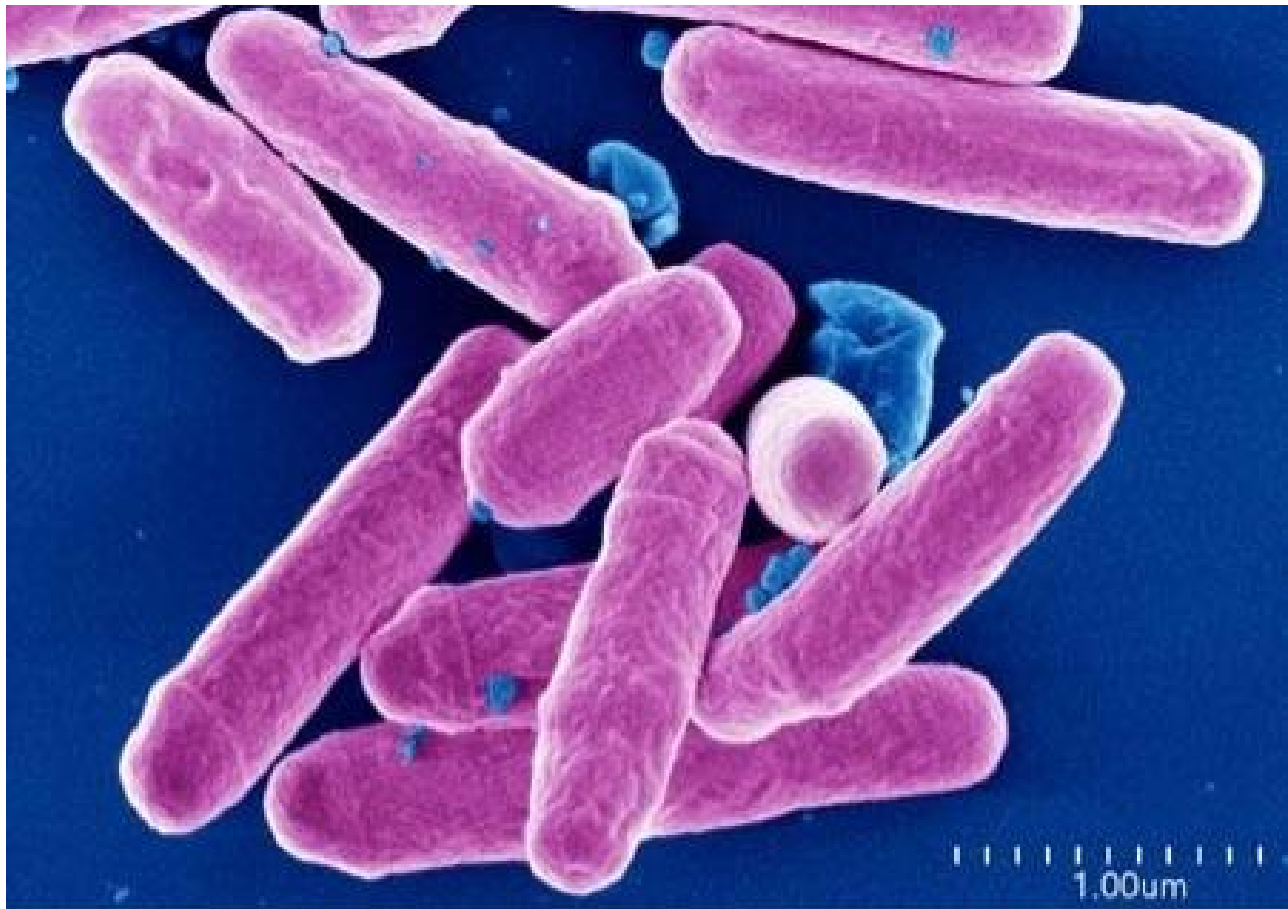


Tuberculosis Control Program Annual Report 2016

South Dakota Department of Health



For additional information visit the South Dakota Tuberculosis Control Program website:
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EPIDEMIOLOGICAL PROFILE OF TUBERCULOSIS IN SOUTH DAKOTA

During the last 10 years, South Dakota averaged 14 cases of tuberculosis (TB) per year. During 2016, there were 12 cases of TB reported to the South Dakota Department of Health. Figure 1 shows the 10-year trend of TB cases reported in South Dakota.

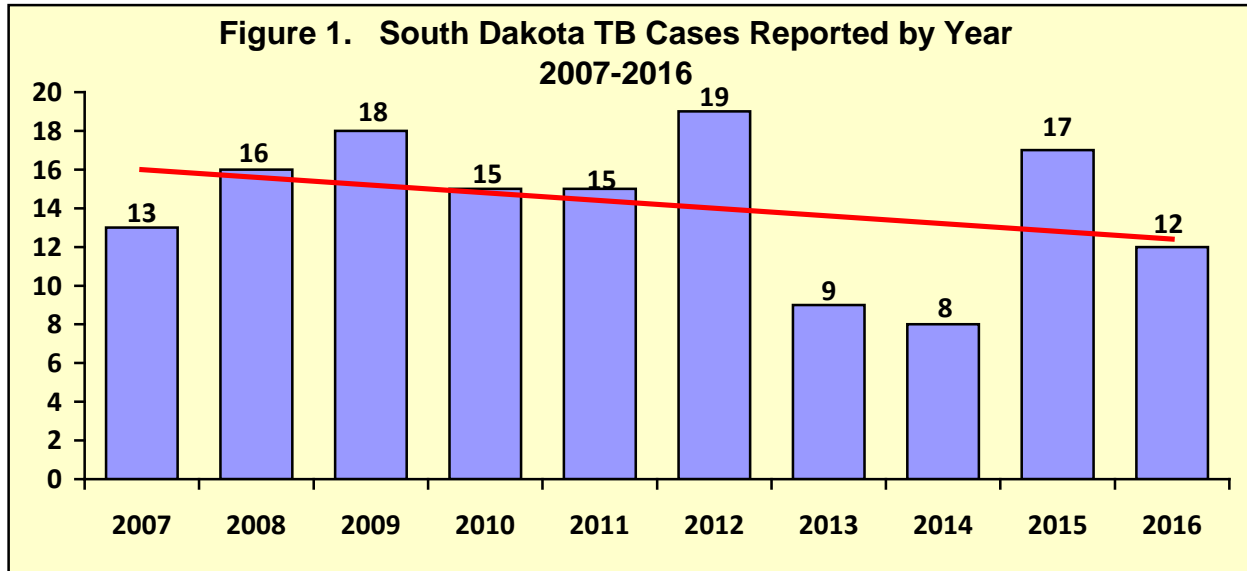
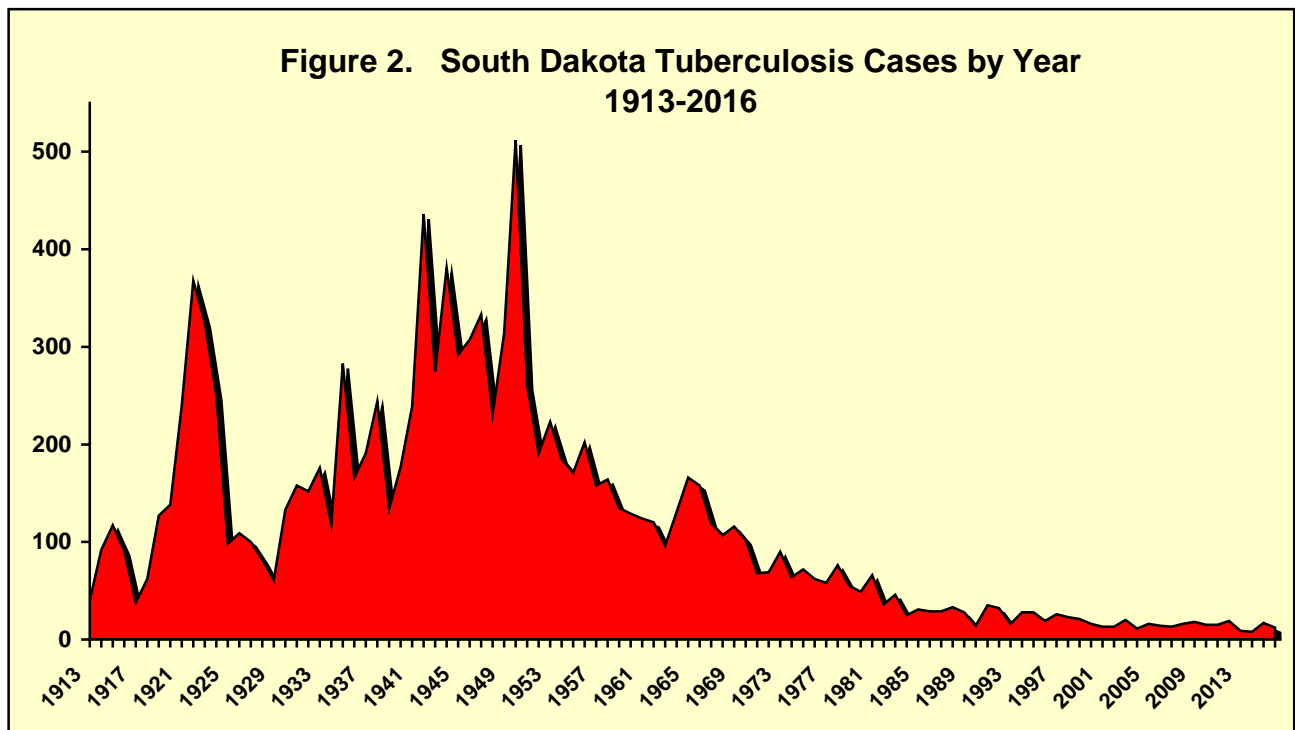


