

2016 GEORGIA TUBERCULOSIS REPORT



2016 Georgia Tuberculosis Report

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Executive Summary

In 2016, a total of 301 new tuberculosis (TB) cases were reported in Georgia, representing a 6% decrease from 2015. The 2016 TB incidence of 2.9 cases per 100,000 persons represents a slight decrease from 3.1 cases per 100,000 persons in 2015.

TB incidence by Health District in 2016 ranged from 0.7 cases per 100,000 persons in District 5-1 (Dublin) to 7.8 in District 3-5 (DeKalb). Eight Health Districts (Districts 3-1, 3-2, 3-3, 3-4, 3-5, 6, 7 and 8-2) reported TB incidence higher than the state incidence. Four counties (DeKalb, Fulton, Gwinnett and Cobb) reported >20 cases each in 2016, accounting for 53% of reported cases statewide.

Among 301 TB cases reported in Georgia in 2016, U.S.-born persons accounted for 158 (52%) cases, and 143 (48%) cases occurred among foreign-born persons. The top four countries of origin for foreign-born persons reported with TB disease in Georgia in 2016 were India, Mexico, Ethiopia and Nigeria. TB cases in persons born in these countries accounted for 53% of all cases among foreign-born persons.

HIV status was reported for 94% of TB cases in 2016; among these patients, 11% were HIV positive. Among TB cases living in congregate settings at risk for TB exposure, 9% were homeless in the year before diagnosis, 2% were correctional facility inmates at the time of diagnosis, and <1% were long-term care facility residents.

In 2016, three cases of multidrug-resistant TB (MDR-TB or TB resistant to at least isoniazid and rifampin) occurred. None of the MDR-TB cases had a previous episode of TB; two were born in countries with a high burden of TB.

The latest year with completed contact investigation data was in 2015. Among 4,322 identified contacts of TB cases reported in 2015 in Georgia, 3,749 (87%) completed a medical evaluation for TB. Among 587 contacts diagnosed with latent TB infection (LTBI), 361 (62%) started LTBI treatment and of those, 270 (75%) completed LTBI treatment.

Although TB incidence is decreasing in Georgia, epidemiologic modeling by the U.S. Centers for Disease Control and Prevention project 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 in high-risk individuals such as 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 (TB) 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 and TB Epidemiology Section of the Georgia Department of Public Health (DPH), which 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 patients, administer directly observed therapy, 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), secure web-based surveillance software developed by DPH, 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 register to become a SendSS user by logging into the system's Web site at: <https://sendss.state.ga.us> then selecting TB from the list of reportable diseases.

Public health authorities collect data on reported TB cases that include demographic, clinical, risk factor, and contact information, which are analyzed to describe the distribution of the disease among Georgia's population, identify high risk groups and TB clusters, describe trends in morbidity, mortality, drug resistance patterns, treatment outcomes, and infection rates among contacts to TB cases. The data are used at state and local levels 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.

TB Case Definition for Public Health Surveillance

Clinical case definition

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

Confirmed case: A case that meets the clinical case definition or is laboratory confirmed

Current Epidemiology of Tuberculosis in Georgia

Georgia reported 301 new tuberculosis (TB) cases in 2016. This represents a 6% decrease from 321 TB cases reported in 2015. TB case numbers have decreased 67% since 1991 when the peak of a resurgent period of tuberculosis occurred in Georgia (Figure 1). The TB case rate in Georgia decreased from 3.1 cases per 100,000 persons during 2015 to 2.9 cases per 100,000 in 2016, which is equal to the U.S. case rate (Figure 2). According to the CDC, Georgia ranked sixth in the United States for number of new TB cases and ranked 10th for TB case rate among the 50 reporting states in 2016.

Geographic Distribution

Among the 159 counties in Georgia, four counties in the metropolitan Atlanta area reported the highest number of TB cases in 2016: DeKalb (58 cases), Fulton (44), Gwinnett (33), and Cobb (24) (Table 1). These four counties accounted for 53% of TB cases reported in Georgia in 2016.

Among Georgia's 18 Health Districts, which has oversight responsibility for public health in the state's 159 counties, DeKalb Health District had the highest TB case rate in 2016 (7.8 per 100,000) followed by the Columbus District (4.5 per 100,000). Fulton and Clayton District both had a TB case rate of 4.3 per 100,000 (Table 2).

Sex and Age Distribution

In 2016, TB in Georgia occurred predominantly among males (188 cases, 62%), compared to females (113, 38%). The highest proportion of TB cases by age group occurred among persons 45-64 years old (112 cases, 37%). Among the 45-64 age group, (86 cases, 77%) were male and (26 cases, 23%) were female (Figure 5). This age group also had the highest TB case rate (4.2 per 100,000) while the lowest was among children 5-14 years old (0.7 per 100,000) (Figure 6). The TB case rate for children younger than 5 years of age, an age group at high risk for developing deadly forms of TB, decreased from 2.1 per 100,000 in 2015 to 1.4 per 100,000 in Georgia during 2016.

Race/Ethnicity Distribution and TB Disparities

TB disproportionately affects racial/ethnic minorities in Georgia. In 2016, non-Hispanic Blacks, Asians and Hispanics, accounted for 49%, 23% and 15% of TB cases in Georgia respectively, but only represented 32%, 4% and 10% of Georgia's population respectively (Figure 7). Non-Hispanic whites constituted 13% of TB cases in 2016. The highest TB case rate among race/ethnic groups was among Asians (17.0 per 100,000), followed by non-Hispanic blacks (4.6 per 100,000) and Hispanics (4.5 per 100,000) (Figure 8). The black non-Hispanic TB case rate in 2016 represents an 85% decrease from the TB case rate in 1993 (30.6 per 100,000) in this population. The black non-Hispanic TB case rate, however, was still more than six times higher than the white non-Hispanic TB case rate (0.8 per 100,000) in Georgia during 2016 (Figure 9).

High-Risk Populations

Foreign-Born

TB cases among persons born outside of the United States accounted for 48% of TB cases in Georgia in 2016. Most foreign-born cases reported in 2016 came from India (21%), Mexico (17%), and Ethiopia (8%) - countries where TB is an endemic disease (Figures 10-11). Among 143 foreign-born cases in 2016, 51 (36%) were diagnosed in the first five years of their arrival in the U.S. This represents a slight decrease from 62 (42%) of foreign-born cases being diagnosed within first five years in 2015.

In 2016, four Health Districts reported 72% of the total number of foreign-born TB cases in Georgia: DeKalb (37 cases), Gwinnett (30), Cobb (22) and Fulton (14). Among these Health Districts, foreign-born TB cases accounted for more than half of the TB cases in Gwinnett (81%), Cobb (79%) and DeKalb (64%). Foreign-born TB cases in the Fulton Health District accounted for 32% of reported TB cases.

HIV Co-Infection

All TB patients need to be tested for HIV infection because TB treatment may change when antiretroviral therapy for HIV is given, and active TB often accelerates the natural progression of HIV infection. Among 283 TB cases in Georgia with known HIV status in 2016, 11% were HIV-positive compared to 9% in 2015 (Figure 12). Among 30 HIV co-infected TB cases in 2016, 80% were non-Hispanic blacks, 73% were male and 50% were 45-64 years old.

HIV status was reported in 94% of TB cases in 2016. In the high-risk age group of adults 25-44 years of age, the percentage of TB cases for which HIV was reported was 94% in 2016 compared to 98% in 2015. Among 18 TB cases whose HIV status was not reported, HIV testing was not offered to 8 cases (44%), the HIV test result was unknown in seven cases (39%), and three (17%) refused testing. The proportion by age group among the TB cases that were not offered the HIV test was highest among adults 65 years and older (4 cases, 50%).

Congregate Settings and Substance Abuse

Persons residing in crowded congregate settings such as homeless shelters, prisons, and nursing homes are at risk for acquiring TB. In 2016, 26 (9%) TB cases in Georgia were homeless, 6 (2%) were residents of correctional facilities, and 1 (<1%) were residents of long-term care facilities. Of the 6 TB cases incarcerated in correctional facilities, five (83%) were inmates in county jails and one was an inmate of the U.S. Immigration and Customs Enforcement (ICE) facility. Substance abuse is the most commonly 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, abuse of

either illicit drugs or alcohol was reported in 63 (21%) of TB cases in 2016 (Table 3, Figure 13).

