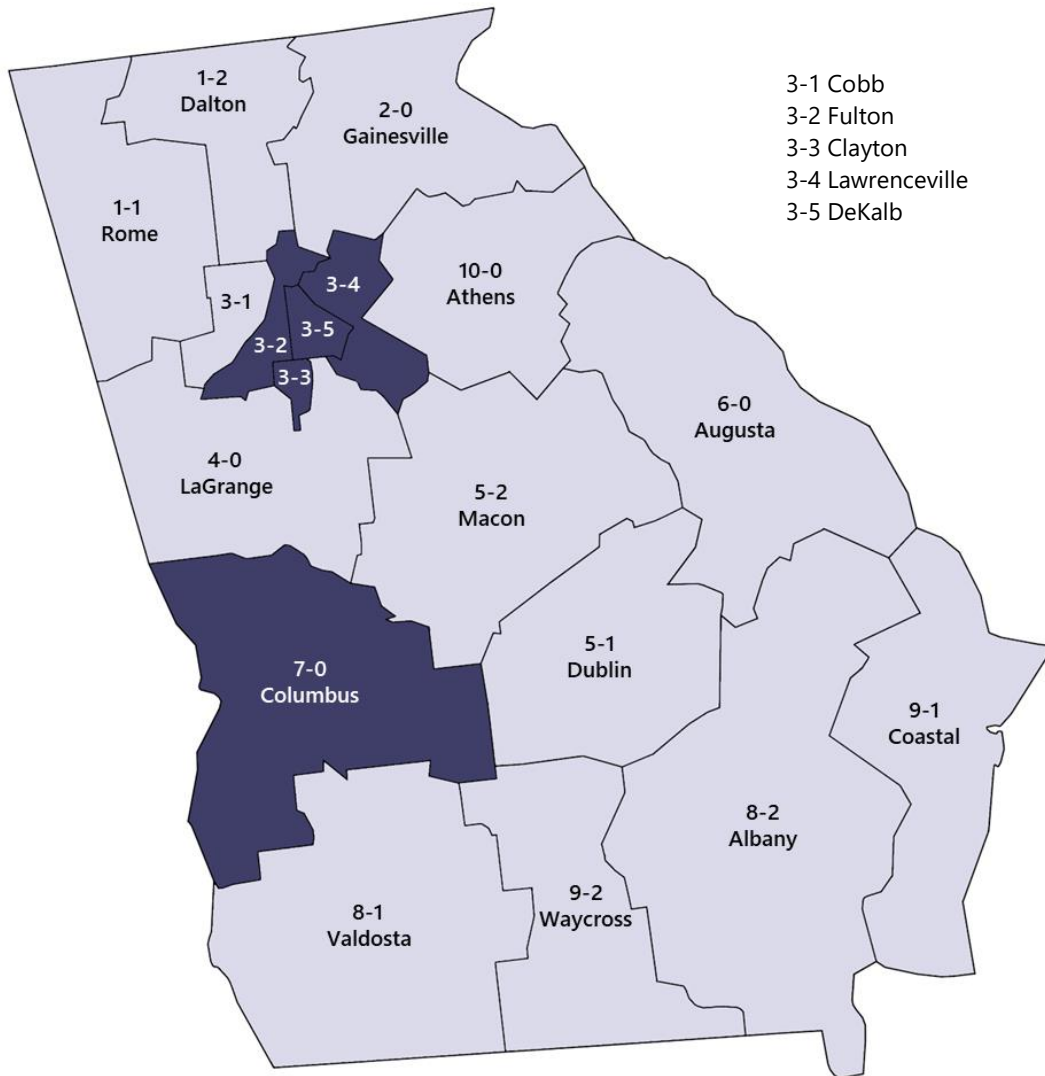
FIGURE 3B: TB CASES BY HEALTH DISTRICT, GEORGIA, 2021 (N=222)



NUMBER OF TB CASES

- High: >18
- Medium: 5-18
- Low: 1-4

FIGURE 4: TB CASE RATES* BY HEALTH DISTRICT, GEORGIA, 2021 (N=222)



CASE RATE PER 100,000 POPULATION

■ > 2.1

■ ≤ 2.1

2021 State Case Rate = 2.1

*Rate per 100,000 population

FIGURE 5: TB CASES BY AGE AND SEX, GEORGIA, 2021 (N=222)

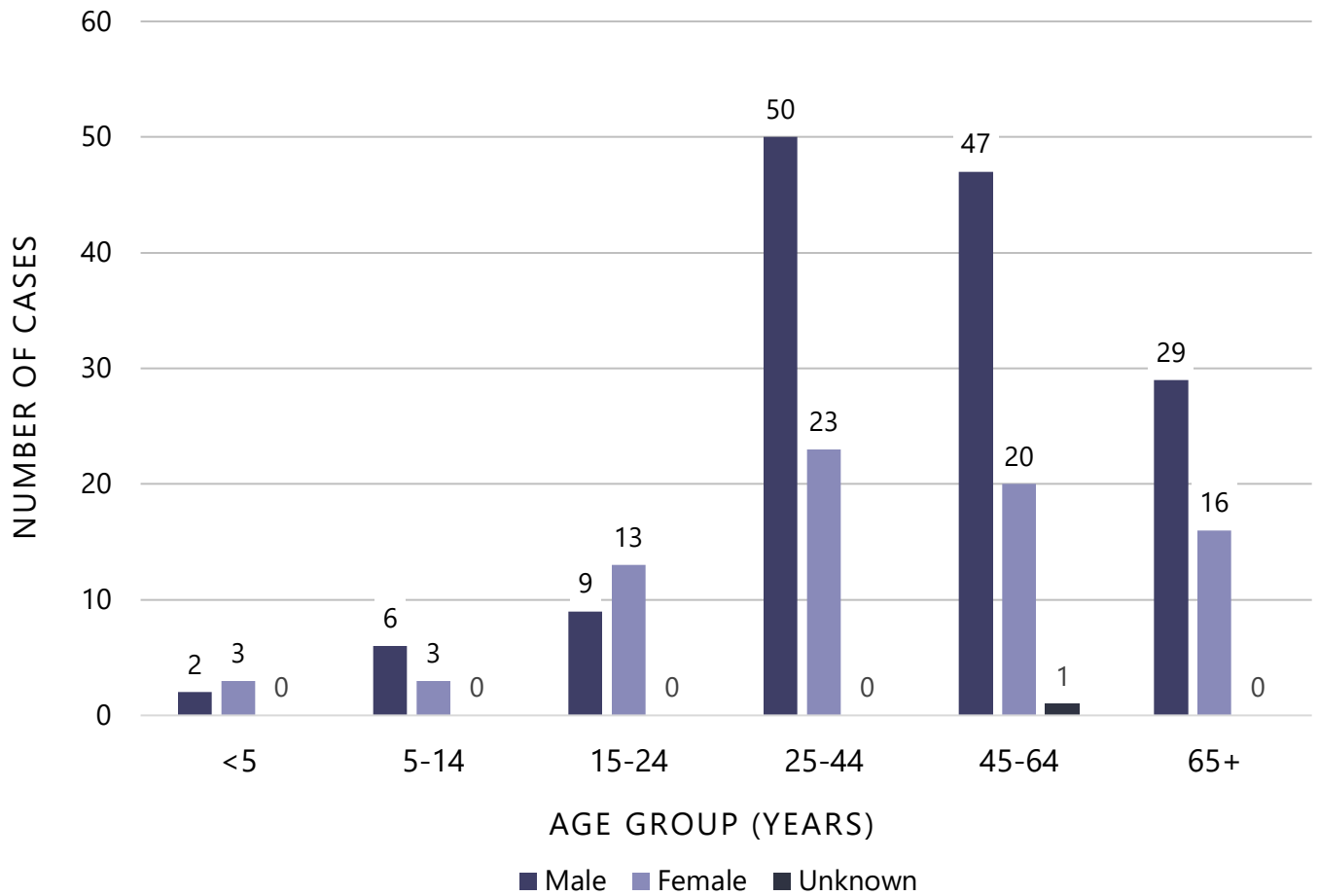


FIGURE 6: TB CASES BY RACE/ETHNICITY, GEORGIA, 2021 (N=222)

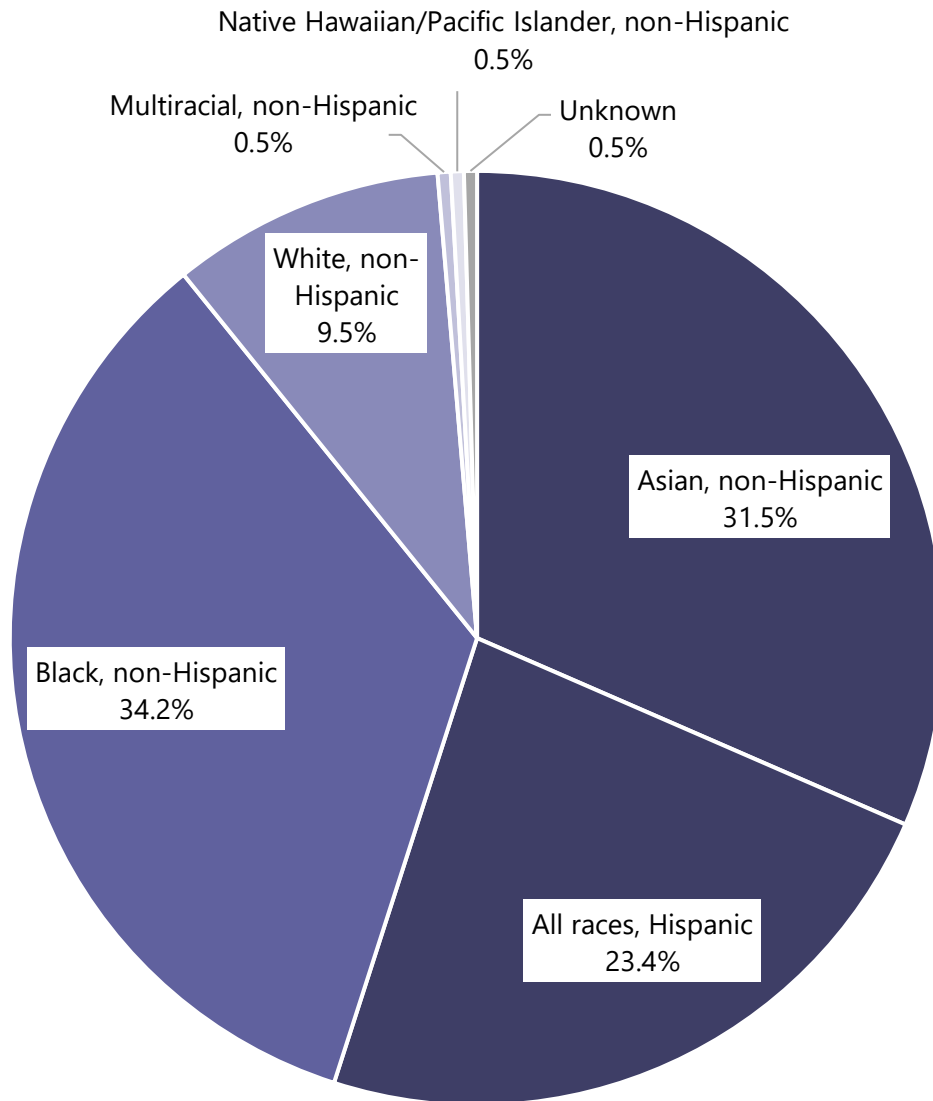
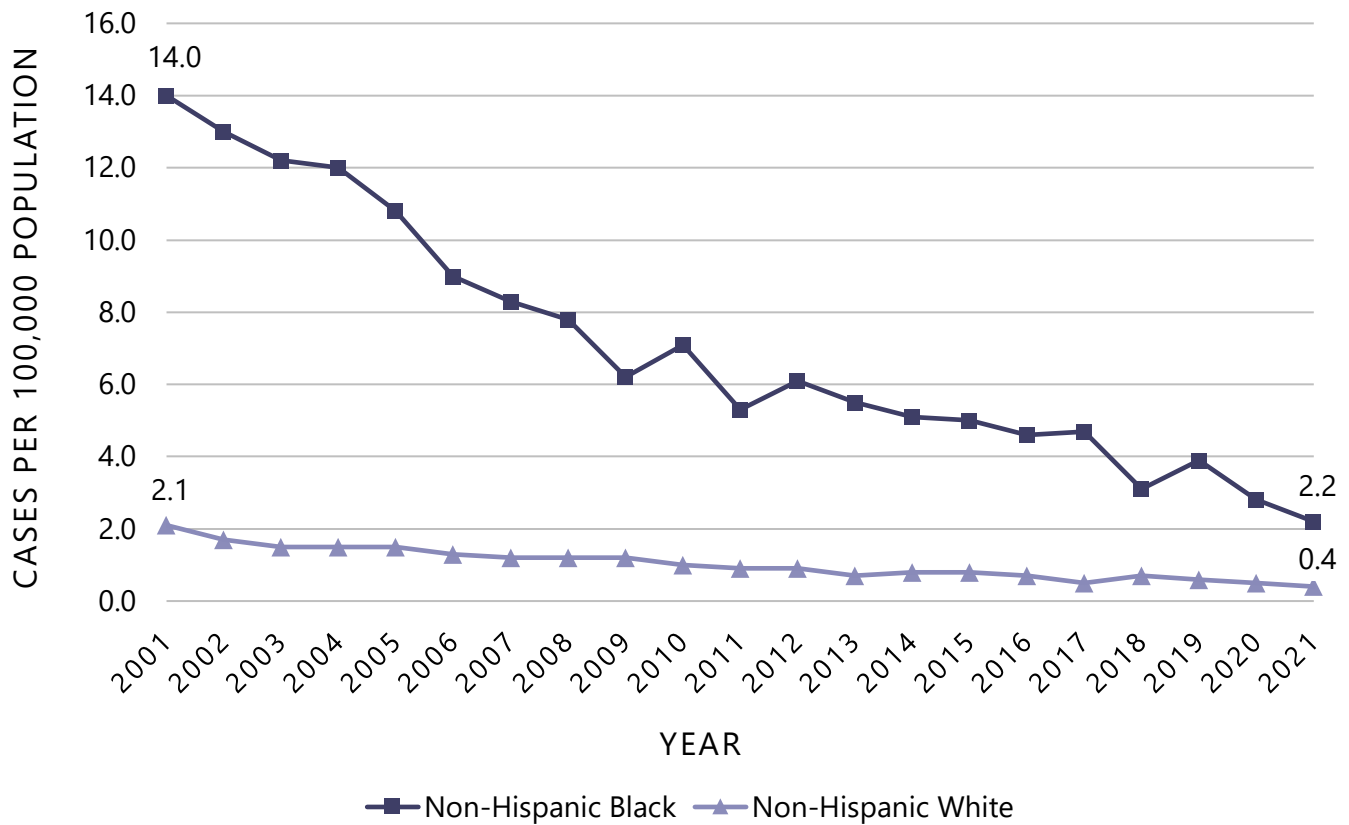


