



Tuberculosis Program 2015 to 2019 Annual Surveillance Report

SAINT LOUIS COUNTY DEPARTMENT OF PUBLIC HEALTH
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Saint Louis County Department of Public Health

Mission

To promote, protect, and improve the health and environment of the community.

Vision

Healthy people, healthy environment, equitable communities.

Values

We believe in:

- Being a public health leader in the community
- Providing equitable access to services and resources
- Being responsive to the changing needs of our community
- Operating in an ethical, transparent, and fiscally responsible manner
- Serving our community with dignity and respect

Report Preparation

This report was prepared by the Saint Louis County Department of Public Health, Division of Communicable Disease Prevention and the Division of Communicable Disease Response.

- Epidemiology Program
- Tuberculosis Program

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Notes About the Data

The Saint Louis County Department of Public Health (DPH) Tuberculosis (TB) Program utilizes National TB Program Objectives and Performance Targets published by the Centers of Disease Control and Prevention (CDC) to evaluate TB within Saint Louis County, MO. The mission of the national program is to promote health and quality of life by preventing, controlling, and eventually eliminating TB from the United States. CDC's National TB Program has a focus on objectives for specific populations and sets these objectives to monitor the nation's progress and motivate change that will prevent further disease. Updated National TB Program Objectives and Performance Targets for 2020 were released in August 2015. A link to these targets can be found in [Appendix B](#). Figures in this report depict both the 2015 and 2020 targets, as well as compare the key findings and accomplishments regarding the control and prevention of TB in the nation, Missouri, and Saint Louis County from 2015 to 2019.

Data about TB disease and infection cases were obtained from the Missouri Health and Surveillance Information System (WebSurv), which is maintained by the Missouri Department of Health and Senior Services (MDHSS). Missouri's communicable disease reporting law, 19 CSR 20-20.020, requires reporting of suspected or confirmed TB disease within twenty-four (24) hours and any TB infection cases within three (3) days, to the local health authority or to MDHSS.

Saint Louis County 2019 rates were calculated with population totals from the Selected Characteristics of the Native and Foreign-Born Population, 2019 American Community Survey 5-year Estimates and the Age and Sex, American Community Survey 1-year Estimate.

DPH, along with the Saint Louis County Department of Planning, established five Saint Louis County regions based on the social and demographic characteristics of the regions' residents. Using five County regions allows for sub-County-level comparisons, without the volatility or risk of individual identifiers which may be present in ZIP Code- or census tract-level comparisons.

Executive Summary

In Saint Louis County, 13 cases of TB disease were reported in 2019. The rate of TB decreased from 1.6 cases per 100,000 population in 2018 to 1.3 cases per 100,000 population in 2019. The TB disease rate in Saint Louis County surpassed the national target (1.4 cases per 100,000 population) in 2019 by 7.1%.

The TB disease case rate within the non-U.S.-born and the U.S.-born population both decreased from 2018 to 2019 by 17.2% and 25.0%, respectively. The non-U.S.-born rate decreased from 17.4 cases to 14.4 cases per 100,000 population. The U.S.-born population had a slight decrease from 0.4 cases to 0.3 per 100,000 in 2018 and 2019, respectively.

The U.S.-born non-Hispanic black TB disease case rate in Saint Louis County remained the same in 2019 as it was in 2018 (1.3 cases per 100,000). The TB disease case rate achieved the CDC's 2015 (1.3 cases per 100,000) and was below the 2020 (1.5 cases per 100,000) U.S.-born non-Hispanic black National TB Program Performance Targets. The non-Hispanic white TB disease case rate decreased to 0.0 cases per 100,000 population in 2019 (vs. 0.2 cases per 100,000 in 2018) and continues to be lower than that of the non-Hispanic black population in Saint Louis County.

In 2019, two of the 13 individuals with TB disease had known risk factors which were smoking (7.7%, n=1) and being immunocompromised (7.7%, n=1) (not HIV).

In 2019, the highest proportion of cases were between the ages of 24 and 44 (30.8%, n=4) and 65+ (30.8%, n=4). There were no cases of TB disease among children under the age of 4 years in Saint Louis County, however, there was one individual with TB disease between the age of 5 and 14 years.

TB infection, a reportable condition in Missouri, is an asymptomatic form of TB disease. Individuals with TB infection are infected with the same bacteria as TB disease but do not feel sick and cannot spread the infection. Screening for and treating TB infection is a priority for the TB program because the infection can progress into TB disease. In 2019, Saint Louis County DPH saw a slight increase of 1.9% in reports of TB infection (n=523) compared to 2018 (n=513).

The Tuberculosis Program

The DPH Tuberculosis (TB) Program performs TB surveillance, prevention services, disease investigation, medical follow-up, treatment, clinical management, and case management for residents of Saint Louis County. Priorities of the Saint Louis County TB Program include:

The TB Program in 2019:

- The DPH Chest Clinic had **464** TB-related appointments scheduled
- **268** unique individuals were seen at Chest Clinic
- **13** TB disease/TB suspects/TB infection patients started DOT therapy
- **51** individuals began treatment for TB infection through Chest Clinic

- Identifying all individuals with suspected and confirmed TB disease and providing patient-centered care, including intensive case management services and appropriate treatment via directly observed therapy (DOT).
- Completing contact investigations among contacts of patients with infectious TB disease, including TB screening, medical evaluations, and prophylactic therapy, if necessary.
- Working in partnership with patients, hospitals, health care providers, and labs to diagnose, treat, and prevent further transmission of TB.
- Collecting and analyzing TB epidemiological data.

Services Provided by Saint Louis County DPH

DPH is the leading provider of TB care in Saint Louis County. The DPH Chest Clinic is available to any Saint Louis County resident with symptoms of TB disease, a positive test for TB infection, and contacts to individuals with TB disease. TB diagnostic services (such as bloodwork, sputum induction, and chest x-rays) and expert medical evaluation are provided on-site. The Chest Clinic supports equitable access to the full continuum of tuberculosis care, from diagnosis through treatment completion, regardless of financial resources, race, gender, age, language, legal status, religious beliefs, sexual orientation, culture, or co-morbidities.

The TB Program provides case management for residents diagnosed with TB disease, regardless of where they are receiving their TB care. Case management activities include patient education, comprehensive patient interviews, medical care coordination, contact elicitation, contact evaluation, and DOT. DOT is the standard of care for managing patients with suspected or confirmed TB disease; it ensures medications are taken appropriately and consistently until completion of treatment, allows for monitoring of treatment failure, and prompt reporting of side effects. DPH outreach workers traverse the entire county to perform DOT in patients' homes, work places, and other locations convenient for the patient.

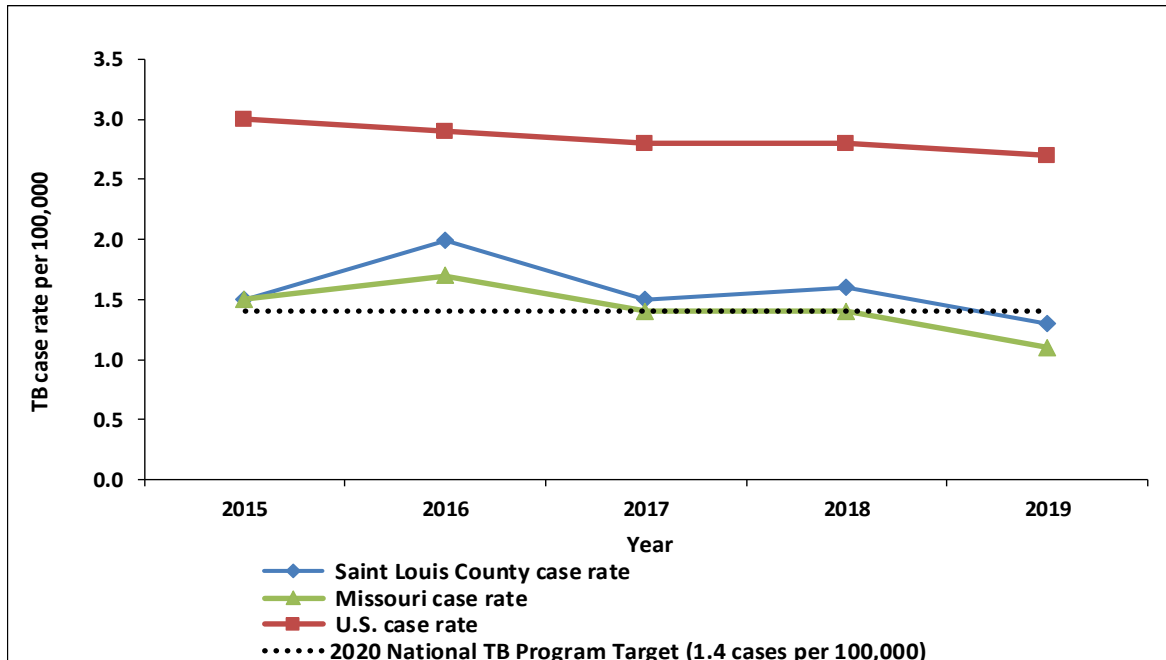
The TB Program works with the Epidemiology Program to conduct surveillance of TB disease, TB infection, and nontuberculous mycobacterial infection. Epidemiologists analyze TB trends, prepare surveillance reports, and update tracking systems to describe how TB impacts residents of Saint Louis County and to develop and revise strategies necessary to improve TB prevention and care within the community.

