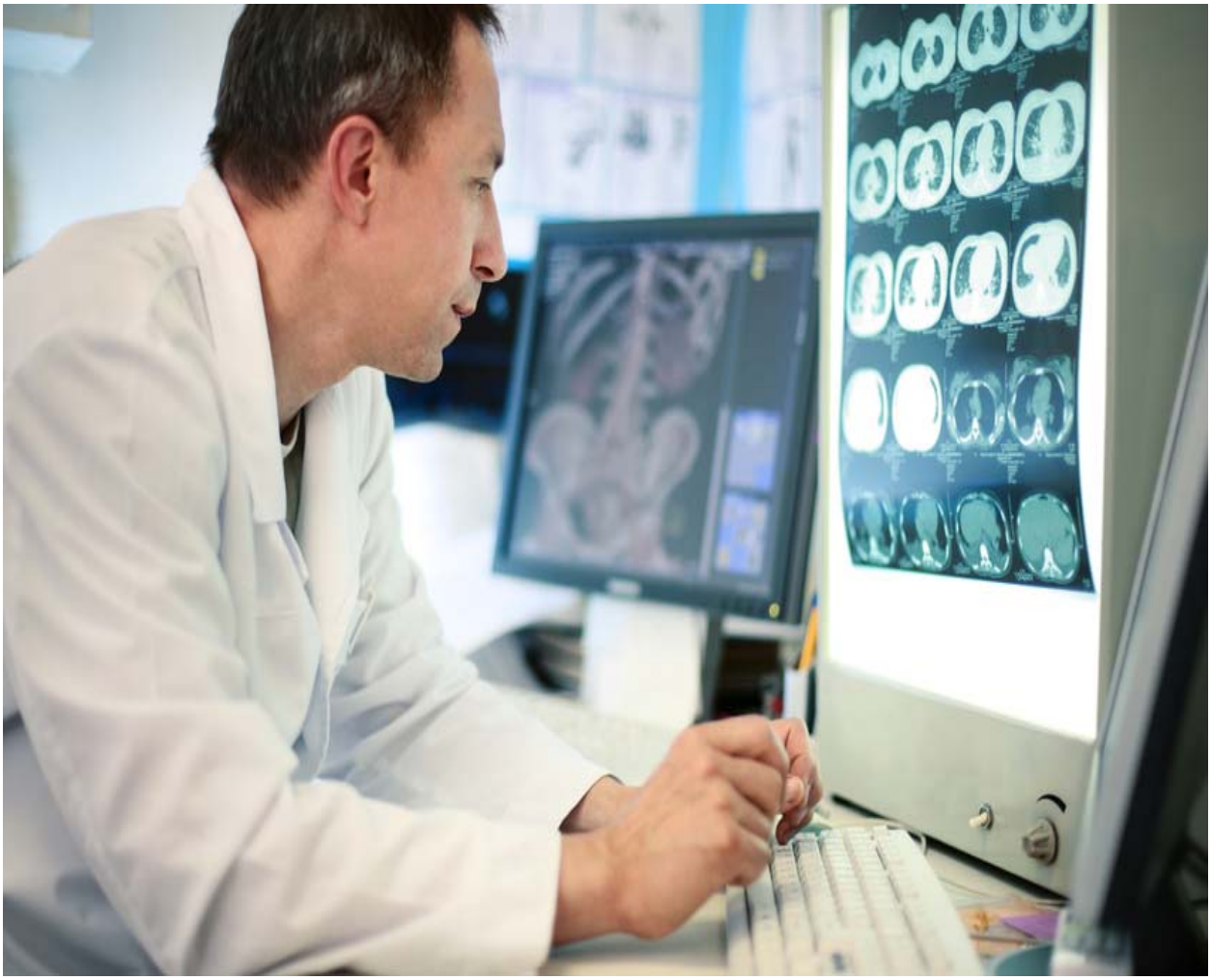
SOUTH DAKOTA DEPARTMENT OF HEALTH

Tuberculosis Control Program Annual Report 2009

South Dakota Department of Health



For additional information, please contact Kristin Rounds, Tuberculosis Control Program Coordinator at (605) 773-3737 or 1-800-592-1861. Additional information may be obtained from the South Dakota TB Control Program website: www.doh.sd.gov/tb.

During the last ten years, South Dakota averaged 15 cases of tuberculosis (TB) per year. During 2009, there were 18 cases of TB reported to the South Dakota Department of Health, which is an increase of 2 cases from 2008. Figure 1 describes the 10-year trend of TB cases reported in South Dakota.

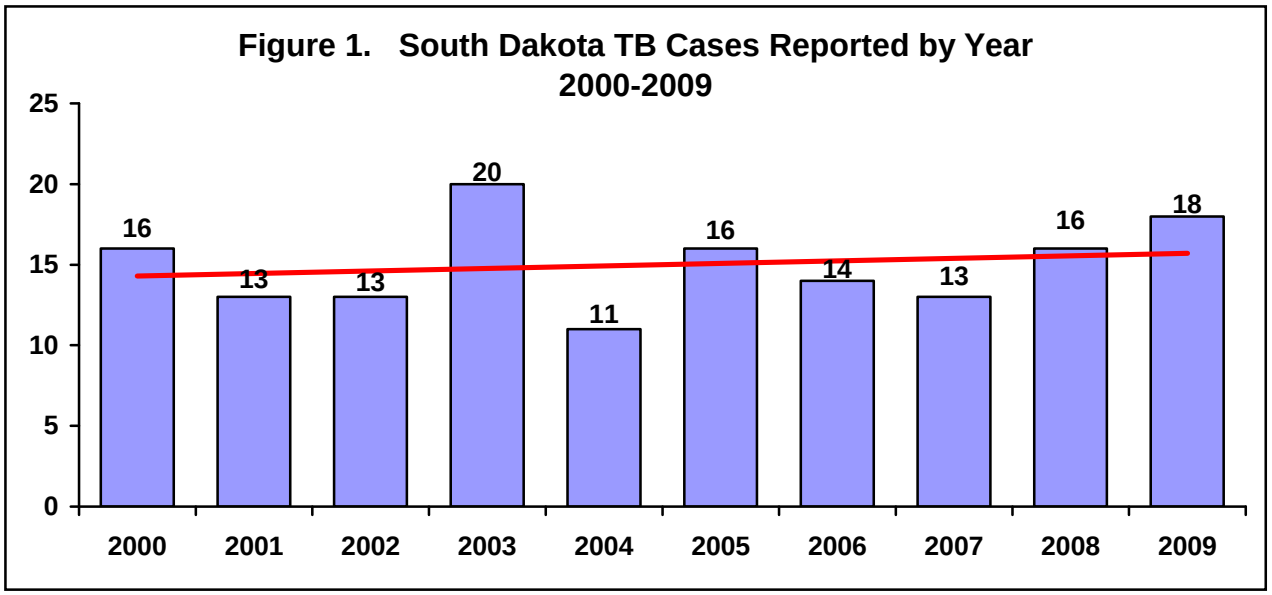
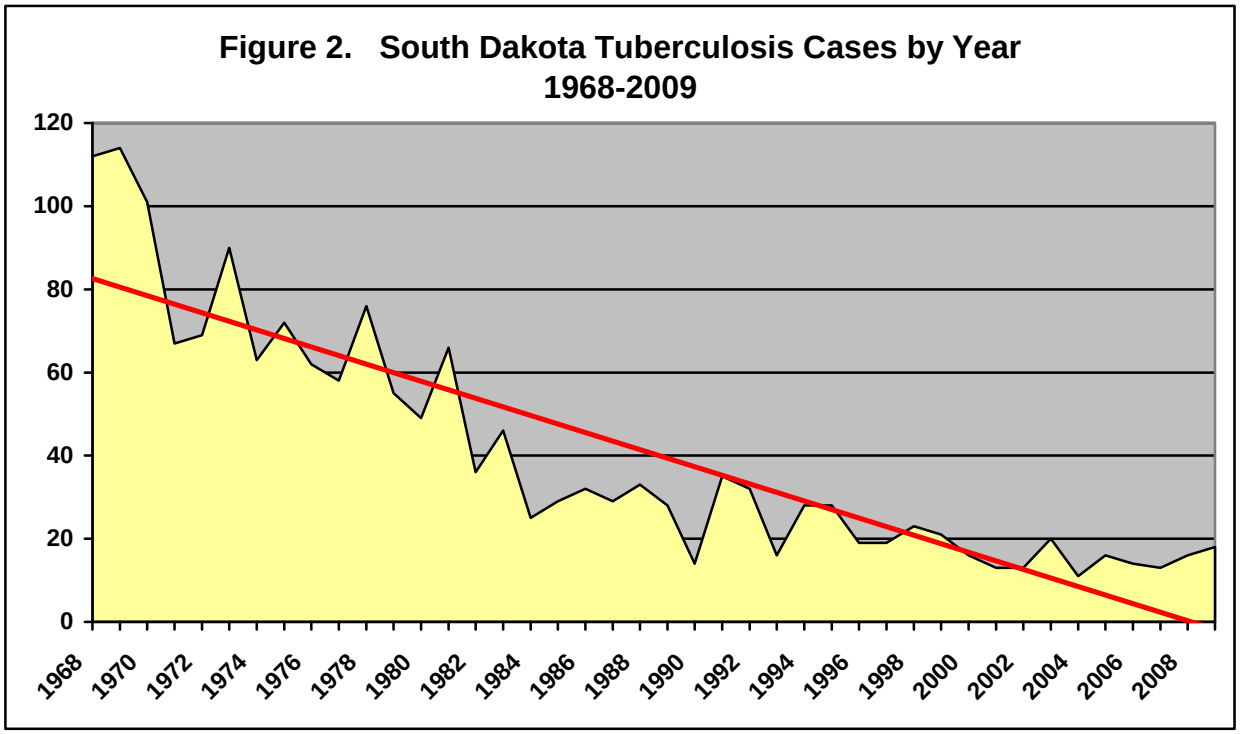