FIGURE 7: TB CASE RATES* AMONG NON-HISPANIC BLACK AND NON-HISPANIC WHITE PERSONS, GEORGIA, 2001-2021



*Rate per 100,000 population

FIGURE 8: U.S.-BORN AND NON-U.S.-BORN TB CASES, GEORGIA, 2017-2021

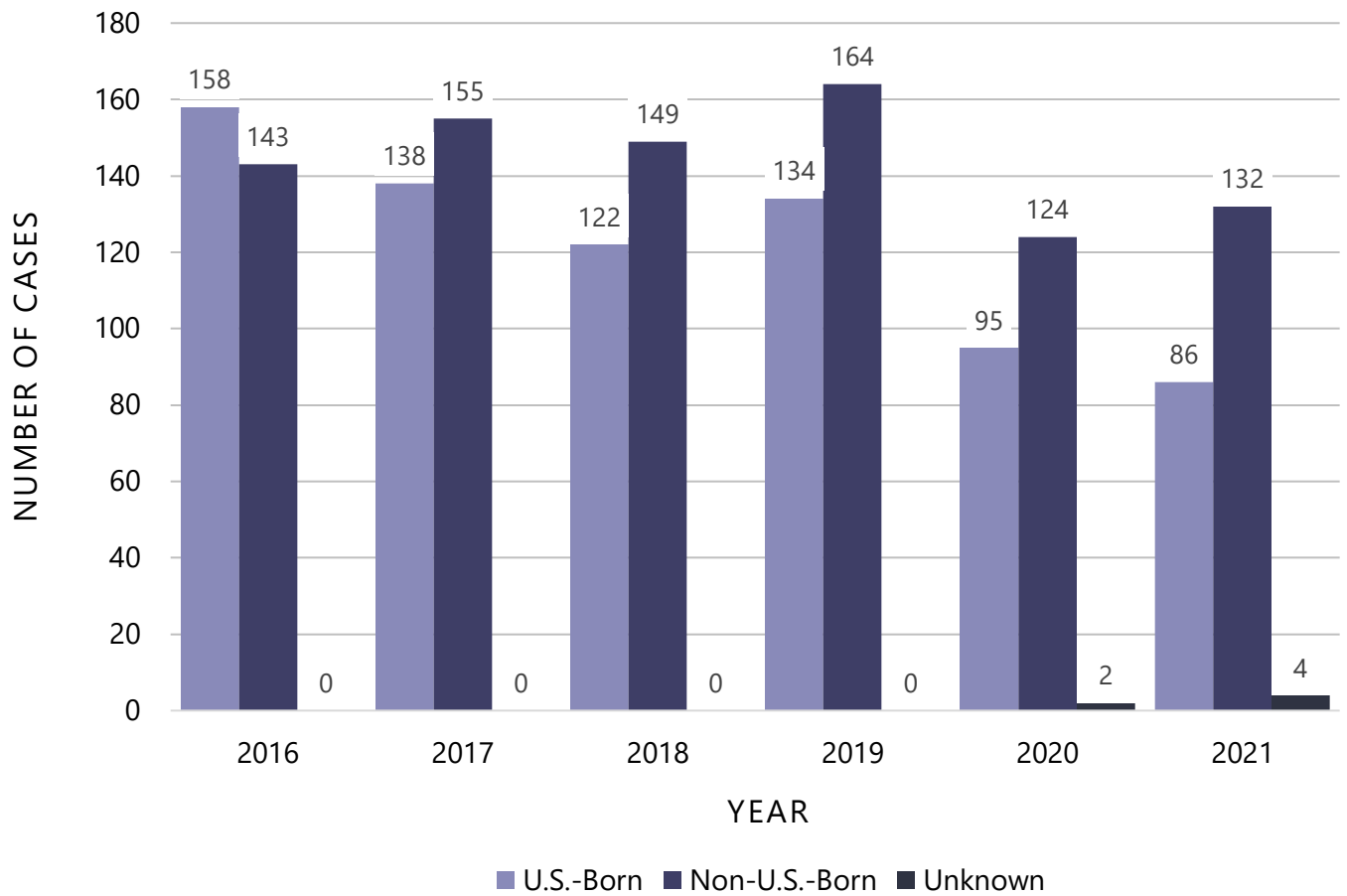
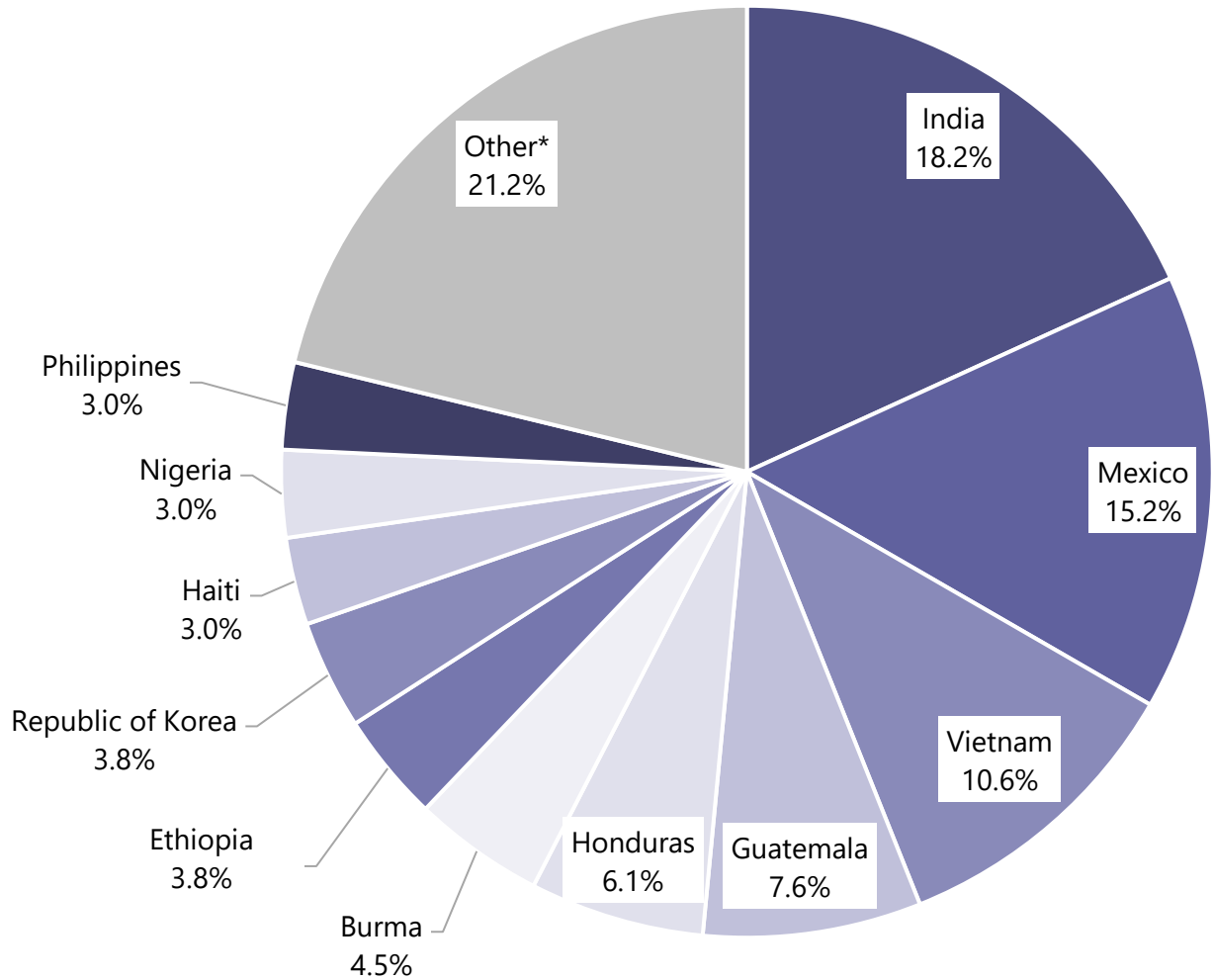


FIGURE 9: COUNTRY OF ORIGIN FOR NON-U.S.-BORN TB CASES, GEORGIA, 2021 (N = 132)



*Other countries of birth include: Afghanistan, Bangladesh, Bhutan, Cambodia, China, El Salvador, Eritrea, The Gambia, Indonesia, Kenya, Malaysia, Mauritius, Nepal, Pakistan, Panama, Peru, Republic of Congo, Romania, Sierra Leone, Somalia, Swaziland, Venezuela, and Zambia