Pediatric TB

TB in children is considered a sentinel public health event because it often indicates recent transmission from an infectious adult case. Additionally, potentially lethal forms of TB such as TB meningitis or disseminated TB can develop in very young children. In 2016, children younger than 15 years old comprised 6% of Georgia TB cases; 9 cases (1.4 per 100,000) were reported in children younger than 5 years old, 10 cases (0.7 per 100,000) were reported in children 5-14 years old. There were no cases of TB meningitis among children younger than 15 in 2016.

Latent tuberculosis infection (LTBI) in children younger than five years old is also a reportable disease in Georgia. When LTBI in a child less than five years of age is reported, public health personnel will initiate contact investigations to identify the source of the infection, recommend treatment for latent TB infection, follow up with the child to ensure completion of treatment and monitor for development of active TB disease. Early identification of TB infection and treatment in children can prevent progression to active disease and identify a previously undiagnosed and untreated case of active TB.

In 2016, 28 children younger than five years old were reported to have LTBI in Georgia; 21 (75%) were identified by TB screening by non-public health providers and 7 (25%) were identified by contact investigations performed by county health department staff.

Drug Resistance

Among 214 culture-positive TB cases in Georgia during 2016, 100% were tested for initial drug susceptibility to the three first-line anti-TB medications: isoniazid (INH), rifampin (RIF), and ethambutol (EMB). Of 202 tested isolates from Georgia cases with no previous history of TB, 15 (7%) had primary resistance to INH, three (1%) to RIF, and none to EMB (Table 4). There were three reported cases of multidrug-resistant TB (MDR-TB, i.e. TB resistant to at least INH and RIF) in 2016 compared to none in 2015. The percentage of cases with primary INH resistance (INH-R) ranged from 7% to 22% in the past five years while an average less than two MDR-TB cases per year was reported in Georgia over that same time period (Figure 14).

Indicators of Infectiousness

Persons with pulmonary or laryngeal TB have the 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 2016, 78% of all Georgia TB cases had pulmonary TB, 52% had sputum cultures that were positive for *Mycobacterium tuberculosis*, 31% were sputum AFB smear-positive, and 29% showed cavitory lesions on chest radiography.

Initial Diagnosis, Health Provider Data, and Directly Observed Therapy

In Georgia, the majority of TB patients are initially diagnosed in a hospital or clinic and patients are followed up by county health departments after discharge to continue their TB treatment. In 2016, 200 (66%) of the 301 TB cases in Georgia were reported initially by a hospital or clinic. Eight hospitals in Georgia reported five or more TB cases in 2016: Grady Memorial Hospital (18 cases), Gwinnett Hospital (14 cases), Piedmont Hospital (10 cases), VA Medical Center (6 cases), Athens Regional, Medical Center of Central GA, Memorial Health University and Phoebe Putney Memorial Hospital reported 5 cases each.

Among TB cases with available data on type of outpatient healthcare provider, county health departments provided case management for 93% of all Georgia TB cases, 8% of cases were treated by health department and private physician, 3% of cases were cared for solely by a private physician and managed solely as in-patients, and less than 1% were treated at correctional facilities. County health department staff provides directly observed therapy (DOT) to TB patients, which entails watching a patient swallow every dose of their TB medications for at least 6 months. Among 222 Georgia TB cases reported in 2016 with available case completion data, 91% received TB treatment entirely by DOT and 9% were treated by a combination of DOT and self-administered therapy.

TB Mortality

Eighteen persons died of TB in Georgia in 2016, where the age-adjusted TB mortality rate in 2016 was 0.2 per 100,000. From 2012 to 2016, an average of 14 people died of TB in Georgia each year. Within these years, the highest number of deaths from TB was reported in 2012 with 20 deaths.

TB Treatment Outcomes

Among 286 TB cases in Georgia who started treatment for TB in 2015, (the most recent year with completed treatment outcome data), 279 (97.6%) completed treatment, 5 (1.7%) were lost to follow-up, and 2 (0.7%) cases from Health District 7 have unknown treatment outcomes as of this writing (one of these cases was being treated at a nursing home and the other case was being treated for TB meningitis from Gwinnett County then patient moved to another county before completing treatment).

TB Contact Investigations and Latent TB Infection

Public health authorities routinely conduct a contact investigation among persons exposed to a TB case to identify secondary TB cases and contacts with latent TB infection (LTBI). Index TB 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 ask recent contacts to a case if 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 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.

Among 4,322 identified contacts of Georgia TB cases reported in 2015 (the latest year with completed contact investigation data), 3,749 (87%) were completely evaluated for TB. Of the completely evaluated contacts, 587 (16%) had LTBI and 21 (0.6%) had TB disease. Among the 587 contacts with LTBI, 361 (62%) started LTBI treatment and of those, 270 (75%) completed LTBI treatment, 34 (10%) chose to stop LTBI treatment on their own, 32 (9%) were lost to follow-up, 12 (3%) had adverse side-effects, 5 (1%) moved elsewhere, and 5 (1%) discontinued treatment due to a provider's decision.

Surveillance Summary of TB Genotype Clusters

TB Genotyping

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, to describe risk factors for transmission, to identify possible sources of transmission, and to determine ways to stop transmission.

From 2012-2016, 92 small (2-3 TB cases), 22 medium (4-9 cases), and nine large (≥ 10 cases) TB genotype clusters were identified in Georgia. Figure 17 displays the proportion of small, medium, and large TB genotype clusters per year from 2012-2016. Some genotype clusters such as the cluster associated with a TB outbreak among homeless persons (G05625) persisted, but decreased, throughout this 5-year time period. Seven cases associated with the homeless outbreak strain were reported in 2016 compared to the upsurge of 42 TB cases associated with this strain that occurred in 2014. Table 10 summarizes the distribution of ten medium TB genotype clusters and nine large TB genotype clusters across several counties in Georgia from 2012-2016. TB cases associated with these clusters were predominantly reported from Fulton County (104/316 cases or 33%) and DeKalb County (34/316 cases or 11%).

Genotype Cluster G03953 in Jefferson County with Infected Pediatric Contacts

From 2012-2016, CDC's TB Genotyping Information Management System (TBGIMS) alerted the GA DPH TB Program of a small genotype cluster (G03953) consisting of three TB cases from Jefferson County. All three cases were US-born African-American males ranging in ages from 45-64. One case was smear positive and had pulmonary

cavitary disease, reported a history of intravenous drug use, and was HIV positive. Another case died during treatment for TB. From these two cases, 38 contacts were identified of which two children developed clinical TB disease, a third child had LTBI, nine other relatives had LTBI and one relative was diagnosed with culture positive TB and was the third case in this cluster. The county health department extended the contact investigation to include social and workplace contacts; and attempted to find an epidemiologic link between the case that died and the HIV positive case. All three cases reported by the TBGIMS alert were relatives. All nine adult contacts that had LTBI, started LTBI treatment and of these, six completed LTBI treatment and three refused treatment. The three pediatric contacts that developed active TB completed TB treatment.

Genotype Cluster G10063 in Muscogee County Involving Drug Abuse and Excessive Alcohol Use

From 2012 through 2016, 13 TB cases with genotype G10063 were reported primarily from Health District 7 (Columbus Health District). Of these 13 cases, 12 were reported from Muscogee County and one from Talbot County. The clustered cases were primarily US-born (100%), African-American (92%) and male (62%). Of the 13 cases, 9 (69%) reported a history of substance abuse, 6 (46%) reported a history of excessive alcohol use, 5 (38%) died during treatment for TB, 2 (15%) were homeless, and 2 (15%) were HIV positive. We analyzed the contact investigation data and observed that one of the cases was reported as a contact and listed as a relative to that case. These two cases had six mutual contacts, and all of these contacts were relatives. There were 142 contacts reported and of these contacts, 19 (13%) were children under 15 years of age. All pediatric contacts completed medical evaluation, and 8 (62%) children had LTBI; two additional contacts were counted as clinical TB cases. All eight pediatric contacts with LTBI began treatment. Among the 142 named contacts, a total of 20 contacts had LTBI. GA DPH TB staff conducted a site visit to the Columbus Health District with CDC Division of TB Elimination epidemiologists participating by conference call to review the clustered cases and contact investigation with the Health District staff. The Columbus Health District planned and implemented a health fair in the neighborhood where most of the TB cases were reported, close to a liquor store where some of the cases in this cluster reportedly frequented, collaborating with a local hospital to use their community outreach van to offer HIV, STD and TB, blood pressure screening and flu shots to the community. No secondary TB cases were found through the health fair.