Figure 2 illustrates the historical decreasing trend of reported tuberculosis cases in South Dakota since 1968. This dramatic decrease is a result of mandatory reporting of suspected TB cases to the Department of Health along with case management, treatment and comprehensive contact investigations to ensure those exposed to tuberculosis receive prompt and appropriate intervention efforts.



The most recent data available nationally and regionally is from calendar year 2008. 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. Please note that South Dakota has the second highest TB case rate behind Minnesota when comparing these 7 states.

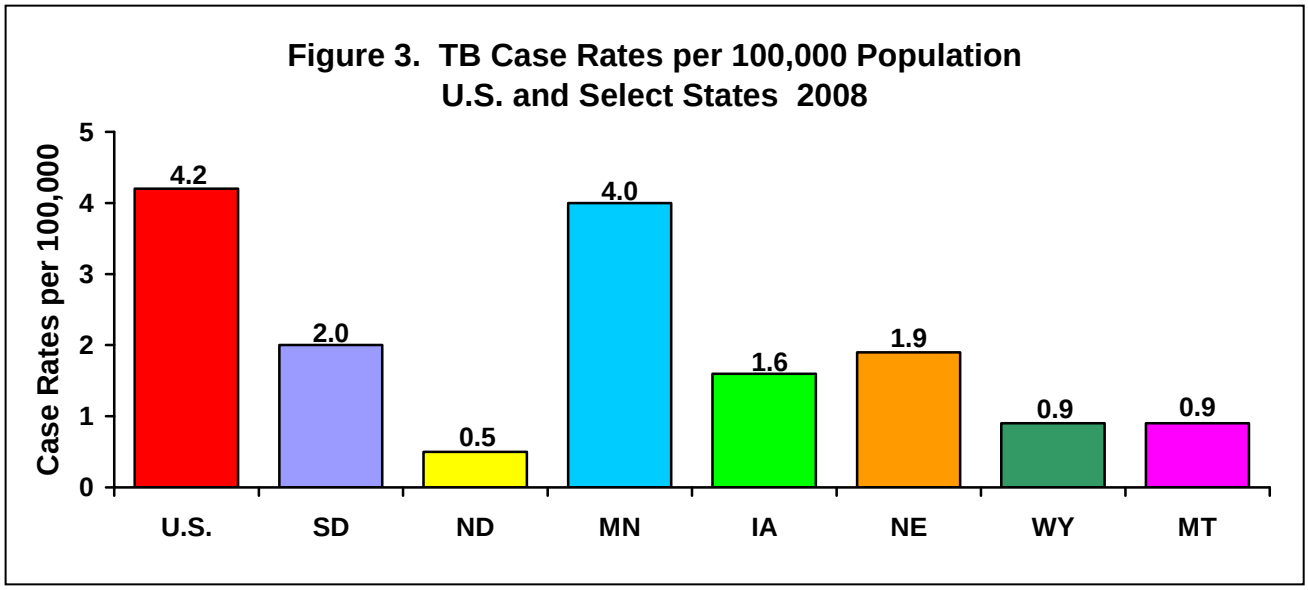
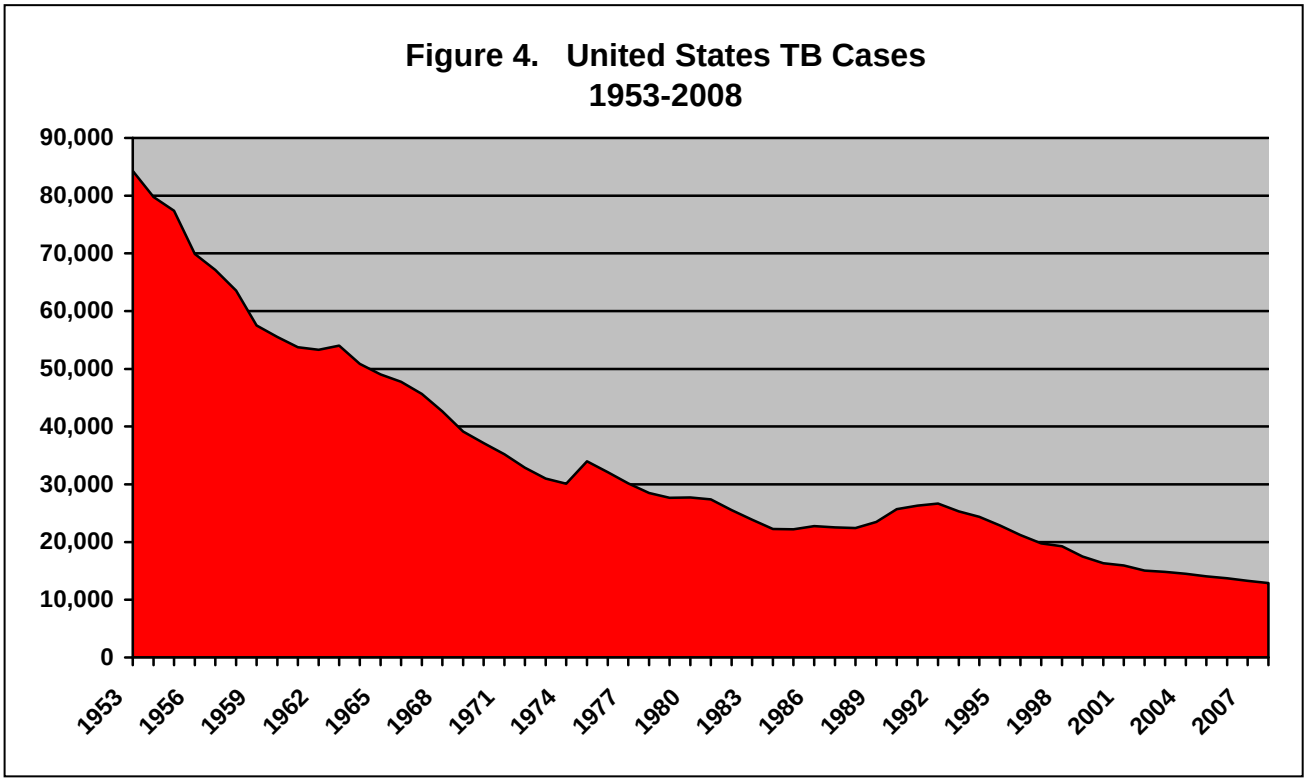