*These numbers represent patients who were managed by Saint Louis County in 2019 regardless of counted jurisdiction or year.

Tuberculosis Disease in Saint Louis County

Nationally, there were 8,916 cases of tuberculosis (TB) disease (2.7 cases per 100,000 population) reported to the CDC in 2019. Thirteen individuals were diagnosed with TB disease in Saint Louis County in 2019, which corresponds to a case rate of 1.3 cases per 100,000. The state of Missouri had a rate of 1.1 per 100,000 population (n=70) in 2019. CDC set a 2020 Performance Target of 1.4 TB disease cases per 100,000 population or lower; the state of Missouri and Saint Louis County were able to achieve this target while the United States was unable to reach this target. TB disease rates for the United States, Missouri, and Saint Louis County throughout the previous five years are shown in Figure 1, below.

**Figure 1: Tuberculosis Case Rate
United States, Missouri, and Saint Louis County, 2015 to 2019**



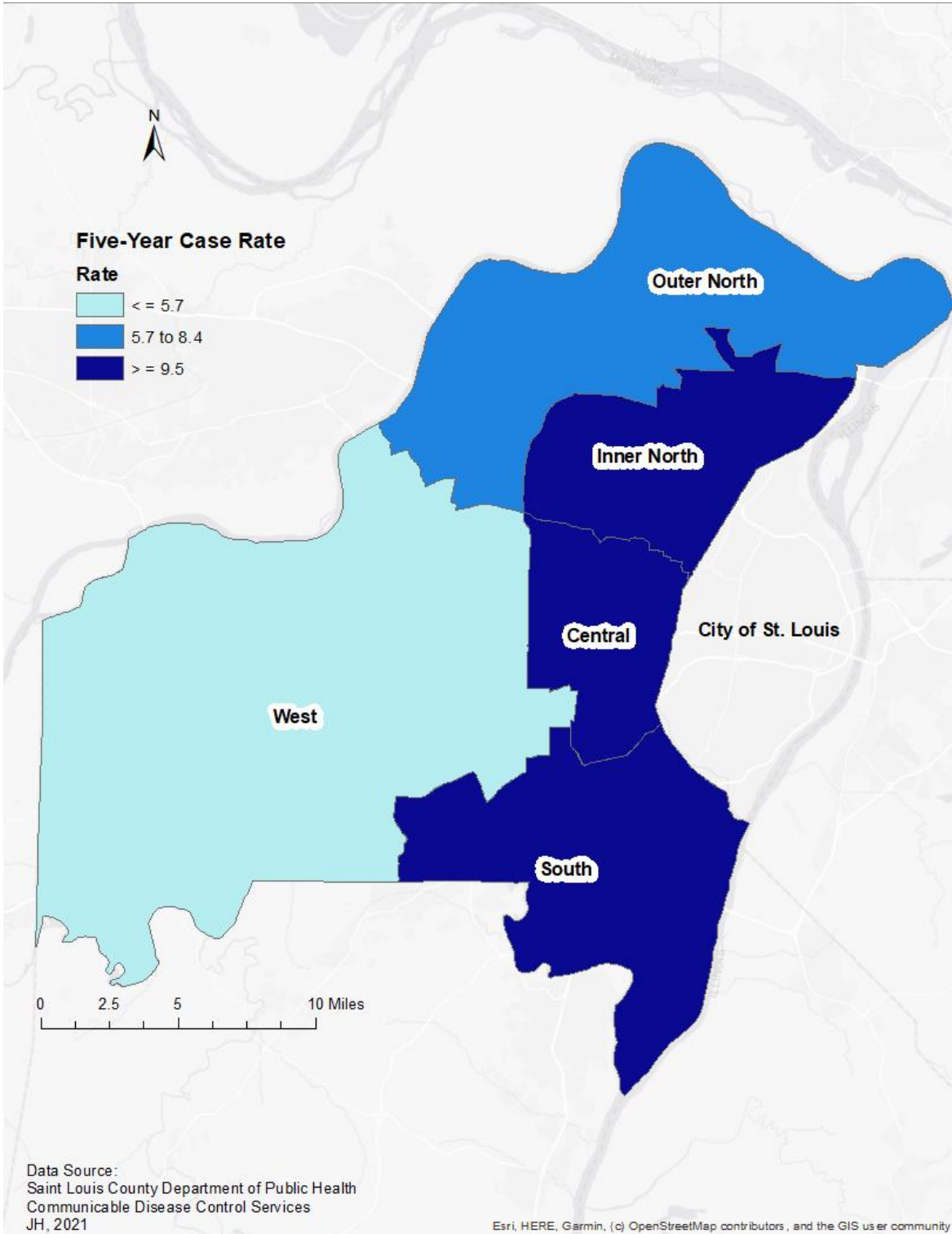
The ZIP Code in Saint Louis County with the highest rate of TB disease during 2015 to 2019 was 63132, which had a five-year case rate of 22.3 cases per 100,000 population. Only ZIP Codes with one or more reported cases of TB disease within the five-year timeframe are represented in Table 1. Map 1 represents the TB disease case rate for the previous five years visualized over the five regions of Saint Louis County: Inner North, Outer North, West, Central, and South.

Table 1: Tuberculosis Five-Year Case Rate by ZIP Code, Saint Louis County, 2015 to 2019

ZIP Code	5-year case rate per 100,000 population	ZIP Code	5-year case rate per 100,000 population
63132	22.3	63124	9.2
63137	21.7	63135	9.1
63138	16.1	63043	8.9
63125	15.3	63031	8.4
63141	14.6	63121	8.1
63130	14.0	63126	6.8
63136	13.8	63128	6.7
63146	13.3	63074	6.6
63117	11.7	63119	5.9
63129	11.2	63131	5.7
63021	10.7	63005	5.6
63042	10.3	63114	5.6
63123	10.3	63026	4.5
63033	9.3	63122	2.6
		63107	2.4

*Population numbers based on U.S. Bureau of Census 2018 estimates. Case rates are based on the total Saint Louis County population of the ZIP Code.

Map 1: Tuberculosis Case Rate per 100,000 Population by Saint Louis County Region, 2015 to 2019, Saint Louis County, n = 79



*Case rates are based on the total Saint Louis County population of the ZIP Codes in each region.

