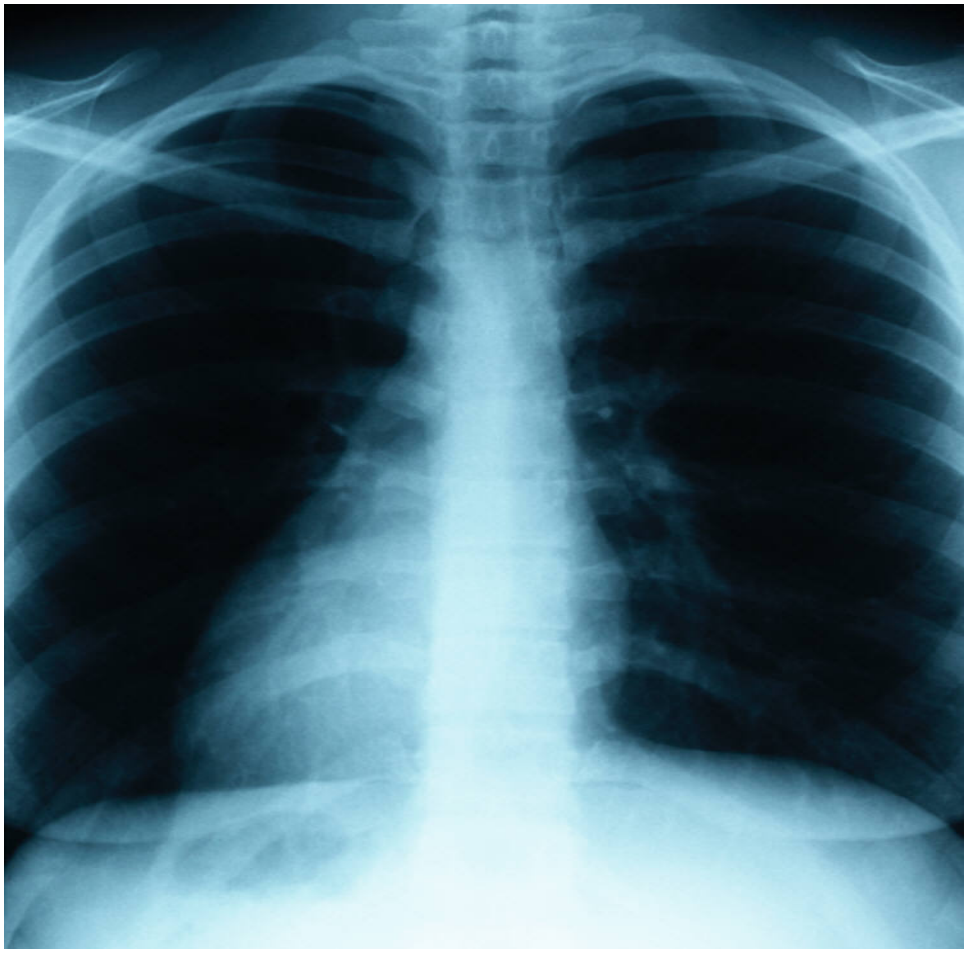
Tuberculosis Control Program Annual Report 2007

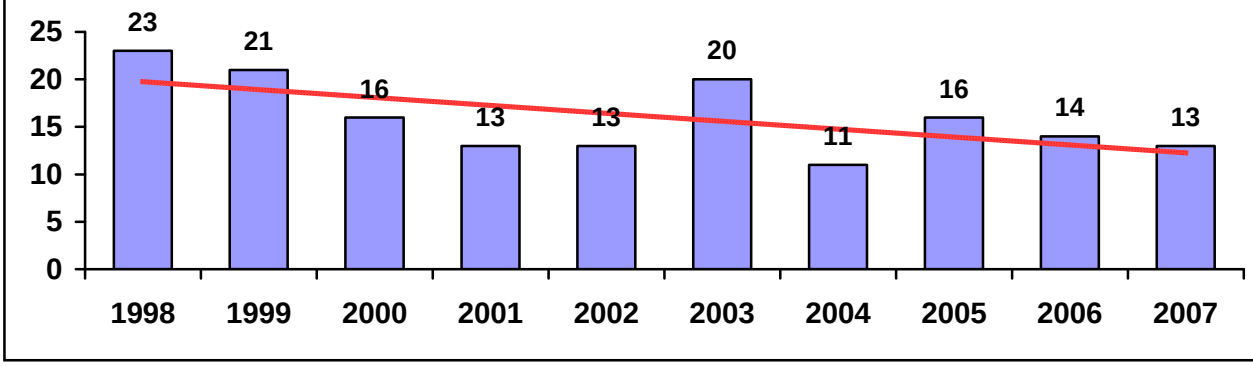
South Dakota Department of Health



For additional information, please contact Kristin Rounds, Tuberculosis Control Program Coordinator at (605) 773-3737 or 1-800-592-1861 or see the website: www.state.sd.us/doh/tb.