Figure 4 illustrates the historical trend of decreasing TB cases reported in the United States. In 2008 there were 12,904 TB cases reported in the US which was the lowest year on record, representing a 2.9% decrease from 2007. During 2008, 18 states reported increased case counts from 2007. The 4 states of California, Texas, New York and Florida accounted for 49% of the national case total. During 2008, 1.0% of the reported cases had primary multi-drug resistance compared to 1.1% in 2007 which is defined as no previous history of TB disease and resistance to the tuberculosis medications of at least isoniazid and rifampin.

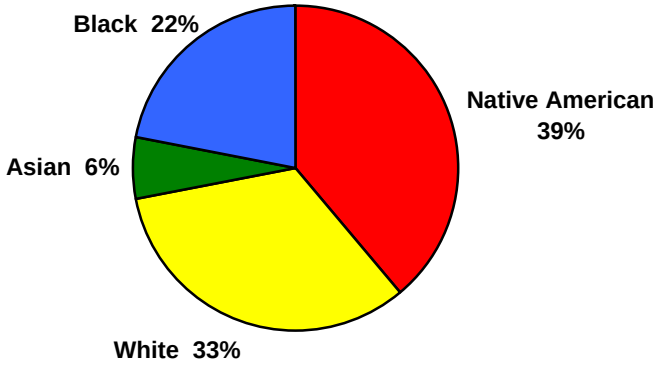


Native Americans have historically represented the highest percentage of TB cases by race. This trend continued in 2009 with Native Americans contributing 39% of the total TB cases reported. Table 1 and Figure 5 provide information on TB cases by race in 2009.

Table 1. TUBERCULOSIS CASES REPORTED BY SEX AND RACE SOUTH DAKOTA 2009

Race	Male	Female	Total	% of Cases
Native American	3	4	**7**	39%
White	5	1	**6**	33%
Black	3	1	**4**	22%
Asian	0	1	**1**	6%
Total	**11**	**7**	**18**	**100%**

Figure 5. TB Cases by Race South Dakota 2009



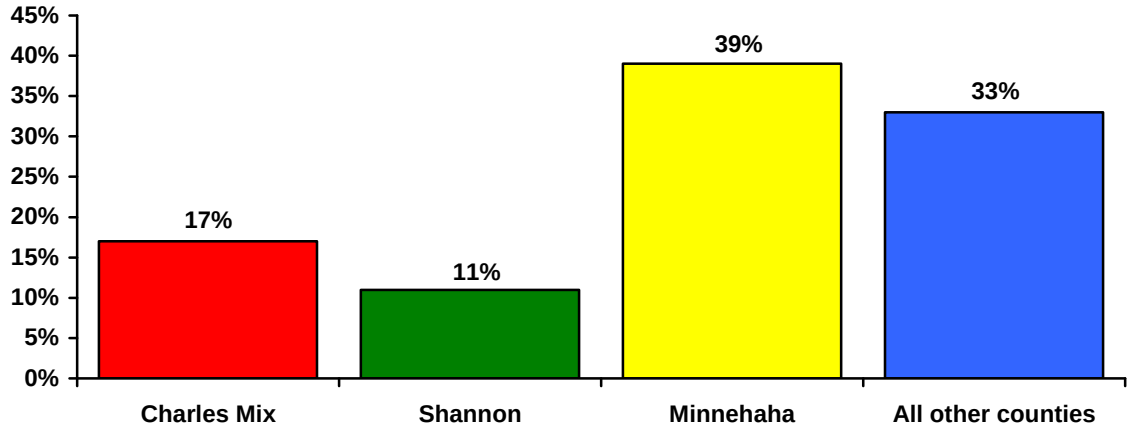
The TB incidence rate, which measures the number of TB cases per 100,000 population, is the best measure for determining the progress towards the elimination of TB in South Dakota. Historically, Native American TB case rates have dropped considerably while white cases have consistently remained low. 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 2004-2009

Race	2004	2005	2006	2007	2008	2009
US Case Rate (All Races)	*5.0*	*4.8*	*4.6*	*4.4*	*4.2*	*Not available**
SD All Races	1.5	2.1	1.8	1.7	2.1	2.2
SD Native American	7.3	8.8	8.8	10.3	5.9	10.3
SD White	0.6	0.6	0.1	0.4	0.1	0.9
SD Black	0.0	48.4	64.5	32.3	161.3	64.5
SD Asian	0.0	52.1	52.1	17.4	17.4	17.4
All Other SD Races	41.3	0.0	0.0	0.0	0.0	0.0

**2009 US case rate data is not yet available.*

Figure 6. TB Cases Reported by County of Residence
South Dakota 2009



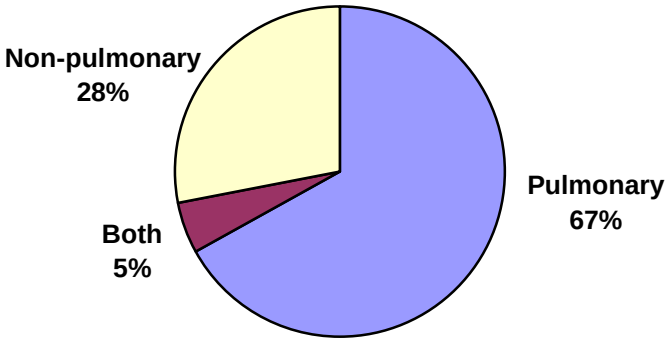
Tuberculosis cases in South Dakota have historically been located in a few geographic locations that consistently report the majority of TB cases. These include Minnehaha County which reports the highest number of foreign-born TB cases and Shannon, Todd and Pennington counties which report the highest number of Native American TB cases. Figure 6 and Table 3 provide additional information on the counties of residence of the TB cases in 2009.