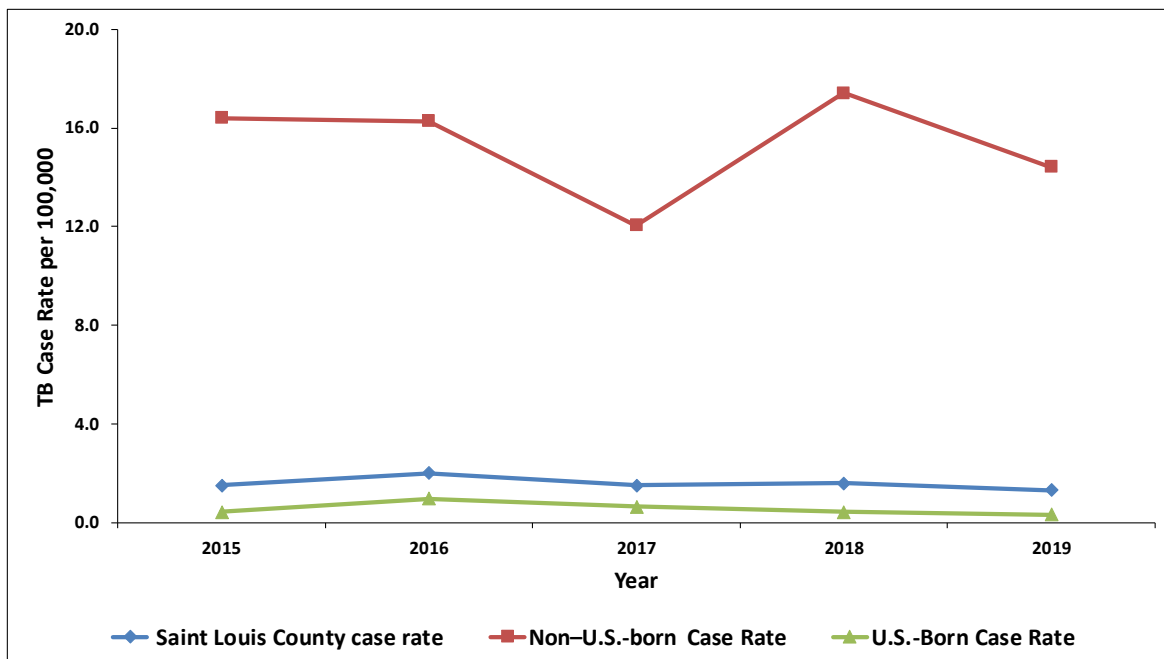
Tuberculosis Disease by Country of Birth

Country of birth is the greatest risk factor for exposure to *Mycobacterium tuberculosis* (TB). Because many other countries experience higher rates of TB compared with the U.S., many of the individuals seen and treated for TB disease by the TB Program are non-U.S.-born. Table 2 depicts TB disease among U.S.-born and non-U.S.-born residents in Saint Louis County from 2015 to 2019. The TB disease case rate among non-U.S.-born residents has consistently been higher than the rate among U.S.-born residents throughout the previous five years, as seen in Figure 2. During 2015 to 2019, 32.9% (n=26) of individuals with TB disease were U.S.-born, compared to 67.0% (n=53) of individuals being non-U.S.-born residents. The proportion of TB disease cases per year that were U.S.-born ranged from a high of 45.0% (n=9) in 2016 to a low of 23.1% (n=3) in 2019.

Table 2: Tuberculosis Cases and Case Rate in U.S.-Born and Non-U.S.-Born Residents, Saint Louis County, 2015 to 2019

Case Year	U.S.-Born Residents		Non-U.S.-Born Residents	
	TB Case Count	TB Case Rate per 100,000	TB Case Count	TB Case Rate per 100,000
2015	4	0.4	11	16.4
2016	9	1.0	11	16.3
2017	6	0.6	9	12.1
2018	4	0.4	12	17.4
2019	3	0.3	10	14.4

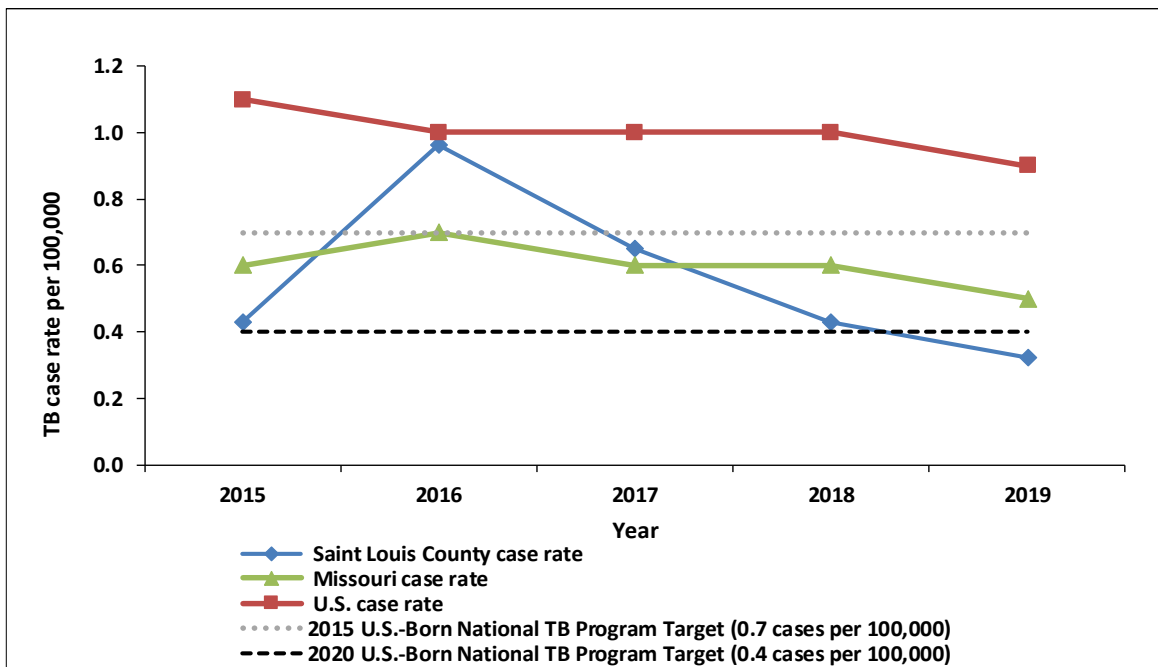
Figure 2: Tuberculosis Case Rate in U.S.-Born and Non-U.S.-Born Residents, Saint Louis County, 2015 to 2019



CDC’s 2015 and 2020 Performance Targets called for reducing the TB disease case rate among U.S.-born persons to 0.7 cases and 0.4 cases per 100,000 population, respectively.

In 2019, Saint Louis County had a rate of 0.3 cases per 100,000 among the U.S.-born population, a 25.0% decrease compared to 2018 (0.4 cases per 100,000). The state of Missouri had a rate of 0.5 cases per 100,000 population and CDC reports the 2019 national case rate as 0.9 cases per 100,000 population. Comparing the local, state, and national 2019 case rates with the 2015 and 2020 target, as seen in Figure 3, Saint Louis County was able to meet the 2015 and 2020 targets of 0.7 and 0.4 cases per 100,000 population, respectively. Throughout the past five years, the state of Missouri was able to maintain a rate at or below the 2015 target, whereas, the United States was unable to meet the 2015 or 2020 targets but was able to reduce its case rate by 10.0%.

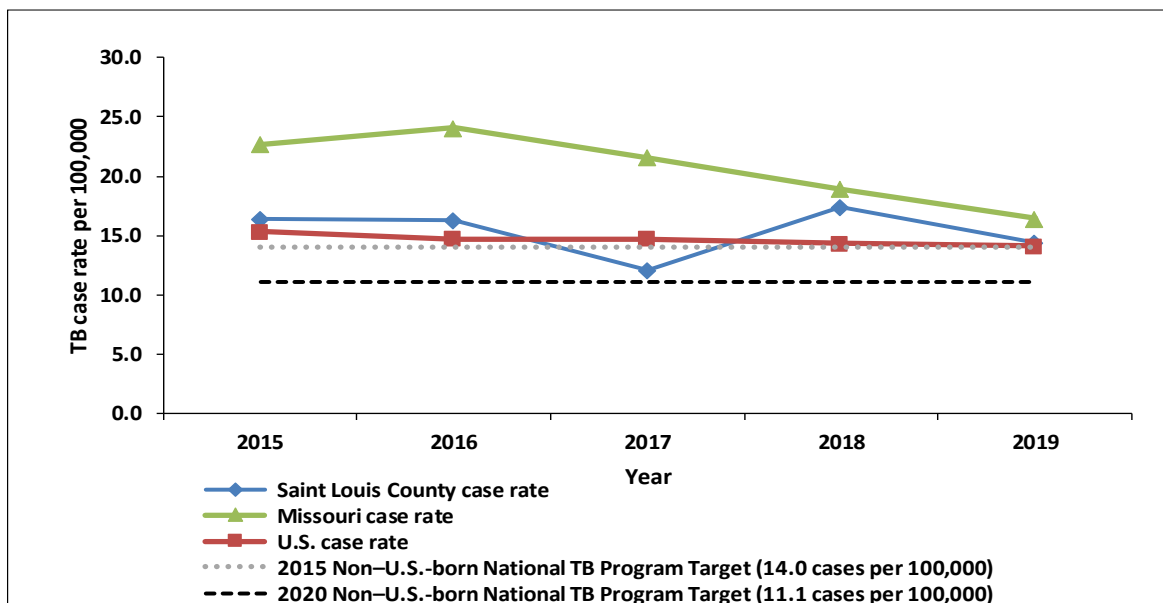
Figure 3: Tuberculosis Case Rate in U.S.-Born Residents, United States, Missouri, and Saint Louis County, 2015 to 2019



