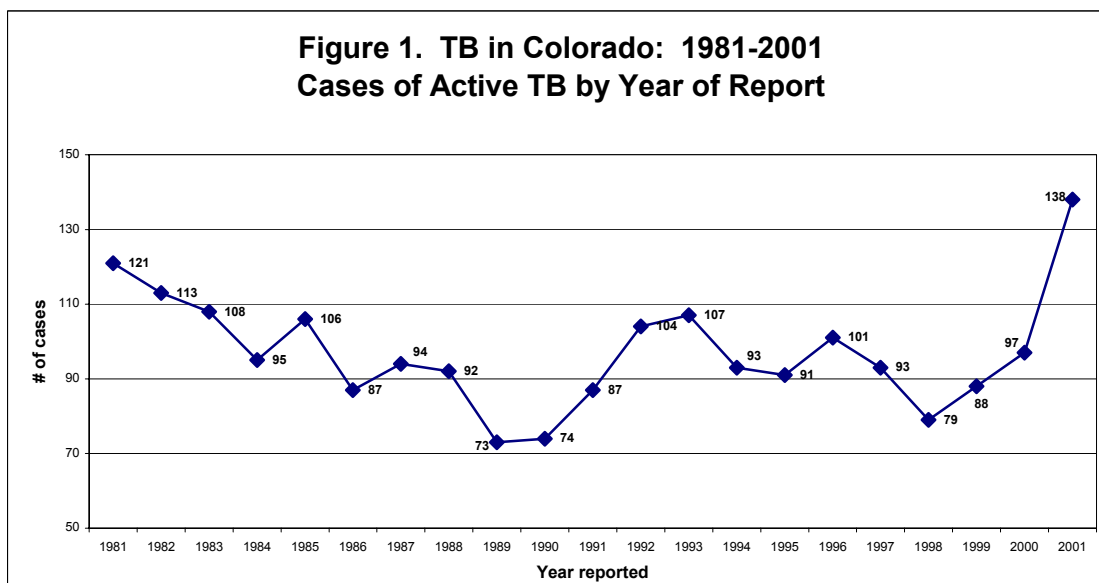


Tuberculosis in Colorado A Summary of Cases Reported in 2001

In contrast to the decline in tuberculosis (TB) cases nationally, the number of cases of active TB in Colorado has increased for the third consecutive year. In 2001, 138 cases of TB were reported – a 42 percent increase from the 97 cases reported in 2000 (**Figure 1**). **Table 1** shows a comparison between 2000 and 2001 cases.



**Table 1. TB in Colorado: 2000-2001
Comparison of 2000 and 2001 Cases**

	Year reported				
	2000		2001		% change
	n	%	n	%	
Age Group					
<15	5	5.2	16	11.6	220.0
15-24	13	13.4	20	14.5	53.8
25-44	31	32.0	44	31.9	41.9
45-64	24	24.7	32	23.2	33.3
65+	24	24.7	26	18.8	8.3
TOTAL	97	100.0	138	100.0	42.3
Gender					
Male	59	60.8	77	55.8	30.5
Female	38	39.2	61	44.2	60.5
TOTAL	97	100.0	138	100.0	42.3
Race/Ethnicity					
White	25	25.8	27	19.6	8.0
Black	12	12.4	19	13.8	58.3
Hispanic	38	39.2	68	49.3	78.9
Amer Ind/AK native	5	5.2	2	1.4	(60.0)
Asian/Pacific Is	17	17.5	22	15.9	29.4
TOTAL	97	100.0	138	100.0	42.3
Region					
Denver metro ^a	63	64.9	96	69.6	52.4
Other than Denver metro	34	35.1	42	30.4	23.5
TOTAL	97	100.0	138	100.0	42.3
Country of Origin					
United States	38	39.2	53	38.4	39.5
Mexico	26	26.8	35	25.4	34.6
Vietnam	5	5.2	6	4.3	20.0
Other countries	28	28.9	44	31.9	57.1
TOTAL	97	100.0	138	100.0	42.3
HIV Status Among 25-44 Age Group					
Negative	21	67.7	40	90.9	90.5
Positive	6	19.4	2	4.5	(66.7)
Refused testing	4	12.9	2	4.5	(50.0)
TOTAL	31	100.0	44	100.0	41.9
Other					
Homeless within past year	8	8.2	8	5.8	0.0
Resident of correctional facility at diagnosis	1	1.0	2	1.4	-
Resident of long-term care facility	4	4.1	4	2.9	0.0
Injected drug use within past year	2	2.1	1	0.7	(50.0)
Non-injected drug use within past year	3	3.1	9	6.5	200.0
Excess alcohol use within past year	11	11.3	18	13.0	63.6
Health care worker within past 2 years	6	6.2	5	3.6	(16.7)

a. Denver metro includes: Adams, Arapahoe, Denver, Douglas, and Jefferson counties.
Beginning in 2001, Boulder County is included as part of Denver metro.

Incidence

In 2001, the case rate for TB jumped to 3.2 per 100,000 (**Figure 2**). To reach the “Healthy People 2010” goal of 1.0 case per 100,000, Colorado will need to reduce the overall number of new cases of TB by approximately 70 percent. As shown in **Table 2**, the case rates for Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaskan native populations exceed 1.0 per 100,000.