Table 1. Number of TB Cases and TB Case Rates* per 100,000 population by County, Georgia, 2015-2016

COUNTY	2015		2016	
	Number of cases	Case Rate	Number of cases	Case Rate
Appling	< 5	--	0	0
Atkinson	< 5	--	0	0
Bacon	0	0	0	0
Baker	< 5	--	0	0
Baldwin	0	0	0	0
Banks	< 5	--	0	0
Barrow	< 5	--	< 5	--
Bartow	< 5	--	< 5	--
Ben Hill	0	0	0	0
Berrien	0	0	< 5	--
Bibb	< 5	--	7	4.6
Bleckley	0	0	0	0
Brantley	0	0	0	0
Brooks	0	0	< 5	--
Bryan	0	0	0	0
Bulloch	0	0	0	0
Burke	< 5	--	0	0
Butts	< 5	--	< 5	--
Calhoun	0	0	0	0
Camden	< 5	--	0	0
Candler	0	0	0	0
Carroll	< 5	--	0	0
Catoosa	< 5	--	< 5	--
Charlton	< 5	--	0	0
Chatham	< 5	--	7	2.4
Chattahoochee	0	0	0	0
Chattooga	0	0	0	0
Cherokee	< 5	--	0	0
Clarke	< 5	--	< 5	--
Clay	0	0	< 5	--
Clayton	8	2.9	12	4.3
Clinch	< 5	--	0	0
Cobb	26	3.5	24	3.2
Coffee	< 5	--	0	0
Colquitt	0	0	< 5	--
Columbia	<5	--	< 5	--
*excludes Augusta State Medical Prison (ASMP)	<5	na	0	0
ASMP only	<5	na	0	0
Cook	< 5	--	0	0
Coweta	< 5	--	< 5	--
Crawford	0	0	0	0
Crisp	< 5	--	0	0

COUNTY	2015		2016	
	Number of cases	Case Rate	Number of cases	Case Rate
Dade	0	0	0	0
Dawson	0	0	0	0
Decatur	0	0	< 5	--
DeKalb	56	7.6	58	7.8
Dodge	0	0	0	0
Dooly	0	0	0	0
Dougherty	< 5	--	5	5.6
Douglas	0	0	5	3.5
Early	0	0	0	0
Echols	0	0	0	0
Effingham	< 5	--	< 5	--
Elbert	0	0	0	0
Emanuel	< 5	--	< 5	--
Evans	0	0	0	0
Fannin	0	0	< 5	--
Fayette	0	0	< 5	--
Floyd	< 5	--	< 5	--
Forsyth	7	3.3	< 5	--
Franklin	0	0	< 5	--
Fulton	64	6.3	44	4.3
Gilmer	0	0	0	0
Glascok	0	0	0	0
Glynn	< 5	--	< 5	--
Gordon	0	0	0	0
Grady	< 5	--	< 5	--
Greene	< 5	--	0	0
Gwinnett	29	3.1	33	3.6
Habersham	< 5	--	0	0
Hall	6	3.1	< 5	--
Hancock	0	0	0	0
Haralson	0	0	0	0
Harris	0	0	0	0
Hart	< 5	--	< 5	--
Heard	0	0	0	0
Henry	< 5	--	< 5	--
Houston	6	4.0	< 5	--
Irwin	0	0	0	0
*excludes Irwin County Detention Center (ICDC)				
ICDC only	0	0	<5	--
Jackson	0	0	0	0
Jasper	0	0	0	0
Jeff Davis	< 5	--	0	0
Jefferson	0	0	5	31.4
Jenkins	0	0	0	0
Johnson	0	0	0	0

COUNTY	2015		2016	
	Number of cases	Case Rate	Number of cases	Case Rate
Jones	0	0	0	0
Lamar	< 5	--	< 5	--
Lanier	0	0	0	0
Laurens	< 5	--	0	0
Lee	< 5	--	0	0
Liberty	< 5	--	0	0
Lincoln	0	0	0	0
Long	0	0	0	0
Lowndes	< 5	--	< 5	--
Lumpkin	0	0	0	0
Macon	< 5	--	< 5	--
Madison	0	0	0	0
Marion	0	0	0	0
McDuffie	0	0	0	0
McIntosh	< 5	--	0	0
Meriwether	< 5	--	0	0
Miller	0	0	0	0
Mitchell	< 5	--	0	0
Monroe	0	0	0	0
Montgomery	0	0	0	0
Morgan	0	0	0	0
Murray	0	0	0	0
Muscogee	11	5.5	11	5.6
Newton	< 5	--	< 5	--
Oconee	0	0	0	0
Oglethorpe	0	0	0	0
Paulding	< 5	--	< 5	--
Peach	0	0	0	0
Pickens	0	0	0	0
Pierce	0	0	< 5	--
Pike	0	0	0	0
Polk	0	0	0	0
Pulaski	< 5	--	0	0
Putnam	< 5	--	0	0
Quitman	< 5	--	0	0
Rabun	< 5	--	0	0
Randolph	0	0	0	0
Richmond	7	3.5	8	4.0
Rockdale	5	5.6	< 5	--
Schley	0	0	0	0
Screven	< 5	--	< 5	--
Seminole	< 5	--	0	0
Spalding	< 5	--	< 5	--

COUNTY	2015		2016	
	Number of cases	Case Rate	Number of cases	Case Rate
Stephens	0	0	0	0
Stewart	0	0	0	0
*excludes Stewart ICE Detention Center (SDC)	0	0	0	0
SDC only	0	0	0	0
Sumter	0	0	< 5	--
Talbot	0	0	< 5	--
Taliaferro	0	0	0	0
Tattnall	0	0	< 5	--
Taylor	0	0	0	0
Telfair	0	0	0	0
Terrell	0	0	< 5	--
Thomas	0	0	0	0
Tift	0	0	< 5	--
Toombs	< 5	--	0	0
Towns	0	0	0	0
Treutlen	0	0	0	0
Troup	< 5	--	< 5	--
Turner	0	0	0	0
Twiggs	0	0	0	0
Union	0	0	0	0
Upson	< 5	--	0	0
Walker	< 5	--	0	0
Walton	0	0	< 5	--
Ware	0	0	0	0
Warren	0	0	0	0
Washington	0	0	0	0
Wayne	0	0	< 5	--
Webster	0	0	0	0
Wheeler	0	0	< 5	--
White	0	0	0	0
Whitfield	< 5	--	< 5	--
Wilcox	0	0	0	0
Wilkes	0	0	0	0
Wilkinson	0	0	0	0
Worth	0	0	0	0
GEORGIA	321	3.1	301	2.9

Note: In counties where one to four cases were reported and the county population is less than 100,000, "< 5" is used to represent the number of reported cases, and the case rate is not calculated.

Table 2. Number of TB Cases and TB Case Rates* per 100,000 population by Health District, Georgia, 2015- 2016

Health District	2015		2016	
	Number of Cases	Case rate	Number of Cases	Case rate
1.1 Rome	8	1.2	5	0.8
1.2 Dalton	4	1.2	5	1.1
2.0 Gainesville	20	3.0	9	1.3
3.1 Cobb	26	2.9	29	3.3
3.2 Fulton	64	6.3	44	4.3
3.3 Clayton	8	2.9	12	4.3
3.4 Lawrenceville	35	3.2	37	3.4
3.5 DeKalb	56	7.6	58	7.8
4.0 LaGrange	15	1.8	13	1.5
5.1 Dublin	2	1.3	1	0.7
5.2 Macon	11	2.1	9	1.7
6.0 Augusta *excludes Augusta State Medical Prison (ASMP)	12	2.5	18	3.7
ASMP only	2	n/a	0	n/a
7.0 Columbus	17	4.5	17	4.6
8.1 Valdosta *excludes Irwin County Detention Center (ICDC)	2	0.8	7	2.7
ICDC only	0	n/a	1	n/a
8.2 Albany	10	2.8	13	3.7
9.1 Coastal	13	2.1	10	1.6
9.2 Waycross	10	2.7	5	1.4
10 Athens	6	1.2	8	1.6
Total	321	3.1	301	2.9

Table 3. Percentage of TB Cases with Risk Factors for TB by Health District, Georgia, 2016