CDC’s 2015 and 2020 Performance Targets called for reducing the TB disease case rate among non-U.S.-born persons to 14.0 cases and 11.1 cases per 100,000 population, respectively.

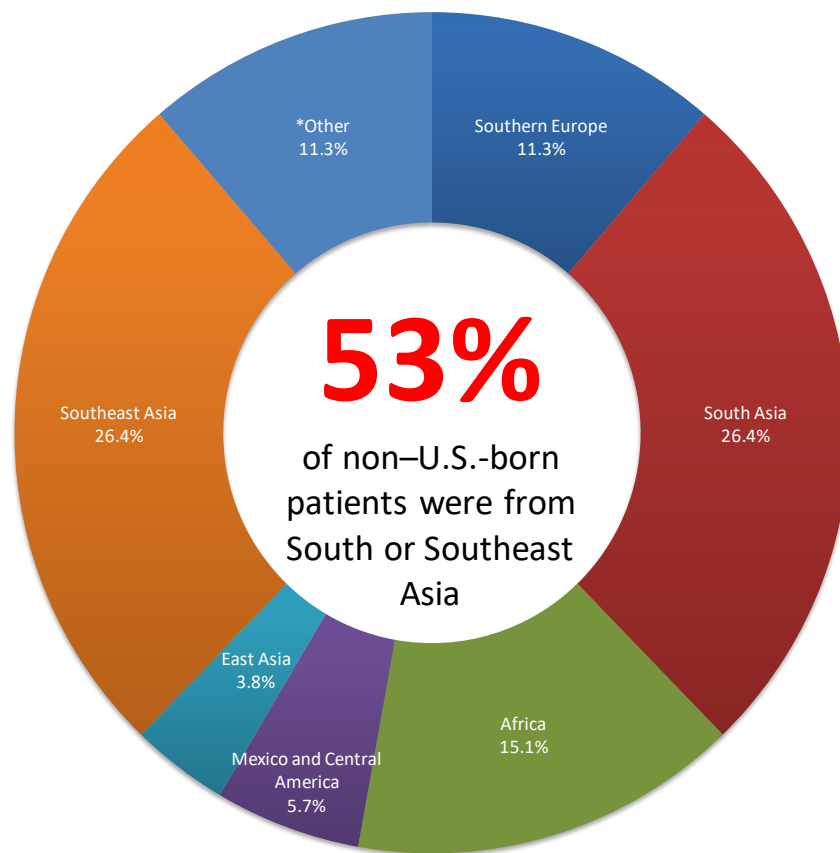
In 2019, the TB disease case rate among non–U.S.-born residents in Saint Louis County was above both the 2015 and 2020 national targets, at 14.4 cases per 100,000 population. Although Saint Louis County’s rate was above the national target, the 2019 rate was a 17.2% decrease from 2018. The 2019 national TB disease case rate was 14.1 cases per 100,000 population, slightly above the 2015 target. Missouri had a rate that was greater than both the local and national rates (16.4 cases per 100,000 population). Neither the state of Missouri nor the United States was able to achieve the 2015 or 2020 Performance Targets, as seen in Figure 4, although the United States was only 0.01% away from reaching their 2015 target.

Figure 4: Tuberculosis Case Rate in Non–U.S.-Born Residents, United States, Missouri, and Saint Louis County, 2015 to 2019



During 2015 to 2019, there were 53 cases of TB disease among non-U.S.-born residents. Twenty-six point four percent (n=14) of cases were born in South Asia and 26.4% (n=14) of cases occurred among residents born in Southeast Asia. Figure 5 depicts the origins of TB disease cases in non-U.S.-born residents for the previous five years by regions. These regions are pre-defined by the CDC and used by DPH to de-identify patients. See [Appendix A](#) for the complete list of countries and territories included in each CDC region.

Figure 5: Tuberculosis Cases in Non-U.S.-Born Residents by Country of Birth, Saint Louis County, 2015 to 2019



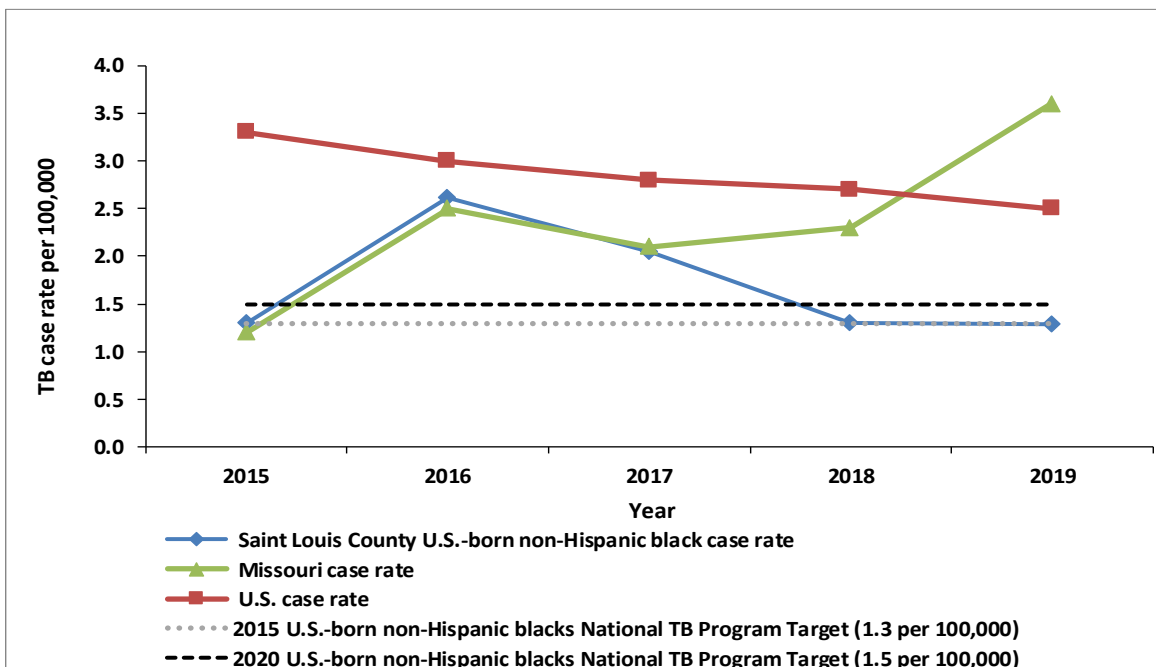
*Includes: Caribbean, West/Central Asia, Middle East, and Eastern, Western, and Northern Europe.

Tuberculosis Disease by Race and Ethnicity

Saint Louis County is actively working to address racial and ethnic health disparities and improve the health of persons disproportionately affected by tuberculosis (TB). This can be seen through the availability of Chest Clinic and case management services to all County residents, regardless of financial resources, race, gender, age, language, legal status, religious beliefs, sexual orientation, culture, or co-morbidities.