Table 3. TB CASES REPORTED BY COUNTY OF RESIDENCE
SOUTH DAKOTA 2009

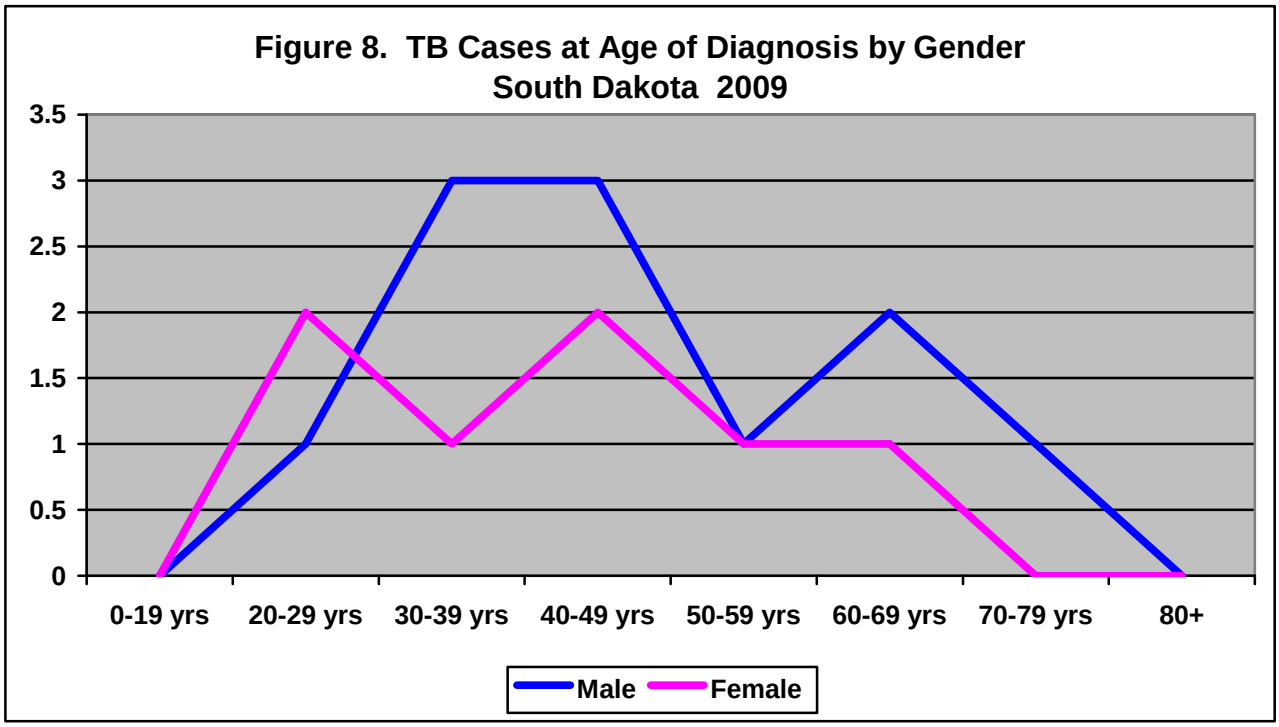
County	# of TB Cases	County	# of TB Cases
Butte	1	Roberts	1
Charles Mix	3	Shannon	2
Davison	1	Spink	1
Jerauld	1	Todd	1
Minnehaha	7		

Tuberculosis remains primarily a pulmonary disease with approximately 85% of cases nationally are reported as pulmonary disease and 15% as non-pulmonary disease. South Dakota has historically reported a higher percentage of non-pulmonary TB disease. In 2009 this trend continued with 5 cases (28%) reported as non-pulmonary disease as described in Figure 7. The non-pulmonary sites of disease in 2009 included TB reported in pleural fluid, lymph nodes, uterine tissue, spinal tissue and peritoneal tissue.

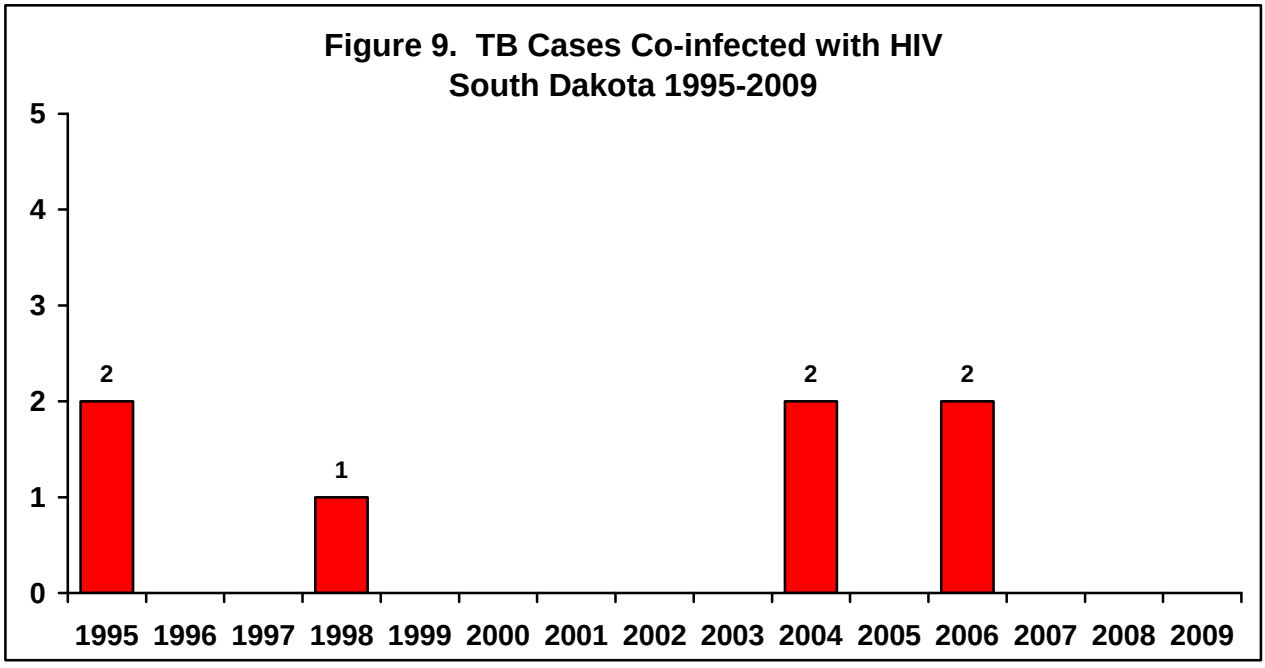
Figure 7. Percentage of Pulmonary versus Non-pulmonary
South Dakota 2009



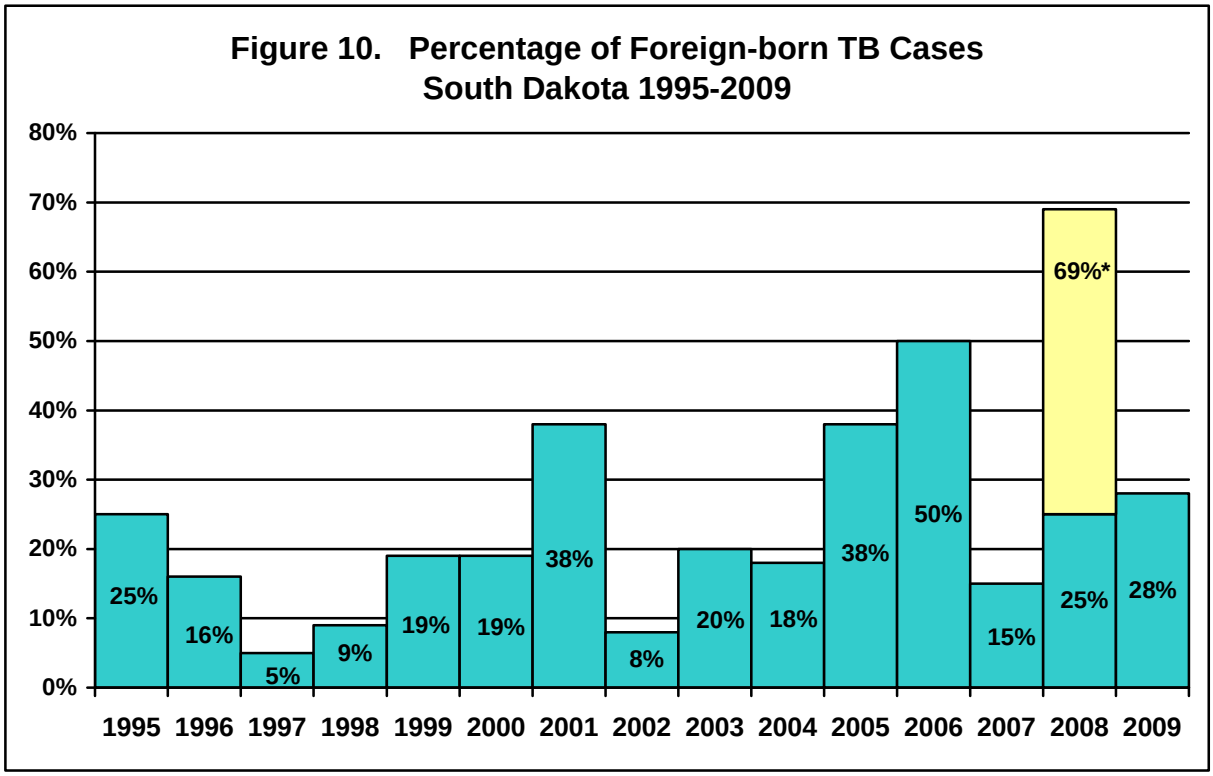
The average age of the TB case in 2009 was 45 years of age. This is a shift to older patients as compared to 2008 when the average age was 22 years of age. There were no children less than 10 years of age during this time period. Figure 8 illustrates the age at diagnosis by gender for tuberculosis cases reported in 2009.