HEALTH DISTRICT	Foreign-born %	HIV Infected %	Homeless %	Inmate %	Nursing Home %	Substance Abuse %
1.1 Rome	60	20	0	0	0	40
1.2 Dalton	60	0	0	0	0	20
2.0 Gainesville	22	0	0	0	0	0
3.1 Cobb	76	7	10	7	0	14
3.2 Fulton	32	30	23	2	0	34
3.3 Clayton	58	0	0	0	0	0
3.4 Lawrenceville	81	11	3	0	3	16
3.5 DeKalb	64	9	3	0	0	14
4.0 LaGrange	38	0	0	0	0	15
5.1 Dublin	0	0	0	0	0	0
5.2 Macon	22	11	11	11	0	22
6.0 Augusta	22	17	6	0	0	17
ASMP only	0	0	0	0	0	0
7.0 Columbus	6	6	24	6	0	41
ICE only	0	0	0	0	0	0
8.1 Valdosta	50	0	13	13	0	13
8.2 Albany	8	0	15	0	0	62
9.1 Coastal	30	0	0	0	0	20
9.2 Waycross	20	0	0	0	0	0
10 Athens	50	0	13	0	0	25
Georgia	48	11	9	2	0.3	21

Table 4. Primary Resistance to First-line Anti-TB Medications by Health District Georgia, 2016

TB Drug	Isoniazid		Rifampin		Ethambutol	
	No.	%	No.	%	No.	%
1.1 Rome	0	0	0	0	0	0
1.2 Dalton	0	0	0	0	0	0
2.0 Gainesville	1	17	0	0	0	0
3.1 Cobb	2	13	1	7	0	0
3.2 Fulton	4	19	1	5	0	0
3.3 Clayton	1	13	0	0	0	0
3.4 Lawrenceville	2	6	0	0	0	0
3.5 DeKalb	0	0	0	0	0	0
4.0 LaGrange	0	0	0	0	0	0
5.1 Dublin	0	0	0	0	0	0
5.2 Macon	2	22	0	0	0	0
6.0 Augusta & ASMP	2	17	0	0	0	0
7.0 Columbus & ICE	0	0	0	0	0	0
8.1 Valdosta	1	14	1	14	0	0
8.2 Albany	0	0	0	0	0	0
9.1 Coastal	0	0	0	0	0	0
9.2 Waycross	0	0	0	0	0	0
10 Athens	0	0	0	0	0	0
Georgia Total	15	7	3	2	0	0

Table 5. Completion of TB Treatment by Health District, Georgia, 2014-2015

HEALTH DISTRICT	2014		2015	
	No. Cases that Completed Tx/No. Cases Started Tx*	%	No. Cases that Completed Tx/No. Cases Started Tx*	%
1.1 Rome	11/11	100	7/7	100
1.2 Dalton	6/6	100	4/4	100
2.0 Gainesville	12/12	100	18/18	100
3.1 Cobb	18/19	95	24/24	100
3.2 Fulton	65/66	98	54/55	98
3.3 Clayton	9/9	100	5/5	100
3.4 Lawrenceville	33/34	97	28/30	93
3.5 DeKalb	53/55	96	52/55	94
4.0 LaGrange	5/6	83	14/14	100
5.1 Dublin	2/2	100	1/1	100
5.2 Macon	9/11	91	8/8	100
6.0 Augusta	6/6	100	12/12	100
ASMP	3/3	100	2/2	100
7.0 Columbus	12/14	86	13/14	93
8.1 Valdosta	4/4	100	1/1	100
8.2 Albany	11/11	100	9/9	100
9.1 Coastal	17/17	100	11/11	100
9.2 Waycross	3/3	100	10/10	100
10 Athens	2/2	100	6/6	100
Georgia Total	284/292	97	279/286	98

*Cases who died or who left the U.S. while on TB treatment are excluded

Table 6. Completion of TB Treatment (Tx) within 12 months among TB cases eligible for 12-month TB Treatment by Health District, Georgia, 2014-2015

HEALTH DISTRICT	2014		2015	
	No. Cases Completed Tx in 12 months/ No. Started Tx	%	No. Cases Completed Tx in 12 months/ No. Started Tx	%
1.1 Rome	11/11	100	7/7	100
1.2 Dalton	6/6	100	4/4	100
2.0 Gainesville	10/12	83	16/17	94
3.1 Cobb	14/16	88	15/19	79
3.2 Fulton	58/64	91	48/52	94
3.3 Clayton	9/9	100	5/5	100
3.4 Lawrenceville	30/32	94	26/28	93
3.5 DeKalb	50/52	96	48/54	89
4.0 LaGrange	3/5	60	14/14	100
5.1 Dublin	2/2	100	1/1	100
5.2 Macon	9/11	91	8/8	100
6.0 Augusta	5/6	83	5/10	50
ASMP	3/3	100	2/2	100
7.0 Columbus	12/14	86	9/13	69
8.1 Valdosta	4/4	100	1/1	100
8.2 Albany	11/11	100	9/9	100
9.1 Coastal	17/17	100	10/10	100
9.2 Waycross	3/3	100	10/10	100
10 Athens	2/2	100	6/6	100
Georgia Total	260/281	93	244/270	90

*Cases who died or who left the U.S. during TB treatment, rifampin-resistant cases, meningial TB, TB of the bone, joint or central nervous system, and children < 15 years old with miliary TB are excluded

Table 7. Completely Evaluated Contacts of TB Cases by Health District, Georgia, 2014-2015

HEALTH DISTRICT	2014		2015	
	No. Contacts Evaluated/ No. Contacts Identified	%	No. Contacts Evaluated/ No. Contacts Identified	%
1.1 Rome	48/52	92	58/103	56
1.2 Dalton	137/141	97	265/279	95
2.0 Gainesville	172/201	86	388/440	88
3.1 Cobb	117/143	82	115/127	91
3.2 Fulton	993/1088	91	1112/1228	91
3.3 Clayton	42/45	93	22/22	100
3.4 Lawrenceville	200/224	89	127/140	91
3.5 DeKalb	509/624	82	402/427	94
4.0 LaGrange	19/52	36	169/238	71
5.1 Dublin	1/1	100	8/16	50
5.2 Macon	128/246	52	116/132	88
6.0 Augusta	468/625	75	255/291	88
7.0 Columbus	139/159	87	229/264	87
8.1 Valdosta	12/21	57	24/24	100
8.2 Albany	327/383	85	55/59	93
9.1 Coastal	148/161	92	88/115	76
9.2 Waycross	25/35	71	244/322	76
10 Athens	10/10	100	72/95	76
Georgia Total	3495/4211	83	3749/4322	87

Table 8. Infected Contacts started on LTBI Treatment by Health District, Georgia, 2014-2015

HEALTH DISTRICT	2014		2015	
	No. Infected Contacts on LTBI Treatment / No. Infected Contacts	%	No. Infected Contacts on LTBI Treatment / No. Infected Contacts	%
1.1 Rome	3/5	60	6/7	86
1.2 Dalton	41/43	95	8/8	100
2.0 Gainesville	35/47	74	65/86	76
3.1 Cobb	29/37	78	22/29	76
3.2 Fulton	71/101	70	48/96	50
3.3 Clayton	7/9	78	0/4	0
3.4 Lawrenceville	21/35	60	38/47	81
3.5 DeKalb	83/120	69	50/105	48
4.0 LaGrange	5/8	62	13/16	81
5.1 Dublin	0/1	0	2/2	100
5.2 Macon	7/11	64	3/7	43
6.0 Augusta	26/38	68	45/94	48
7.0 Columbus	44/52	85	10/18	56
8.1 Valdosta	3/12	25	1/1	100
8.2 Albany	17/21	81	13/19	68
9.1 Coastal	51/55	93	9/15	60
9.2 Waycross	2/2	100	19/21	90
10 Athens	na	na	11/72	15
Georgia Total	445/588	76	361/587	62

Table 9. LTBI Treatment Completion of Infected Contacts exposed TB Cases by Health District, Georgia, 2014-2015