Figure 2 illustrates the 100-year history of tuberculosis cases in South Dakota. Since the 1950's there has been a dramatic decrease of cases due to the development of anti-tuberculosis medications. Case reductions are also a result of mandatory reporting of suspected TB cases to the Department of Health, case management, new treatment regimens and comprehensive contact investigations to ensure those exposed receive prompt intervention efforts.



The most recent data available nationally and regionally is from calendar year 2015. Figure 3 provides a comparison of the TB case rate per 100,000 population for the United States as well as a regional comparison of South Dakota and our border states of North Dakota, Minnesota, Iowa, Nebraska, Wyoming and Montana.

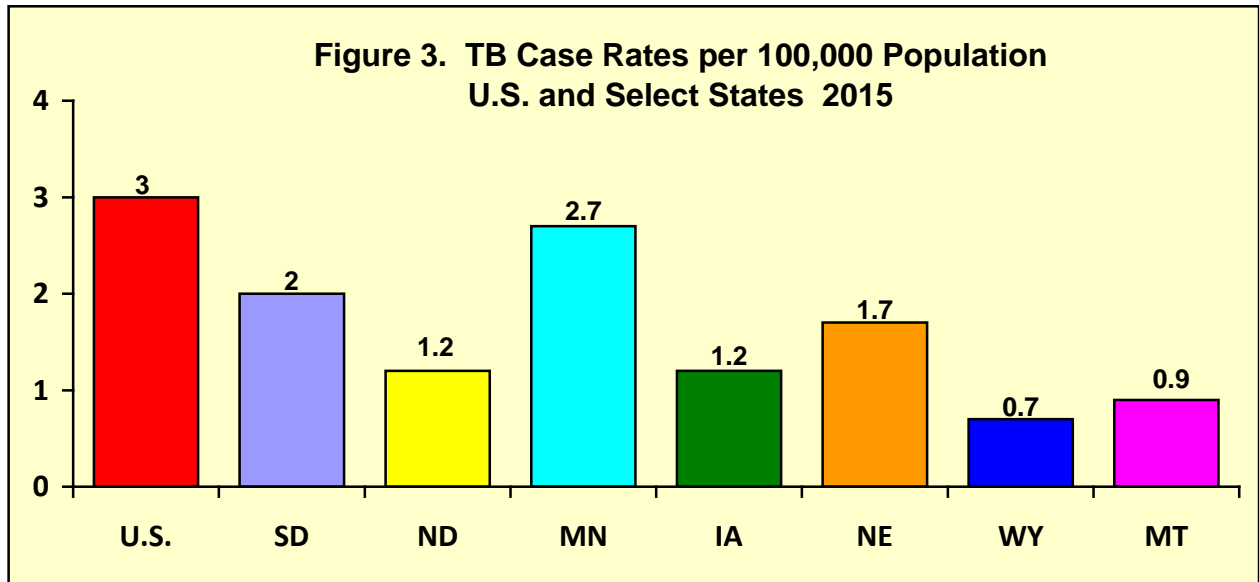
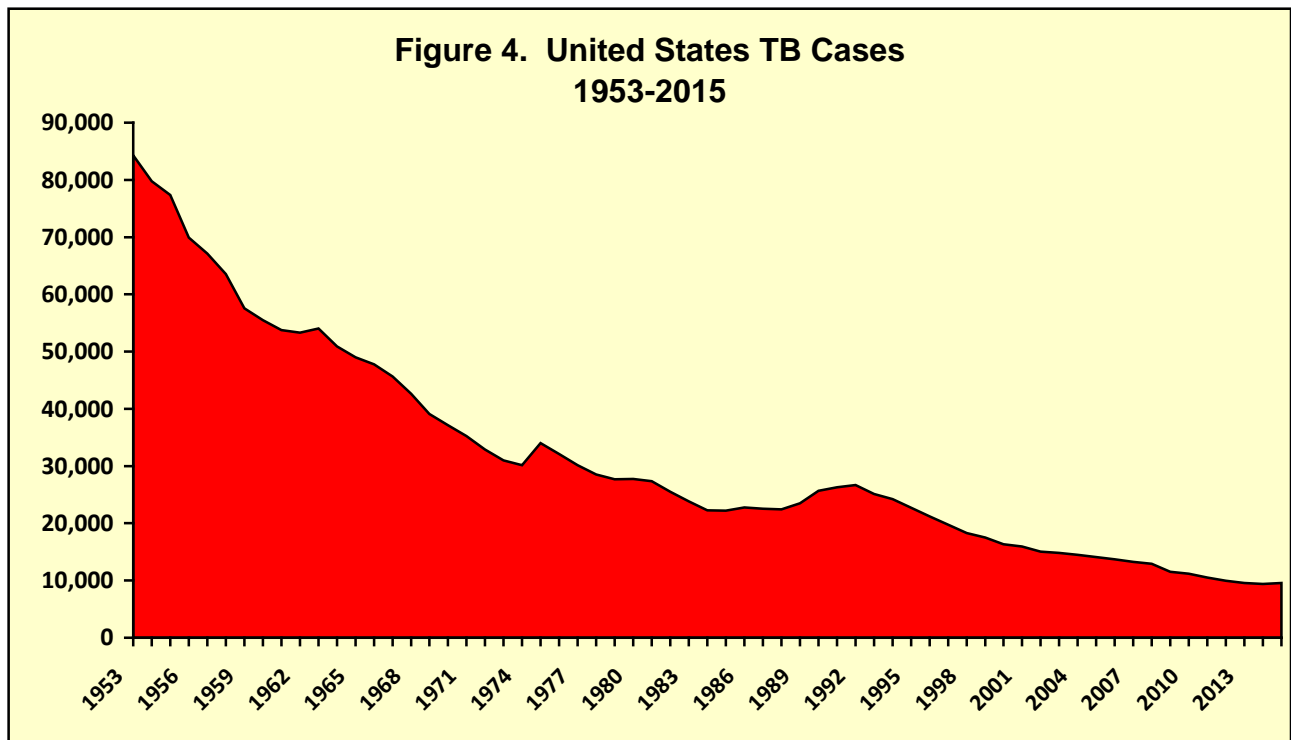


Figure 4 illustrates the historical trend of decreasing TB cases reported in the United States. In 2015 there were 9,557 TB cases reported in the US which is a 1.6% increase from 2014. During 2015, 27 states reported increased case counts from 2014. The 4 states of California, Texas, New York and Florida accounted for 51% of the national case total. During 2015, 1.1% of the reported cases had primary multi-drug resistance which is defined as resistance to the TB medications of at least isoniazid and rifampin. During 2015, 67% of TB cases nationally were in foreign-born persons, the highest percentage ever reported.