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 aged 25-44 years of age are offered HIV testing. Co-infected TB cases require more monitoring for toxicity and are frequently treated with second line TB medications. Figure 9 describes the number of TB cases co-infected with HIV since 1995 documenting that these HIV co-infected TB cases remain uncommon.

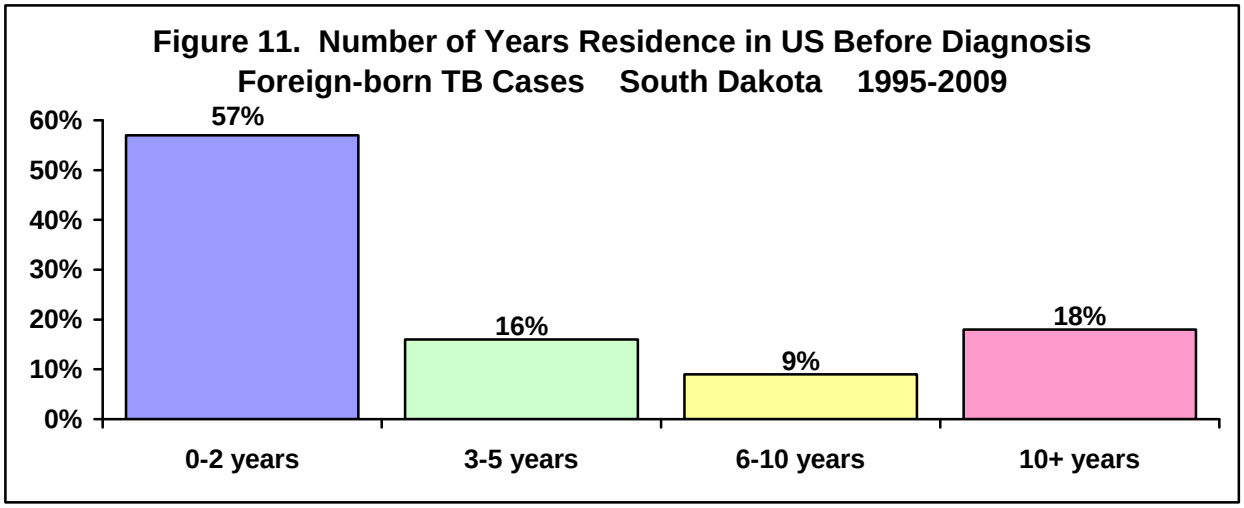


Tuberculosis cases who were born outside the United States continue to represent an important risk group in the United States as well as in South Dakota, however during 2009 this group decreased to 28% of the total cases reported. Figure 10 describes the percentage of foreign-born TB cases in South Dakota. US-born TB cases born to foreign-born parents is a relatively new TB risk factor which has been identified nationally. TB cases were first reported in this new risk group in 2008 and are represented in Figure 10.

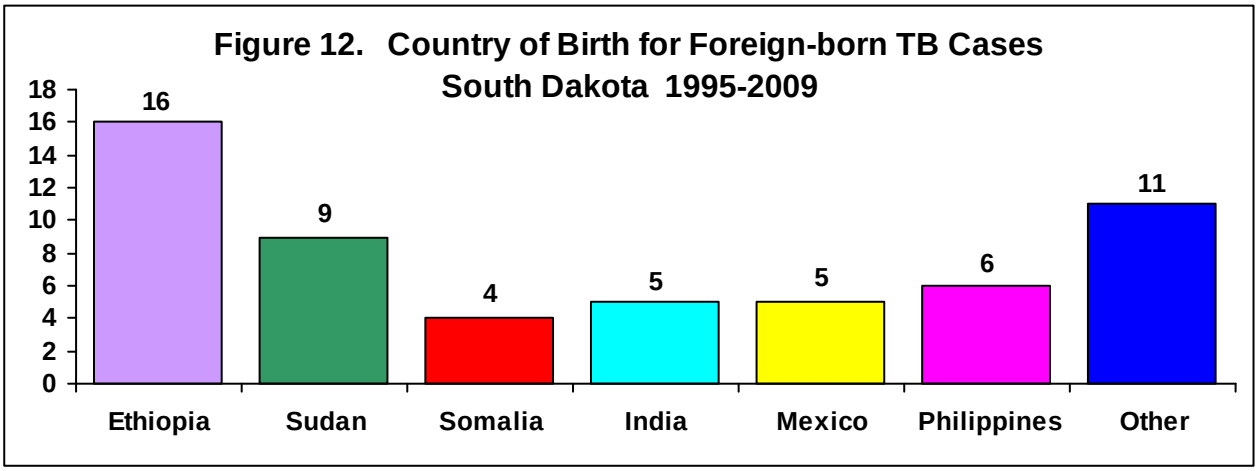


** In 2008, the 69% includes both foreign-born TB cases as well as US-born TB cases born to foreign-born parents.*

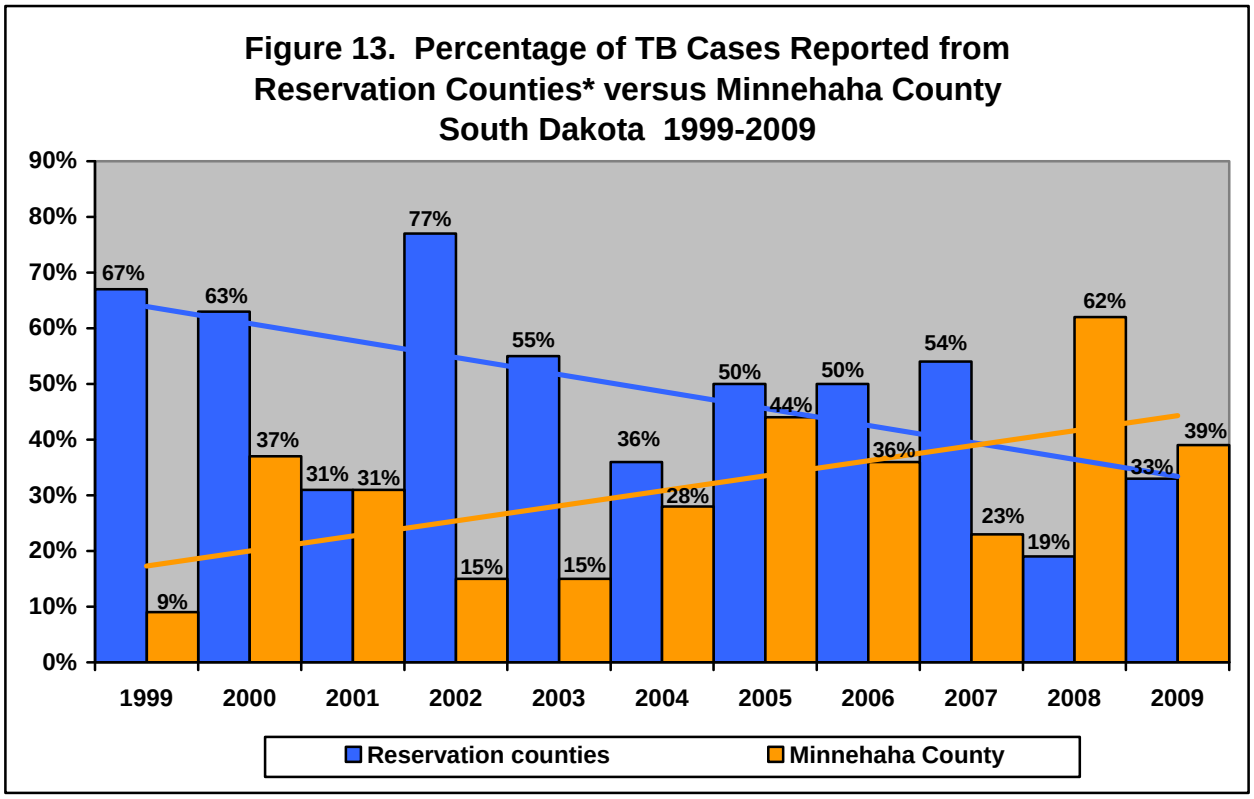
Most foreign-born persons who develop active TB usually do so within the first 2 years after arrival in the United States. Figure 11 describes that 57% of foreign-born TB cases since 1995 developed active TB within the first 2 years of their arrival. Because of this increased risk, these individuals 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 12 describes the country of birth for the foreign-born TB cases reported in South Dakota since 1995. Countries of birth for the "other" category include Afghanistan, China, El Salvador, Indonesia, Romania, Russia, South Africa and Vietnam.