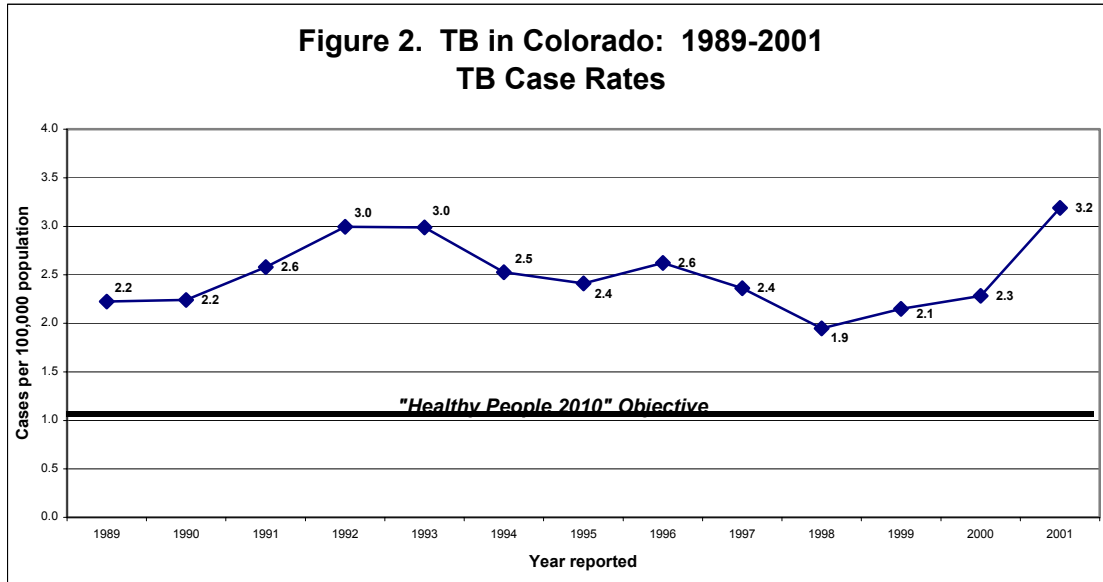
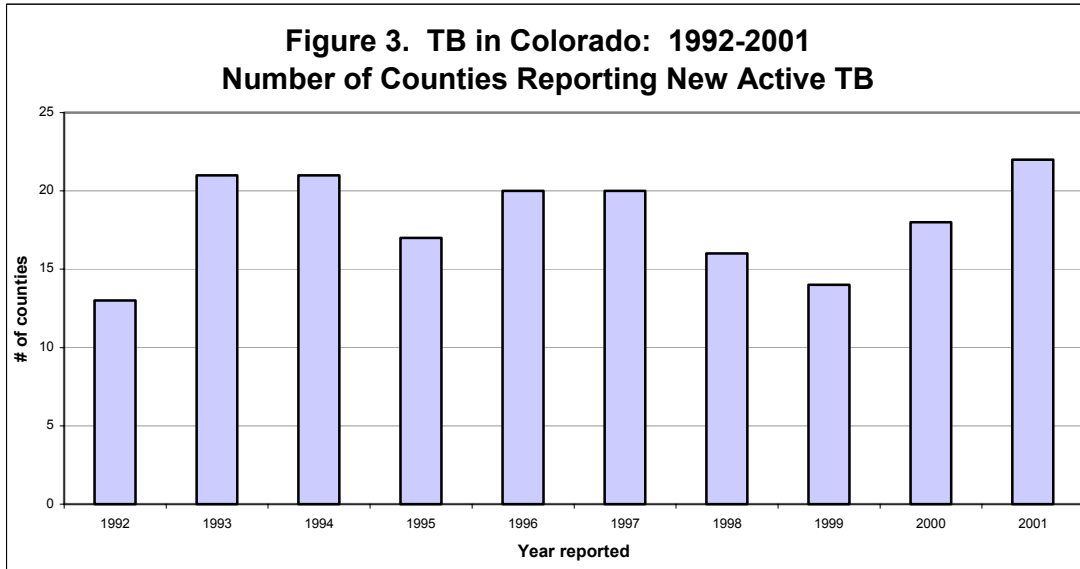