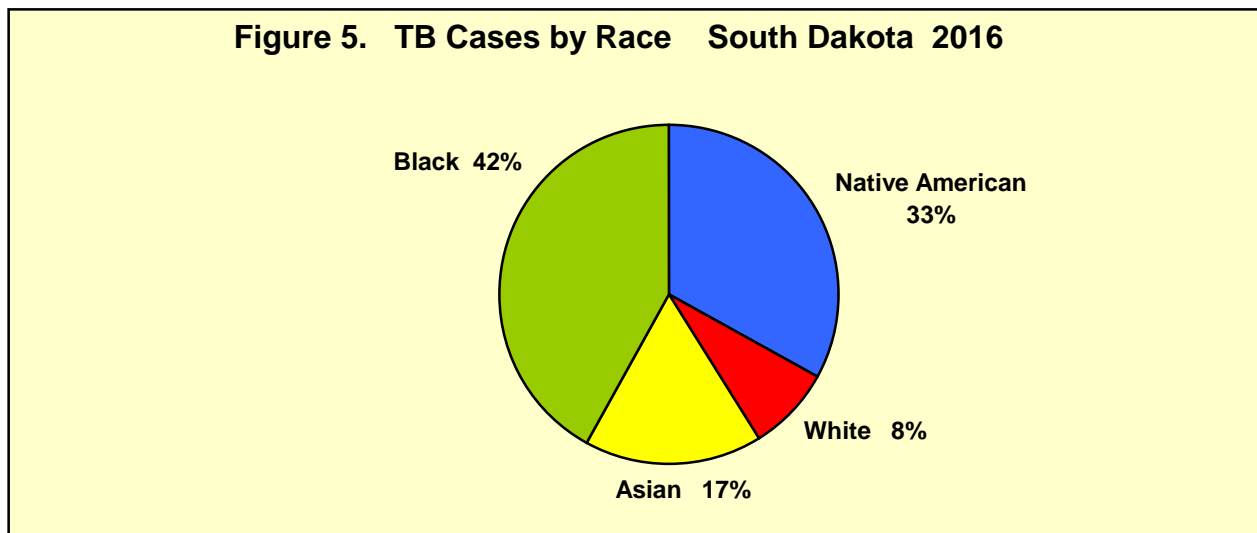


Native Americans have historically reported the highest percentage of TB cases by race; however, in 2016 they accounted for only 33% of the total TB cases reported. Table 1 and Figure 5 provide information on TB cases by race in 2016.

**Table 1. TUBERCULOSIS CASES REPORTED BY SEX AND RACE
SOUTH DAKOTA 2016**

Race	Male	Female	Total	% of Cases
Native American	0	4	4	33%
White	1	0	1	8%
Black	5	0	5	42%
Asian	2	0	2	17%
Total	8	4	12	100%

Figure 5. TB Cases by Race South Dakota 2016



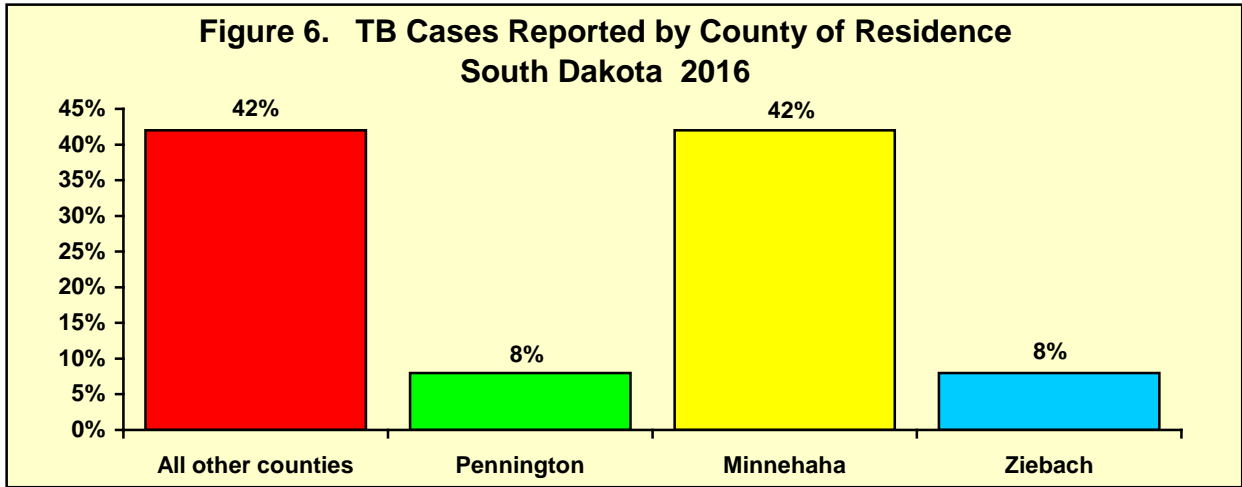
The TB incidence rate, which measures the number of TB cases per 100,000 population, is the best measure for determining the progress towards the elimination of TB in South Dakota. Historically, Native American TB case rates have dropped considerably while white cases have consistently remained low. The Black, Asian and other races mainly represent TB cases born outside of the United States who were diagnosed in South Dakota. Table 2 provides additional information on TB case rates for the last 6 years.

**Table 2. TUBERCULOSIS MORBIDITY INCIDENCE RATES
PER 100,000 BY RACE & YEAR SOUTH DAKOTA 2011-2016**

Race	2011	2012	2013	2014	2015	2016
US Case Rate (All Races)	3.4	3.2	3.0	3.0	2.9	Not available*
SD All Races	1.8	2.3	1.1	1.0	2.1	1.5
SD Native American	6.1	9.7	6.1	3.7	13.4	4.9
SD White	0.7	0.9	0.1	0.4	0.4	0.1
SD Black	13.6	20.4	13.6	13.6	13.6	34
SD Asian	39.4	26.3	13.1	0.0	13.1	26.3
All Other SD Races	0	0	0	0	0	0

*2016 US case rate data is not yet available.

The South Dakota TB elimination goal is to reduce tuberculosis cases to an incidence of no more than 3.5 cases per 100,000 by the year 2020. In addition there is a special population target goal of reducing Native American tuberculosis cases to less than 15 cases per 100,000 by 2020. As referenced in Table 2, both of these objectives were accomplished in 2016.

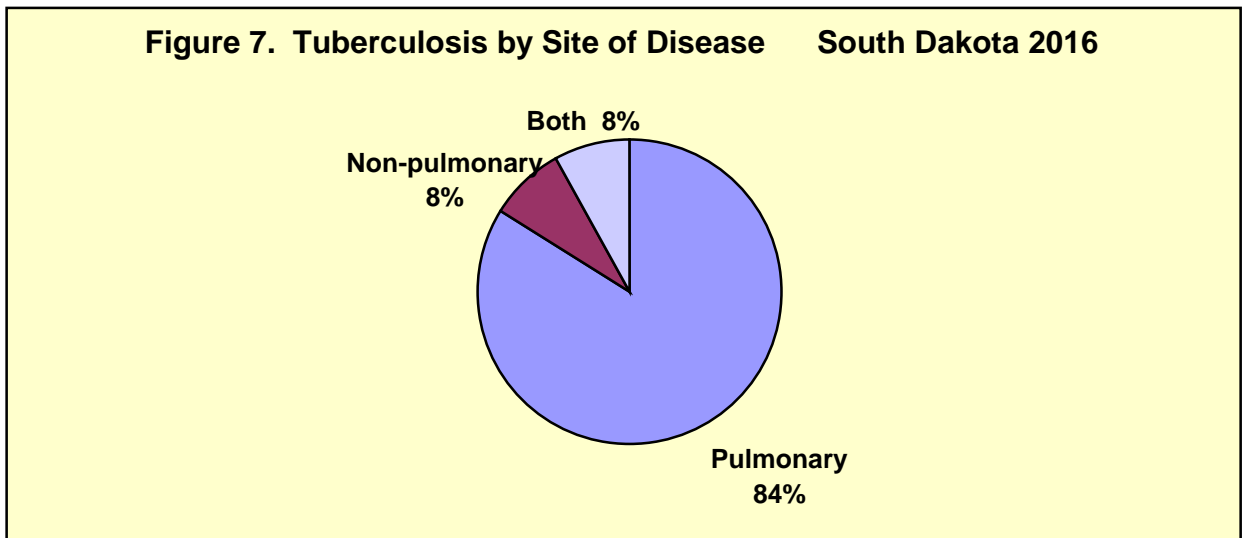


Tuberculosis cases in South Dakota have historically been located in a few geographic locations that consistently report the majority of TB cases. These include Minnehaha County which reports the highest number of foreign-born TB cases and Oglala Lakota (previously Shannon County), Todd and Pennington counties which report the highest number of Native American TB cases. Figure 6 and Table 3 provide additional information on the counties of residence of the TB cases in 2016.