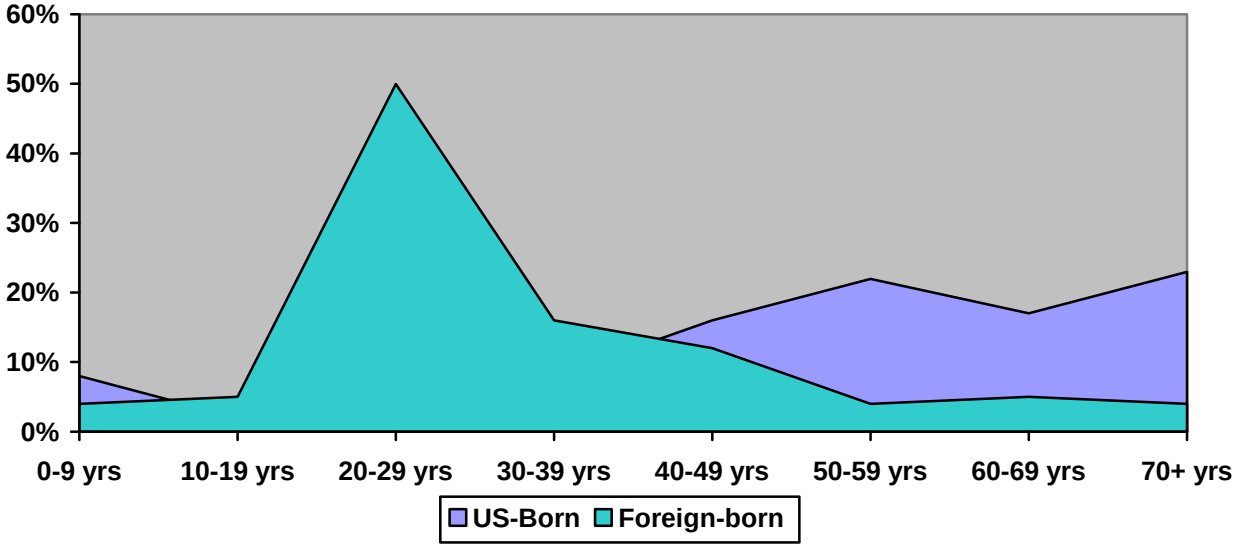
Another aspect to the increase of foreign-born TB cases in South Dakota is the change in geography where TB cases are reported. Historically, the highest percentage of TB cases were reported from counties that included and bordered American Indian Reservations. As Native American TB cases have decreased and foreign-born TB cases have increased, there has been a geographic shift of TB cases from reservation counties to Minnehaha County as illustrated in Figure 13. This is due to the fact that most foreign-born persons who resettle in South Dakota do so in Minnehaha County.



* Reservation counties include Bennett, Brule, Buffalo, Charles Mix, Corson, Dewey, Jackson, Mellette, Pennington, Shannon, Todd, Tripp, Walworth and Ziebach counties.

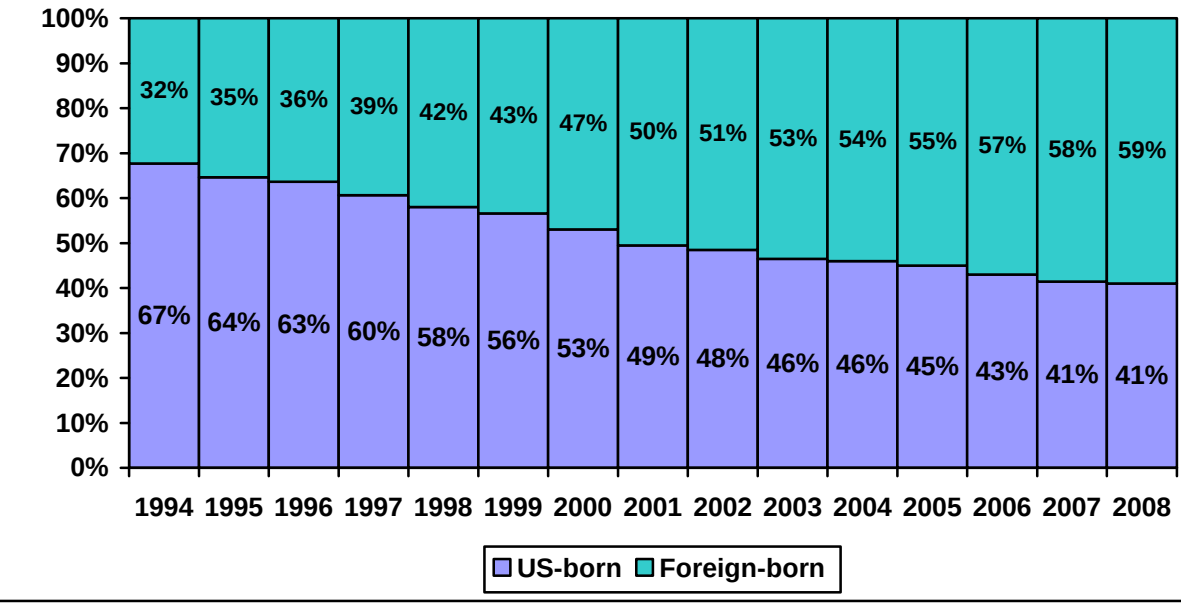
Foreign-born TB cases consistently are reported in younger persons as compared to US born patients in South Dakota. This presents additional TB control issues as these TB cases more commonly have young children who have been exposed in the home and typically are employed which may require an investigation at their worksite to those exposed. Figure 14 illustrates that the majority of foreign-born TB cases are diagnosed while young adults.