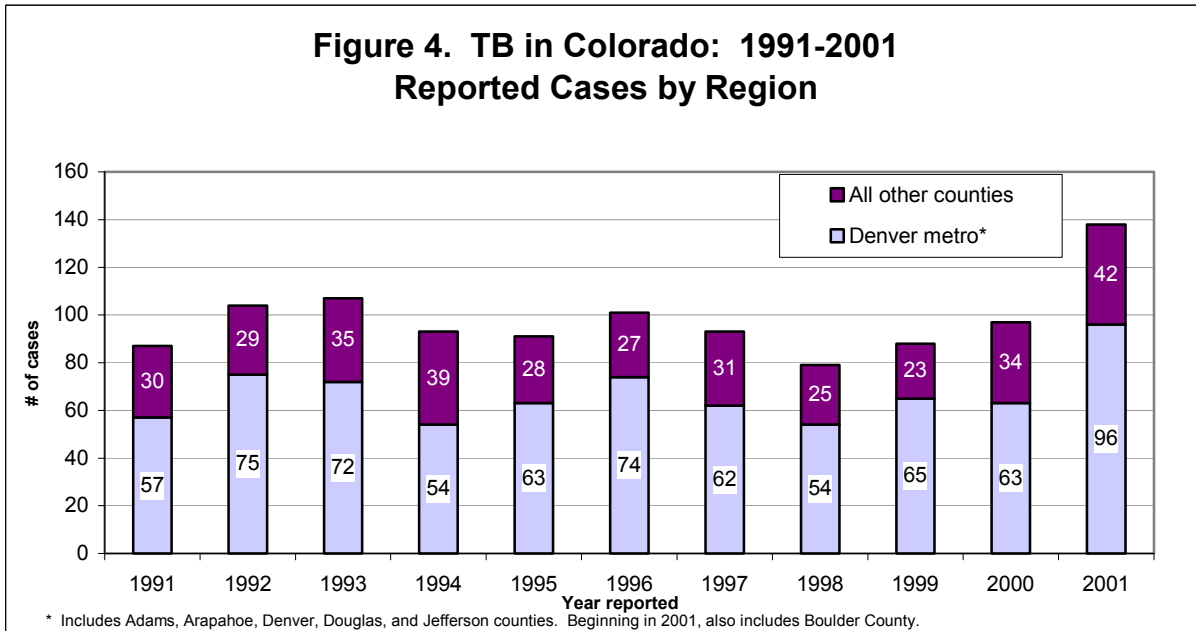
Table 2. TB in Colorado: 2001 Case Rates (per 100,000) by Race/Ethnicity			
Race/ethnicity	# cases	2001	
		Pop est.	Rate
White	27	3,221,244	0.8
Black	19	186,988	10.2
Hispanic	68	720,687	9.4
Asian/Pacific Islander	22	123,225	17.9
Amer Ind/AK native	2	72,770	2.7
TOTAL	138	4,324,914	3.2
Year 2010 goal: <=1.0 cases per 100,000 population			

Location

In 2001, 22 of Colorado's 64 (34 percent) counties reported new active cases of TB. Costilla, Elbert, and Saguache Counties reported cases after having been free of TB for at least five years. Conversely, 16 counties that had reported at least one case during the previous five years did not report any new cases in 2001 (Figure 3, Table 3).



Approximately 56 percent of the state's population resides in the Denver metropolitan counties of Adams, Arapahoe, Boulder, Denver, Douglas, and Jefferson. However, 70 percent of all the cases of TB in Colorado are from those metropolitan counties (Figure 4).



**Table 3. TB in Colorado: 1996-2001
Cases by County and Year of Report**

NOTE: Only counties reporting cases are listed.

County	1996	1997	1998	1999	2000	5-year mean	2001 cases
Adams	10	10	7	8	5	8.0	15
Alamosa	0	1	0	0	0	0.2	0
Arapahoe	13	10	6	12	10	10.2	11
Archuleta	1	0	0	0	0	0.2	0
Bent	0	0	1	0	0	0.2	0
Boulder	1	6	4	3	6	4.0	5
Broomfield	NA	NA	NA	NA	NA	NA	1
Costilla	0	0	0	0	0	0.0	1
Crowley	1	0	0	0	0	0.2	0
Delta	1	0	0	0	2	0.6	1
Denver	40	37	34	39	42	38.4	55
Douglas	2	1	1	1	0	1.0	0
Eagle	1	3	0	0	2	1.2	0
El Paso	5	5	4	9	7	6.0	7
Elbert	0	0	0	0	0	0.0	1
Fremont	0	1	1	0	0	0.4	0
Garfield	0	1	1	0	0	0.4	0
Gunnison	0	1	0	0	0	0.2	2
Jefferson	8	4	6	5	6	5.8	9
La Plata	2	0	0	0	1	0.6	1
Lake	1	0	0	0	0	0.2	0
Larimer	0	3	1	0	2	1.2	3
Las Animas	1	2	0	1	0	0.8	1
Lincoln	0	0	1	0	0	0.2	0
Mesa	5	1	2	0	2	2.0	4
Moffat	0	0	0	1	0	0.2	0
Montezuma	0	0	0	0	1	0.2	0
Montrose	1	1	0	0	2	0.8	1
Morgan	1	1	0	0	1	0.6	0
Otero	1	1	2	1	1	1.2	3
Phillips	0	0	0	1	0	0.2	0
Pitkin	0	0	0	0	1	0.2	1
Pueblo	4	1	5	5	0	3.0	3
Rio Grande	0	0	0	1	0	0.2	1
Routt	0	1	0	0	0	0.2	0
Saguache	0	0	0	0	0	0.0	2
Summit	0	0	0	0	2	0.4	0
Weld	2	3	3	1	4	2.6	10
TOTAL	101	94	79	88	97	90.5	138

The rates in counties with small populations may vary considerably from year to year although the frequency of reports may change by only one or two cases. In order to make a more realistic comparison, the average incidence for counties during the past five years is listed in **Table 4**. At 4.1 cases per 100,000 per year, the incidence rate for the metropolitan Denver counties combined was nearly twice the rate in the rest of the state (2.2 per 100,000 per year).