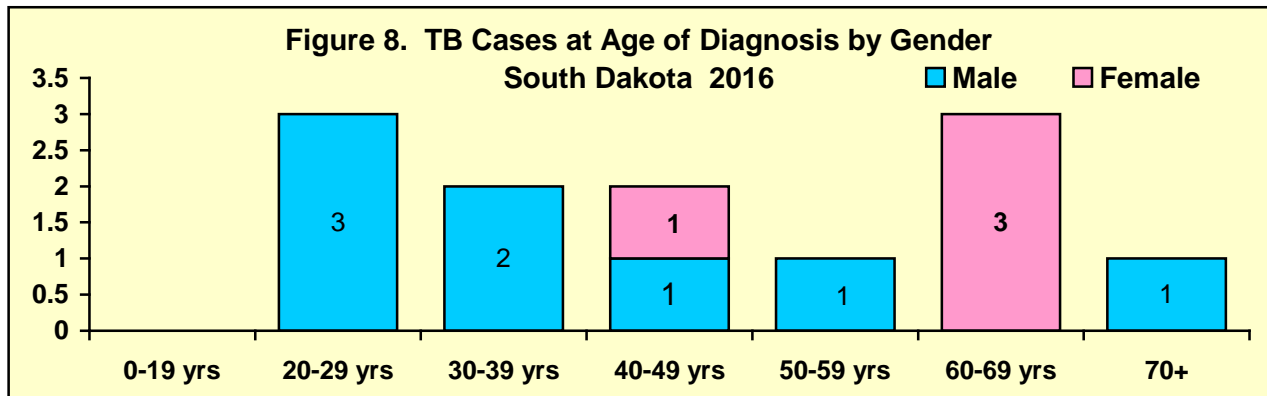
**Table 3. TB CASES REPORTED BY COUNTY OF RESIDENCE
SOUTH DAKOTA 2016**

County	# of TB Cases	County	# of TB Cases
Brookings	1	Pennington	1
Codington	1	Roberts	1
Charles Mix	1	Union	1
Minnehaha	5	Ziebach	1

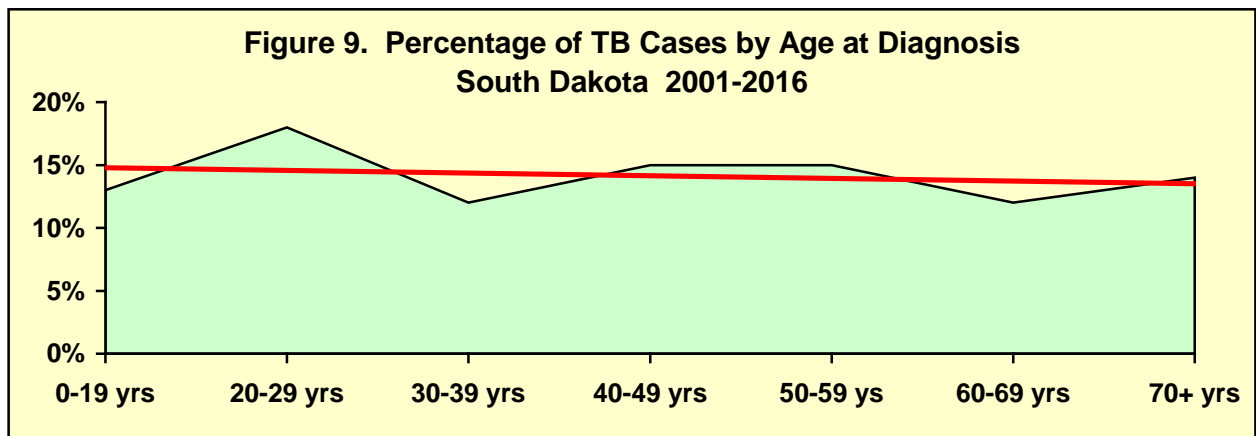
Tuberculosis remains primarily a pulmonary disease with approximately 85% of cases nationally reported as pulmonary disease and 15% as non-pulmonary disease. South Dakota has historically reported a higher percentage of non-pulmonary TB disease; however, in 2016 South Dakota followed very closely with the national trend as described in Figure 7. The non-pulmonary sites of disease in 2016 included TB reported in the CSF, knee fluid and lung tissue.



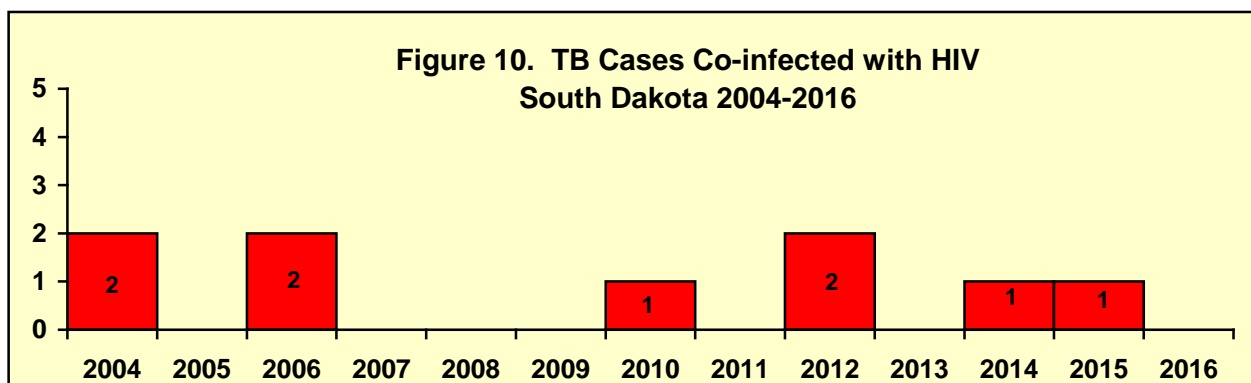
The average age of a TB case in 2016 was 46 years of age. This is an increase in age as compared to 2015 when the average age was 40 years of age. There were no children less than 10 years of age reported during this time period. Figure 8 illustrates the age at diagnosis by gender for tuberculosis cases reported in 2016.



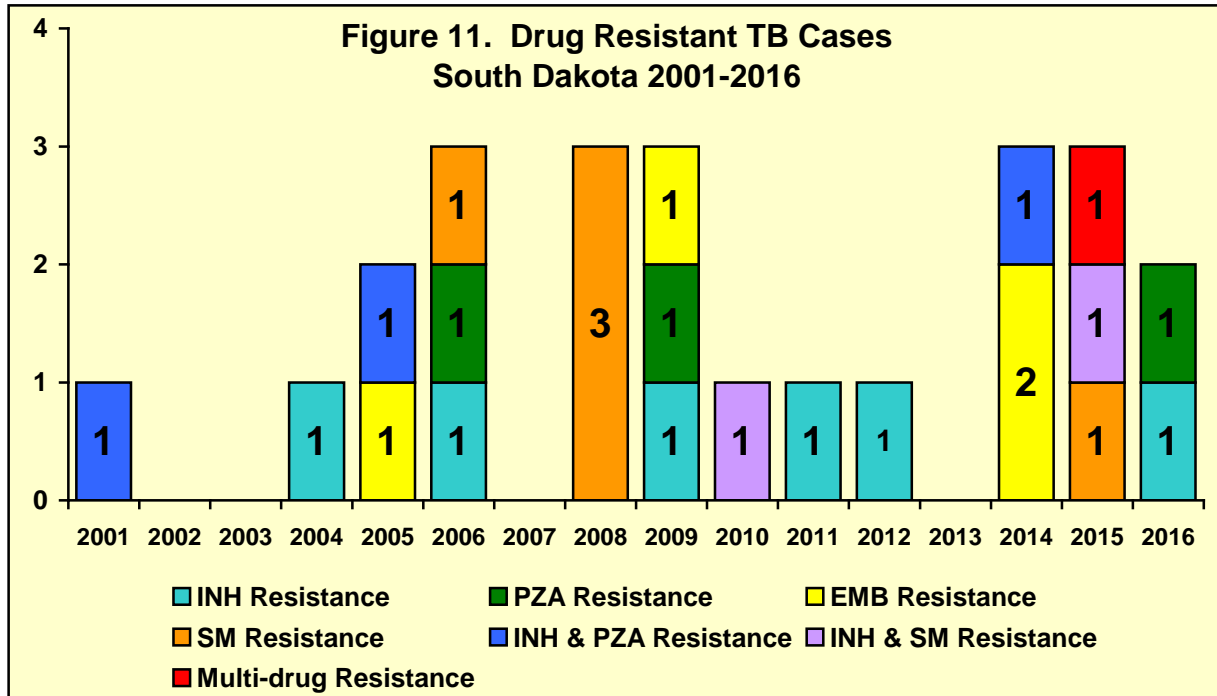
Historically most tuberculosis cases are diagnosed as adults in South Dakota. Figure 9 shows the majority of TB cases diagnosed in South Dakota were 40 years of age or older at the time of diagnosis from 2001 through 2016.



Co-infection with HIV is an important risk factor for the development of active TB. Because of this, all TB cases diagnosed in South Dakota are offered HIV testing. Co-infected TB cases require more monitoring for toxicity and are frequently treated with second line TB medications. Figure 10 describes the number of TB cases co-infected with HIV since 2004 documenting that HIV co-infected TB cases remain uncommon.