Figure 14. Percentage of US-Born TB Cases versus Foreign-born TB Cases by Age at Diagnosis South Dakota 1995-2009

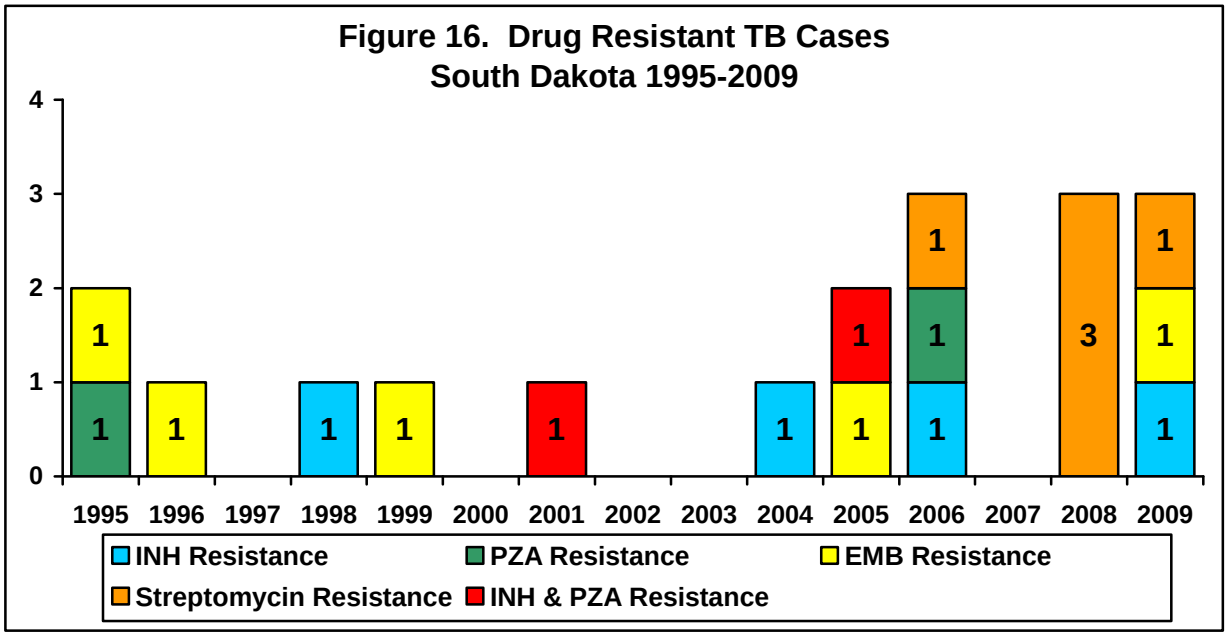


Foreign-born TB cases represent a unique challenge to the South Dakota TB Control Program because of cultural issues, language barriers and a greater likelihood of drug resistance. As these cases continue to increase in South Dakota, additional time and resources will need to be dedicated to address these unique issues. Figure 15 describes the ever increasing trend of the percentage of foreign-born TB in the United States since 1994.

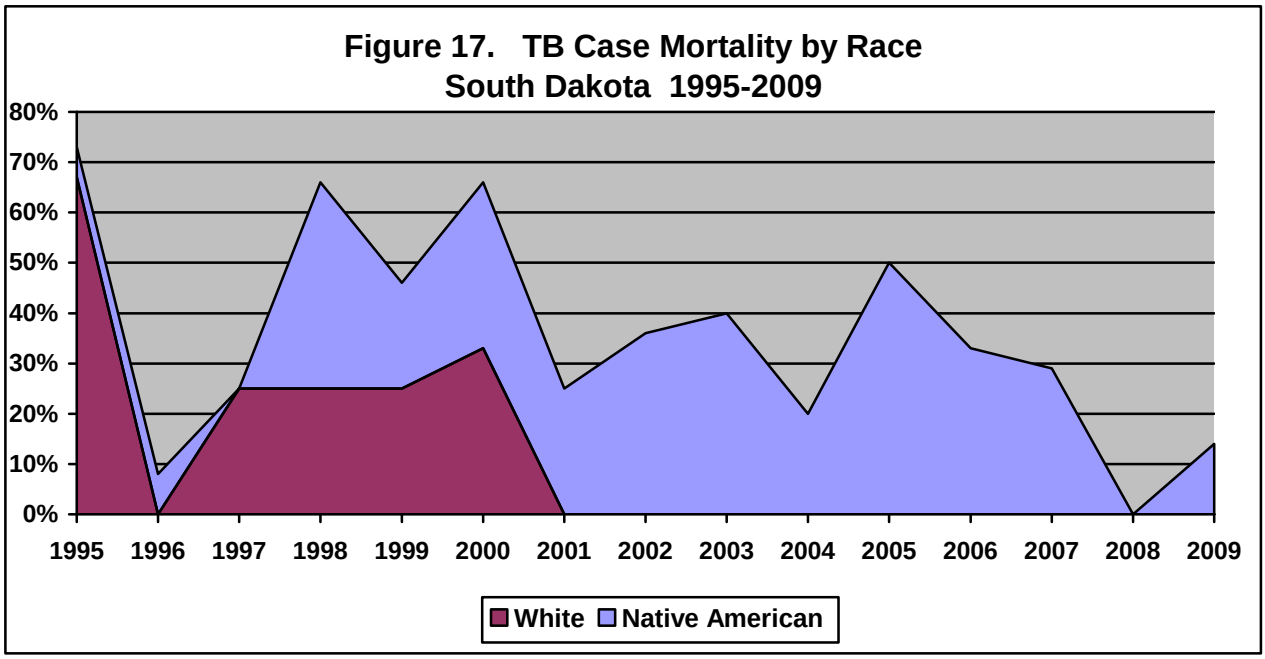
Figure 15. Percentage of US-born vs Foreign-born TB Cases United States 1994-2008



All culture positive TB cases are tested for drug resistance to first-line TB medications including isoniazid, rifampin, pyrazinamide, ethambutol and streptomycin. Patients with single drug resistance can usually be successfully treated for their TB disease. Multi-drug resistant TB (defined by CDC as resistance to at least INH and RIF) is a significant public health problem because of the difficulty in achieving a successful treatment outcome. Figure 16 describes the drug resistant TB cases since 1995 illustrating that South Dakota has most often had single drug resistant cases reported. No multi-drug resistant TB cases have ever been reported in South Dakota although the Department of Health has managed several MDR-TB case reported in other states that have moved to South Dakota.



South Dakota has reported a higher than expected mortality rate during certain years, especially among Native American patients. Figure 17 describes the mortality rates by race since 1995 showing the higher trend among Native American cases since 1998. Mortality rates are calculated by the percentage of TB cases by race that die during the year of their diagnosis.