During the last ten years, South Dakota averaged 16 cases of tuberculosis (TB) per year. During 2007, there were 13 cases of TB reported to the South Dakota Department of Health, which is a decrease of 1 case from 2006. Figure 1 describes the 10-year trend of decreasing TB case reports.

Figure 1. South Dakota TB Cases Reported by Year 1998-2007



The most recent data available nationally and regionally is from calendar year 2006. Figure 2 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 compared to 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 2. TB Case Rates per 100,000 Population U.S. and Select States, 2006

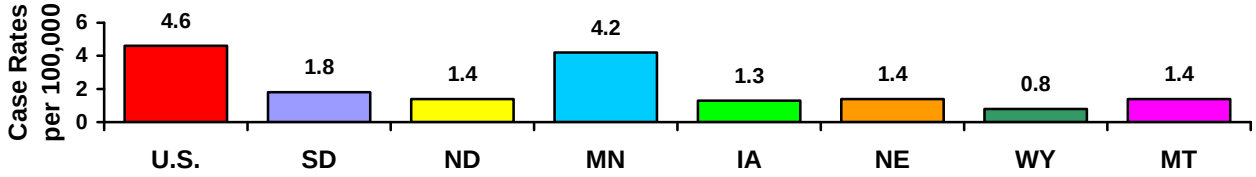
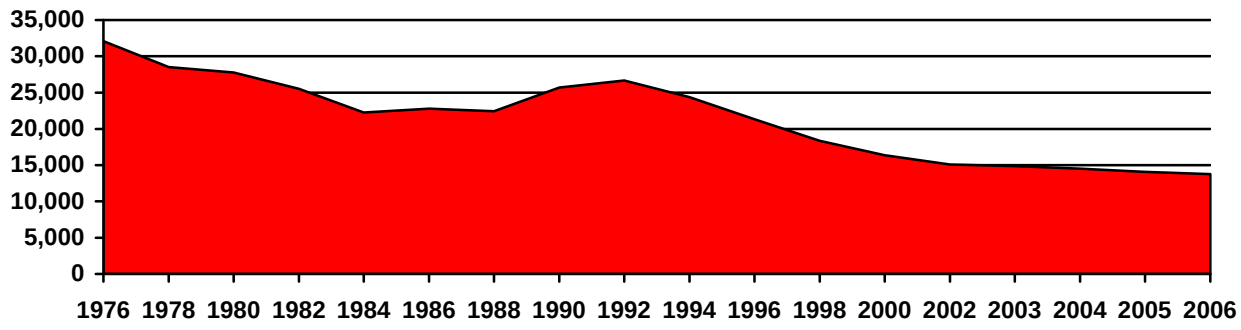


Figure 3 illustrates the historical trend of decreasing TB cases reported in the United States. In 2006 there were 13,779 TB cases reported in the US which was the lowest year on record, representing a 2.1% decrease from 2005.

Figure 3. United States TB Cases, 1975-2006

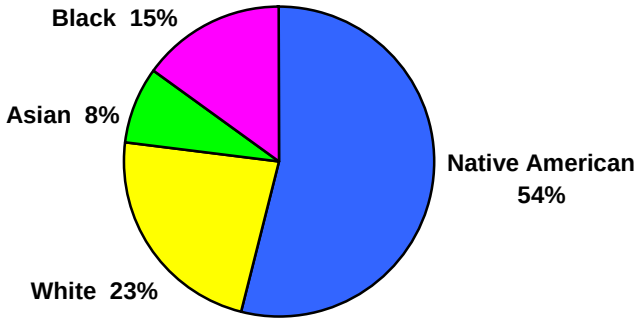


Native Americans have historically represented the highest percentage of TB cases by race. This trend continued in 2007 with Native Americans contributing 54% of the total TB cases reported. However, the percentage of Native American TB cases has dropped considerably in the last 10 years since 1997 when they represented 74% of the total cases reported. This decreasing trend is explained in part by the increasing trend of more foreign-born TB cases reported in South Dakota. Table 1 and Figure 4 provide additional information on TB cases by race in 2007.

Table 1. TUBERCULOSIS CASES REPORTED BY SEX AND RACE SOUTH DAKOTA 2007

Race	Male	Female	Total	% of Cases
Native American	4	3	**7**	54%
White	2	1	**3**	23%
Black	1	1	**2**	15%
Hispanic	0	0	**0**	0%
Asian	0	1	**1**	8%
Total	**7**	**6**	**13**	**100%**