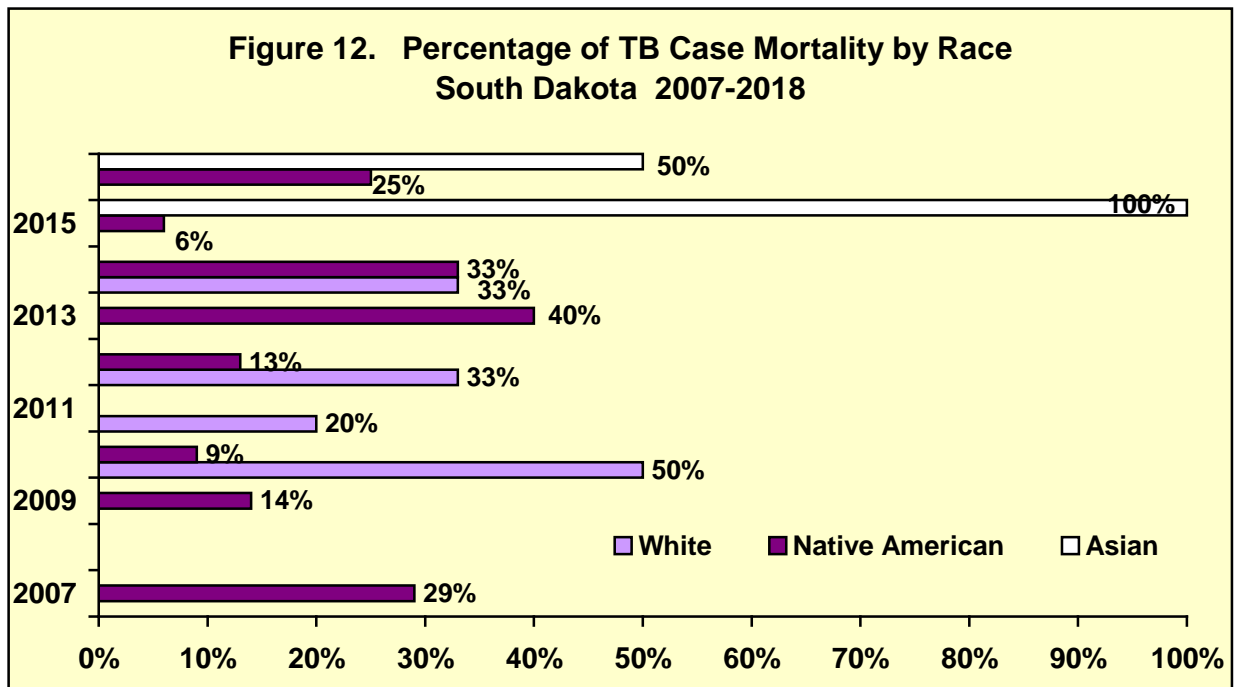


All culture positive TB isolates are tested for drug resistance to first-line TB medications including isoniazid (INH), rifampin (RIF), pyrazinamide (PZA), ethambutol (EMB) and streptomycin (SM). Multi-drug resistant TB is defined by CDC as resistance to at least INH and RIF and is a significant public health problem because of the difficulty in achieving a successful treatment outcome. Figure 11 shows drug resistant TB cases since 2000 illustrating that South Dakota most often has single drug resistant cases. South Dakota reported the first multi-drug resistant TB case in 2015.



*The 2015 MDR-TB case was resistant to INH, RIF, PZA, EMB, SM, Rifabutin and Ethionamide.

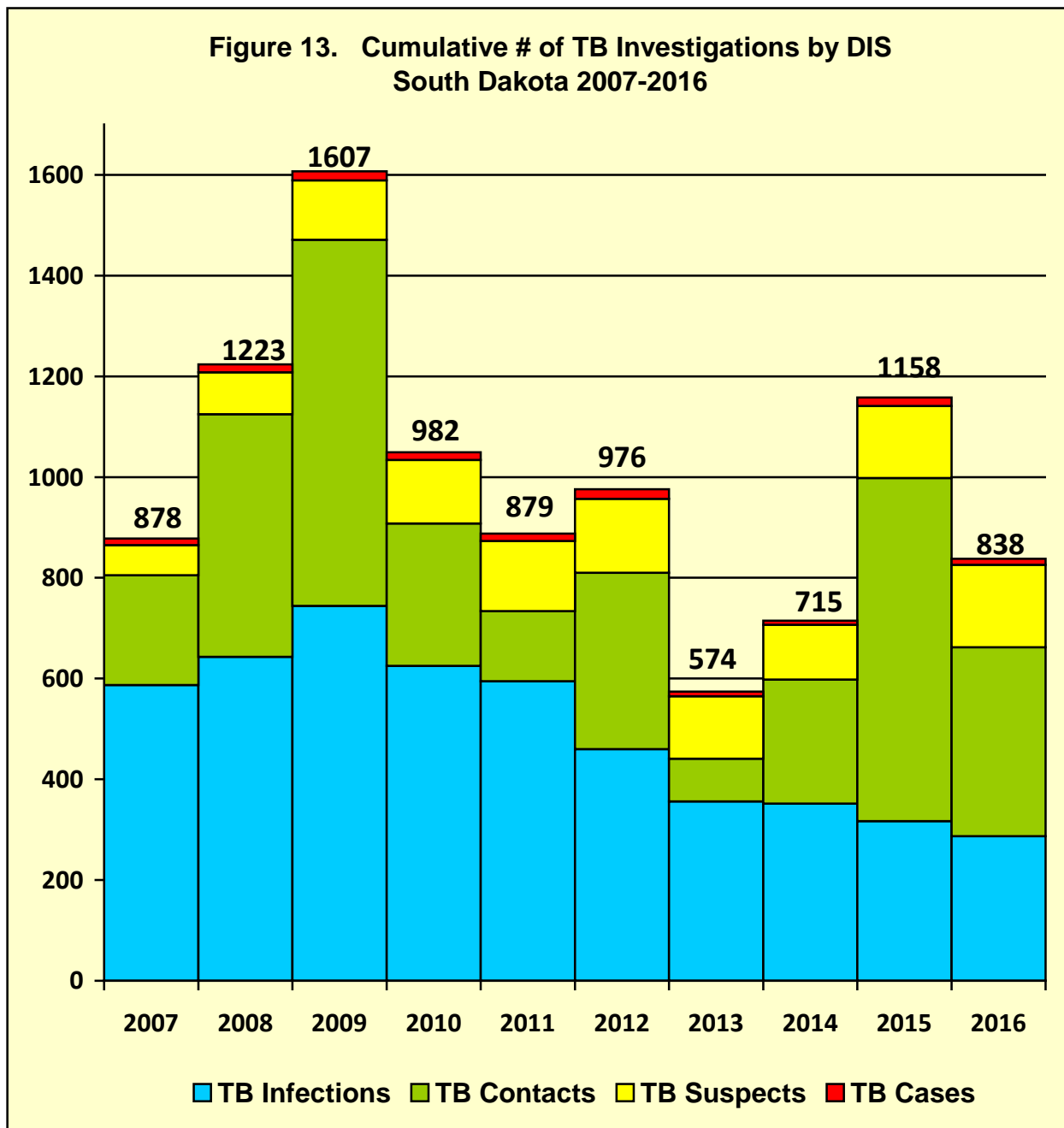
South Dakota has reported a high mortality rate during certain years, especially among Native American patients. Figure 12 shows the mortality rates by race since 2007 for all races.



The workload in the TB Control Program consists of four categories of patients:

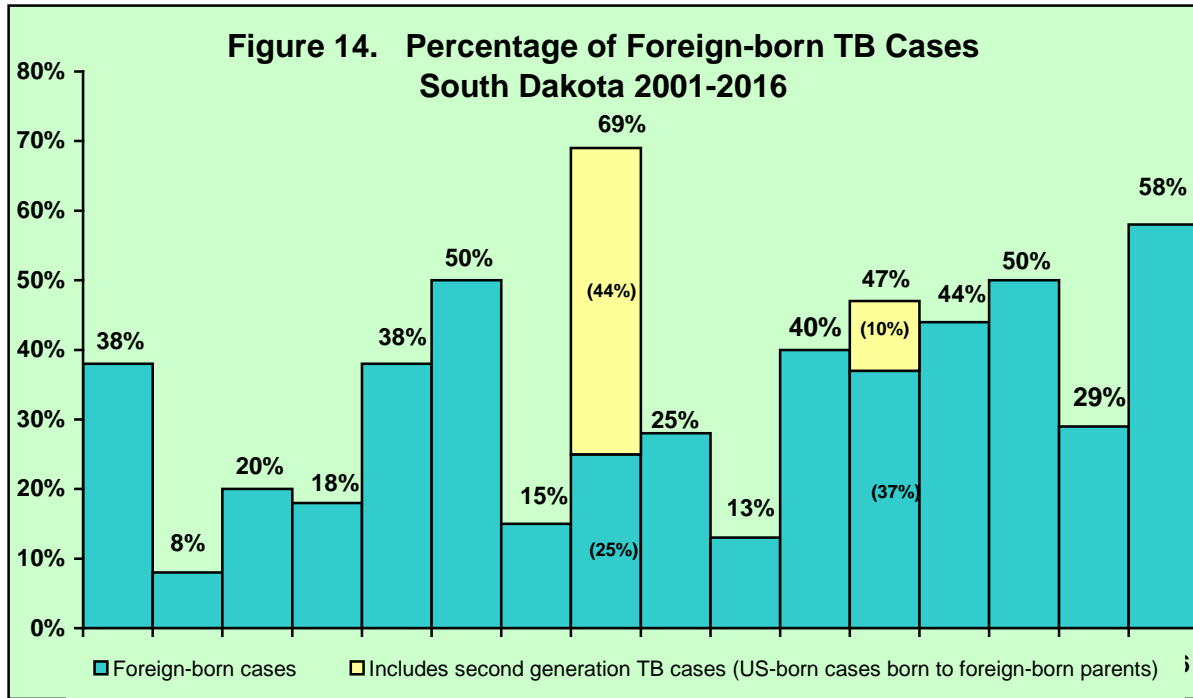
- 1) **TB cases** (persons diagnosed with active TB)
- 2) **TB suspects** (persons suspected of active TB with a pending diagnosis)
- 3) **TB contacts** (persons exposed to an infectious TB case)
- 4) **Latent TB infection** (persons reported with a positive TB skin test or positive IGRA test [interferon gamma release assay])

Disease Intervention Specialist (DIS) staff are responsible for ensuring appropriate investigation, treatment and follow-up of these individuals statewide. Figure 13 describes this cumulative caseload which is divided among 19 DIS staff illustrating that the active TB cases and suspect TB cases represent the smallest number of patients reported. TB contacts and patients with latent TB infection make up the greatest percentage of assigned workload for DIS staff within the TB Control Program.

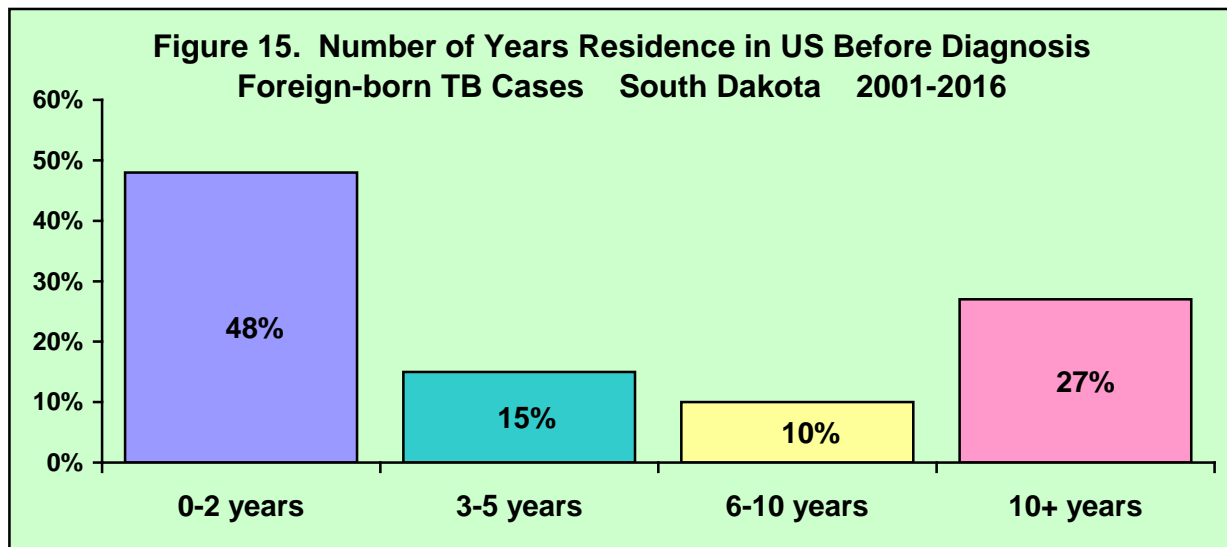


ANALYSIS OF FOREIGN-BORN TB CASES IN SOUTH DAKOTA

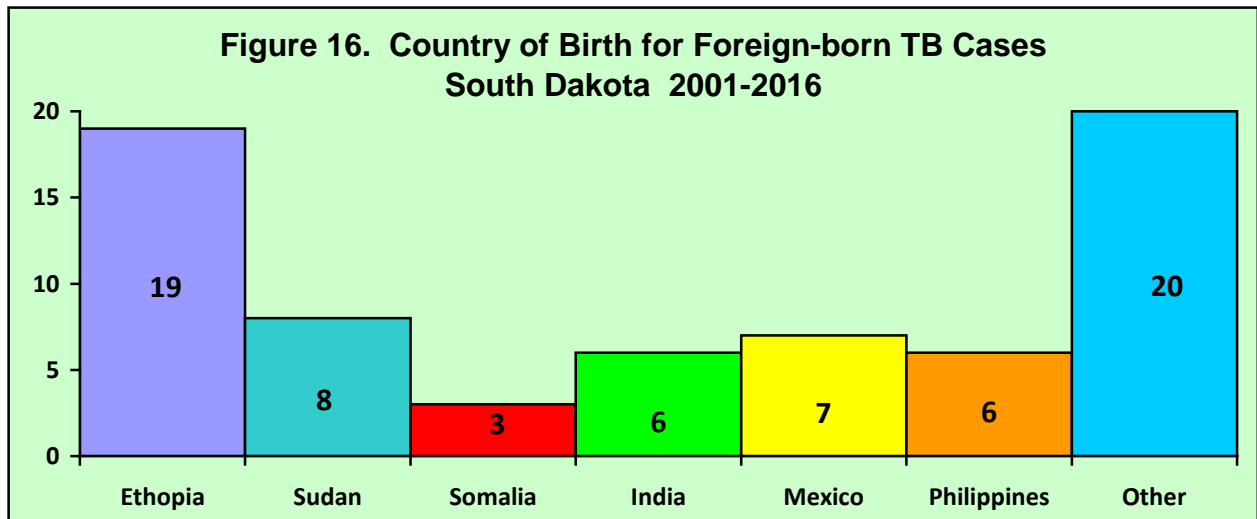
Tuberculosis cases who were born outside the United States continue to represent an important risk group in the United States as well as in South Dakota. Figure 14 describes the percentage of foreign-born TB cases in South Dakota. Second generation TB cases (US-born TB cases born to foreign-born parents) are a relatively new risk group that has been identified nationally. TB cases were first reported in this group in South Dakota in 2008 and then again in 2012.



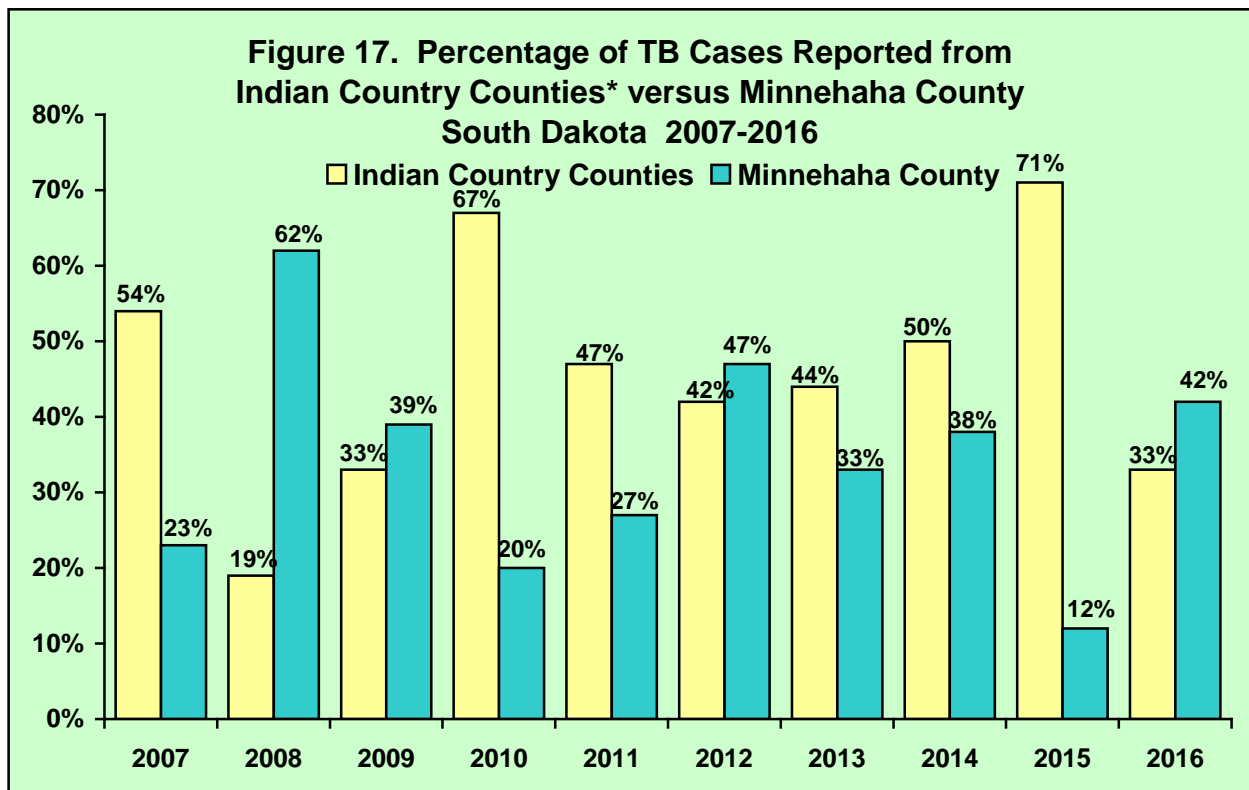
Most foreign-born persons who develop active TB usually do so within the first two years after arrival in the United States. Figure 15 describes that 63% of foreign-born TB cases since 2001 developed active TB within the first five years of their arrival. Because of this increased risk, these individuals are targeted for preventive TB program activities including targeted TB skin testing and preventive treatment programs.