HEALTH DISTRICT	2014		2015	
	No. Contacts that Completed LTBI Treatment / Contacts Treated	%	No. Contacts that Completed LTBI Treatment / Contacts Treated	%
1.1 Rome	3/3	100	5/6	83
1.2 Dalton	32/41	78	7/8	88
2.0 Gainesville	25/35	71	49/65	75
3.1 Cobb	16/29	55	17/22	77
3.2 Fulton	42/71	59	39/48	81
3.3 Clayton	4/7	57	na	na
3.4 Lawrenceville	17/21	81	29/38	76
3.5 DeKalb	66/83	80	38/50	76
4.0 LaGrange	5/5	100	9/13	69
5.1 Dublin	na	na	0/2	0
5.2 Macon	3/7	43	3/3	100
6.0 Augusta	10/26	38	34/45	76
7.0 Columbus	26/44	59	6/10	60
8.1 Valdosta	3/3	100	1/1	100
8.2 Albany	14/17	82	9/13	69
9.1 Coastal	43/51	84	7/9	78
9.2 Waycross	1 /2	50	12/19	63
10 Athens	na	na	5/11	46
Georgia Total	310/445	70	270/361	75

Table 10. Frequency of Medium and Large TB Genotype Clusters in Counties of Georgia, 2012-2016

Medium Clusters (4 – 9 TB cases) ^a	Large Clusters (≥ 10 TB Cases)
G00518 DeKalb (n=6) Gwinnett (n=2) Chatham (n=1)	G05625 Fulton (n=47) DeKalb (n=4) Chatham (n=1) Cobb (n=1) Paulding (n=1) Rockdale (n=1)
G10773 DeKalb (n=5) Fulton (n=1) Jasper (n=1) Muscogee (n=1) Richmond (n=1)	G10763 Richmond (n=9) Hart (n=5) Stephens (n=5) Franklin (n=1) Gwinnett (n=1) Haralson (n=1) Houston (n=1) Newton (n=1)
G15727 Fulton (n=7) Bibb (n=1)	G00013 Fulton (n=16) Clayton (n=2) DeKalb (n=2) Spalding (n=2) Coweta (n=1) Dawson (n=1) Douglas (n=1) Glynn (n=1) Gwinnett (n=1)
G13198 McIntosh (n=4) Fulton (n=1) Glynn (n=1) Lowndes (n=1)	G12352 Hall (n=10) Clarke (n=2) Columbia (n=2) Jackson (n=2) Fulton (n=1) Stephens (n=1)

Medium Clusters (4 – 9 TB cases) ^a	Large Clusters (≥ 10 TB Cases)
G15085 Macon (n=4) Fulton (n=3)	G10265 Dougherty (n=6) Chatham (n=1) Troup (n=4) Fulton (n=1) DeKalb (n=2) Mitchell (n=1) Lee (n=2) Upton (n=2)
G16216 Houston (n=3) Bibb (n=2) Laurens (n=2)	G00010 Terrell (n=5) DeKalb (n=1) Lee (n=2) Dougherty (n=1) Clayton (n=1) Effingham (n=1) Cobb (n=1) Fulton (n=1)
G0401 DeKalb (n=4) Gwinnett (n=3)	G10063 Muscogee (n=12) Talbot (n=1)
G07486 Liberty (n=4) Cobb (n=1) Columbia (n=1)	G05614 Fulton (n=7) DeKalb (n=2) Cobb (n=1) Spalding (n=1)
GG03895 Atkinson (n=2) Coffee (n=2) Catoosa (n=1) Terrell (n=1)	G13324 Fulton (n=4) Richmond (n=1) Bulloch (n=1) Tombs (n=1) Fayette (n=1) Troup (n=1) Gwinnett (n=1)
G10345 Cobb (n=2) Coweta (n=2) Bibb (n=1) Gwinnett (n=1)	

^a Of the medium-sized genotype clusters, only clusters with 6-9 cases per cluster are reported in this Table.