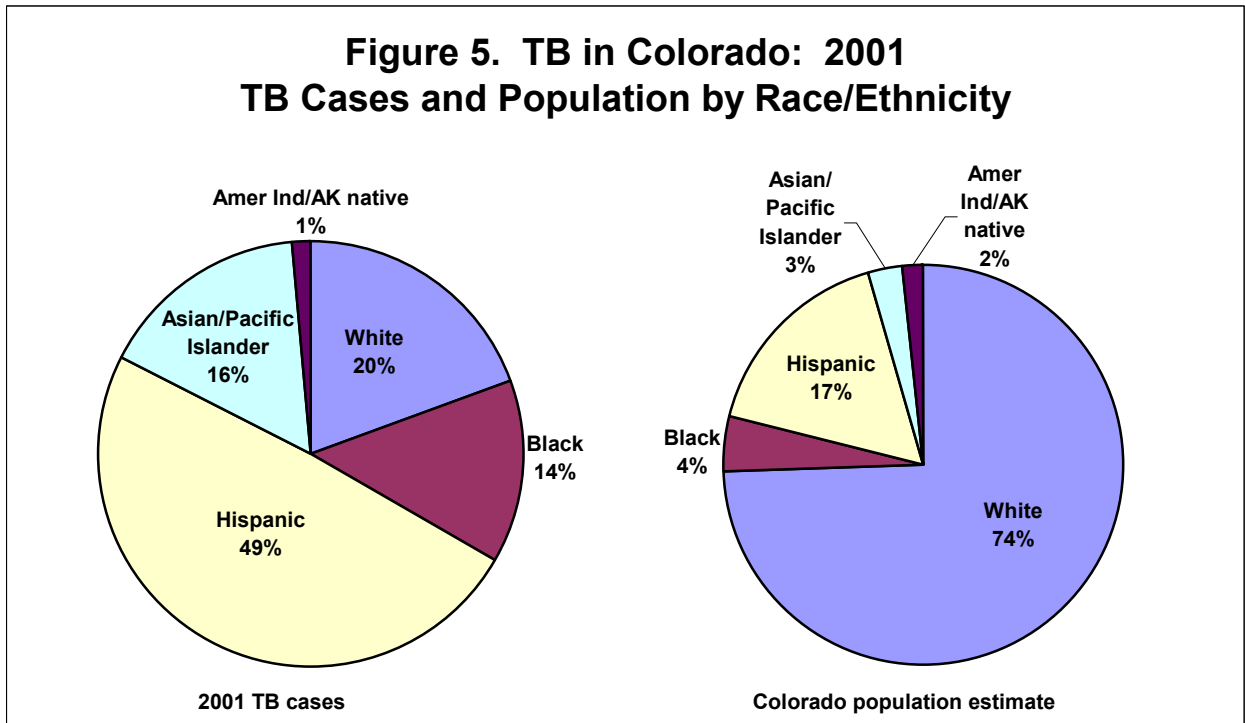
**Table 4. Tuberculosis in Colorado: 1997-2001
Mean Case Rates by County**

County	Mean cases 1997-2001	1999 population	Cases per 100,000 persons per year
Otero	1.6	20,400	7.8
Denver	41.4	545,514	7.6
Saguache	0.4	5,762	6.9
Costilla	0.2	3,680	5.4
Las Animas	0.8	15,142	5.3
Phillips	0.2	4,517	4.4
Gunnison	0.6	13,737	4.4
Bent	0.2	5,995	3.3
Lincoln	0.2	6,090	3.3
Rio Grande	0.4	12,287	3.3
Pitkin	0.4	14,832	2.7
Adams	9.0	355,305	2.5
Eagle	1.0	39,912	2.5
Montrose	0.8	32,742	2.4
Weld	4.2	177,268	2.4
Delta	0.6	27,400	2.2
Arapahoe	9.8	481,305	2.0
Pueblo	2.8	139,715	2.0
Summit	0.4	22,563	1.8
Boulder ^a	5.0	283,929	1.8
Mesa	1.8	114,574	1.6
Moffat	0.2	13,021	1.5
Morgan	0.4	26,953	1.5
Alamosa	0.2	14,823	1.3
El Paso	6.4	508,814	1.3
Jefferson	6.0	520,814	1.2
Elbert	0.2	19,085	1.0
Routt	0.2	19,224	1.0
Garfield	0.4	42,689	0.9
La Plata	0.4	42,758	0.9
Fremont	0.4	45,141	0.9
Montezuma	0.2	23,523	0.9
Larimer	1.8	246,156	0.7
Douglas	0.6	162,322	0.4
Archuleta	0.0	9,573	0.0
Baca	0.0	4,523	0.0
Chaffee	0.0	15,937	0.0
Cheyenne	0.0	2,281	0.0
Clear Creek	0.0	9,186	0.0
Conejos	0.0	8,308	0.0
Crowley	0.0	4,996	0.0
Custer	0.0	3,366	0.0
Dolores	0.0	1,813	0.0
Gilpin	0.0	4,544	0.0
Grand	0.0	11,998	0.0
Hinsdale	0.0	785	0.0
Huerfano	0.0	7,825	0.0
Jackson	0.0	1,581	0.0
Kiowa	0.0	1,631	0.0
Kit Carson	0.0	7,902	0.0
Lake	0.0	7,824	0.0
Logan	0.0	20,287	0.0
Mineral	0.0	805	0.0
Ouray	0.0	3,619	0.0
Park	0.0	13,903	0.0
Prowers	0.0	14,375	0.0
Rio Blanco	0.0	6,098	0.0
San Juan	0.0	554	0.0
San Miguel	0.0	6,533	0.0
Sedgwick	0.0	2,715	0.0
Teller	0.0	20,180	0.0
Washington	0.0	5,024	0.0
Yuma	0.0	9,820	0.0
TOTAL	99.2	4,215,978	2.4