Figure 4. South Dakota TB Cases by Race, 2007



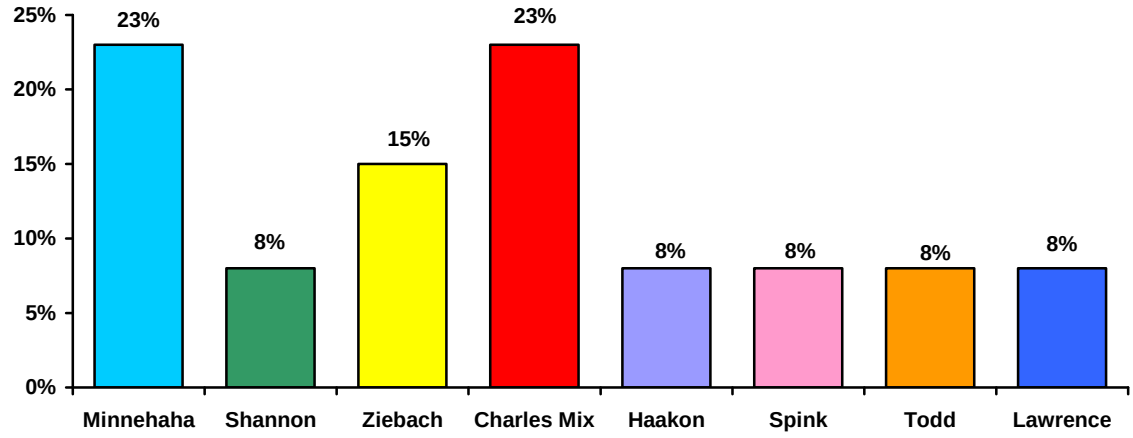
The TB incidence rate, which measures the number of TB cases per 100,000 population, is the best measure for determining the progress towards the elimination of TB in South Dakota. Native American TB case rates have dropped considerably while White cases have consistently remained low. The black, Asian 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 2002-2007

Race	2002	2003	2004	2005	2006	2007
US Case Rate (All Races)	*5.2*	*5.1*	*4.9*	*4.7*	*4.6*	*Not available*
SD All Races	1.7	2.6	1.5	2.1	1.8	1.7
SD Native American	16.1	14.6	7.3	8.8	8.8	10.3
SD White	0.3	0.9	0.6	0.6	0.1	0.4
SD Black	0.0	0.0	0.0	48.4	64.5	32.3
SD Asian	0.0	69.4	0.0	52.1	52.1	17.4
All Other SD Races	0.0	0.0	41.3	0.0	0.0	0.0

**2007 US case rate data is not yet available.*

Figure 5. TB Cases Reported by County of Residence
South Dakota 2007



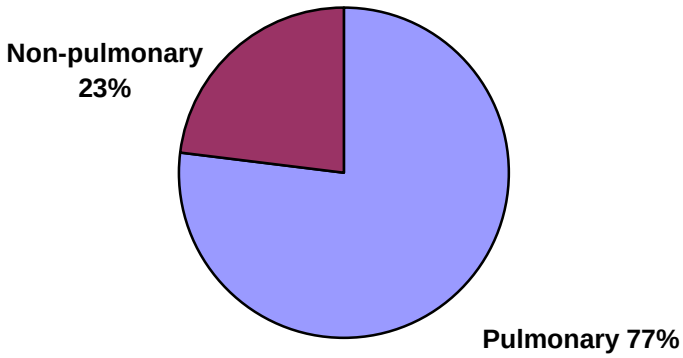
Tuberculosis cases in South Dakota have historically been located in a few geographic locations that consistently report the highest number of TB cases. These include Minnehaha County which reports the most number of foreign-born TB cases and Shannon, Todd and Pennington counties which reported the highest number of Native American TB cases. However, every year there are additional counties throughout the state that report active TB cases representing isolated cases. Figure 5 and Table 3 provide additional information on the counties of residence of the TB cases in 2007.

Table 3. TB CASES REPORTED BY COUNTY OF RESIDENCE
SOUTH DAKOTA 2007

County	# of TB Cases	County	# of TB Cases
Charles Mix	3	Shannon	1
Haakon	1	Spink	1
Lawrence	1	Todd	1
Minnehaha	3	Ziebach	2

Tuberculosis remains primarily a pulmonary disease with approximately 85% of cases nationally being reported as pulmonary disease and 15% as non-pulmonary disease. South Dakota has historically reported a higher percentage of non-pulmonary TB disease as described in Figure 6. The non-pulmonary sites of disease in 2007 included lymph node and bone tuberculosis.