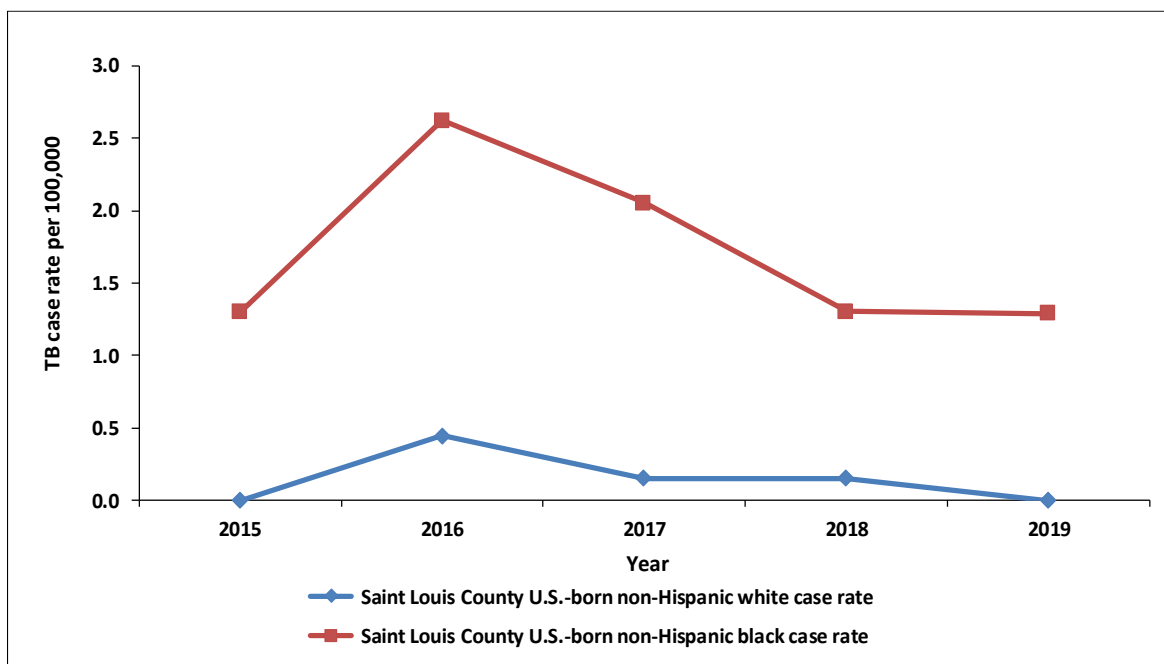
During 2019, the Saint Louis County TB disease rates for the U.S.-born non-Hispanic black population continued to decline after doubling from 2015 to 2016. In Saint Louis County, these rates remained the same from 2018 to 2019 at 1.3 cases per 100,000, meeting the 2015 and 2020 Performance Targets. The 2019 national case rate was 2.5 cases per 100,000 population, a slight decrease from the 2018 rate (2.7 cases per 100,000 population) while Missouri saw a 56.5% increase between 2018 and 2019 (2.3 to 3.6 cases per 100,000). Overall, the United States has seen a continual decrease in TB disease rates among this population for the past five years. The state and national rates were above the CDC’s Performance Targets for 2015 and 2020 to obtain a TB disease case rate of 1.3 cases and 1.5 cases per 100,000 population among the non-Hispanic black residents, as seen in Figure 6.

Figure 6: Tuberculosis Case Rate in U.S.-Born Non-Hispanic Black Residents, United States, Missouri, and Saint Louis County, 2015 to 2019



Throughout the previous five years, TB disease case rates among U.S.-born non-Hispanic black residents have consistently been higher than that of the U.S.-born non-Hispanic white residents in Saint Louis County. During 2019, 100.0% (n=3) of the U.S.-born cases were non-Hispanic black residents, as seen in Figure 7. For reference, according to the 2017 American Community Survey 1-year estimates, there are almost three times as many non-Hispanic white residents living in the county compared to non-Hispanic black residents.

Figure 7: Tuberculosis Case Rate in U.S.-Born Non-Hispanic Black Residents and U.S.-Born Non-Hispanic White Residents, Saint Louis County, 2015 to 2019

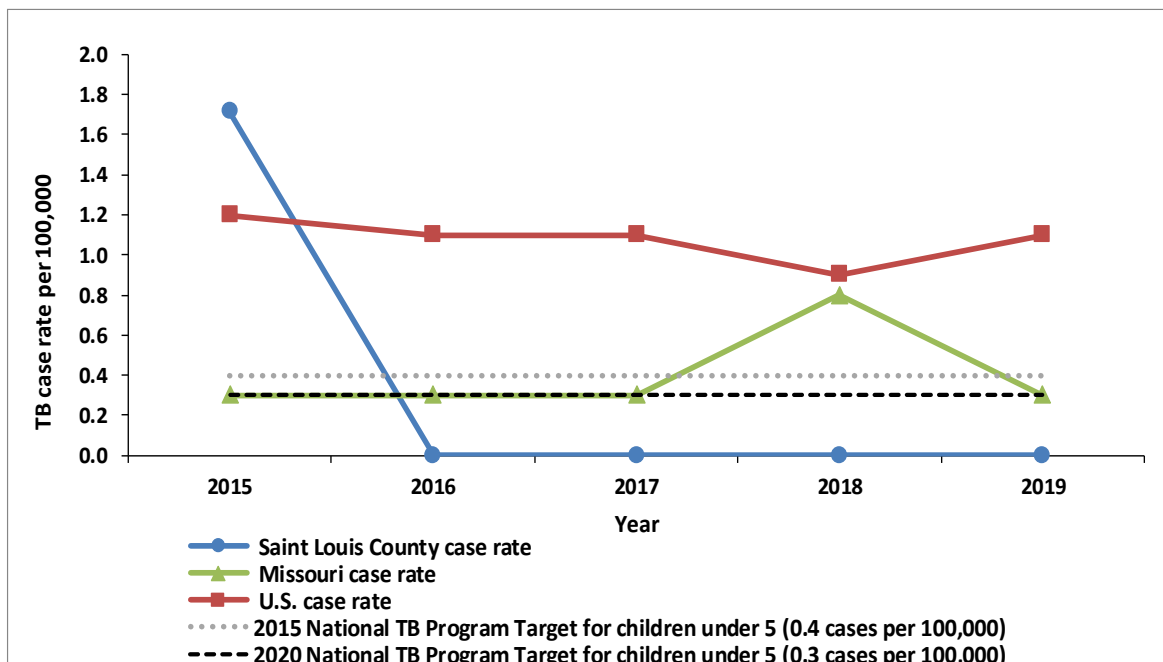


Tuberculosis Disease by Age and Age Group

Children between the ages of 0 to 4 years are more likely than older children and adults to develop life-threatening forms of tuberculosis (TB) disease due to their developing immune systems. The Saint Louis County TB Program works diligently to find and treat residents within this age group to prevent TB disease from developing or becoming life threatening.