a. Includes Broomfield County.

Race/Ethnicity

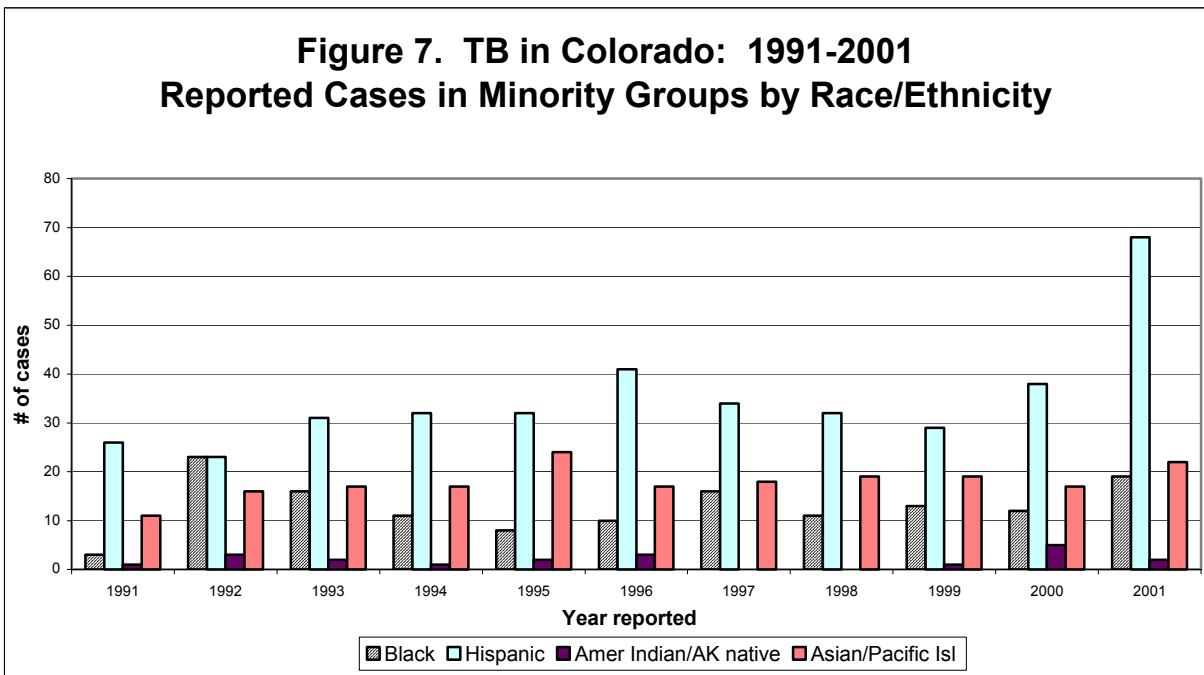
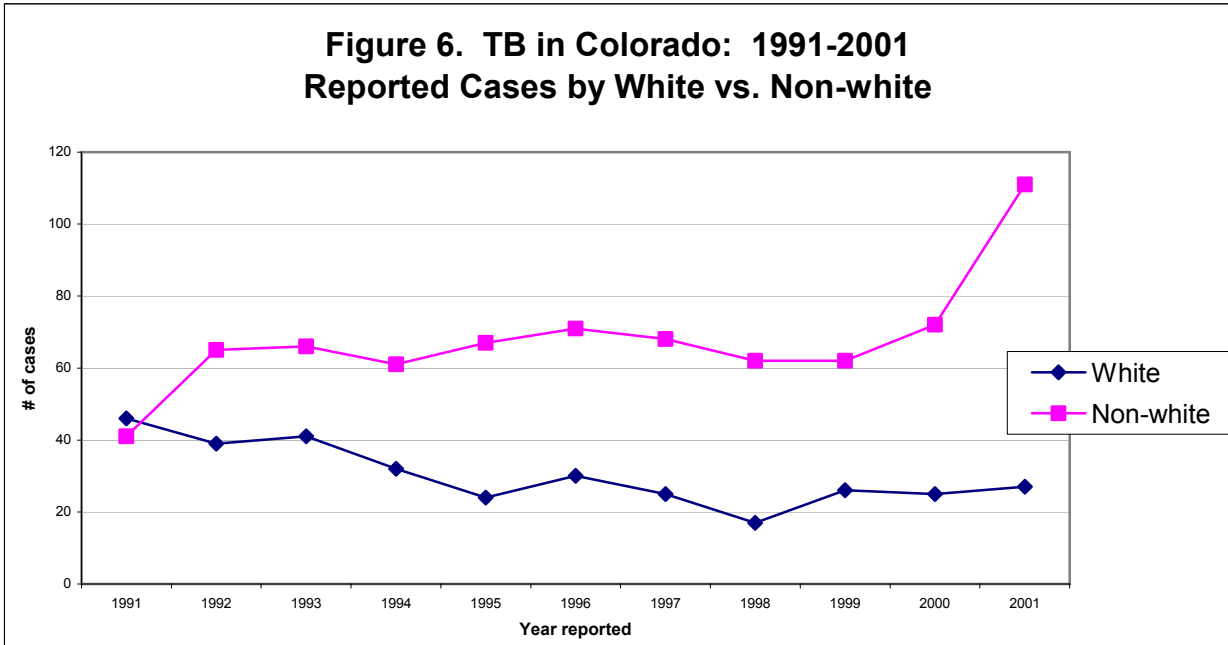
Of the 138 cases reported in 2001, 68 (49 percent) were Hispanic, 27 (20 percent) were non-Hispanic white, 22 (16 percent) were Asian/Pacific Islander, 19 (14 percent) were Black, and 2 (1 percent) were American Indian/Alaskan native. As compared to Colorado's population, which is approximately 75 percent non-Hispanic white, minorities are over-represented (**Figure 5**).