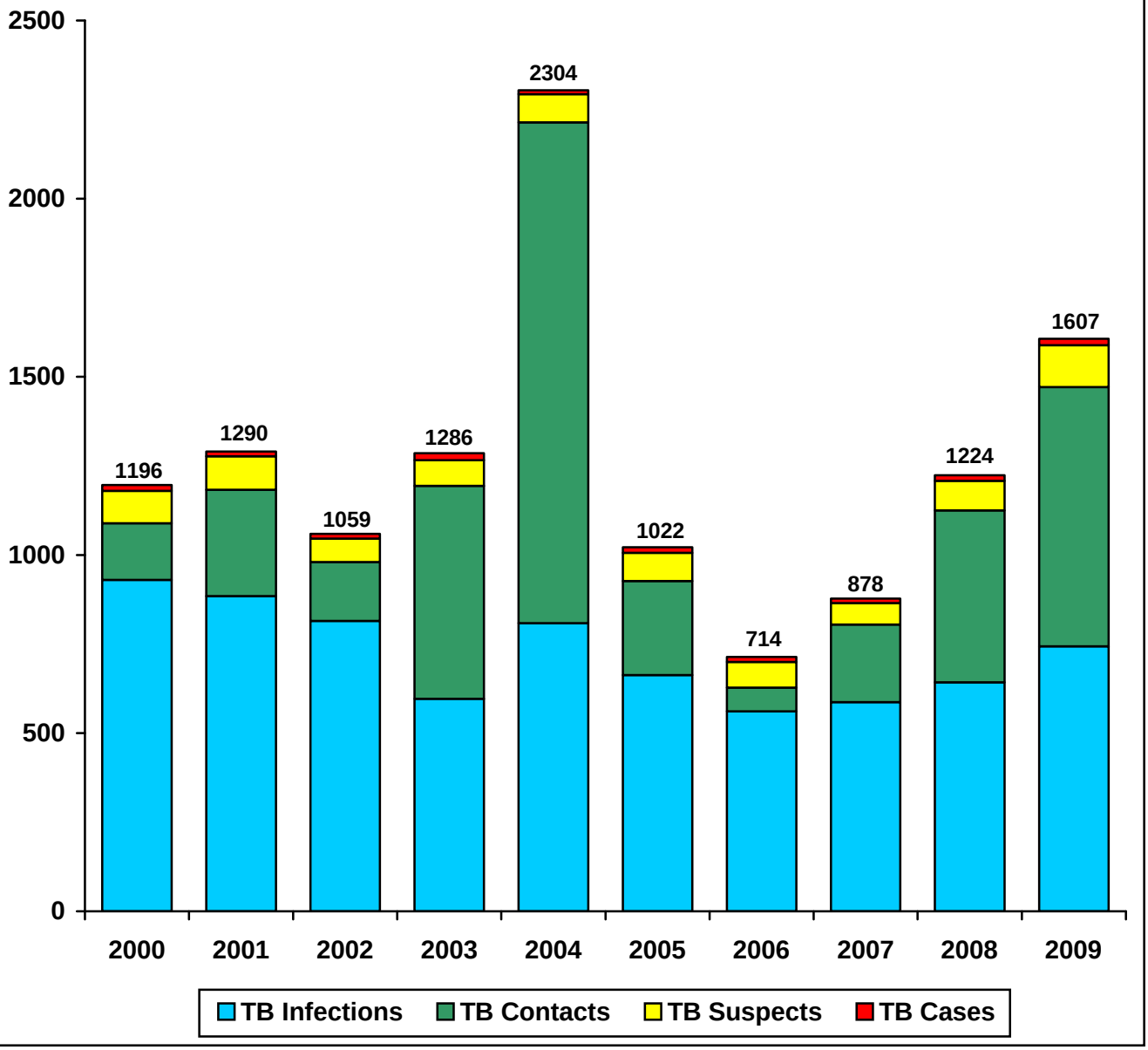


The workload in the TB Control Program includes four categories of patients:

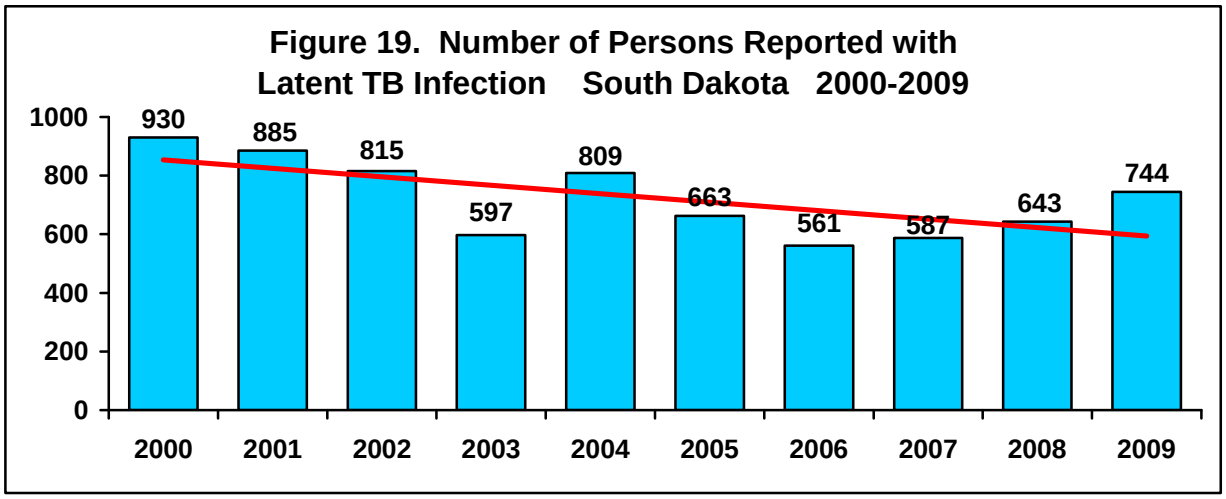
1) **TB cases** (persons diagnosed with active TB)
2) **TB suspects** (persons suspected of active TB with a pending diagnosis)
3) **TB contacts** (persons confirmed to have been exposed to an infectious TB case)
4) **Latent TB infection** (persons reported with a positive TB skin test)

All of these conditions are reportable to the TB Control Program and are initiated for investigation. Disease Intervention Specialist (DIS) staff are responsible for ensuring appropriate investigation, treatment and follow-up of these individuals statewide. Figure 18 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.

Figure 18. Cumulative # of TB Investigations by DIS
South Dakota 2000-2009



Providing 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 19 presents the number of patients reported with latent TB infection (positive TB skin tests) over the last 10 years. All of these individuals have the potential to develop active TB disease and potentially be infectious to others.

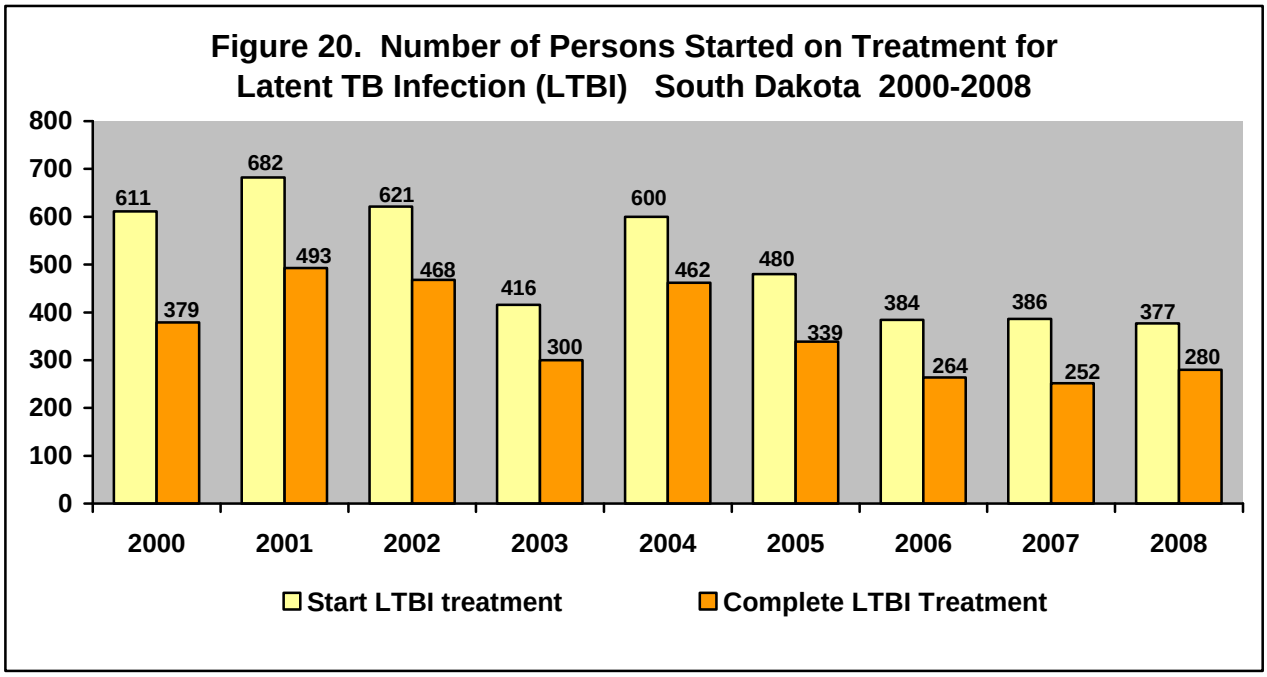


Figure 20 presents the number of patients with latent TB infection that started on a course of preventive treatment as well as the number who ultimately completed this treatment. The treatment is usually done with Isoniazid (INH) which is provided free of charge to patients statewide by the TB Control Program.

Summary of TB Control Program Caseload
South Dakota 2000-2009