Figure 1. TB Cases and Case Rates
Georgia, 1986-2016

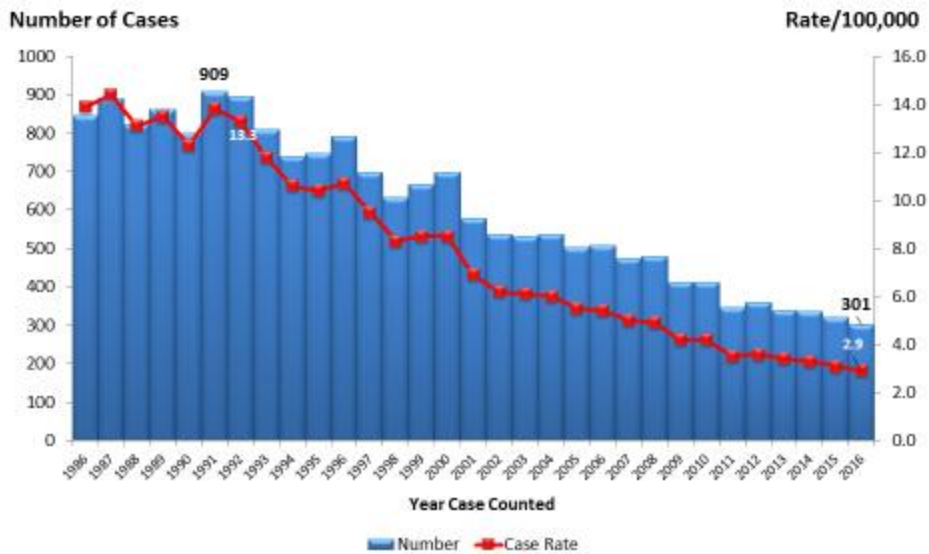


Figure 2. TB Case Rates
Georgia and U.S., 1986-2016

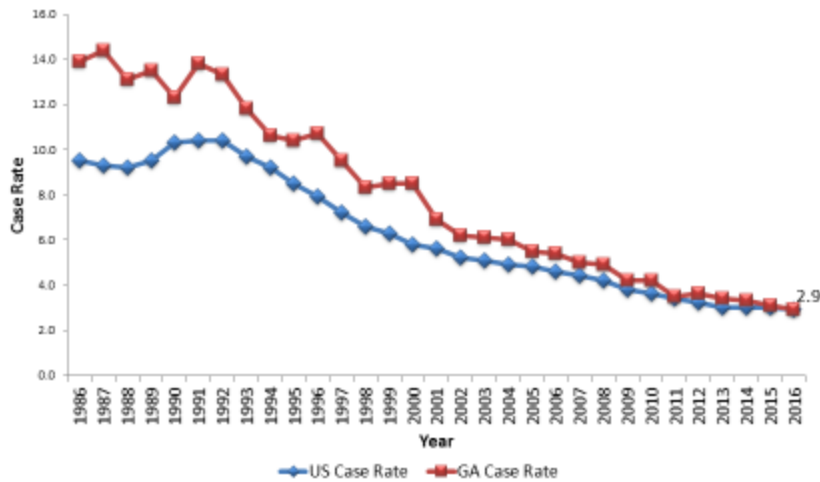


Figure 3. Number of TB Cases by Health Districts Georgia, 2016

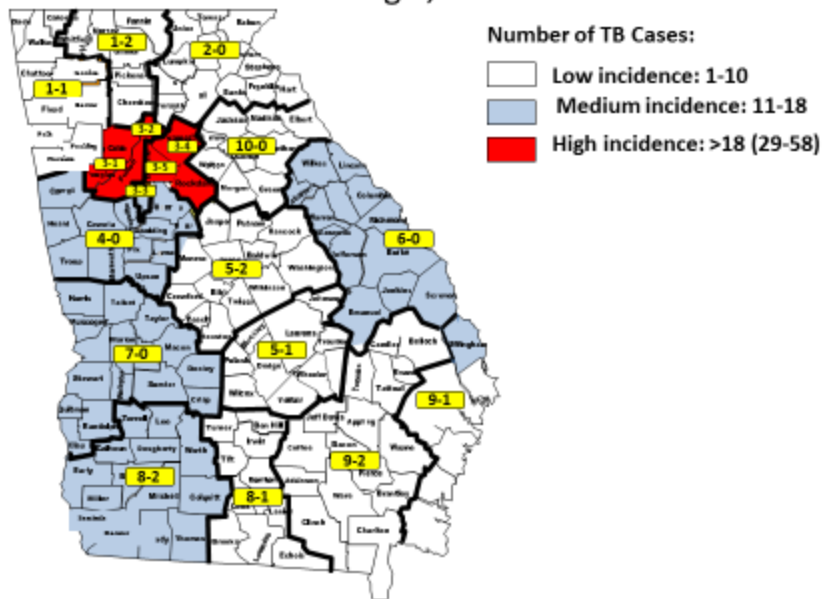


Figure 4. TB Case Rates by Health Districts Georgia, 2016

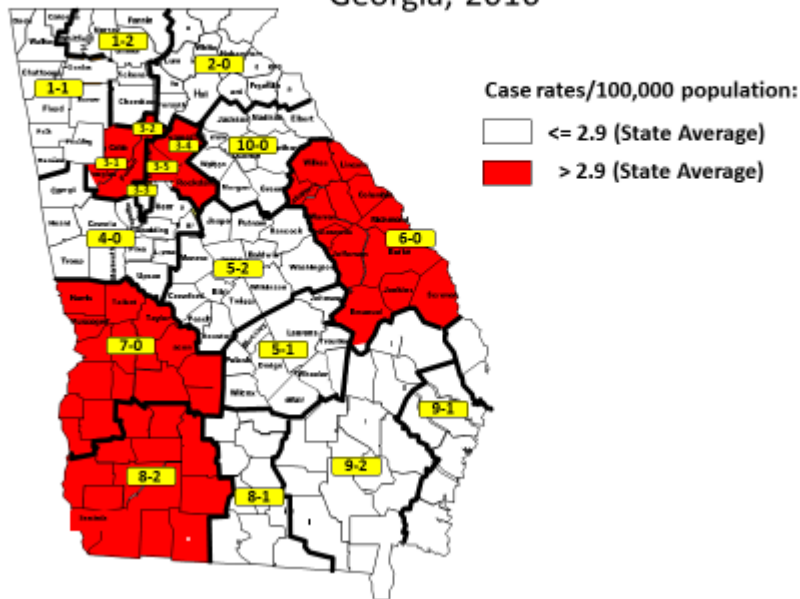


Figure 5. TB Cases by Age Group and Sex
Georgia, 2016

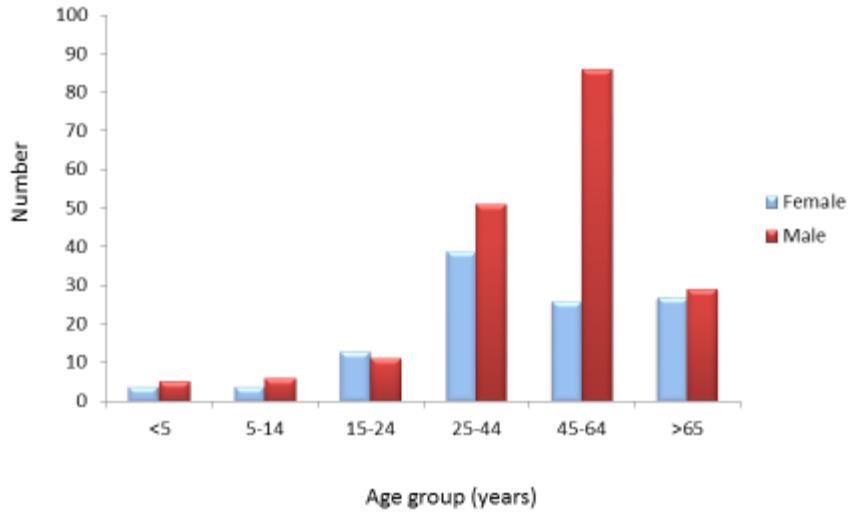
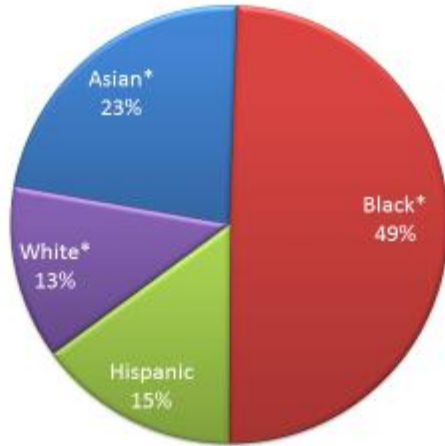


Figure 6. TB Case Rates* by Age Group
2012-2016, Georgia

Age Group	2012	2013	2014	2015	2016
< 5 yrs.	1.6	1.5	2.3	2.1	1.4
5-14 yrs.	0.9	1.2	0.8	0.2	0.7
15-24 yrs.	2.8	1.6	1.5	1.7	1.7
25-44 yrs.	4.3	4.5	4.4	4.0	3.2
45-64 yrs.	5.1	4.5	4.3	4.7	4.2
65+ yrs.	4.4	4.3	4.5	3.6	4.1

*Rates are per 100,000 population

Figure 7. Percentage of TB Cases by Race/Ethnicity
Georgia, 2016



*non-Hispanic

Figure 8. TB Case Rates* by Race/Ethnicity
Georgia, 2012-2016

Race/ Ethnicity	2012	2013	2014	2015	2016
Asian, non-Hispanic	19.8	19.5	19.3	20.2	17.0
Hispanic, All races	6.0	6.2	6.2	4.1	4.5
Black, non-Hispanic	6.1	5.5	5.1	5.0	4.6
White, non-Hispanic	0.9	0.7	0.8	0.8	0.7

*Rates are per 100,000 population

Figure 9. TB Case Rates in non-Hispanic Blacks and Whites, Georgia, 1994-2016

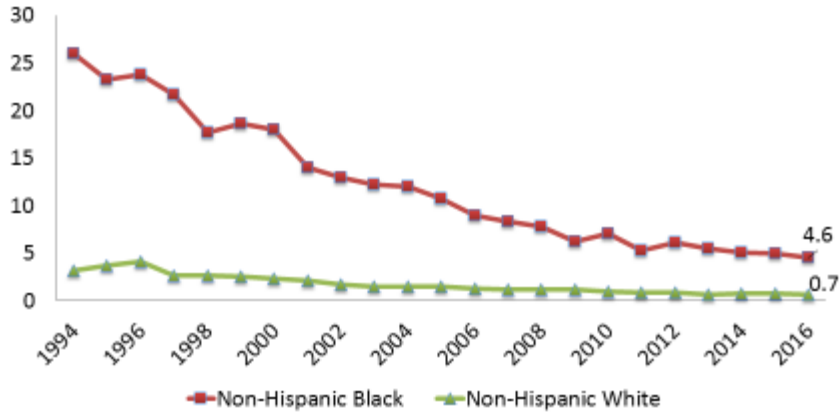


Figure 10. US-born and Foreign-born TB Cases Georgia, 1996-2016

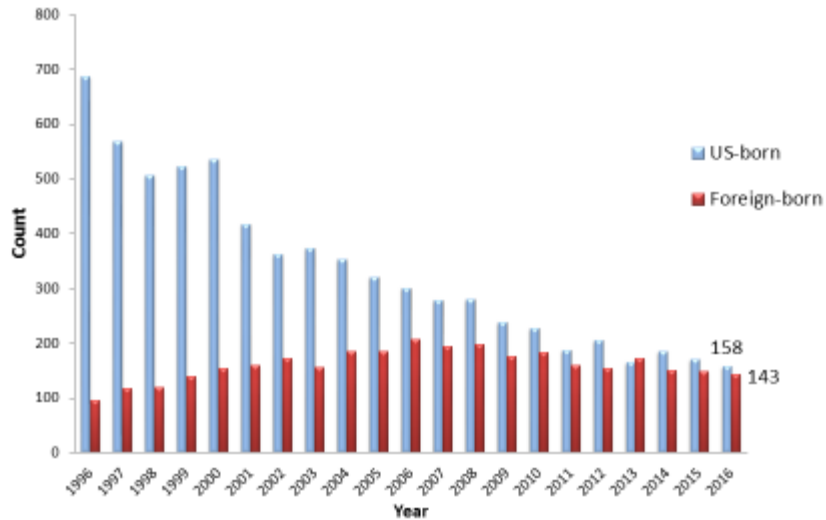


Figure 11. Percent of Foreign-born TB Cases (n=143) by Country of Origin, Georgia, 2016