FIGURE 10: HIV STATUS OF TB CASES, GEORGIA, 2001-2021

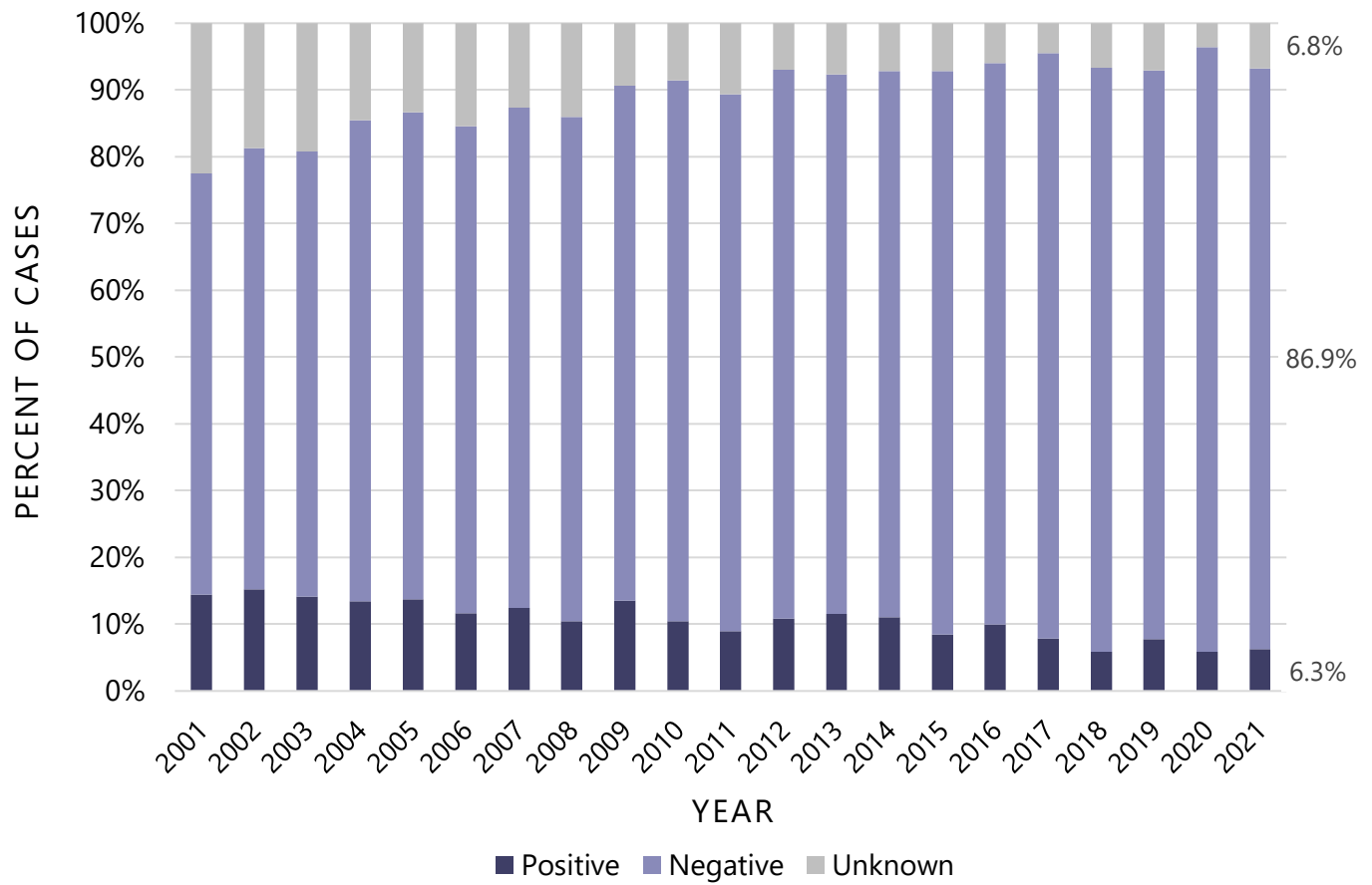


FIGURE 11: RISK FACTORS AMONG TB PATIENTS, GEORGIA, 2017-2021

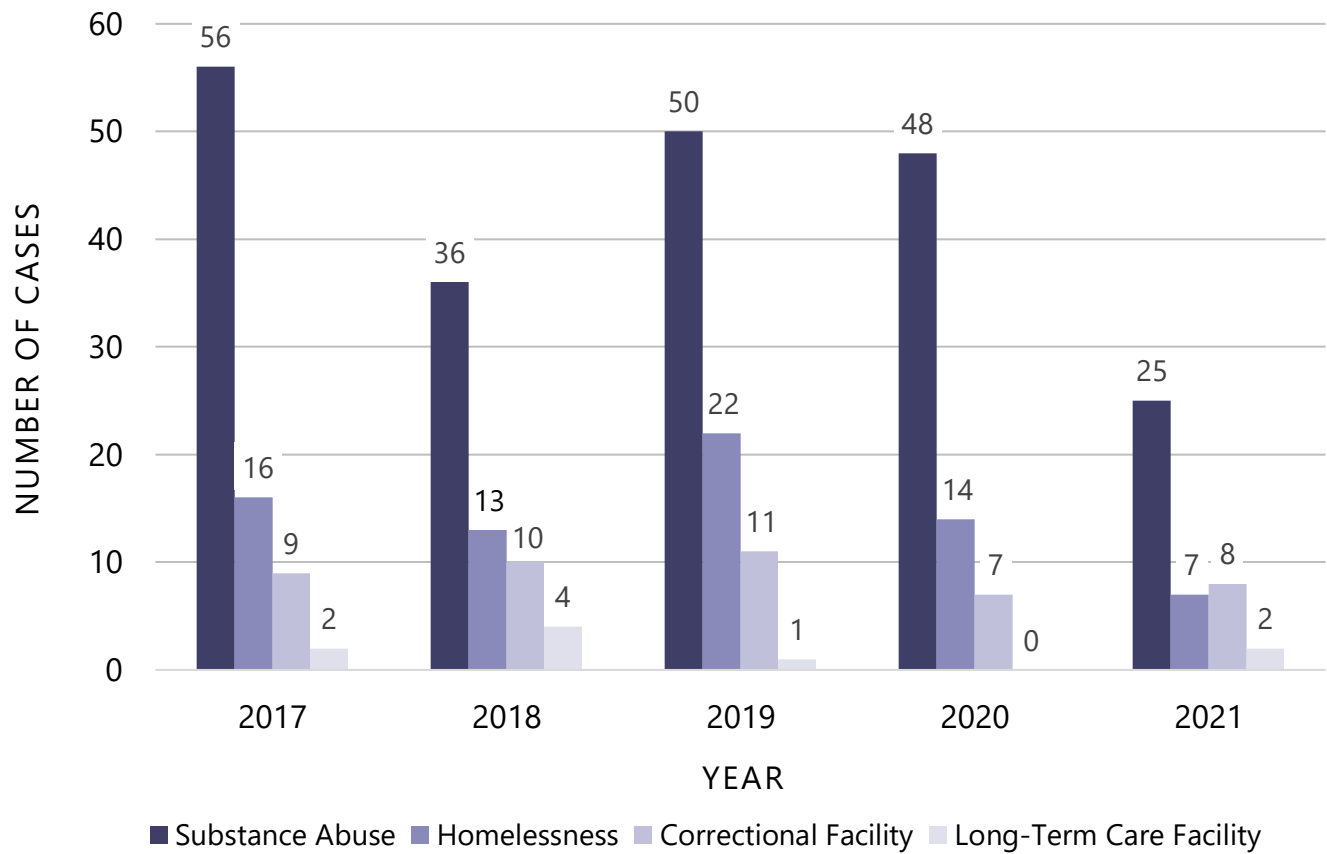
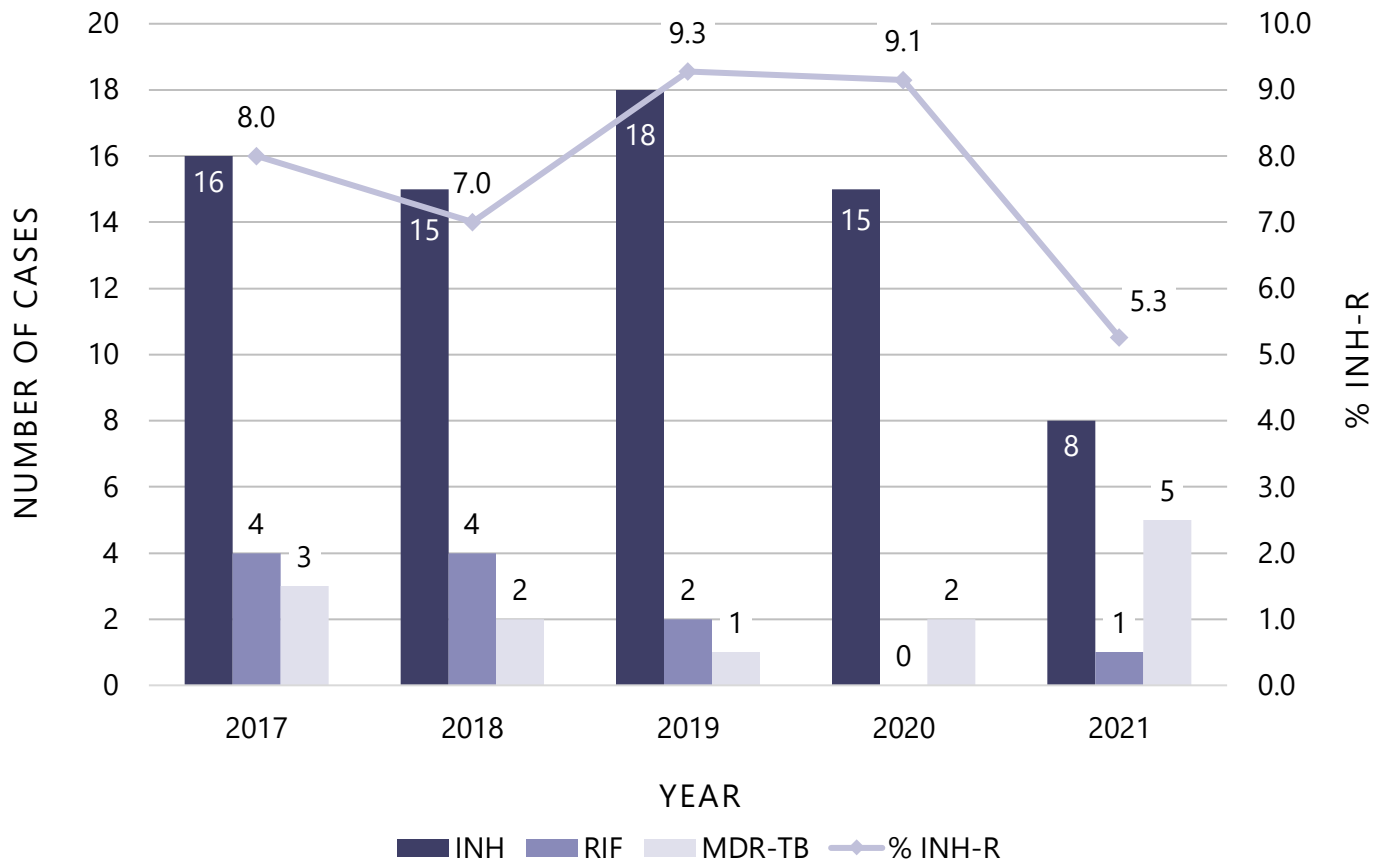
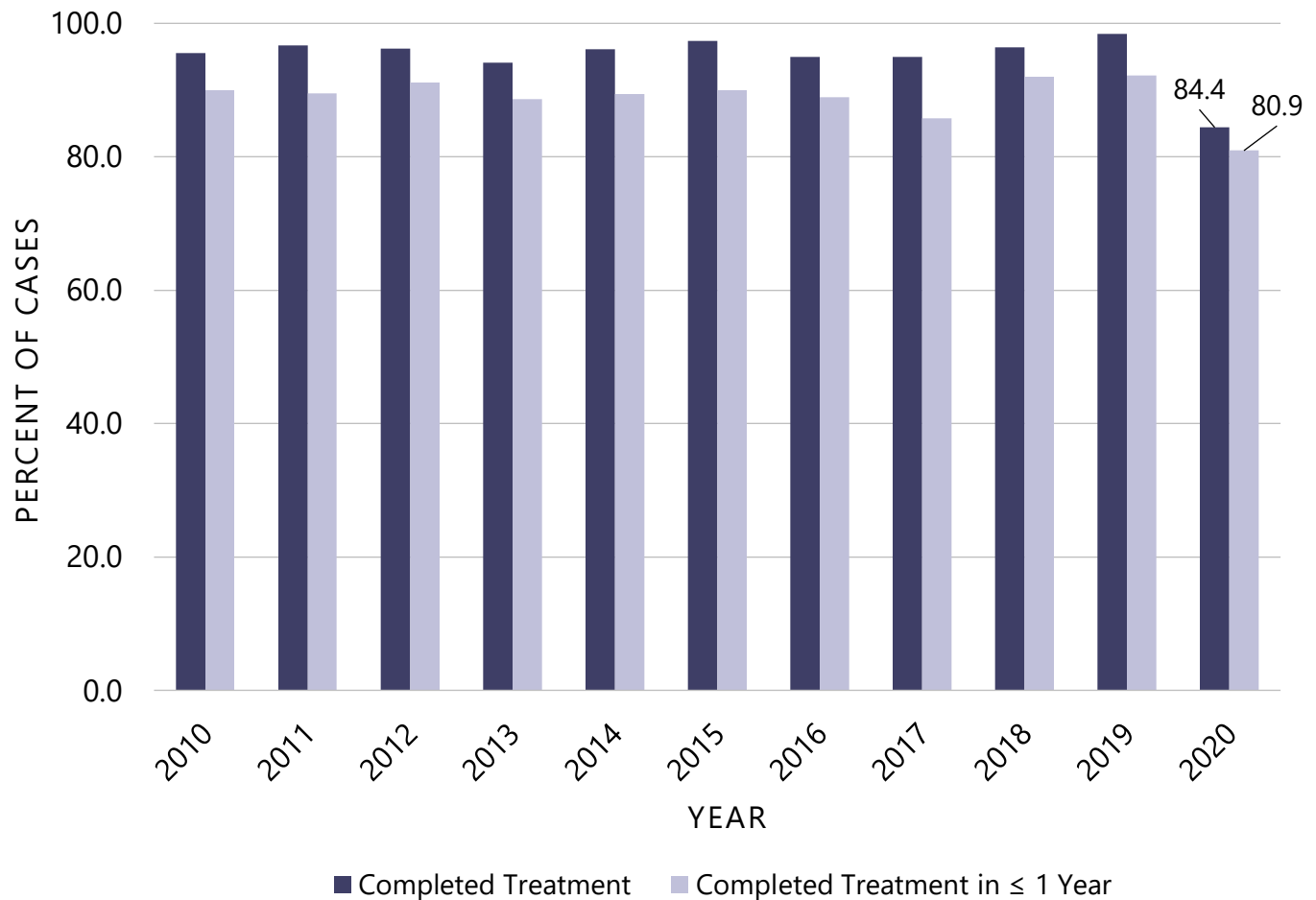


FIGURE 12: PRIMARY DRUG RESISTANCE (INH-R)* AND MULTI-DRUG RESISTANT TB (MDR-TB), GEORGIA, 2017-2021**



*Defined as having no previous diagnosis of TB and having resistance of INH at first occurrence of disease; **Defined as having resistance to at least INH and RIF

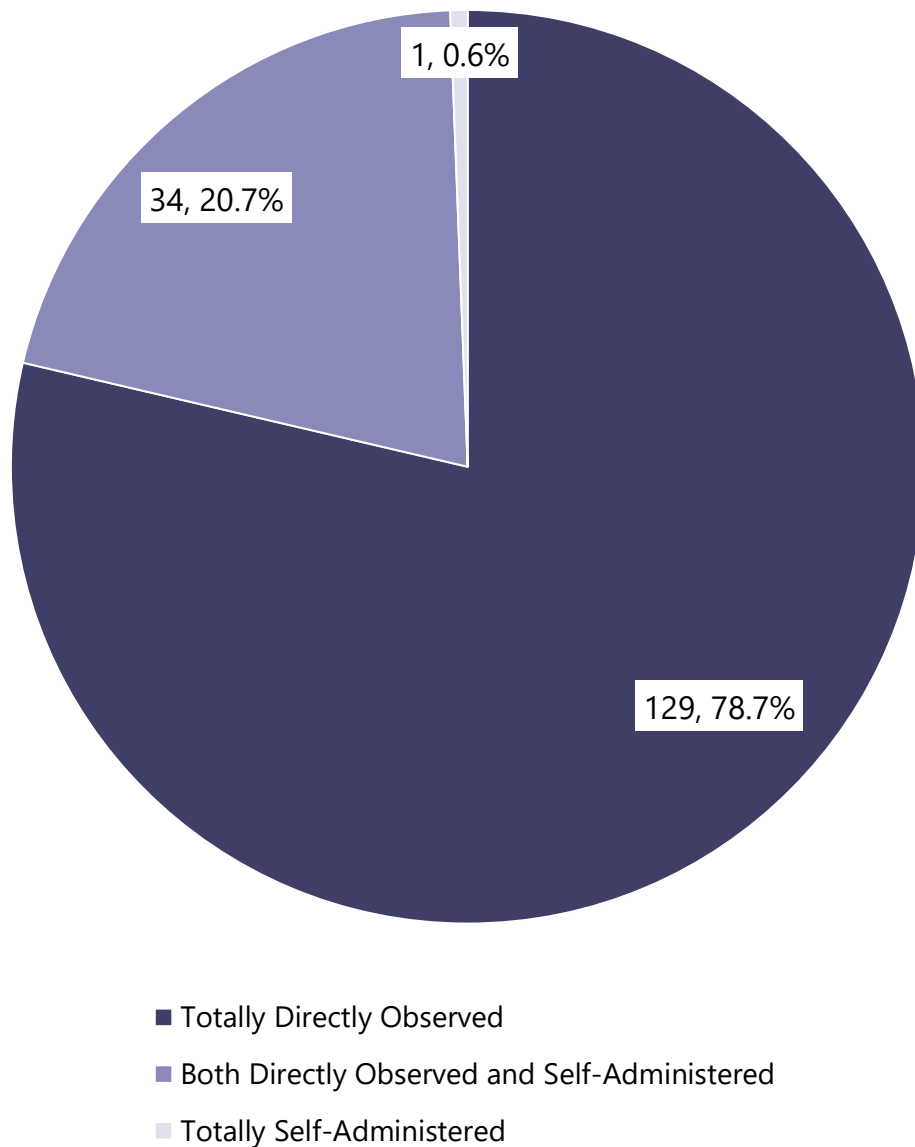
FIGURE 13: COMPLETION OF TB THERAPY, GEORGIA, 2010-2020*



*Data available through 2020

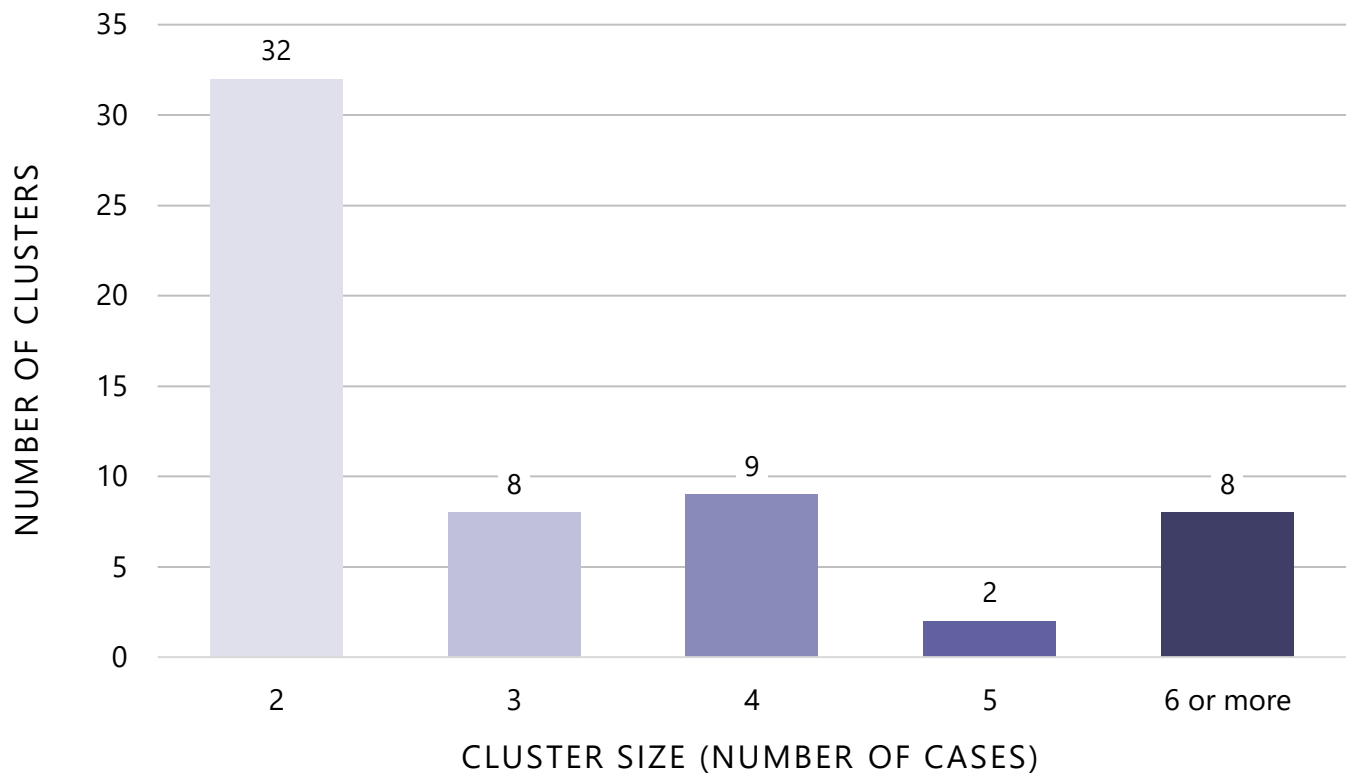
Note: Includes persons alive at diagnosis, with initial drug regimen of one or more drugs prescribed, who did not die within one year of initiating treatment; excludes persons with initial rifampin-resistant isolate, patients with bone and joint disease, meningeal disease, or disease of the central nervous system, or pediatric patients (ages 0–14 years) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment

FIGURE 14: MODE OF TREATMENT ADMINISTRATION AMONG PERSONS REPORTED WITH TB, GEORGIA, 2020^{*}
(N = 164[^])



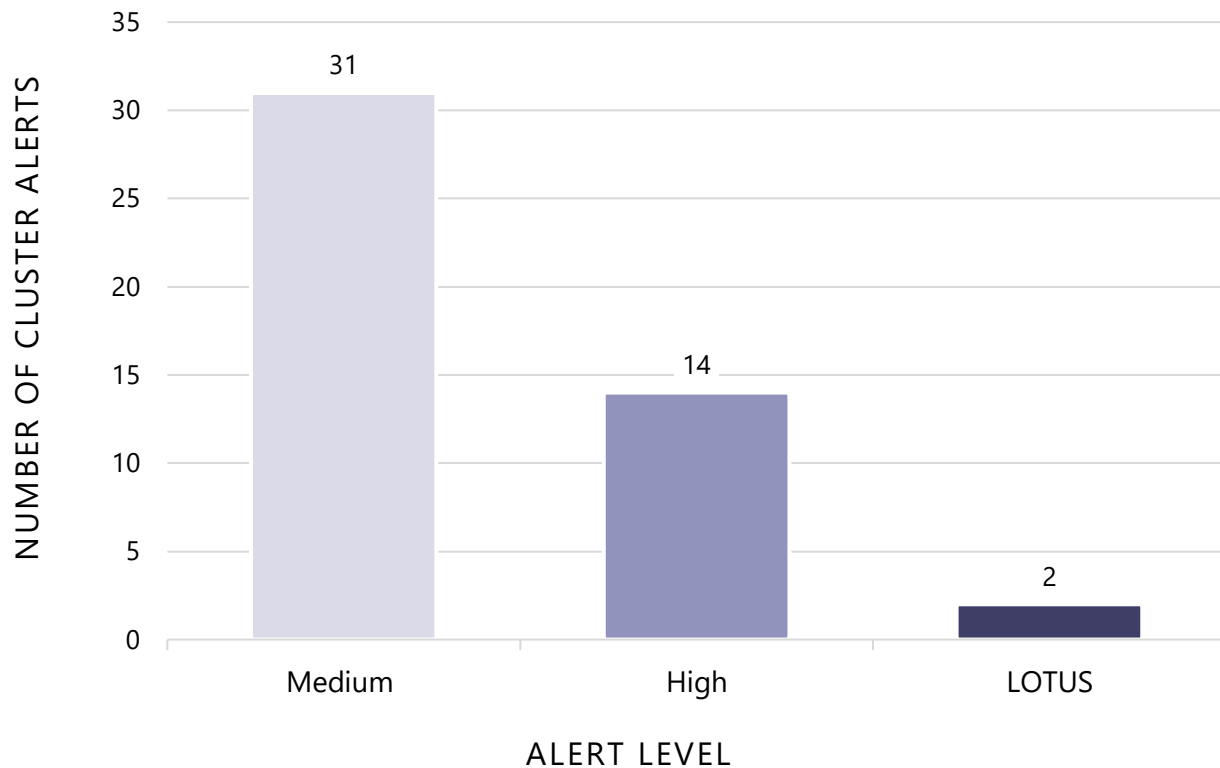
^{*}Data available through 2020; [^]Excludes 56 cases with unknown or missing treatment administration data

FIGURE 15: NUMBER OF TB GENOTYPE CLUSTERS* BY CLUSTER SIZE, GEORGIA, 2019-2021



*Genotype clusters are defined as two or more cases with matching spoligotype and 24-locus MIRU-VNTR (GENType) within the specified 3-year time-period

FIGURE 16: TB GENOTYPE CLUSTER ALERTS BY TB GIMS* ALERT LEVEL[^], GEORGIA, 2019-2021



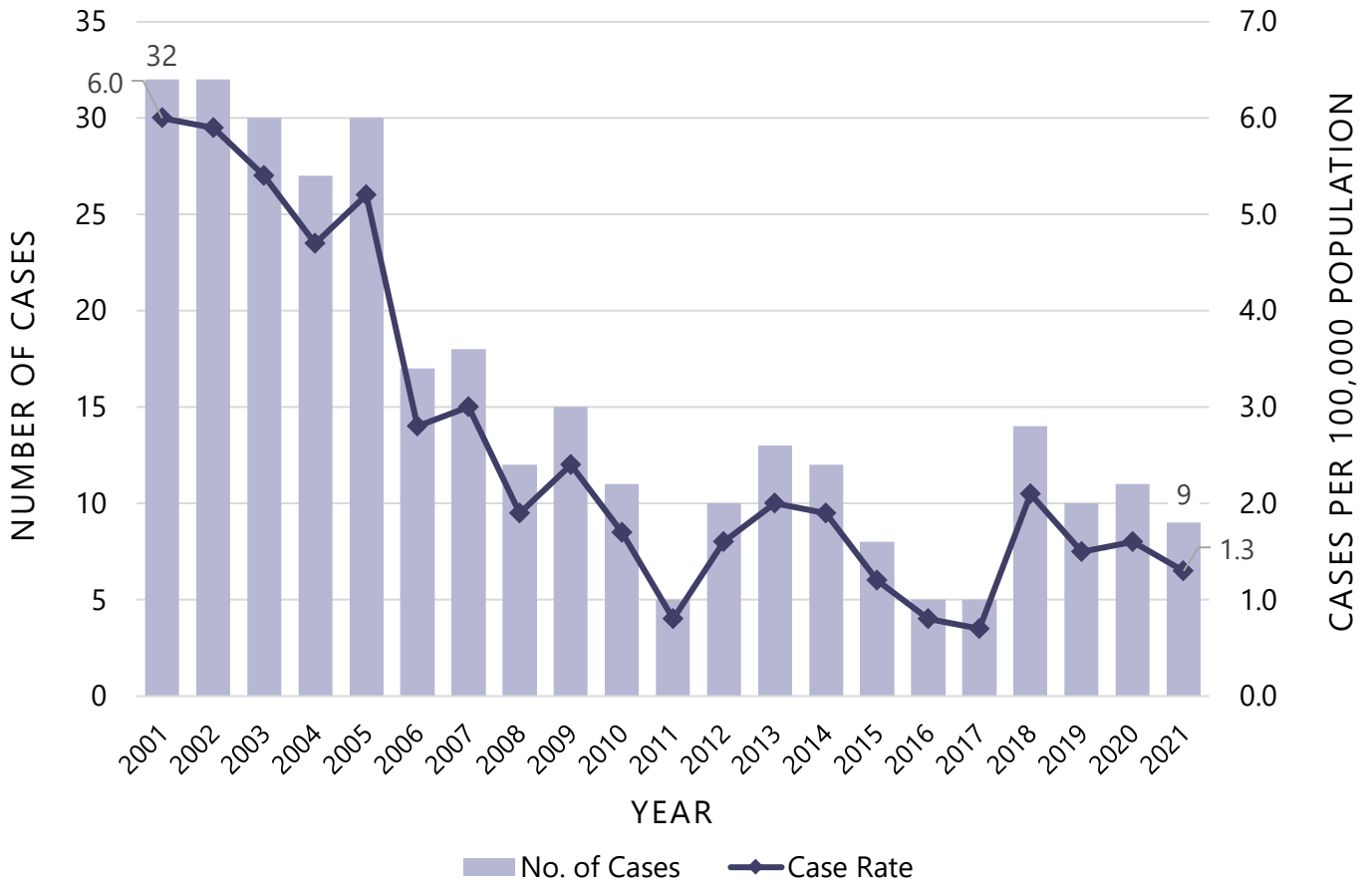
*Tuberculosis Genotyping Information Management System; [^]According to the CDC, alert level is determined by the log likelihood ratio statistic (LLR) for a given cluster, identifying higher than expected geospatial concentrations for a TB genotype cluster in a specific county, compared to the national distribution of that genotype. The Tuberculosis Genotyping Information Management System (TB GIMS) generates alert level notifications based on the LLR: "No alert" is indicated if the LLR is between $0 \leq 5$, "medium" is for clusters with LLRs between $5 \leq 10$, and "high" alert is for clusters with LLRs ≥ 10 . LOTUS (Large Outbreak of Tuberculosis in the United States) alerts are generated when clusters of ≥ 10 genotype-matched cases within a 3-year period that related by recent transmission are identified.