Figure 6. Percentage of Pulmonary versus Non-pulmonary
South Dakota 2007

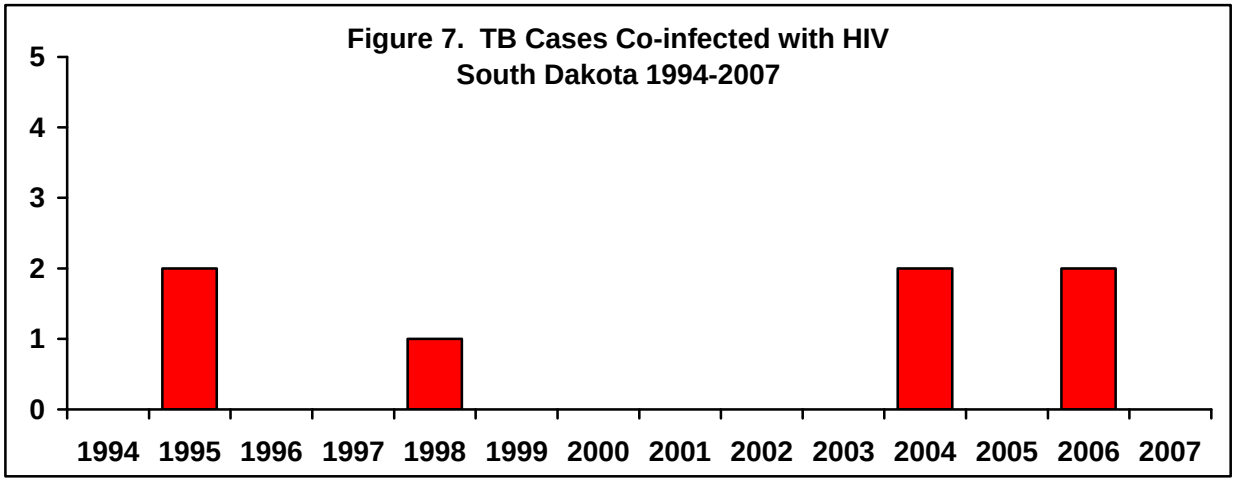


The average age of the TB case in 2007 was 60 years of age. However, this varied by sex with male TB cases being older at 62 years and the female TB cases being younger at 57 years of age. In addition, TB cases born outside the United States tended to be younger with the average age of 53 years while the US born TB cases were older at 61 years of age. Table 4 provides additional information on the age at diagnosis for the TB cases reported in 2007.

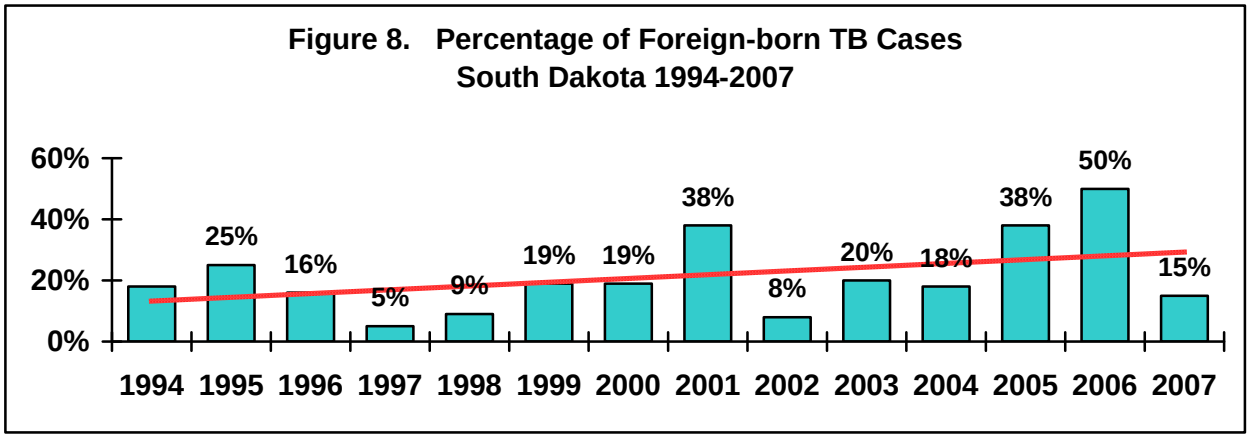
Table 4. TB CASES REPORTED BY SEX AND AGE
SOUTH DAKOTA 2007

Age (years)	Male	Female	Total	% of cases
0-4	0	0	**0**	0%
5-9	0	0	**0**	0%
10-14	0	0	**0**	0%
15-19	0	0	**0**	0%
20-29	0	1	**1**	8%
30-39	0	0	**0**	0%
40-49	1	1	**2**	15%
50-59	4	1	**5**	39%
60-69	0	2	**2**	15%
70-79	1	1	**2**	15%
80-89	1	0	**1**	8%
90+	0	0	**0**	0%
Total	**7**	**6**	**13**	**100%**