Foreign-born TB cases continue to come from many areas of the world however the majority of the TB cases reported in South Dakota are of African descent. Figure 16 describes the country of birth for the foreign-born TB cases reported in South Dakota since 2001. Countries of birth for the “other” category include Afghanistan, Bangladesh, Bhutan, China, El Salvador, Honduras, Indonesia, Kenya, Laos, Liberia, Palau, Romania, Russia, Nepal, Mauritania, Vietnam, South Africa and South Korea.

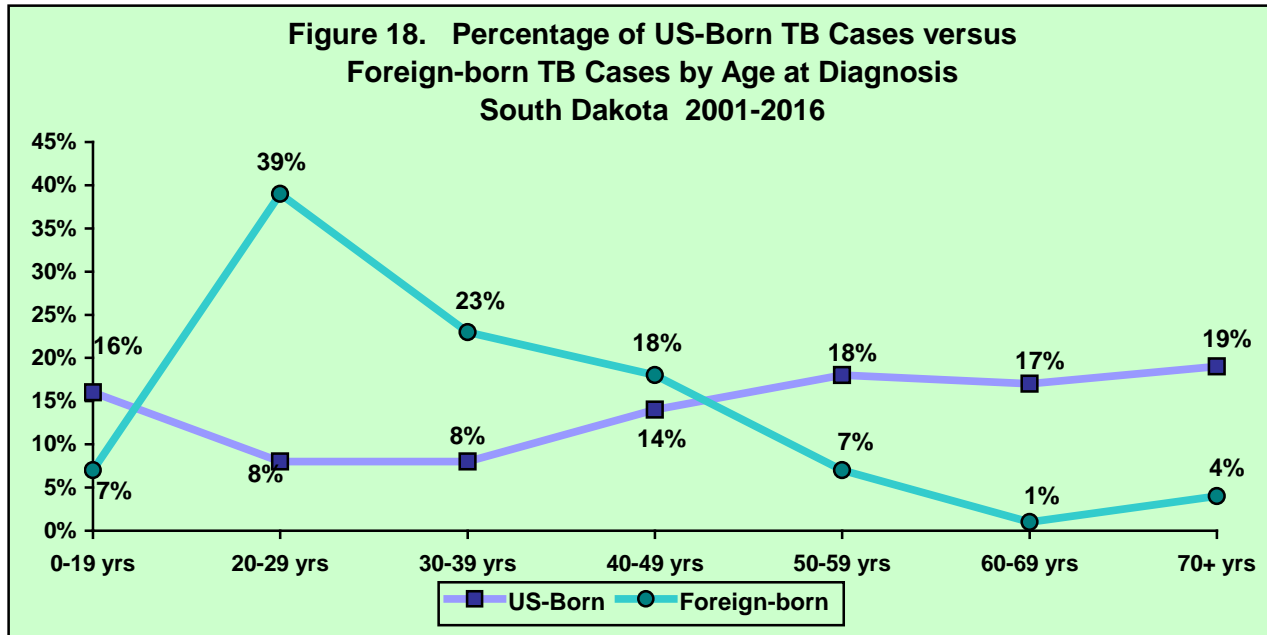


Another factor in the increase of foreign-born TB cases in South Dakota is the change geographically where TB cases are reported. Historically, the highest percentage of TB cases have been reported from counties that included and bordered American Indian Reservations. However, in other years there has been a shift of TB cases reported from Minnehaha County as illustrated in Figure 17. This is due to the fact that most foreign-born persons who resettle in South Dakota do so in Minnehaha County.

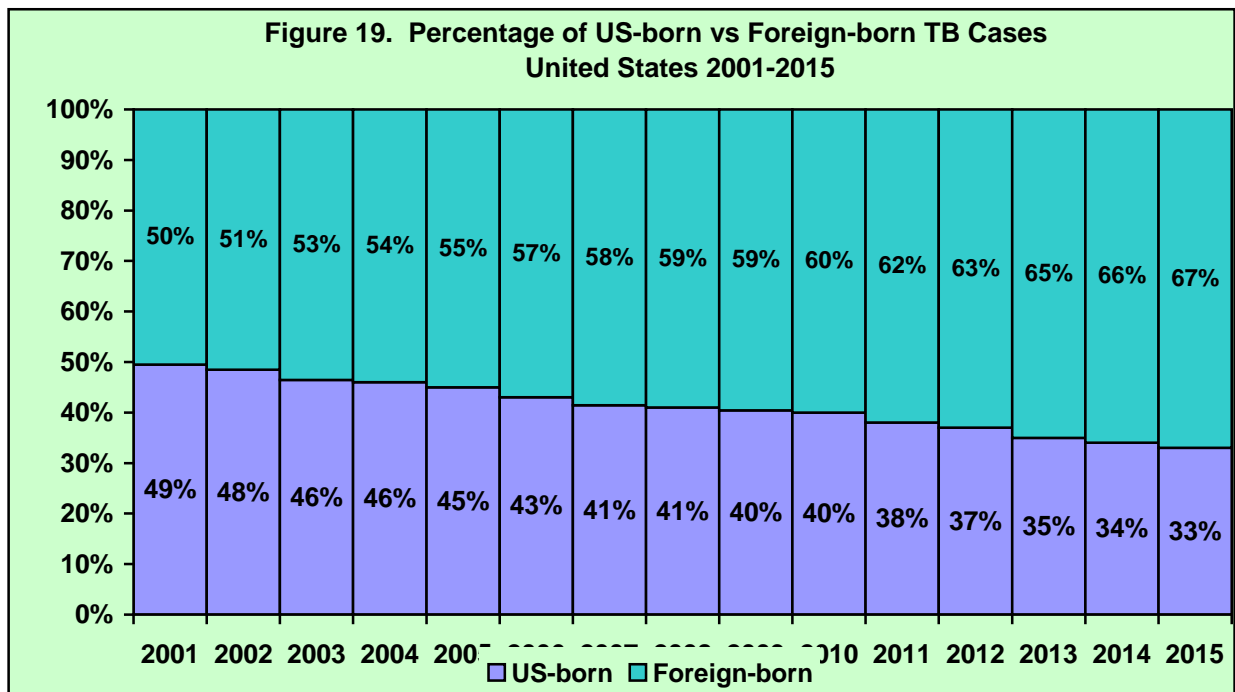


* Indian Country counties include Bennett, Brule, Buffalo, Charles Mix, Corson, Dewey, Jackson, Mellette, Moody, Pennington, Roberts, Oglala Lakota, Todd, Tripp, Walworth and Ziebach.

Foreign-born TB cases are consistently reported in younger persons as compared to U.S. born patients in South Dakota. This presents additional TB program management issues as these TB cases more commonly have young children who have been exposed at home and are typically employed requiring an investigation at their worksite which increases the number of contacts that must be screened and treated. Figure 18 illustrates that the majority of foreign-born TB cases are diagnosed while young adults.