As shown in **Table 5**, there is a greater disparity when looking at the cases by country of origin. Ninety-four percent of the non-U.S. born cases are of non-white race/ethnicity.

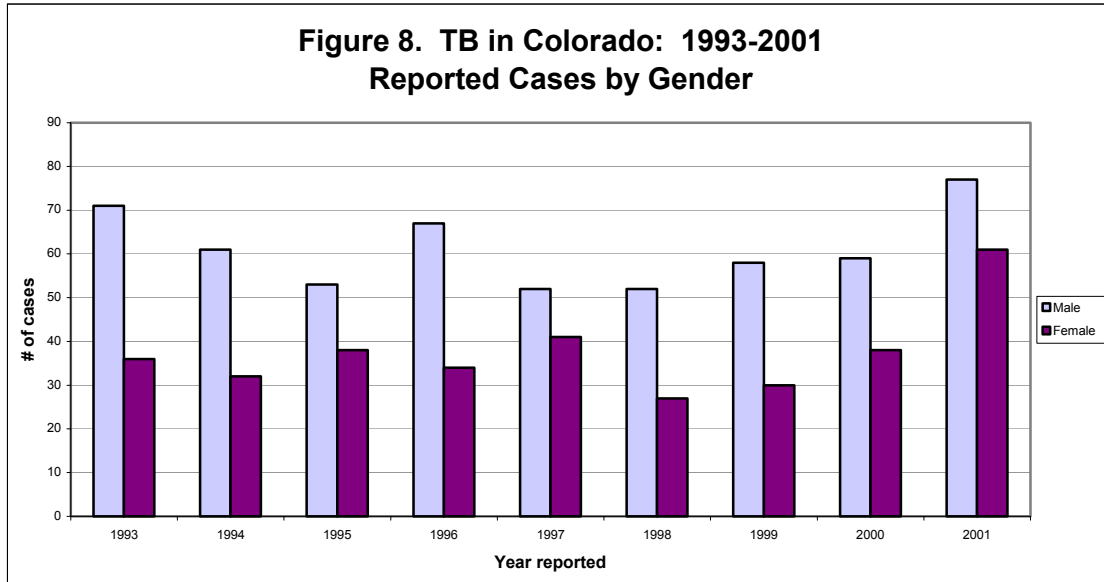
Race/ethnicity	U.S.-born		Foreign-born		Total	
	#	%	#	%	#	%
White	22	15.9	5	3.6	27	19.6
Black	6	4.3	13	9.4	19	13.8
Hispanic	23	16.7	45	32.6	68	49.3
Amer Ind/AK native	2	1.4	0	0.0	2	1.4
Asian/Pacific Is	0	0.0	22	15.9	22	15.9
TOTAL	53	38.4	85	61.6	138	100.0

Since 1991, there has been an overall decrease in cases among the white race/ethnicity group, while cases among the non-white race/ethnicity groups are increasing (**Figure 6**). The number of cases by race/ethnicity among minority groups since 1991 is shown in **Figure 7**.



Gender/Age

The number of cases of TB occurring among males is 1.3 times that occurring among females (**Figure 8**). The ages of persons reported with TB in 2001 ranged from less than one year to 92 years with an average of 41 years.



In 2001, 16 (11.6 percent) of the cases were reported in children less than 15 years of age. Three of the 16 children were born outside of the United States (**Figure 9**). Cases in this age group are an indicator of recent disease transmission.

The largest number of cases for 2001 was in the 25-34 year age group. The 65-74 years age group had the highest incidence with 7.0 cases per 100,000 population (**Table 6**).