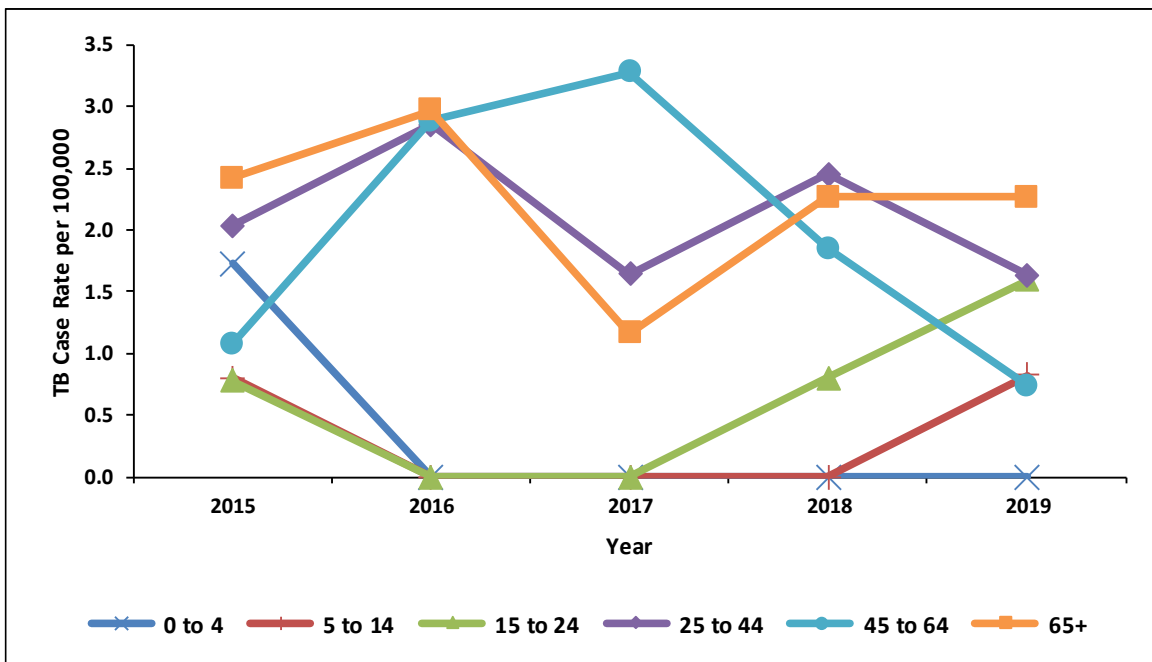
One goal of the CDC’s Performance Targets for 2020 is to reduce the TB disease case rate for children under 5 years old to fewer than 0.3 cases per 100,000 population. For the past four years, Saint Louis County has had no cases of TB disease among children under the age of 5, resulting in a case rate below the Performance Target, as seen in Figure 8. The state of Missouri saw a decrease of TB disease among this age group with a case rate of 0.3 per 100,000 in 2019 compared to 0.8 per 100,000 in 2018. The United States saw a 22.2% increase of TB disease among this age group from 2018 to 2019.

Figure 8: Tuberculosis Case Rates in Children 0-4 Years Old, United States, Missouri, and Saint Louis County, 2015 to 2019



During the last five years, Saint Louis County residents with TB disease ranged in age from 3 to 90 years, with a median age of 49 years. The highest number of TB disease cases among children 0 to 4 years of age occurred in 2015 (n=1). The majority of individuals with TB disease in the previous five years in Saint Louis County have been adults in the 45 to 64 (n=27) and the 25 to 44 (n=26) year-old age groups, as seen in Figure 9.

Figure 9: Tuberculosis Case Rate by Age Group, Saint Louis County, 2015 to 2019



Tuberculosis Disease by Risk Factors

Risk factors for developing active tuberculosis (TB) disease fall into two categories: those which increase the likelihood of exposure to *M. tuberculosis* (e.g., close proximity to someone with TB disease, immigration from parts of the world with higher TB disease rates, or homelessness), and those which increase the risk of progression to TB disease (e.g., HIV infection, diabetes, immunocompromised, and smoking). Although CDC and the World Health Organization (WHO) define many risk factors for the development of TB disease (see the link provided in [Appendix B](#) for more information), with the exception of being non-U.S.-born, the risk factors represented in Table 3 were chosen because they encompass the factors mentioned in CDC's annual TB report and by WHO as comorbidities that could lead to the progression or severity of TB disease.

Of the five risk factors presented in Table 3, TB and HIV coinfection is arguably the most serious throughout the world. People with TB infection who are coinfecting with HIV are more likely to develop TB disease; TB disease then increases the likelihood of death among people living with HIV (CDC, 2016). The National TB Program Objectives and Performance Targets for 2020 includes a goal to increase the number of patients with TB disease being tested for HIV to 98.0%. In 2019, Saint Louis County was able to test 85.0% (n=11) of individuals with TB disease. Of the 86 individuals whose TB treatment were managed by Saint Louis County between 2015 and 2019, 32.6% (n=28) had a single risk factor and 5.8% (n=5) had more than one risk factor. The two most common risk factors from 2015 to 2019 in this population were smoking (42.1%, n=16) and diabetes (34.2%, n=13). The proportion of individuals with TB disease managed by DPH with a medical or social risk factor (other than being non-U.S.-born) per year ranged from a high of 46.7% (n=7) in 2017 to a low of 14.3% (n=2) in 2019. Compared to 2019 national data, the highest percentage of patients (20.7%) had diabetes and 19.9% had a risk factor of "other".

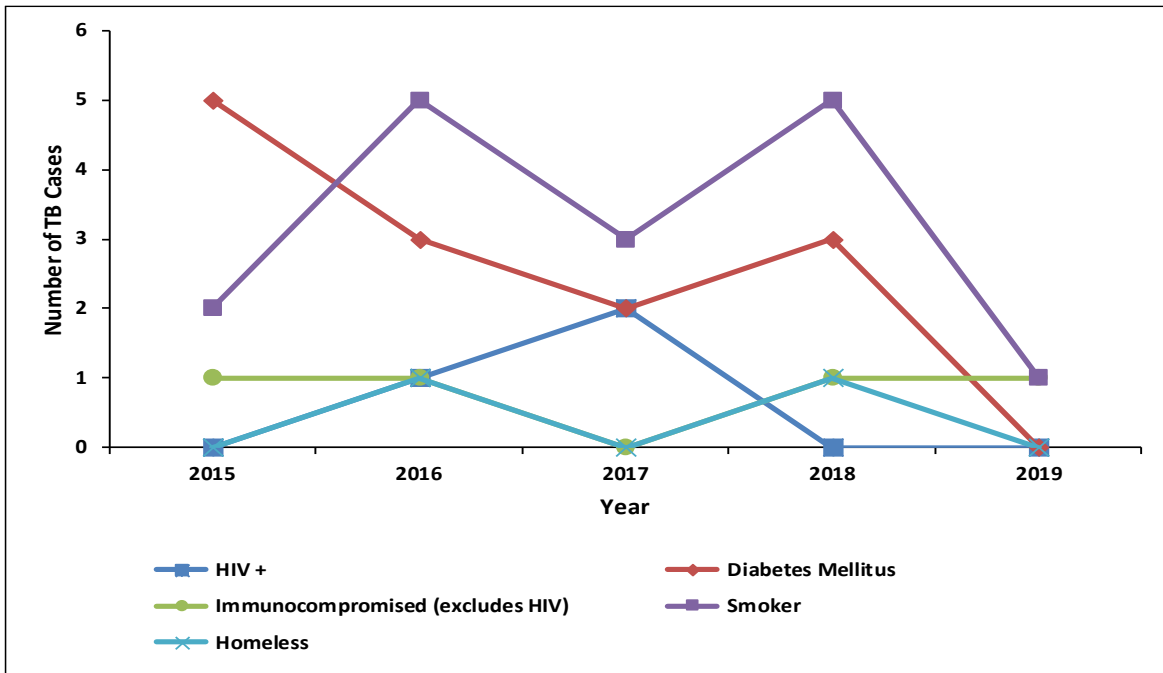
Table 3: Tuberculosis Cases by Risk Factor, Saint Louis County, 2015 to 2019

Year	HIV +	Diabetes Mellitus	Immunocompromised (excludes HIV)	Smoking	Homeless
2015	0	5	1	2	0
2016	1	3	1	5	1
2017	2	2	0	3	0
2018	0	3	1	5	1
2019	0	0	1	1	0
5 Year Total	3	13	4	16	2

*Patients with multiple risk factors are counted more than once.

*Managed patients are included, regardless of counted jurisdiction.