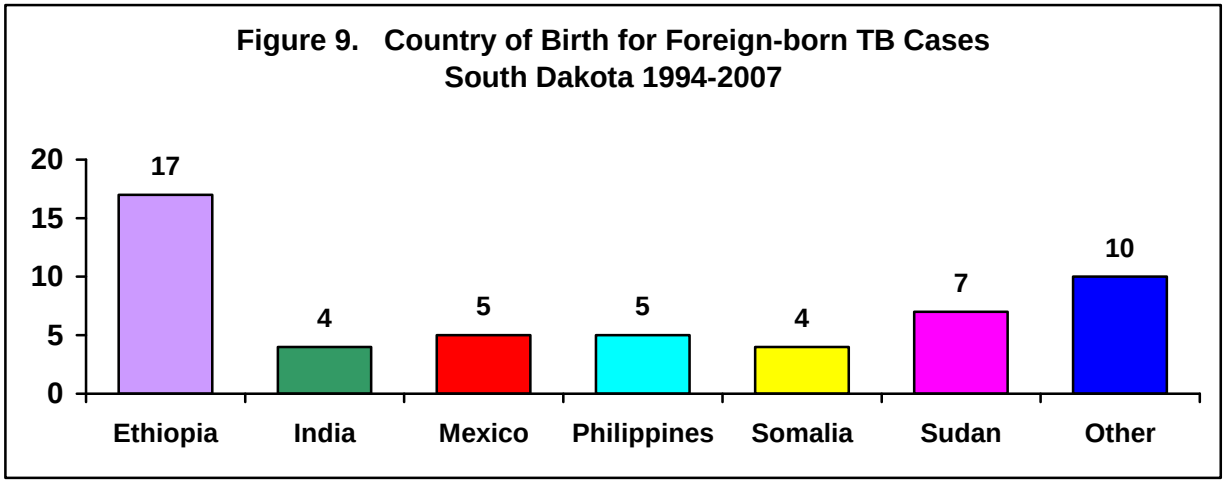
Co-infection with HIV is an important risk factor for the development of active TB. Because of this, all TB cases diagnosed in South Dakota aged 25-44 years of age are offered HIV testing. Co-infected TB cases require more monitoring for toxicity and frequently treatment with second line drugs. Figure 7 describes the number of TB cases co-infected with HIV since 1994 showing that these cases remain uncommon with only 7 reported during this 14 year time period.



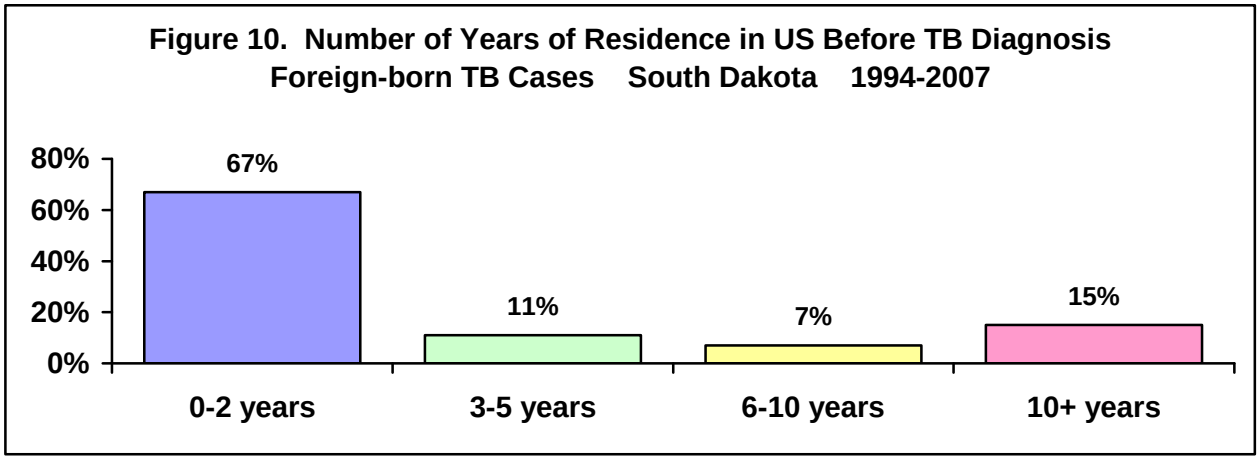
Tuberculosis cases who were born outside the United States continue to represent a larger and increasing percentage of TB cases in the United States as well as in South Dakota. However, during 2007 this group decreased to only 15% of the TB cases reported in South Dakota. Figure 8 describes the percentage of foreign-born TB cases in South Dakota.