2001-2021

TUBERCULOSIS MORBIDITY TRENDS

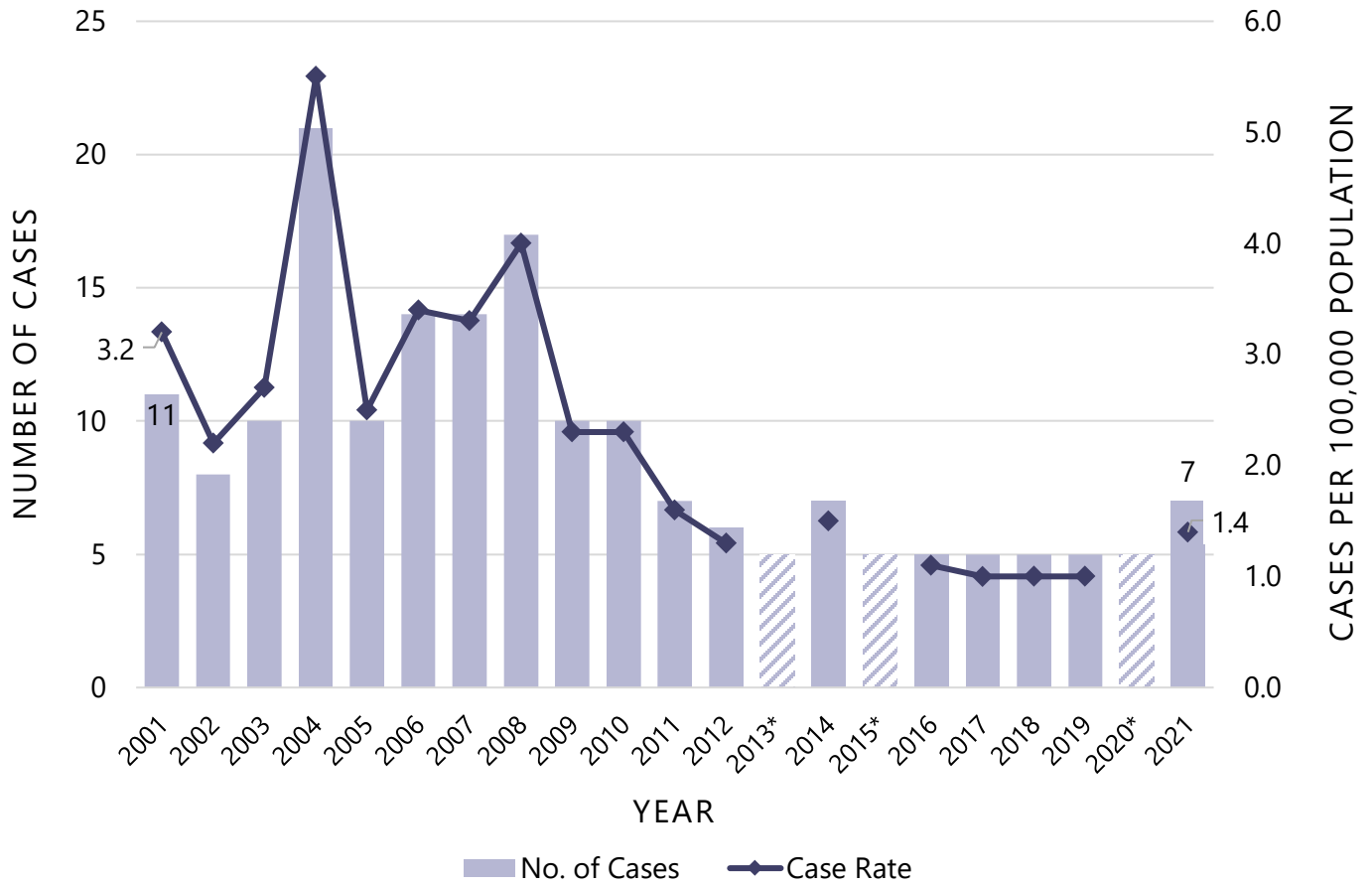
BY HEALTH DISTRICT

DISTRICT 1-1 ROME: TB CASES AND RATES ^, 2001-2021



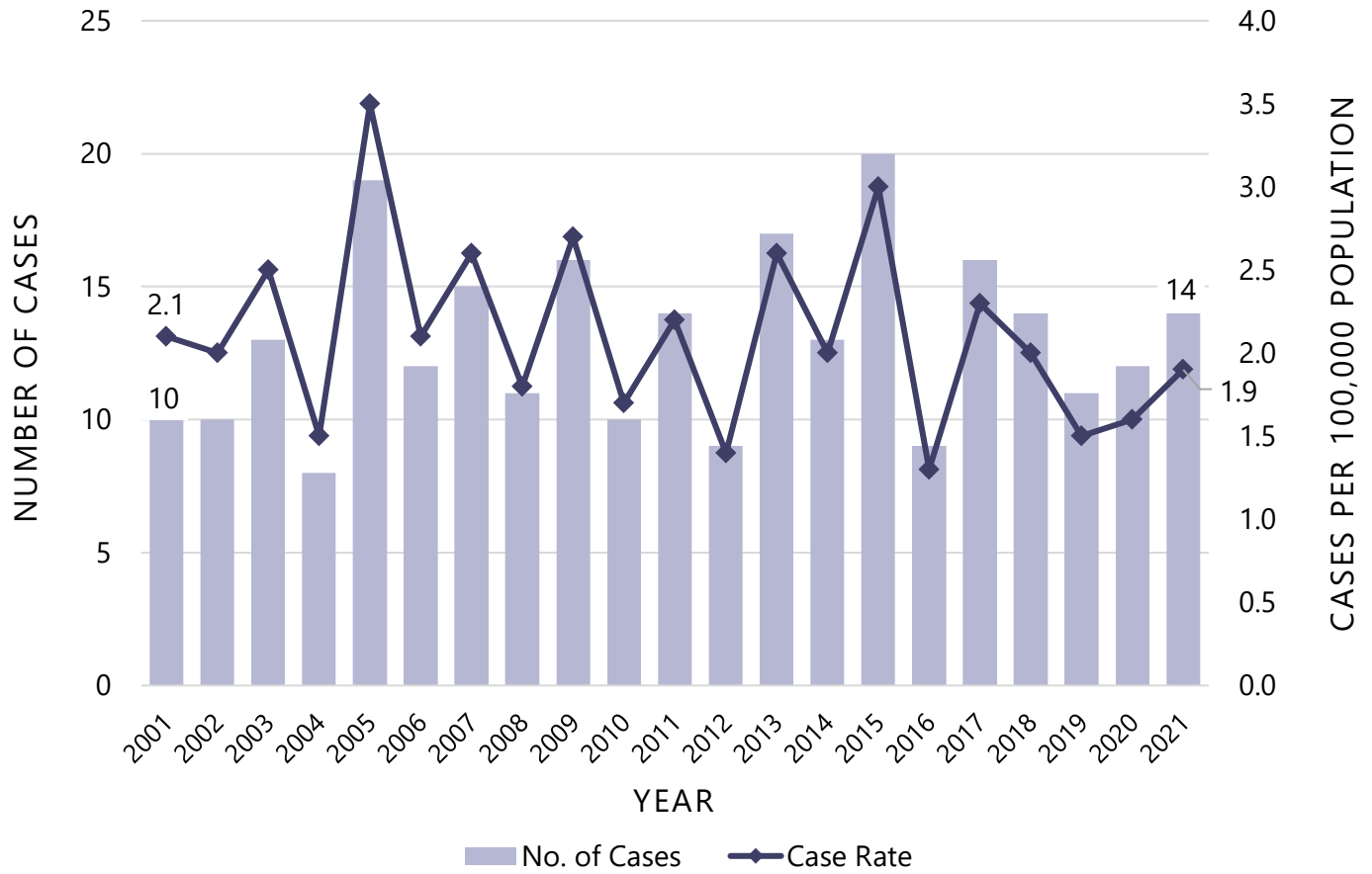
^Rate per 100,000 population

DISTRICT 1-2 DALTON: TB CASES AND RATES[^], 2001-2021



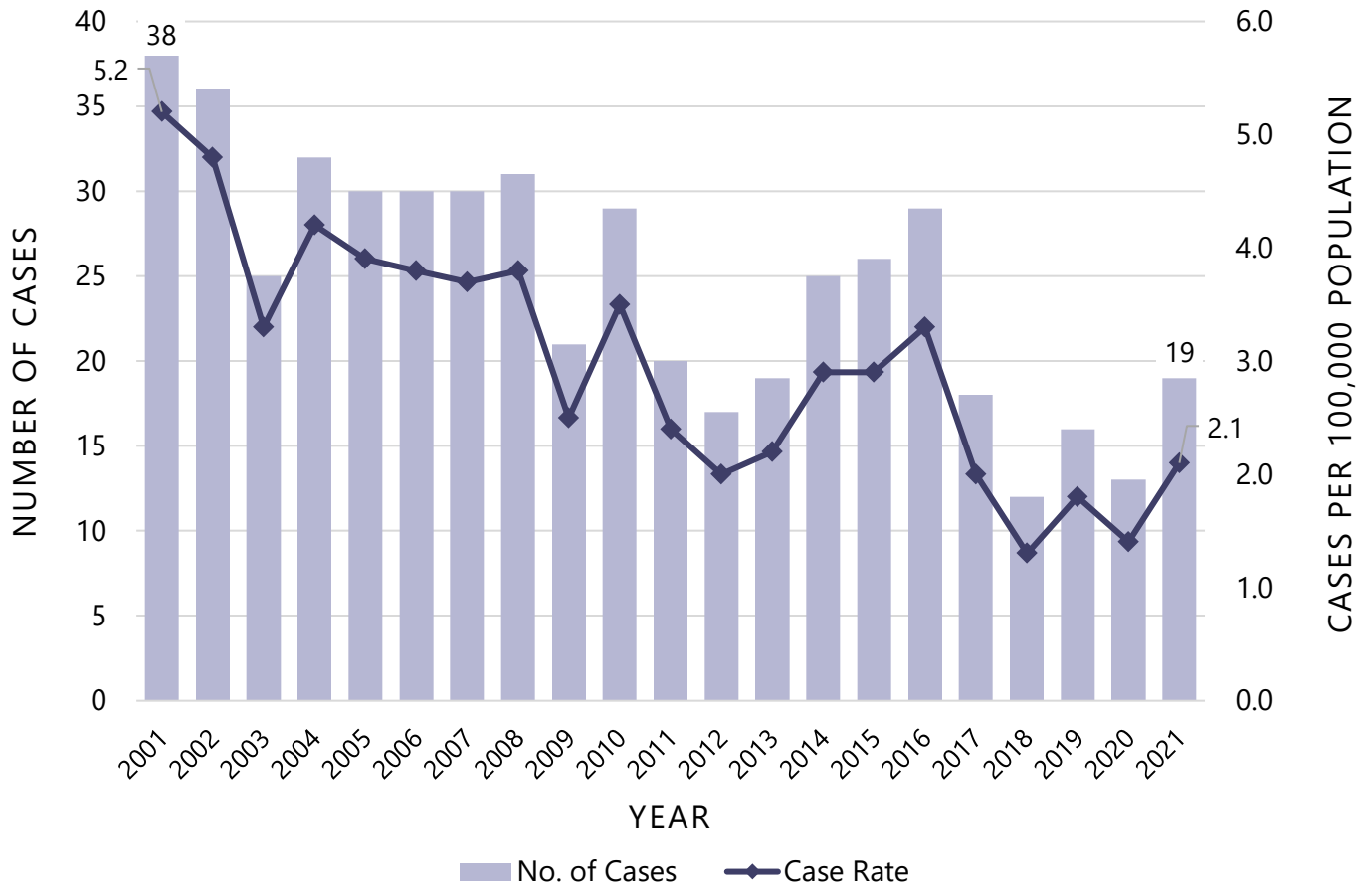
[^]Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated

DISTRICT 2-0 GAINESVILLE: TB CASES AND RATES[^], 2001-2021



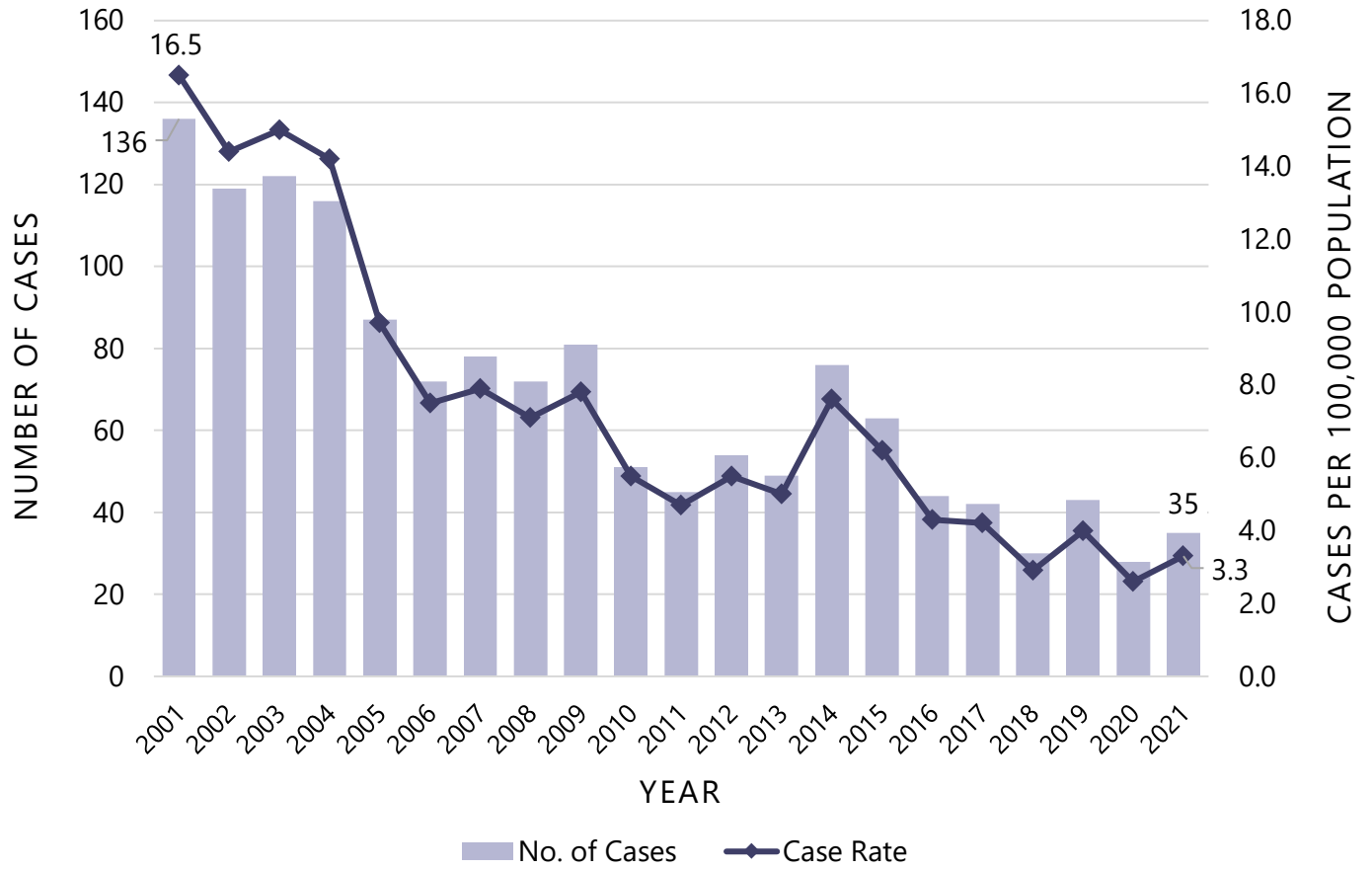
[^]Rate per 100,000 population

DISTRICT 3-1 COBB: TB CASES AND RATES ^, 2001-2021



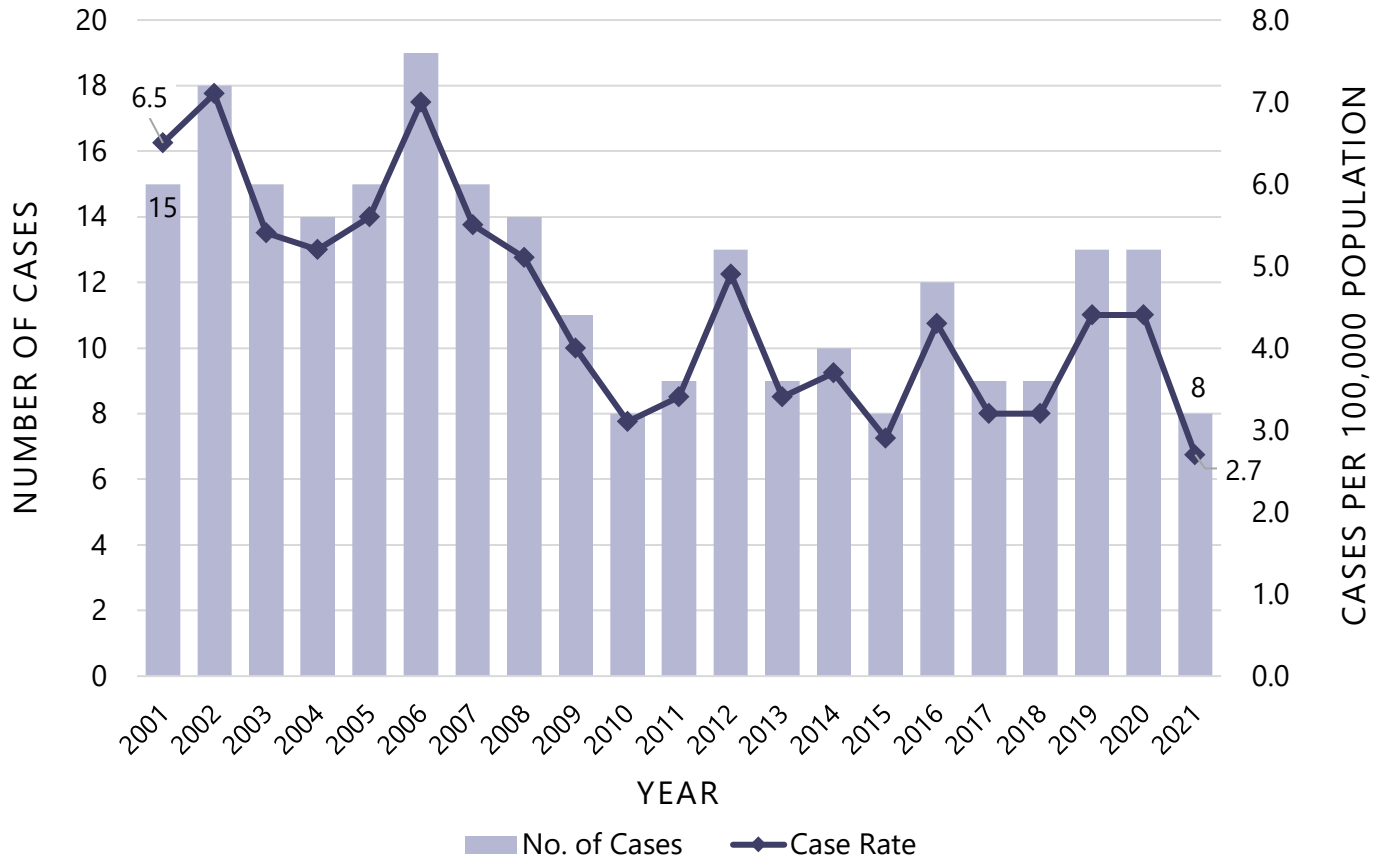
^Rate per 100,000 population

DISTRICT 3-2 FULTON: TB CASES AND RATES[^], 2001-2021



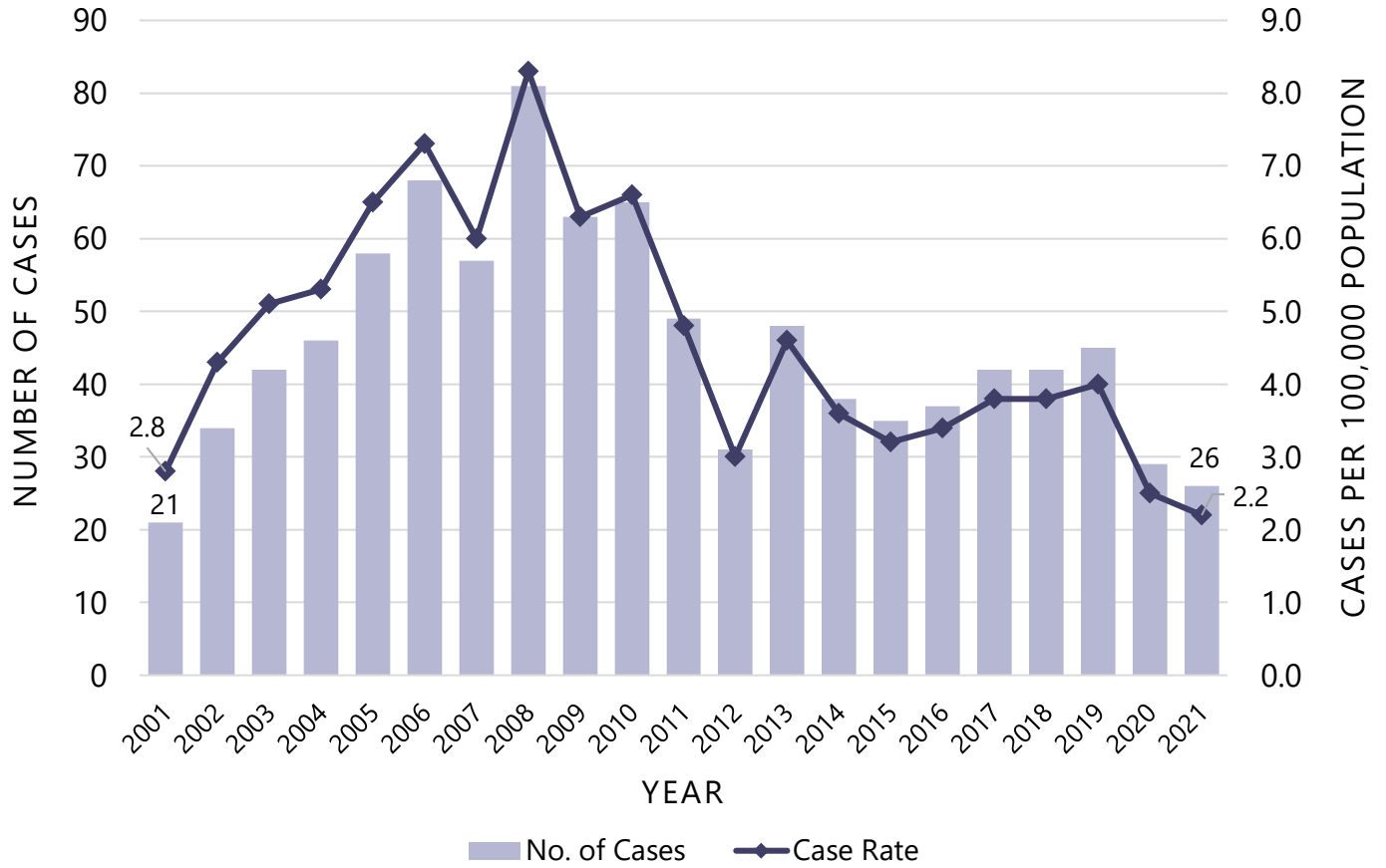
[^]Rate per 100,000 population

DISTRICT 3-3 CLAYTON: TB CASES AND RATES[^], 2001-2021



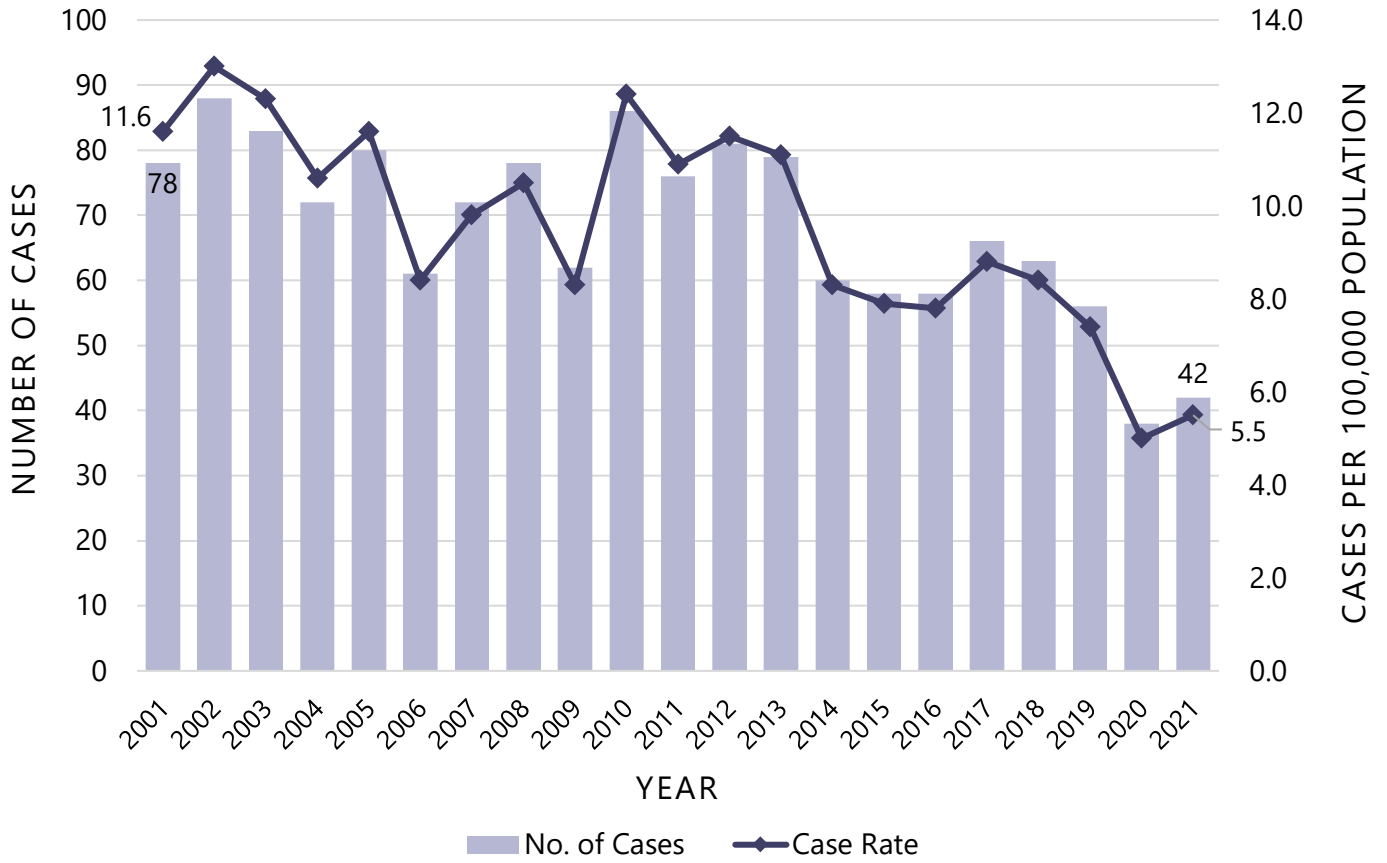
[^]Rate per 100,000 population

DISTRICT 3-4 LAWRENCEVILLE: TB CASES AND RATES[^], 2001-2021



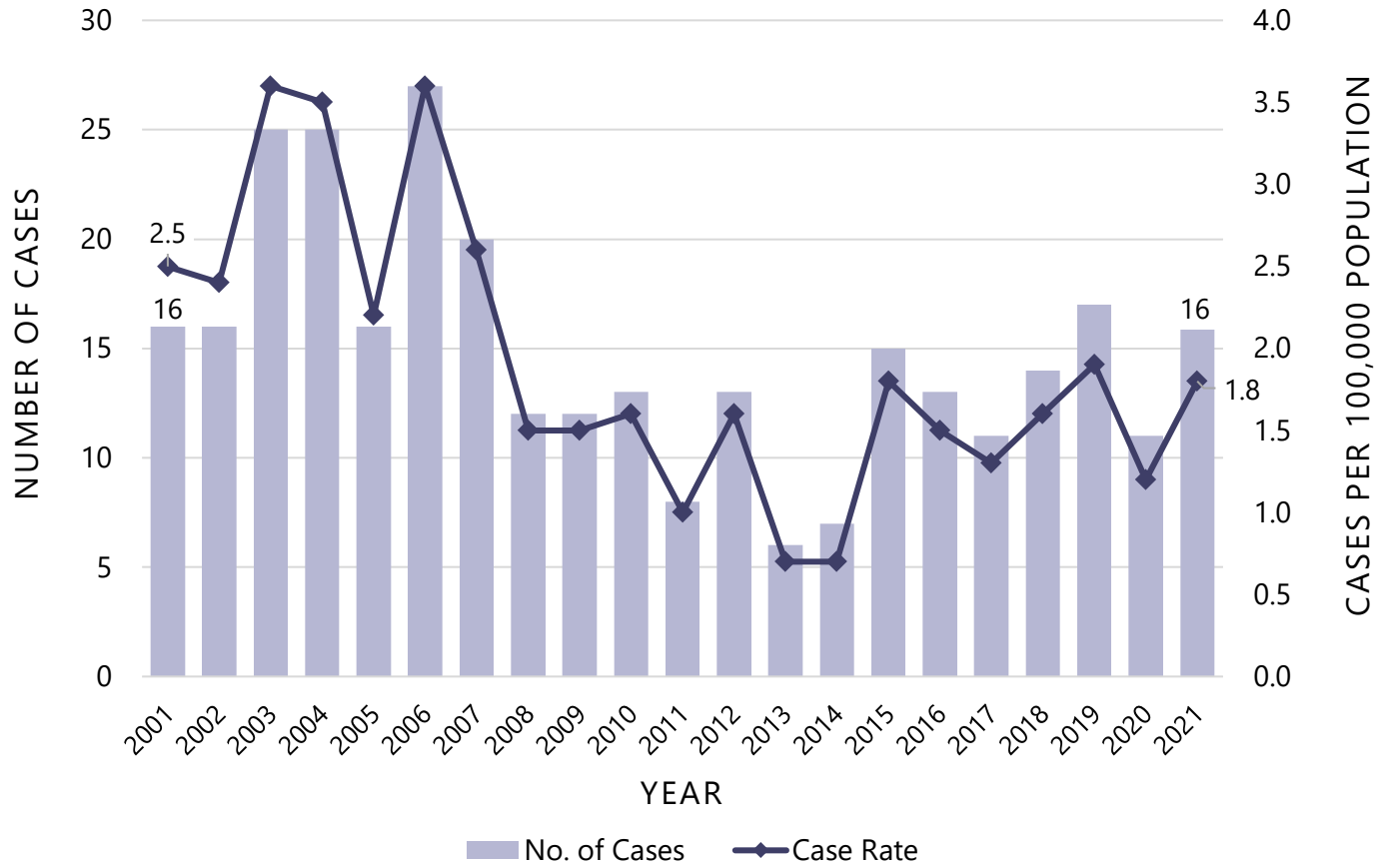
[^]Rate per 100,000 population

DISTRICT 3-5 DEKALB: TB CASES AND RATES[^], 2001-2021