Figure 10: Tuberculosis Cases by Risk Factor, Saint Louis County, 2015 to 2019

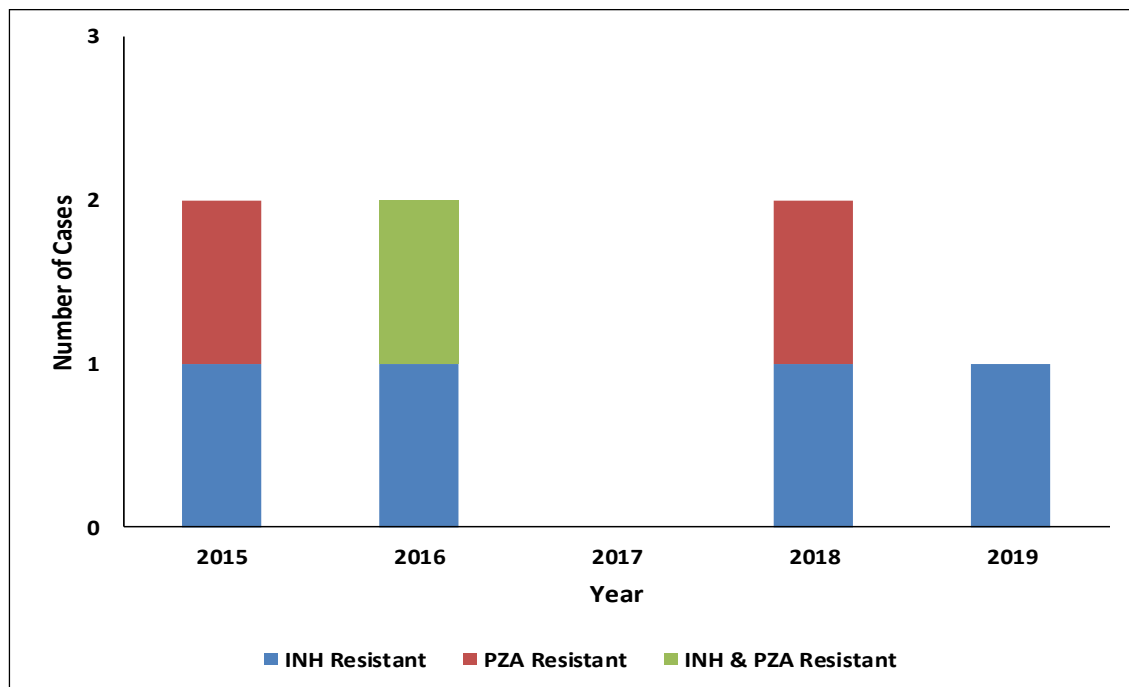


* Cases with multiple risk factors are counted more than once
 * Managed patients are included regardless of counted jurisdiction.

Drug-Resistant Tuberculosis

According to the CDC, multidrug-resistant tuberculosis (MDR-TB) can be defined as a TB organism that is resistant to two of the main medications used to treat TB: isoniazid (INH) and rifampin (RIF). There are two ways an individual can attain MDR-TB: primary or acquired. Primary MDR-TB occurs from the direct transmission of drug resistant TB from one person to another. Acquired MDR-TB occurs when there is a complication with the prescribed regimen, resulting in the typical organism developing a resistance to the medication. In Saint Louis County, from 2015 to 2019, there have been no cases of MDR-TB. TB disease as a result of organisms that demonstrate *in vitro* drug resistance to one medication is referred to as mono-resistant TB. In Saint Louis County from 2015 to 2019, there were six cases of mono-resistant TB, with resistance to INH observed in 66.7% (n=4) of cases. Mono-resistance to pyrazinamide (PZA) was observed in 33.3% (n=2) of all the mono-resistant cases, as seen in Figure 11. TB disease as a result of organisms that demonstrate *in vitro* drug resistance to more than one anti-TB medication (but not INH and RIF) is referred to as poly-resistant TB. From 2015 to 2019, there was one case of poly-resistant, INH and PZA TB. In continued efforts to prevent further drug-resistance, the TB Program works diligently to ensure patients complete their therapy through directly observed therapy (DOT) and proactive case management.

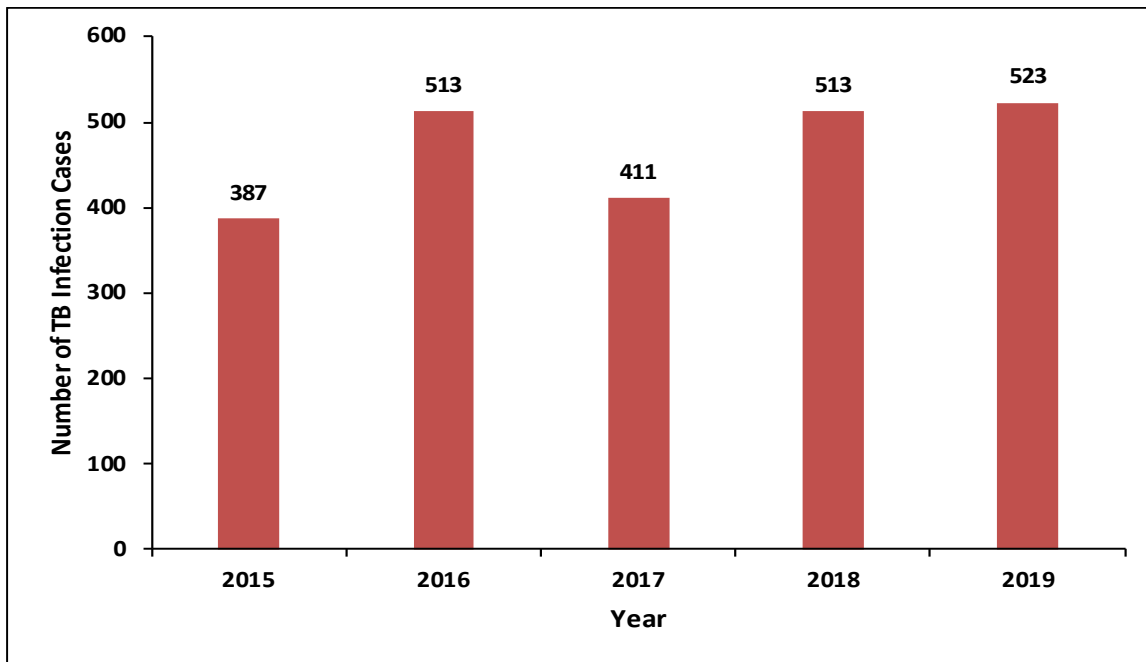
Figure 11: Drug-Resistant Tuberculosis, Saint Louis County, 2015 to 2019



Tuberculosis Infection

Achieving tuberculosis (TB) elimination will require expanded efforts to identify and treat individuals with TB infection. Unlike TB disease, TB infection is not infectious due to the inactivity of the *M. tuberculosis* bacteria in an individual's body. While a person with TB infection has the same bacteria as someone with TB disease, they do not have symptoms, are not sick with the disease, and will not transmit the disease to others. Many healthy people living with TB infection will never progress to TB disease, but 5 to 10% of people will develop the disease at some point in their lives. For half of those who develop TB disease, they will do so within the first two years of becoming infected with *M. tuberculosis*. To treat and prevent progression to TB disease, the state of Missouri requires positive TB screenings to be reported to local health departments. In 2019, there was a 1.9% increase in the number of positive TB infection screenings reported to Saint Louis County DPH compared to 2018. Figure 12 represents the previous five years' worth of reported TB infection.

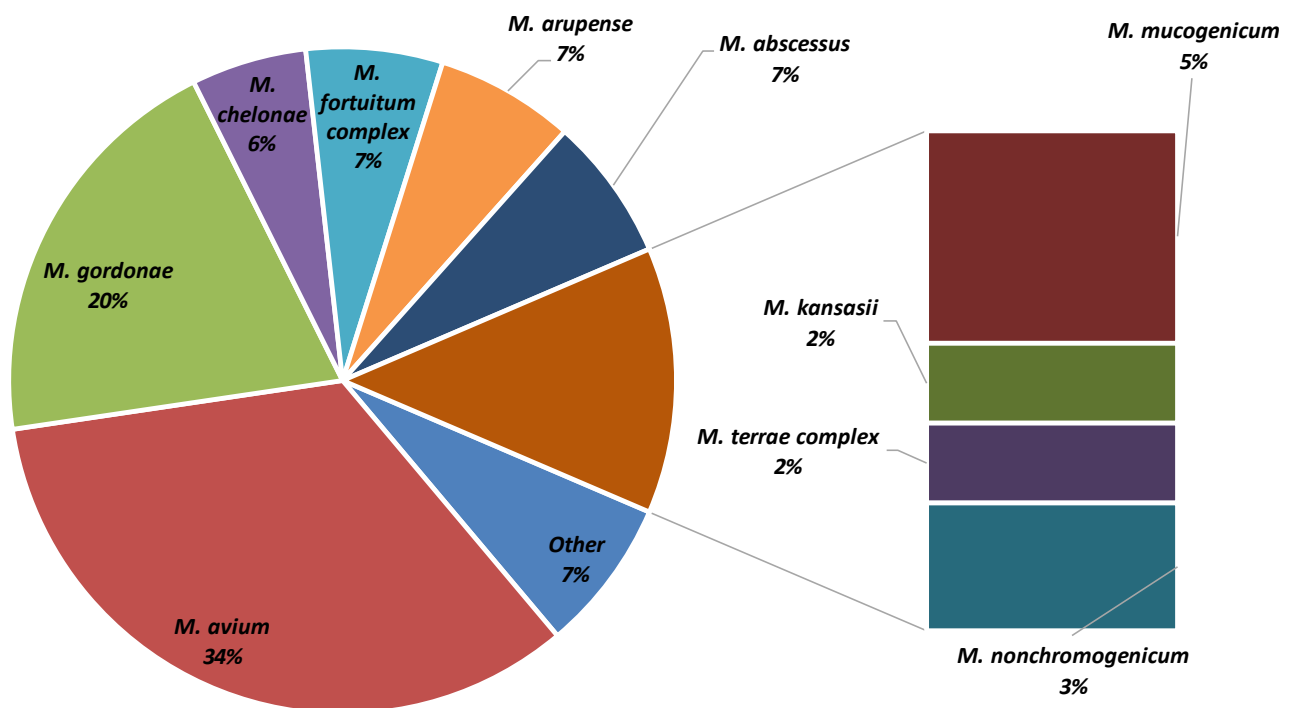
Figure 12: Tuberculosis Infection Cases, Saint Louis County, 2015 to 2019