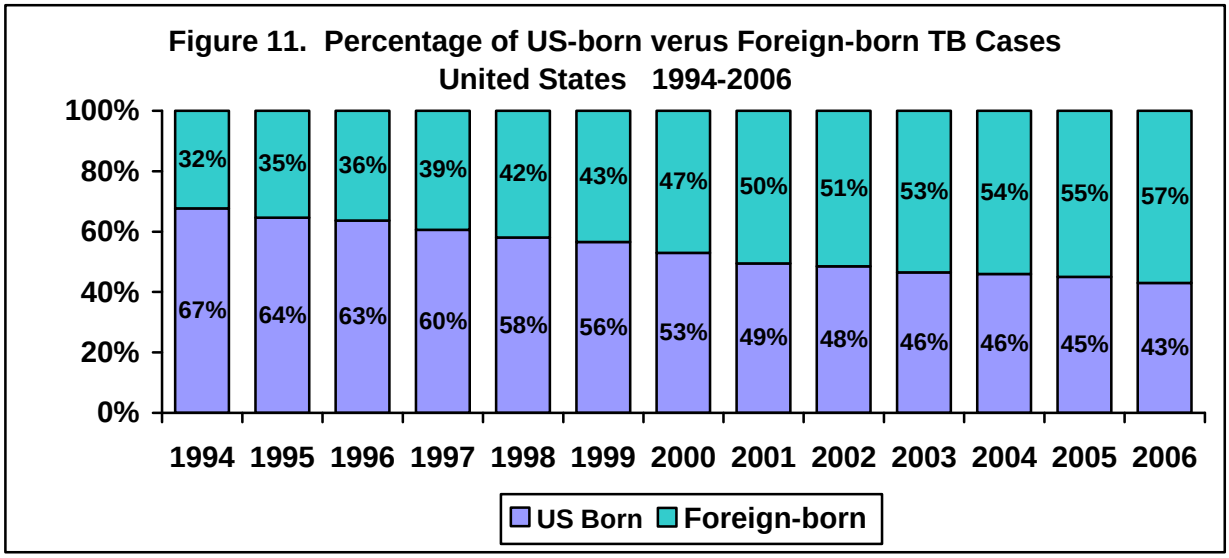
Foreign-born TB cases continue to come from many areas of the world however the majority of the cases reported in South Dakota are of African descent. Figure 9 describes the country of birth for the foreign-born TB cases reported in South Dakota since 1994. Countries of birth for the "other" category include Afghanistan, China, Indonesia, Romania, Russia, South Africa and Vietnam.



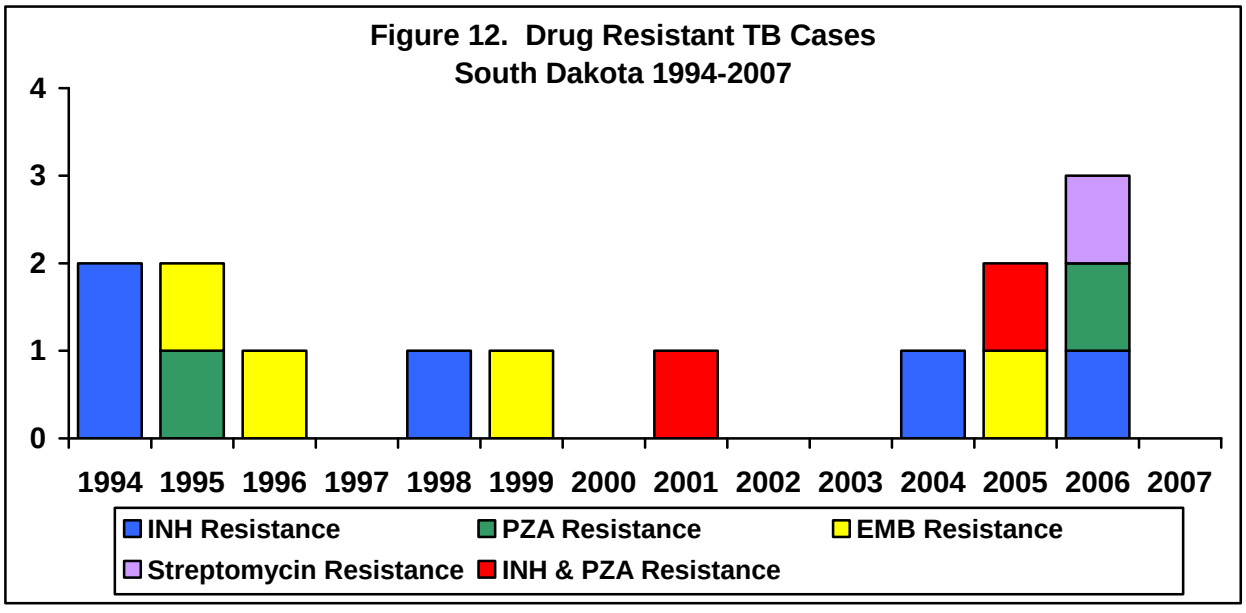
Most foreign-born persons who develop active TB usually do so within the first 2 years after arrival in the United States. Figure 10 describes that 67% of foreign-born TB cases since 1994 developed active TB within the first 2 years of their arrival. Because of this increased risk of development of active TB, these individuals are targeted for preventive activities including targeted TB skin testing and preventive treatment programs.



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 11 describes the ever increasing trend of the percentage of foreign-born TB in the United States since 1994.



All culture positive TB cases are tested for resistance to first-line TB medication 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 12 describes the drug resistant TB cases since 1994 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 did manage a MDR-TB case reported in Colorado who moved to South Dakota during 2006.



South Dakota has reported a higher than expected mortality rate during certain years, especially among Native American patients. Table 5 describes the mortality rates for the last 4 years.