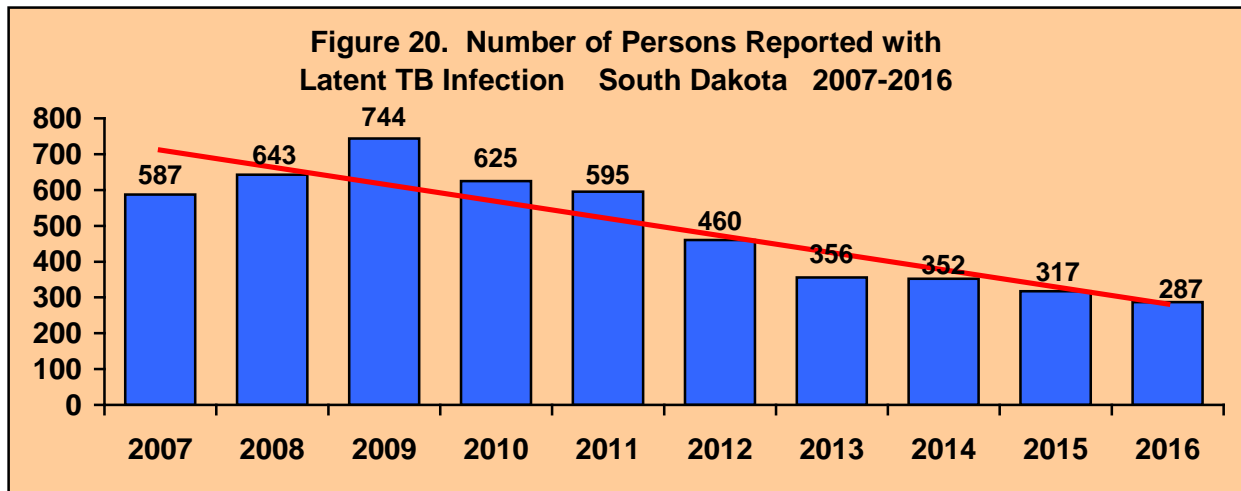


Foreign-born TB cases represent a unique challenge to the South Dakota TB Control Program because of cultural issues, language barriers and a greater likelihood of drug resistance. As these cases continue to increase in South Dakota, additional time and resources will need to be dedicated to address these unique issues. Figure 19 describes the ever increasing trend of the percentage of foreign-born TB in the United States since 2001.



LATENT TB INFECTION AND PREVENTION ACTIVITIES

Ensuring for appropriate treatment and follow-up of active TB cases and suspects is the highest priority of the Tuberculosis Control Program. However, in order to achieve TB elimination in South Dakota, an emphasis must be made on preventing future cases of TB. This is accomplished by follow-up of persons infected with latent TB infection. These individuals are infected with the TB bacteria (*Mycobacterium tuberculosis*) but have not yet developed an active form of the disease. By finding and treating these individuals, future TB cases can be prevented and therefore the TB Control Program dedicates time and resources to this preventive strategy. Figures 20 presents the number of patients reported with latent TB infection (positive TB skin tests or positive IGRA testing) over the last 10 years. All of these individuals have the potential to develop active TB disease and potentially be infectious to others.

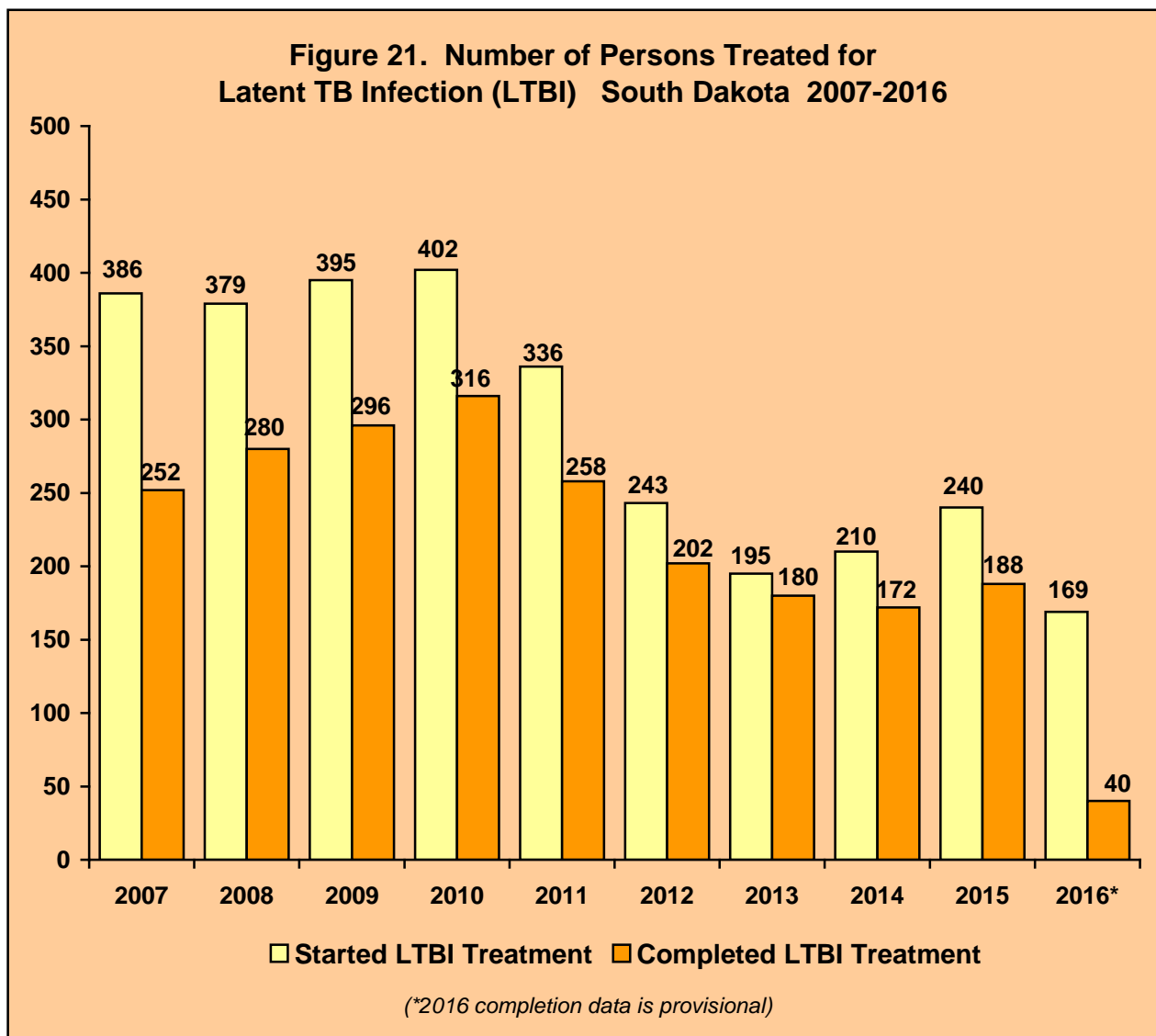


On August 2, 2011, the South Dakota Department of Health implemented an administrative rule change which changed the reporting requirement for latent TB infection. Prior to that, all persons diagnosed with latent TB infection were reportable to the South Dakota Department of Health. As of August 2, 2011, only patients with latent TB infection who have at least one of the following TB risk factors are now reportable:

- REPORTABLE TB RISK FACTORS**
- ✦ Foreign-born persons who entered the US within the last 5 years
 - ✦ Persons evaluated for tumor necrosis factor-alpha therapy
 - ✦ Immunosuppressive therapies (i.e. high dose steroids)
 - ✦ Radiographic evidence of prior TB
 - ✦ Children less than 5 years of age
 - ✦ Close contact to infectious TB
 - ✦ HIV infection
 - ✦ Diabetes
 - ✦ Renal dialysis
 - ✦ Silicosis
 - ✦ Organ transplant
 - ✦ Head and neck cancers
 - ✦ Leukemia
 - ✦ Hodgkin's disease

This reporting change will allow the Department of Health to focus staff time, medication and resources towards those patients who have the highest risk of developing active tuberculosis. Due to this change, only the above patients will be eligible for Department of Health nurse case management and medication. Health care providers and facilities are asked to report only patients with LTBI who meet this new reporting requirement by mailing or faxing the “*Latent Tuberculosis infection Report Form*” to the TB Control Program (reporting instructions are on the form). The form is available on the South Dakota Department of Health website: <http://doh.sd.gov/diseases/infectious/TB>. Patients who do not meet this reporting criteria should be referred to their private health care provider for evaluation and treatment at their own expense. All patients currently being managed by Department of Health staff will be allowed to finish their prescribed course of treatment regardless of their risk factor status.

Figure 21 presents the number of patients with latent TB infection that started a course of preventive treatment as well as the number who completed this treatment. The treatment is usually done with Isoniazid (INH) which is provided free of charge to patients by the TB Control Program.



Summary of TB Control Program Caseload South Dakota 2007-2016