Nontuberculous Mycobacteria

During 2015 to 2019, there were 876 infections due to nontuberculous mycobacteria (NTM) reported to Saint Louis County. The greatest proportion of these infections were due to *Mycobacterium avium*, which caused 34.0% (n= 296) of new NTM reports over the past five years. Figure 13 presents the top 10 NTM species that were reported for the previous five years and all remaining species included in the variable ‘other.’ Patients included in Figure 13 are counted only one time.

Figure 13: Top 10 Nontuberculous Mycobacterial Species, Saint Louis County, 2015 to 2019



*Other includes: blank, other rapid grower, *M. xenopi*, *M. smegmatis*, *M. simiae*, *M. chimaera*, *P. peregrinum*, *M. marinum*, *M. goodii*, *M. parascrofulaceum*, *M. intracellulare*, *M. porcinum*, *M. neworleansense*, *M. neoaurum*, *M. phocaicum*, *M. immunogenum*, *M. lentiflavum*, *M. wolinskyi*, *M. sphagni*, *M. scrofulaceum*, and *M. szulgai*, *M. nocardia brasiliensis*, *M. branderi*, *M. paraffinicum*, *M. aurum*, *M. interjectum*, *M. asiaticum*, *M. bovis*

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- United States Census Bureau / American FactFinder. “Sex and Age” U.S. *2017 American Community Survey 1-Year Estimates*. U.S. Census Bureau’s American Community Survey Office. Web. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_1YR_S0101&prodType=table

Appendix A: CDC Global Regions

The Saint Louis County Department of Public Health utilizes CDC global regions to further de-identify report data. The countries/territories included in each CDC region are provided below.

CDC Region	Countries/ Territories Included
Africa	Algeria, Angola, Botswana, Benin, Bassas Da India, Burundi, Chad, Congo, Cameroon, Comoros, Central African Republic, Cape Verde, Djibouti, Dahomey [Benin], Egypt, Equatorial Guinea, Eritrea, Ethiopia, Europa Island, French Territory of The Affars and Issas, The Gambia, Gabon, Ghana, Glorioso Islands, Guinea, Cote D' Ivoire, Kenya, Liberia, Lesotho, Libya, Madagascar, Spanish North Africa, Mayotte, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Niger, Nigeria, Guinea-Bissau, Reunion, Southern Rhodesia, Rwanda, Seychelles, South Africa, Senegal, Saint Helena, Sierra Leone, Somalia, South Sudan, Spanish Sahara, Sudan, Tromelin Island, Togo, Sao Tome and Principe, Tunisia, Tanzania, Uganda, Burkina Faso, Namibia, Western Sahara, Swaziland, Zambia, Zimbabwe
East Asia	China, Hong Kong, Japan, North Korea, South Korea, Macau, Mongolia, Taiwan, Southern Ryukyu Islands
South Asia	Bangladesh, Bhutan, Sri Lanka, India, Maldives, Nepal, Pakistan, Sikkim
Southeast Asia	Burma, Brunei, Cambodia, Indonesia, Laos, Malaysia, Paracel Islands, Spratly Islands, Papua New Guinea, Timor, Philippines, Singapore, Thailand, East Timor, Vietnam, North Vietnam, South Vietnam
West/Central Asia	Afghanistan, Azerbaijan, Armenia, Georgia, Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan
Australia/Oceania	Australia, Ashmore and Cartier Islands, Cocos (Keeling) Islands, Coral Sea Islands, Norfolk Island, New Zealand
Caribbean (except Haiti)	Aruba, Antigua And Barbuda, Anguilla, Barbados, Bermuda, The Bahamas, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Jamaica, Martinique, Montserrat, Netherlands Antilles, Saint Kitts And Nevis, Saint Lucia, Swan Islands, Trinidad And Tobago, Turks And Caicos Islands, Saint Vincent and the Grenadines, British Virgin Islands
Eastern Europe	Belarus, Bulgaria, Czechoslovakia, Estonia, Czech Republic, Hungary, Latvia, Lithuania, Slovakia, Moldova, Poland, Romania, Russia, Ukraine, and Union Of Soviet Socialist Republics
Southern Europe	Albania, Andorra, Bosnia And Herzegovina, Gibraltar, Greece, Croatia, Italy, F.Y.R.O. Macedonia, Malta, Portugal, Slovenia, San Marino, Spain, Holy See (Vatican City), Yugoslavia
Western and Northern Europe	Austria, Belgium, Denmark, East Berlin, Ireland, Finland, France, Guernsey, Germany, Iceland, Isle Of Man, Jersey, Jan Mayen, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Svalbard, Sweden, Switzerland, United Kingdom, West Berlin
Haiti	Haiti
Mexico & Central America	Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Panama Canal Zone
Middle East	United Arab Emirates, Bahrain, Cyprus, Gaza Strip, Iran, Israel, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, West Bank, Yemen
North America	Canada, Greenland, and Saint Pierre and Miquelon
Pacific Islands	Solomon Islands, Central And Southern Line Islands, Cook Islands, Jarvis Island, Canton And Enderberry Islands, Fiji, Federated States Of Micronesia, Faroe Islands, French Polynesia, Gilbert and Ellice Islands, Gilbert Islands, Heard Island And Mcdonald Islands, Howland Island, Clipperton Island, U.S. Miscellaneous Pacific Islands, Johnston Island, Juan De Nova Island, Kiribati, Christmas Island, Palmyra Atoll, Midway Island, New Caledonia, Niue, Vanuatu, Nauru, Pitcairn Island, Palau, Marshall Islands, Tokelau, Tonga, Tuvalu, Trust Territory Of The Pacific Islands, Wallis And Futuna, Wake Island, and Samoa
South America	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Falkland Islands, Guyana, Suriname, Paraguay, Peru, Uruguay, Venezuela
Other/Unknown	Antarctica, Bouvet Island, French Southern and Antarctic Lands, British Indian Ocean Territory, South Georgia and The South Sandwich Islands, and unknown countries

Appendix B: Useful Links

The following links are useful tools DPH referenced throughout this report.

Centers for Disease Control and Prevention TB Risk Factors can be found at:

<https://www.cdc.gov/tb/topic/basics/risk.htm>

Missouri Department of Health and Senior Services TB reports can be found at:

<http://health.mo.gov/living/healthcondiseases/communicable/tuberculosis/data.php>

National TB Program Objectives & Performance Targets for 2020 can be found at:

<http://www.cdc.gov/tb/programs/Evaluation/Indicators/default.htm>

World Health Organization TB Comorbidity and Risk Factors can be found at:

<http://www.who.int/tb/areas-of-work/treatment/risk-factors/en/>