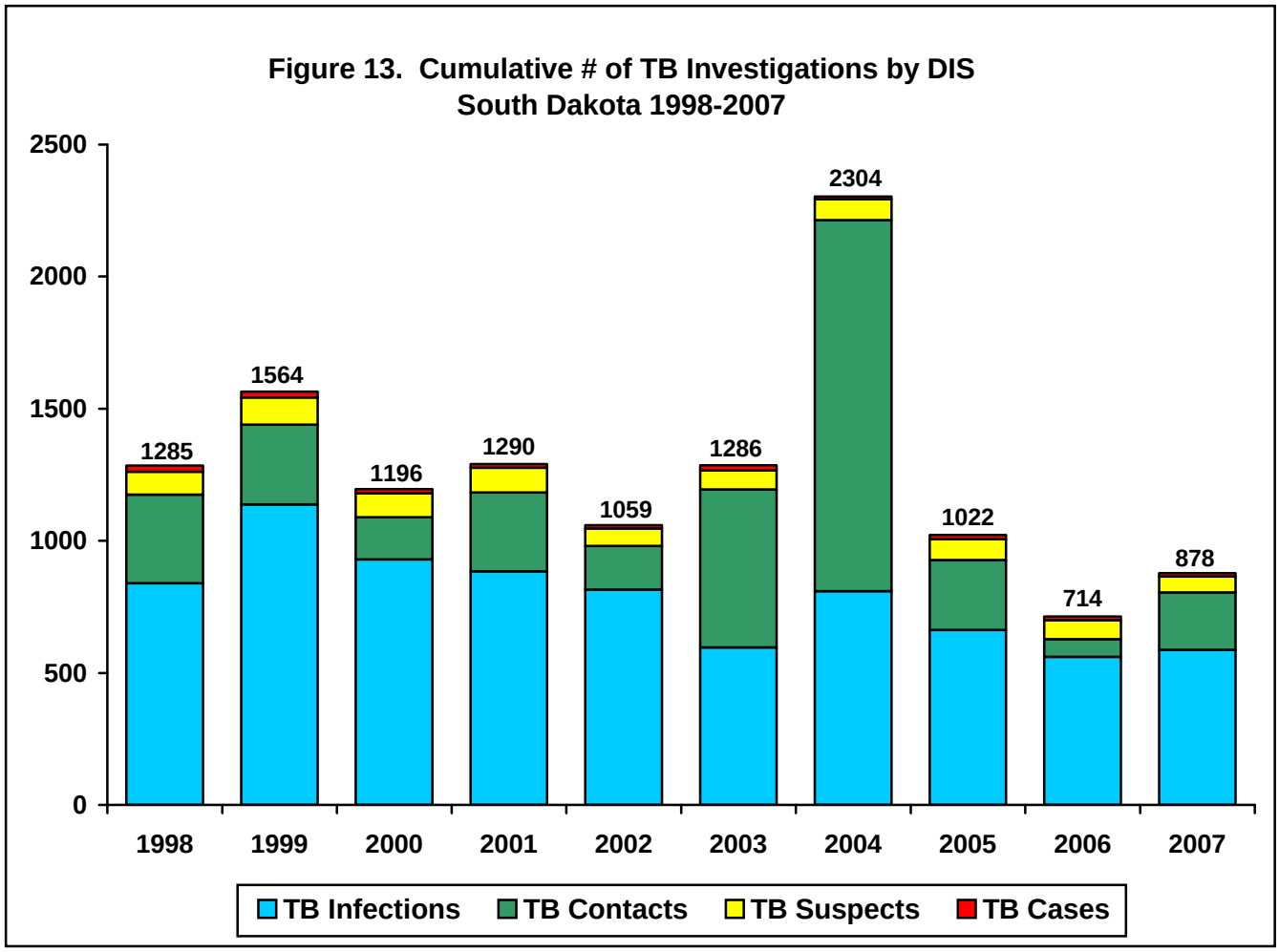
Table 5. TUBERCULOSIS MORTALITY BY RACE AND YEAR
SOUTH DAKOTA 2004-2007

Race	2004		2005		2006		2007	
All races	1/11	9%	3/16	19%	2/14	14%	2/13	15%
Native American	1/5	20%	3/6	50%	2/6	33%	2/7	29%
White	0/4	0%	0/4	0%	0/1	0%	0/3	0%
Black	---	---	0/3	0%	0/4	0%	0/2	0%
Hispanic	0/2	0%	---	---	---	---	---	---
Asian	---	---	0/3	0%	0/3	0%	0/1	0%