Figure 9. TB in Colorado: 1991-2001
Reported Cases in Children < 15 Years by Country of Origin

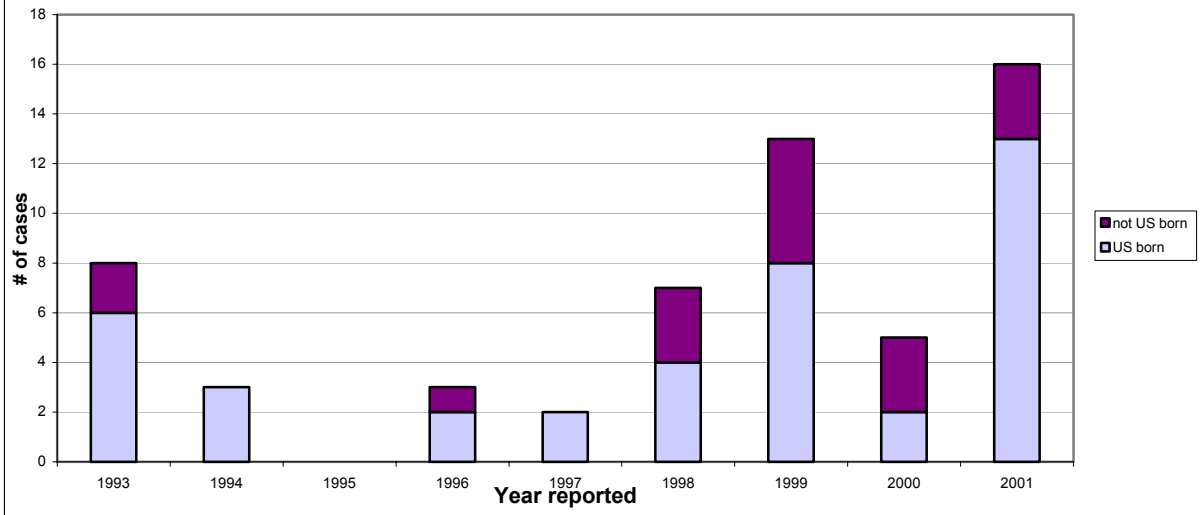


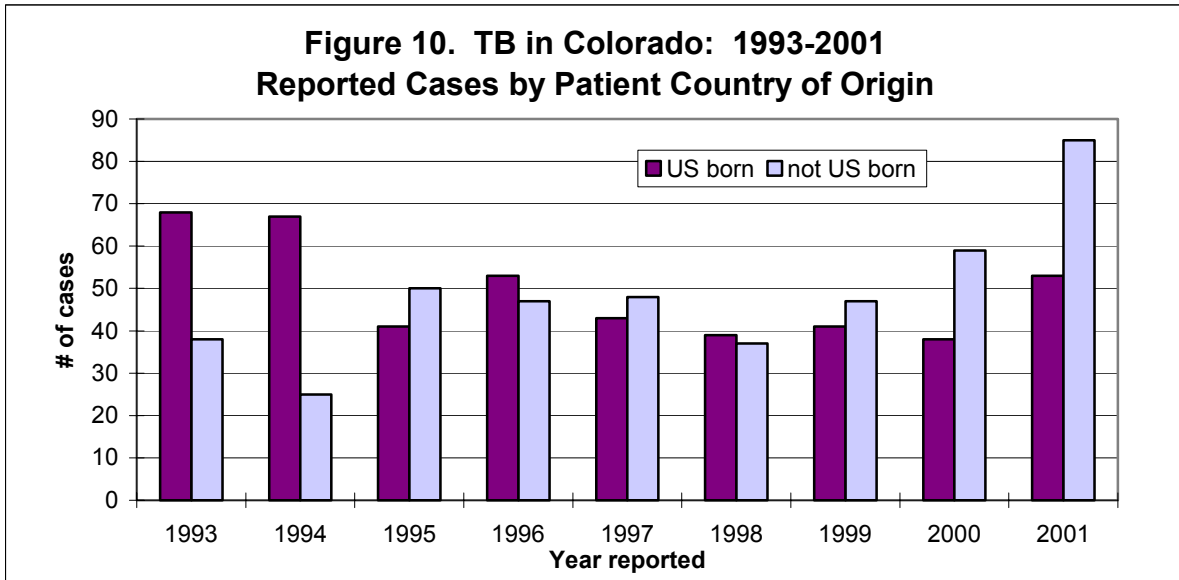
Table 6. TB in Colorado: 2001
Cases and Case Rates by Age Group and Gender

Age group			2001			Rate*
	Male	Female	Total	Pop.est.		
0-14	8	8	16	921,233	1.7	
15-24	12	8	20	617,023	3.2	
25-34	11	15	26	664,218	3.9	
35-44	13	5	18	740,618	2.4	
45-54	11	5	16	621,922	2.6	
55-64	11	5	16	341,551	4.7	
65-74	9	7	16	227,007	7.0	
75-84	2	6	8	142,618	5.6	
85+	0	2	2	48,617	4.1	
TOTAL	77	61	138	4,324,807	3.2	

* Cases per 100,000 persons.