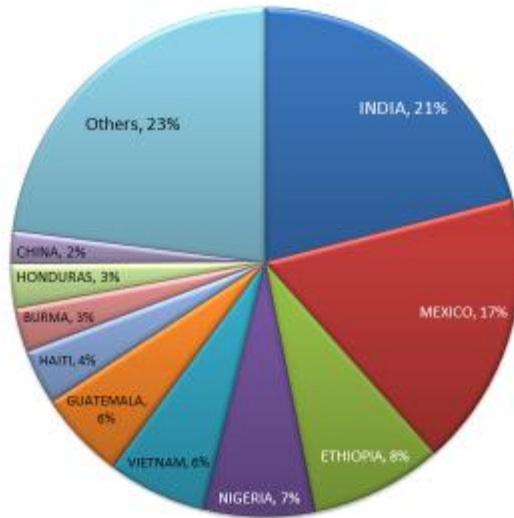


Figure 12. HIV Status of TB Cases Georgia, 1996-2016

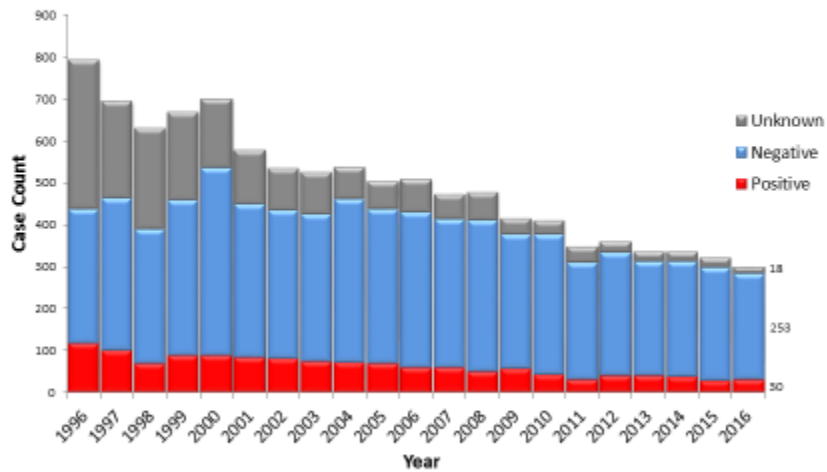


Figure 13. TB in Other High-Risk Populations
Georgia, 2012-2016

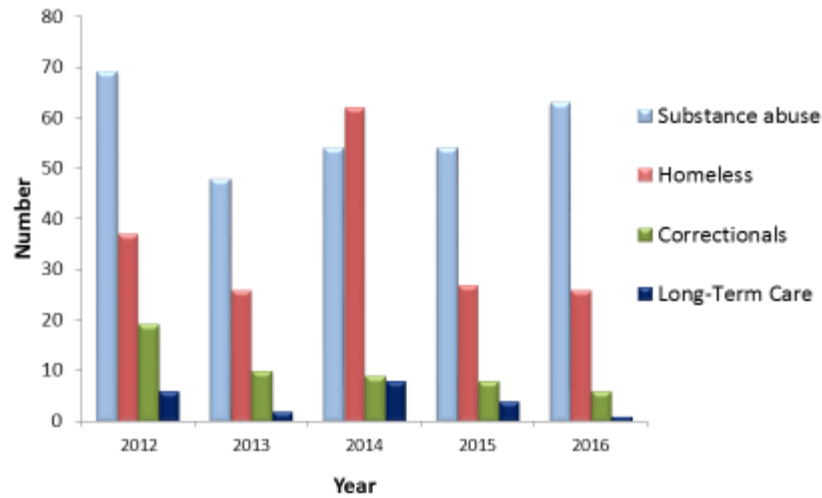


Figure 14. Primary Drug Resistance and MDR-TB
Georgia, 2012-2016

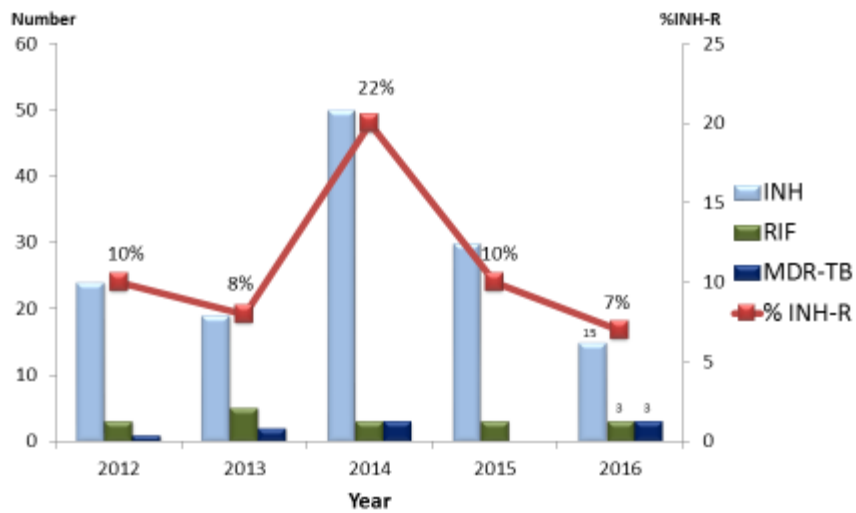
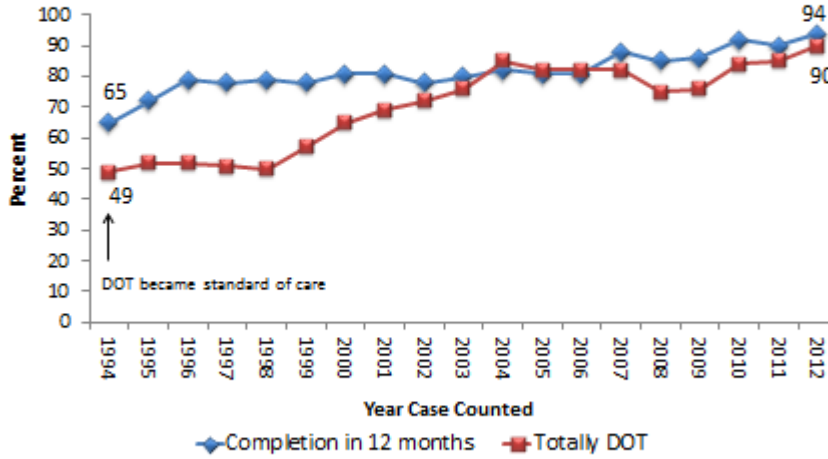


Figure 15. TB Treatment Completion within 12 months and Directly Observed Therapy (DOT) Georgia, 1994-2012*



*In 2009, CDC changed the calculation for TB treatment completion within 12 months to exclude TB cases who moved out of the U.S. while on TB treatment.

Figure 16. Completion of Latent TB Infection (LTBI) Therapy among all contacts of TB cases, Georgia, 2008-2012

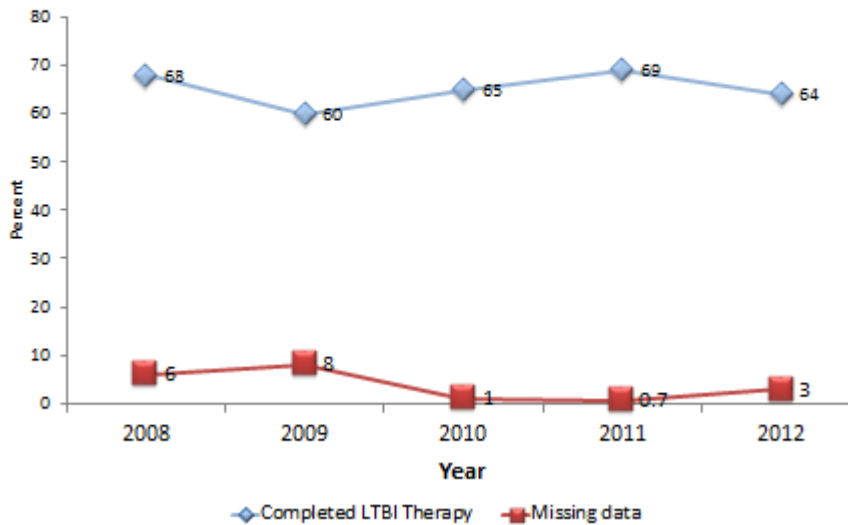
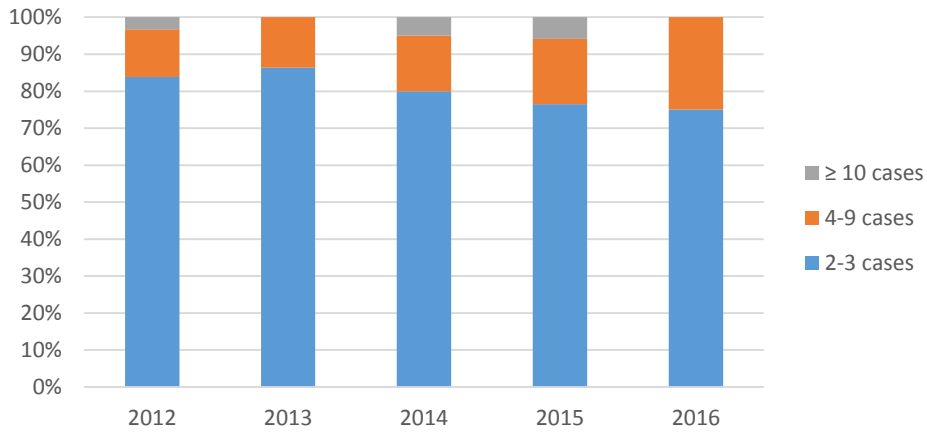