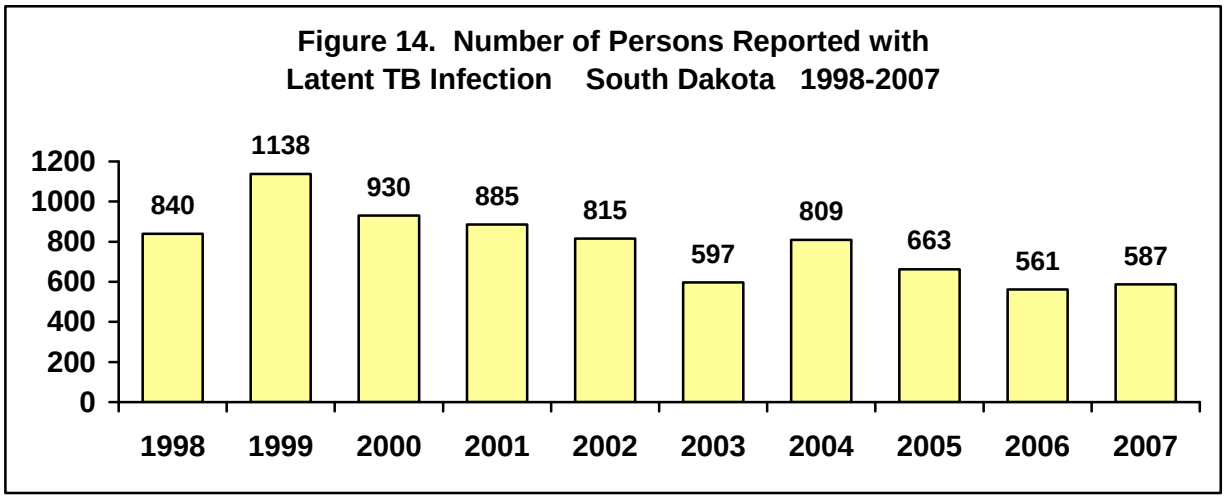
The workload in the TB Control Program includes four categories of patients:
1) **TB cases** (persons diagnosed with active TB)
2) **TB suspects** (persons suspected of active TB with a pending diagnosis)
3) **TB contacts** (persons confirmed to have been exposed to an infectious TB case)
4) **Latent 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 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.

Figure 13. Cumulative # of TB Investigations by DIS
South Dakota 1998-2007



Providing for appropriate treatment and follow-up of active TB cases and suspects is the highest priority of the South Dakota TB 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 (LTBI). 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 14 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.

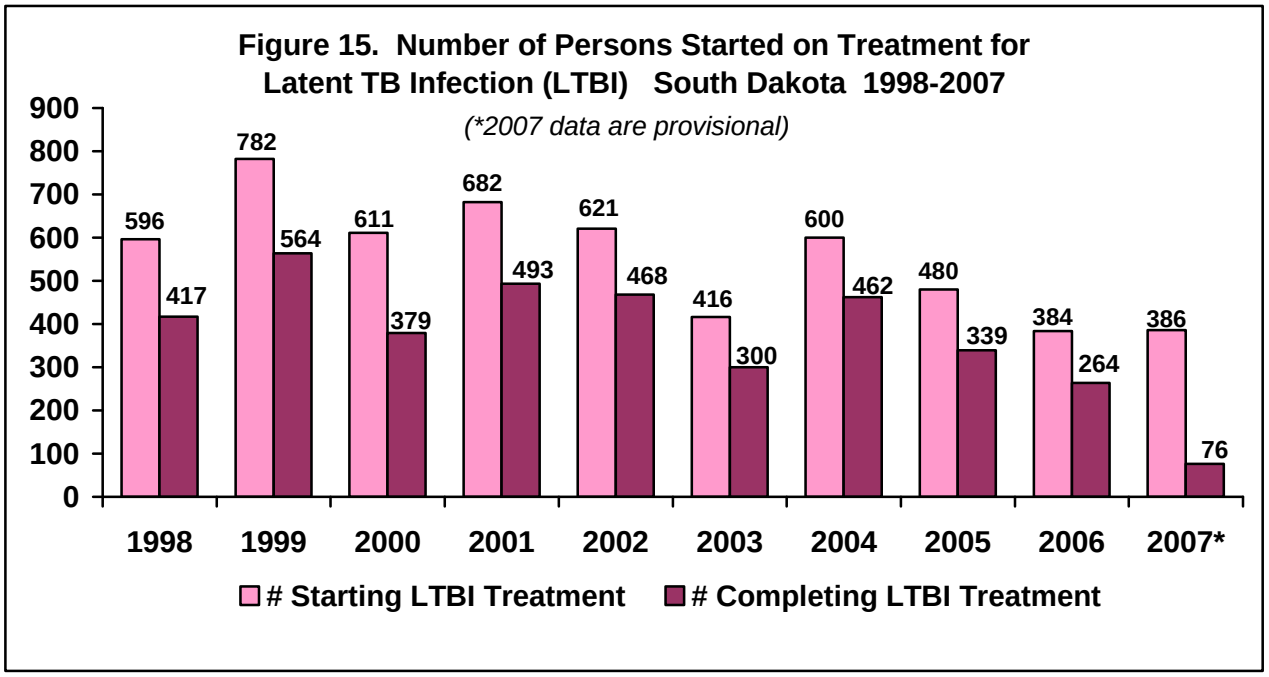


Figure 15 presents the number of patients with latent TB infection that started on a course of preventive treatment as well as the number who ultimately completed this treatment. The usual treatment is done with Isoniazid (INH) which is provided free of charge to patients statewide by the TB Control Program.

Summary of TB Control Program Caseload
South Dakota 1998-2007