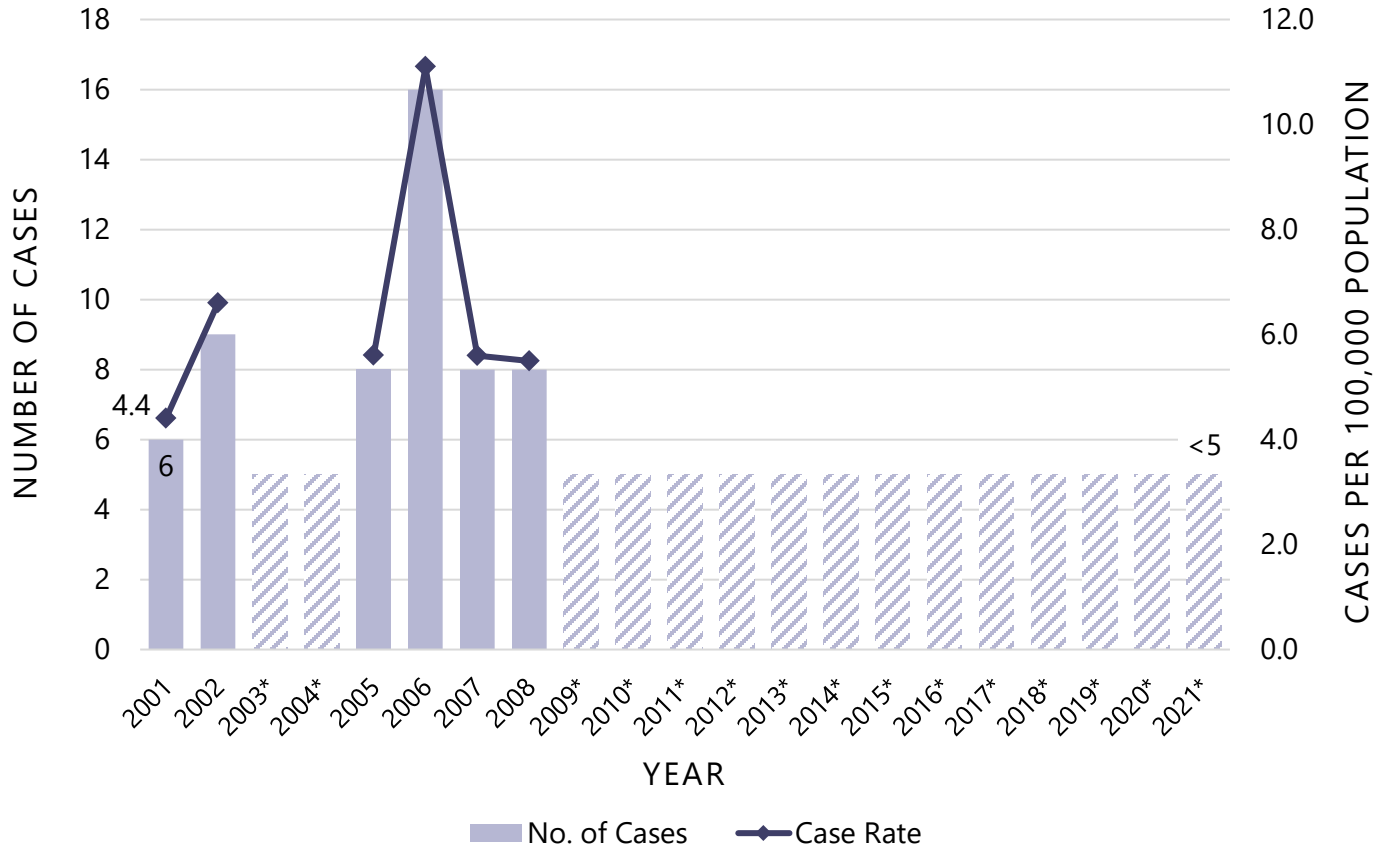
[^]Rate per 100,000 population

DISTRICT 4-0 LAGRANGE: TB CASES AND RATES[^], 2001-2021



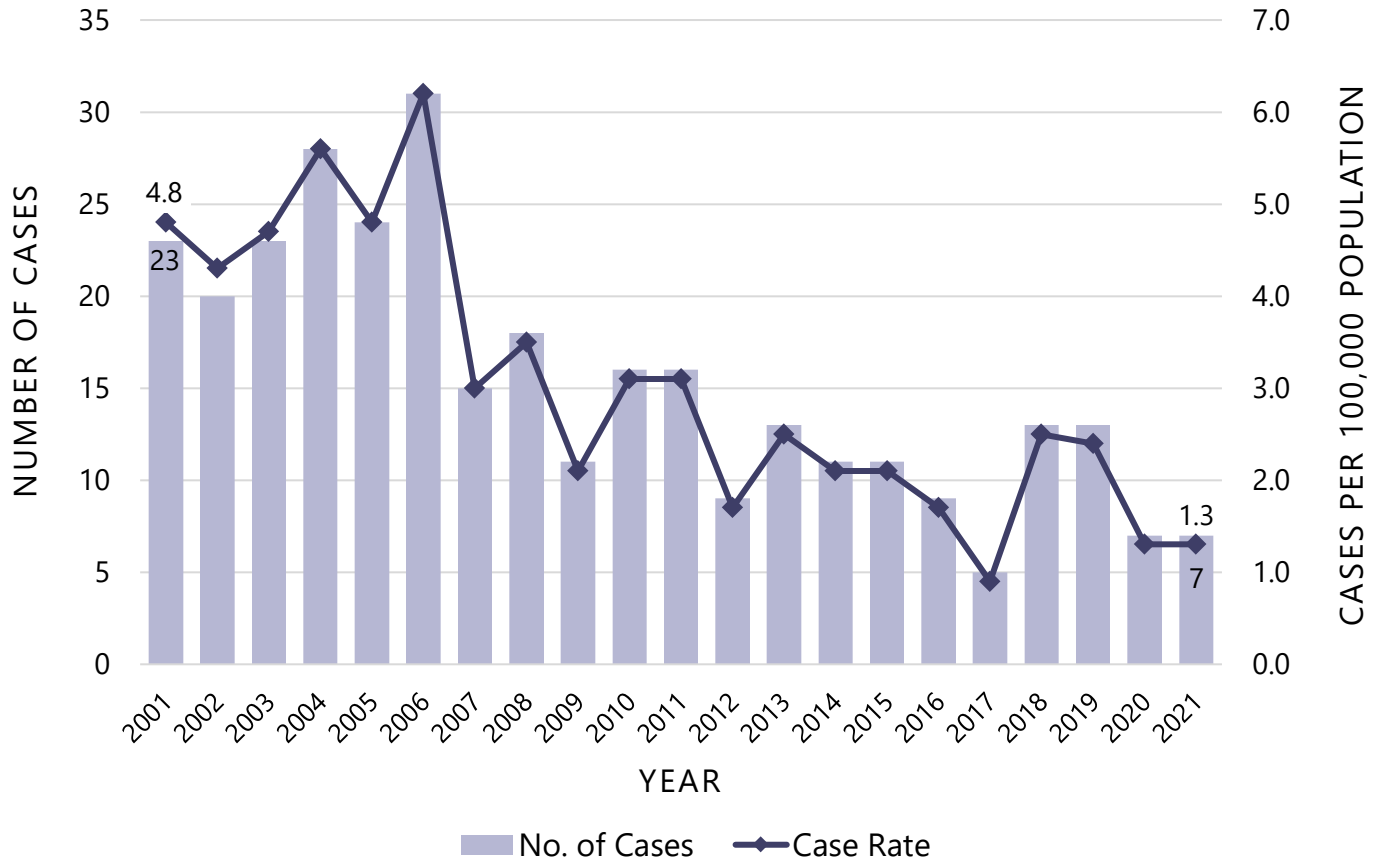
[^]Rate per 100,000 population

DISTRICT 5-1 DUBLIN: TB CASES AND RATES ^, 2001-2021



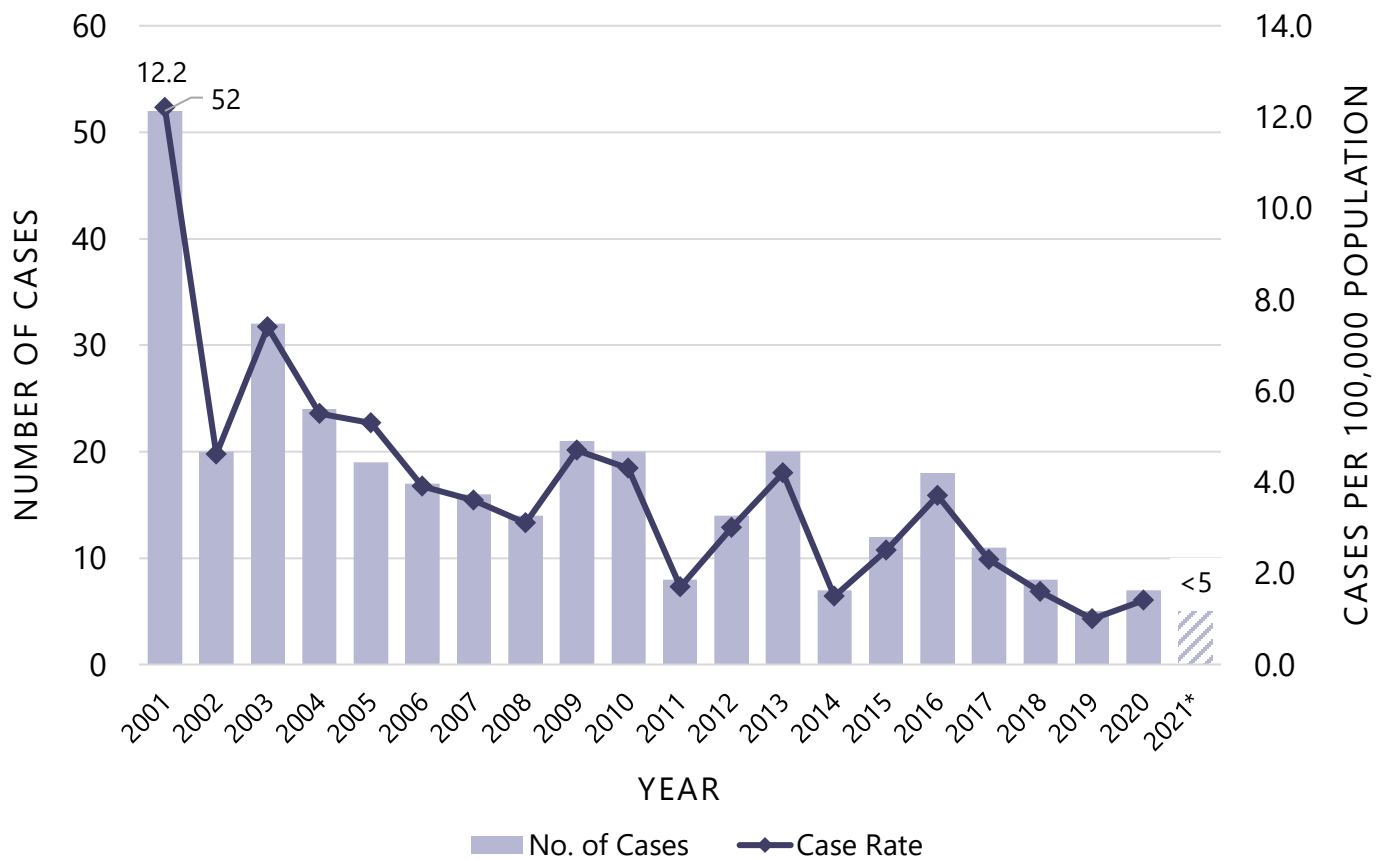
^Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated

DISTRICT 5-2 MACON: TB CASES AND RATES, 2001-2021



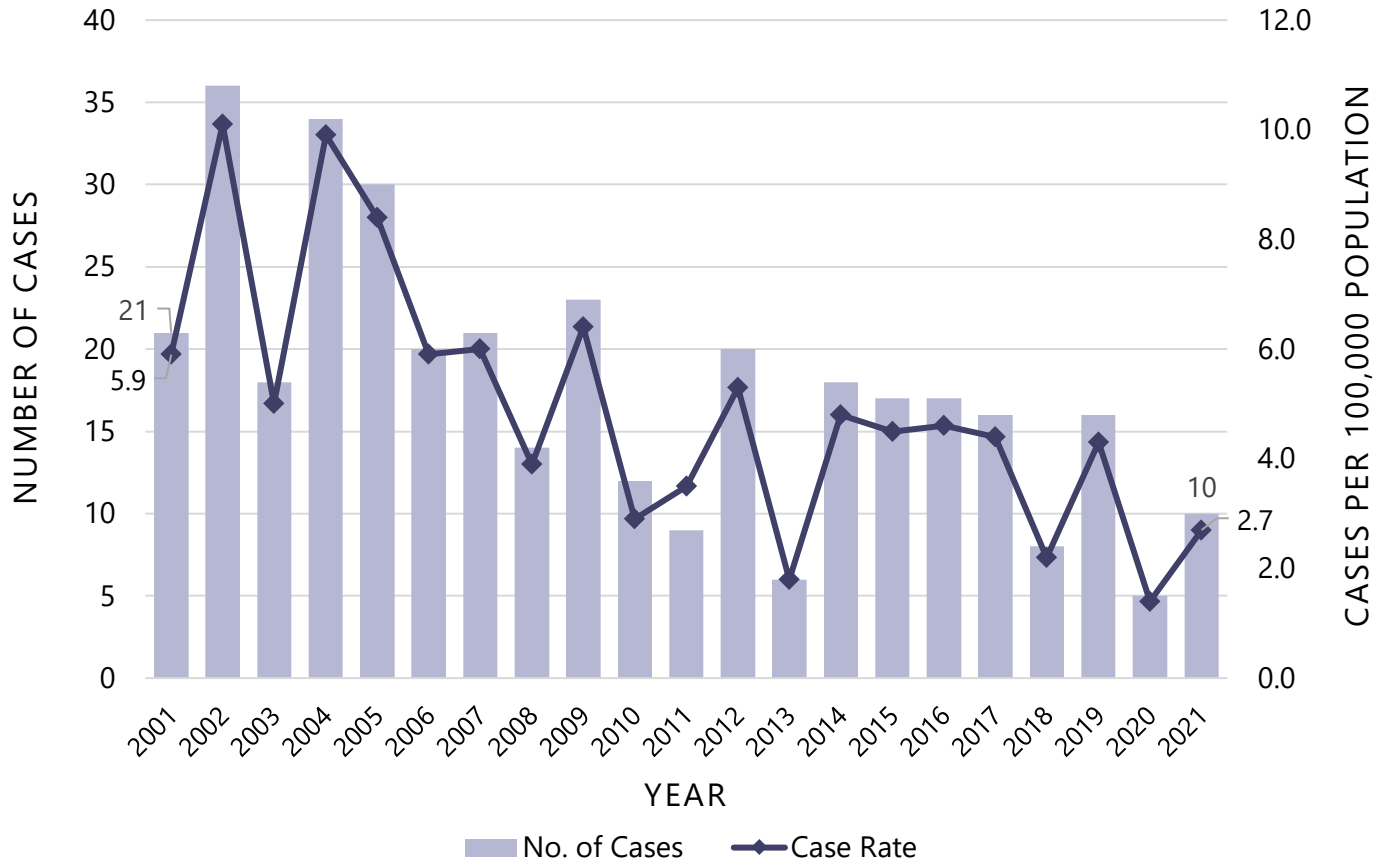
^Rate per 100,000 population

DISTRICT 6-0 AUGUSTA^: TB CASES AND RATES‡, 2001-2021



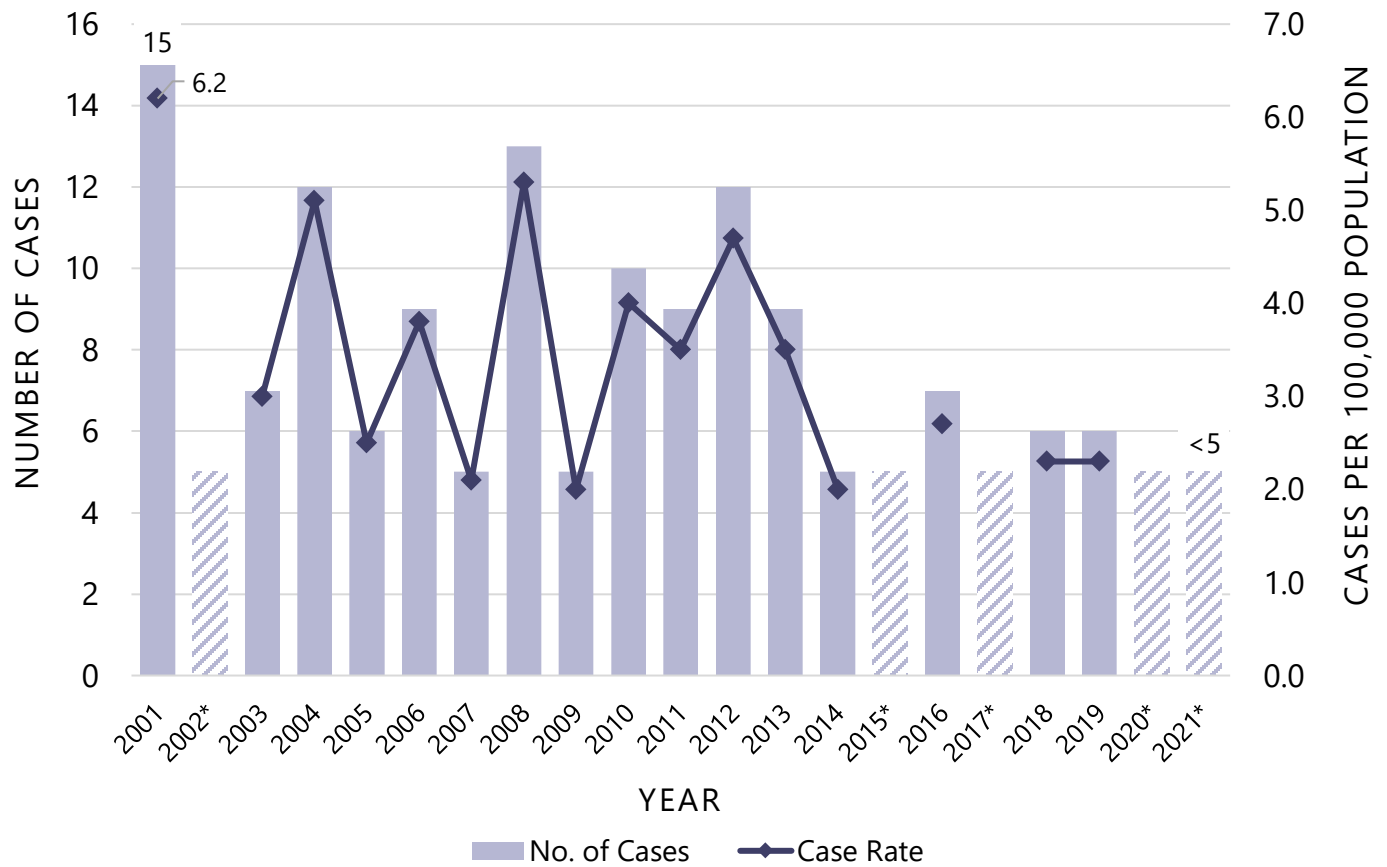
^ Augusta State Medical Prison and Jenkins Correctional Facility cases are not included; ‡Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated

DISTRICT 7-0 COLUMBUS*: TB CASES AND RATES ^, 2001-2021



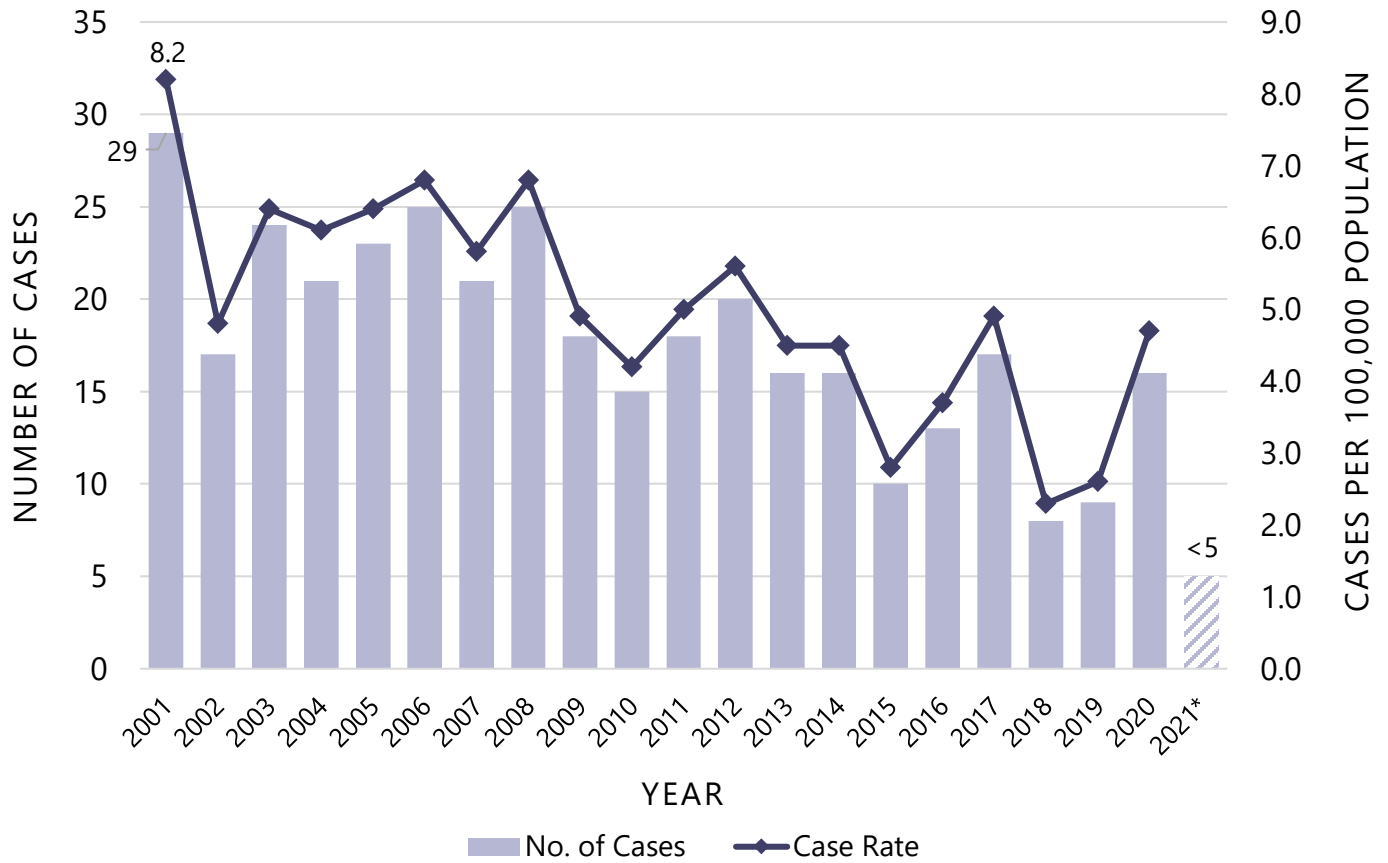
*Stewart Detention Center cases not included; ^Rate per 100,000 population

DISTRICT 8-1 VALDOSTA: TB CASES AND RATES ^, 2001-2021



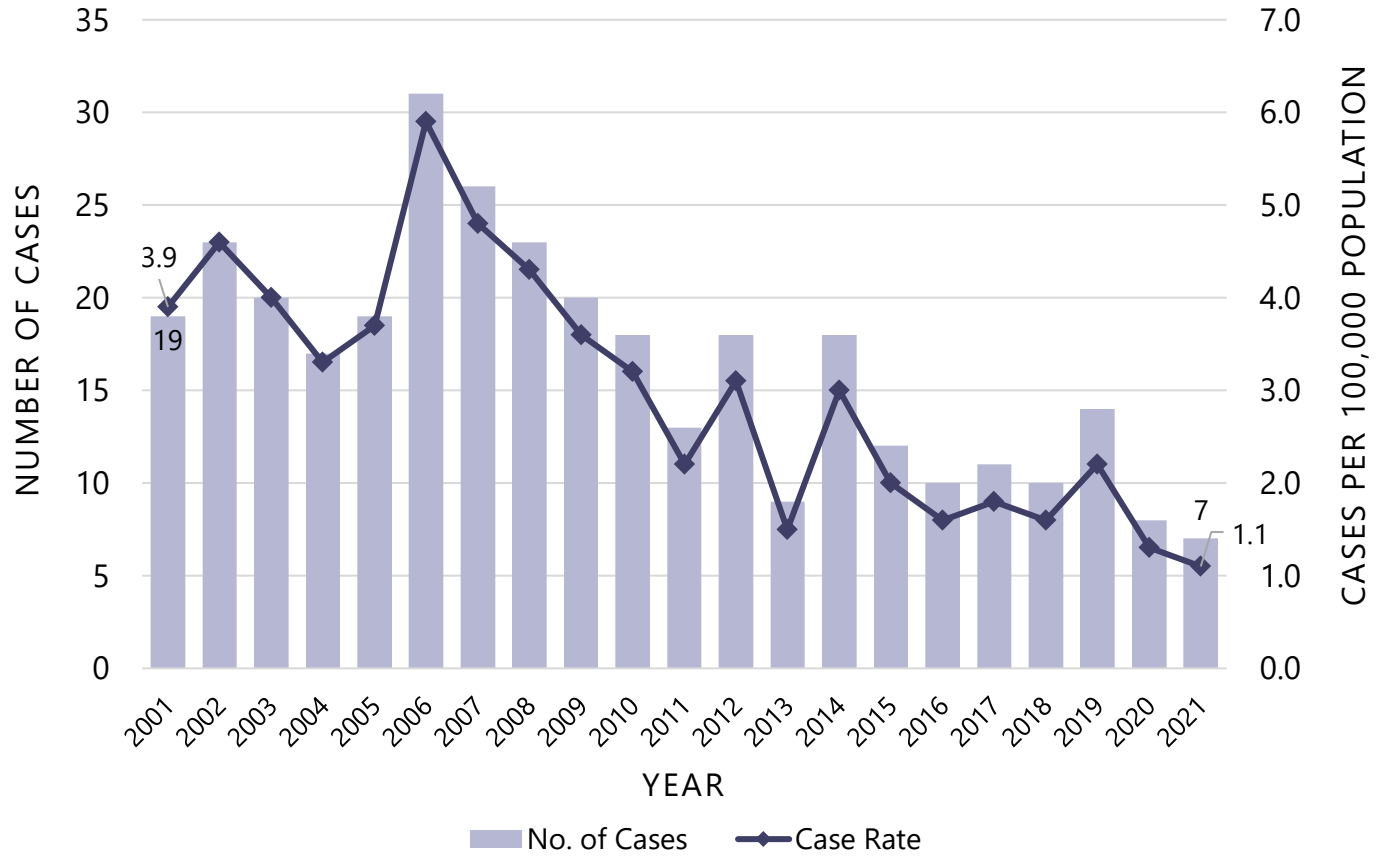
^Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated

DISTRICT 8-2 ALBANY: TB CASES AND RATES[^], 2001-2021



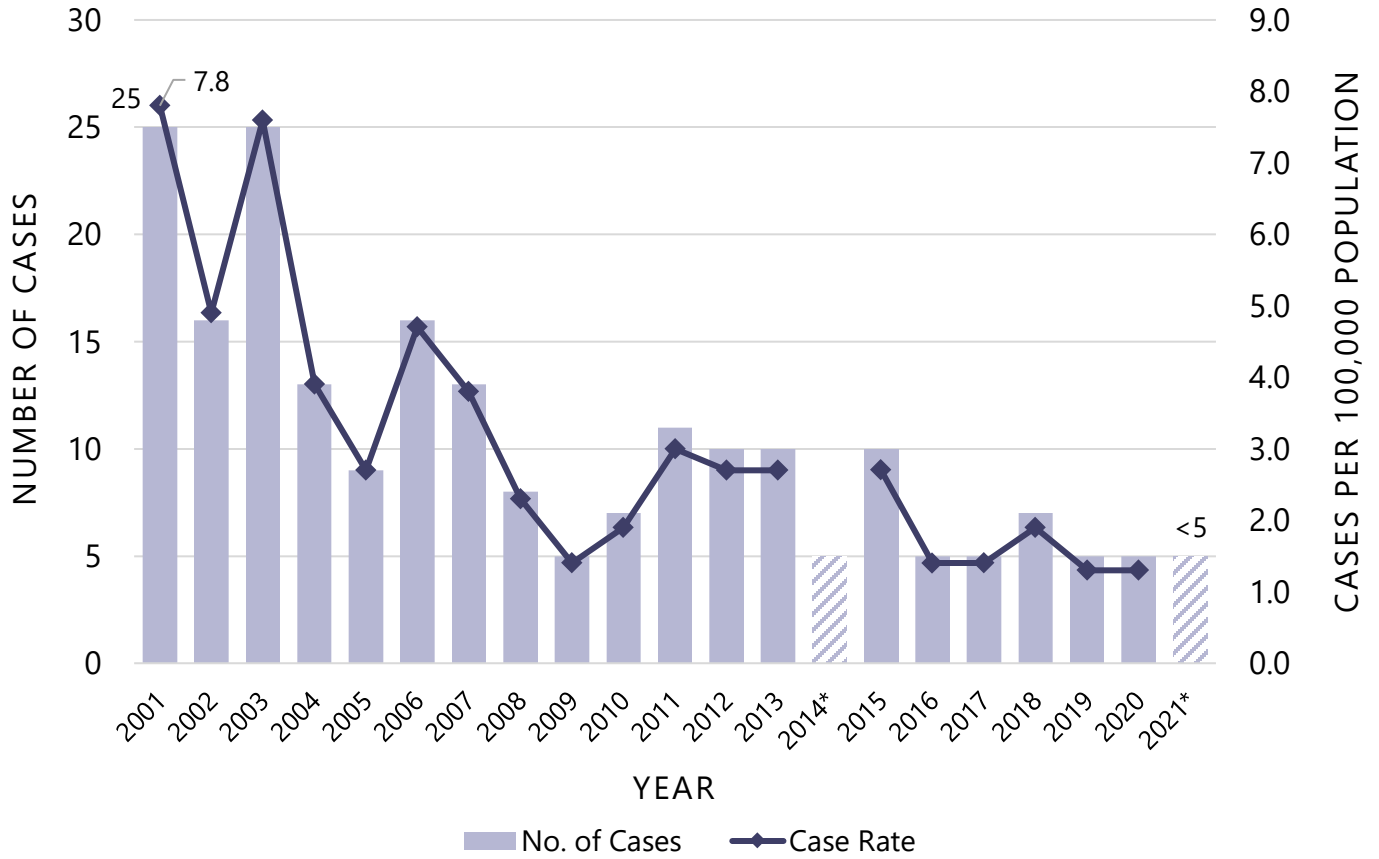
[^]Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated

DISTRICT 9-1 COASTAL: TB CASES AND RATES[^], 2001-2021



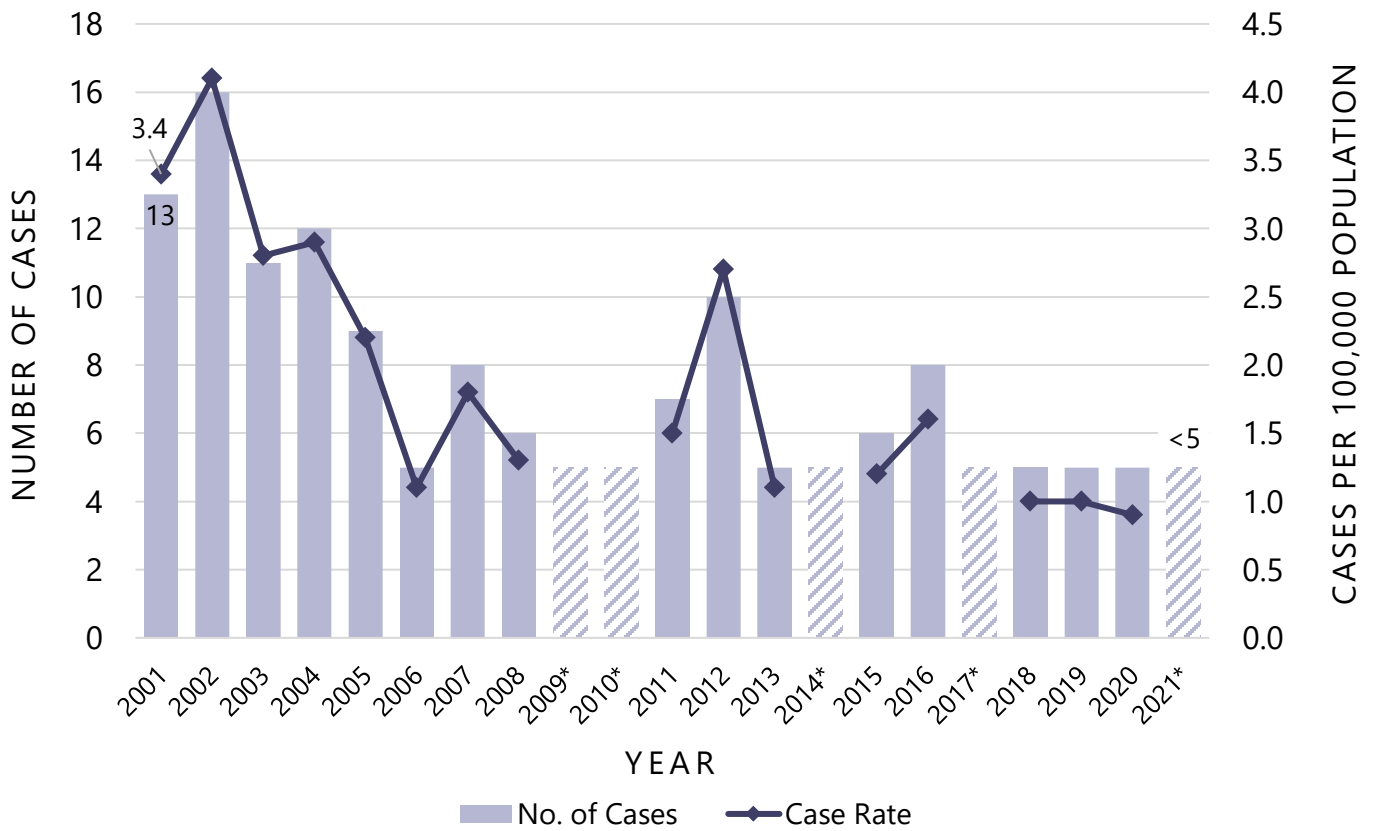
[^]Rate per 100,000 population

DISTRICT 9-2 WAYCROSS: TB CASES AND RATES[^], 2001-2021



[^]Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated

DISTRICT 10-0 ATHENS: TB CASES AND RATES[^], 2001-2021



[^]Rate per 100,000 population; *Case counts between one and four are suppressed and the case rate is not calculated