Figure 17. Proportion of Small, Medium, and Large TB Genotype Clusters, Georgia, 2012-2016

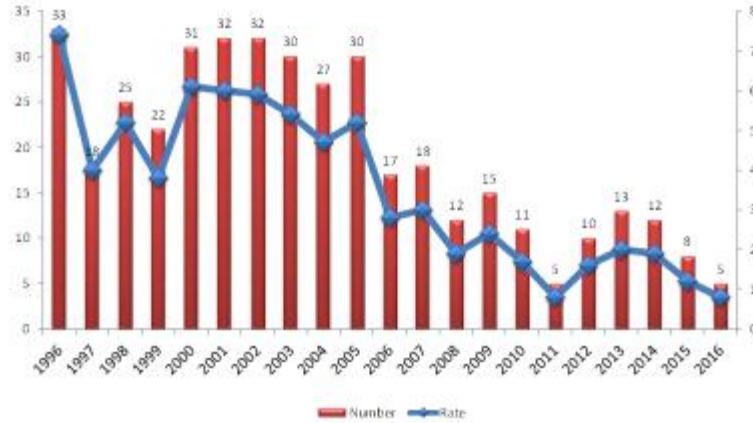


Tuberculosis Morbidity Trends by Health District

Georgia, 1996-2016



TB Case Numbers and Rates District 1-1 (Rome), 1996-2016



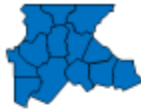
Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 1-2 (Dalton), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 2 (Gainesville), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 3-1 (Cobb), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 3-2 (Fulton), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



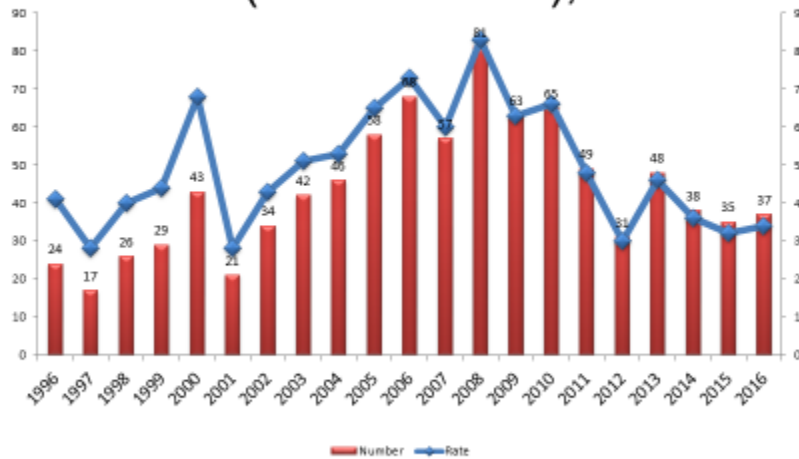
TB Case Numbers and Rates District 3-3 (Clayton), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



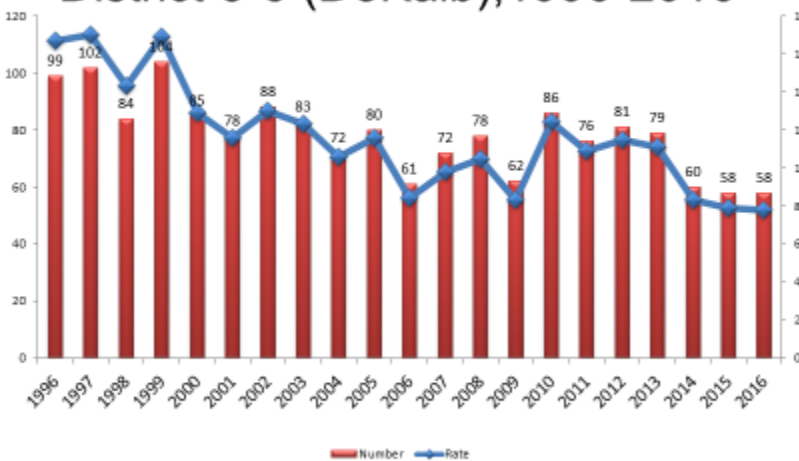
TB Case Numbers and Rates District 3-4 (Lawrenceville), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 3-5 (DeKalb), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



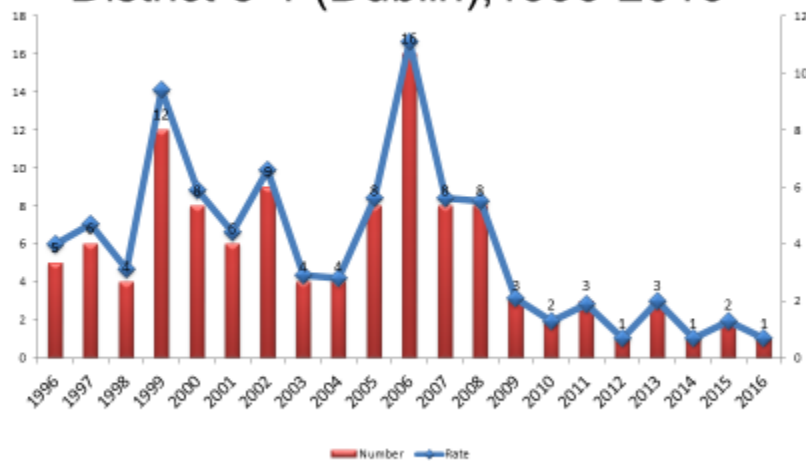
TB Case Numbers and Rates District 4 (LaGrange), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 5-1 (Dublin), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 5-2 (Macon), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 6 (Augusta)*, 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database
*Augusta State Medical Prison cases not included

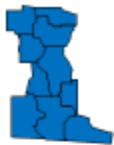


TB Case Numbers and Rates District 7 (Columbus)*, 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database

*ICE Detention Center cases not included



TB Case Numbers and Rates District 8-1 (Valdosta), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 8-2 (Albany), 1996-2016



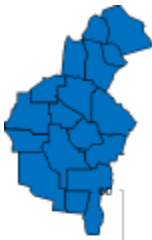
Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 9-1 (Coastal), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



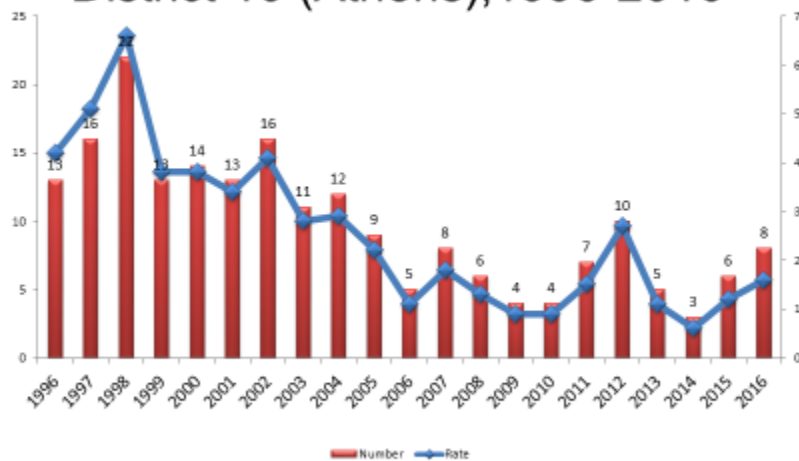
TB Case Numbers and Rates District 9-2 (Waycross), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database



TB Case Numbers and Rates District 10 (Athens), 1996-2016



Rates are per 100,000 population
Source: GA TB surveillance database