Foreign-born

In 2001, 85 (62 percent) of the TB cases were among persons known to have been born outside the United States (**Figure 10**). Though most of these individuals were born in Mexico, there were cases reported in persons born in 25 other countries (**Table 7**).



**Table 7. TB in Colorado: 2001
Patient Country of Origin - Non U.S.-born Cases**

Country	# of cases	Country	# of cases
Afghanistan	1	Korea	1
Bangladesh	1	Kuwait	1
China	3	Laos	2
Taiwan	1	Mexico	35
Congo	3	Pakistan	1
Dominican Republic	1	Paraguay	1
El Salvador	1	Peru	3
Ethiopia	6	Philippines	3
Ghana	1	Somalia	1
Guatemala	2	United Emirates of Arab	1
Honduras	1	Ukraine	1
India	5	Vietnam	6
Indonesia	1		
Kenya	2	TOTAL	85

There are several differences between the characteristics of U.S.-born and foreign-born. In 2001:

- 48 percent of the foreign-born cases were between the ages of 15 and 34. Only nine percent of the U.S.-born cases were in that same age group.
- Six percent (five out of 85) of the foreign-born cases were of white race/ethnicity as compared to 42 percent (22 out of 53) of the U.S.-born cases.
- 16 percent (11 out of 69) of the culture-positive foreign-born cases were resistant to one or more primary drug as compared to six percent (two out of 34) of the U.S.-born cases.
- All of the cases resistant to more than one primary drug were foreign-born.

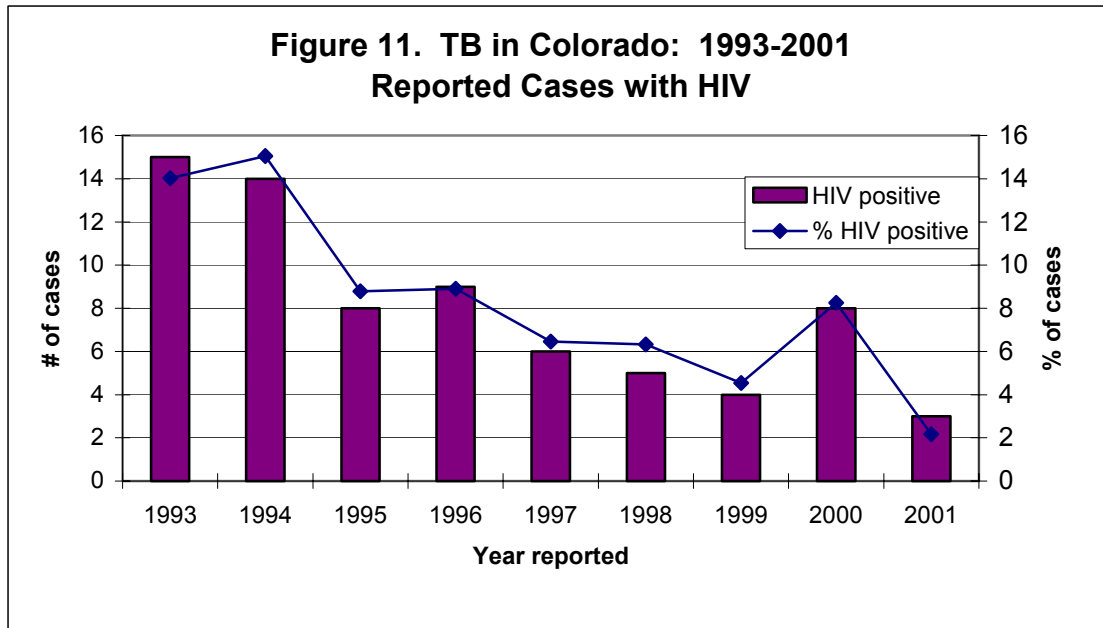
Table 8 shows the number of cases by age group for those born in the United States and those born outside the United States.

Age Group	USA	Foreign	Total
0-4	11	0	11
5-14	2	3	5
15-24	2	18	20
25-34	3	23	26
35-44	7	11	18
45-54	9	7	16
55-64	6	10	16
65-74	7	9	16
75-84	5	3	8
85+	1	1	2
TOTAL	53	85	138

Elapsed time since entry into the U.S. was available for all 85 foreign-born cases reported in 2001. Nineteen (22 percent) were in the U.S. less than six months prior to diagnosis; 13 (15 percent) had been in the U.S. six to 12 months; 20 (24 percent) had been in the U.S. more than one year and less than five years; and 33 (39 percent) had been in the U.S. for more than five years.

HIV/TB Co-infection

The number of cases of TB among persons who are at highest risk of developing active disease – those infected with HIV as well as TB – has been declining since 1993. However, in 2000 the number of persons with TB known to be HIV-positive doubled from 1999 with eight cases reported. In 2001, the number of cases decreased to three (Figure 11).



Occupation

The occupational status is known for all 138 cases in 2000. Five cases were health care workers (currently or within the past two years); six cases were migrant farm workers (currently or within the past two years); 72 were unemployed (including children and retired persons); and 55 worked at a variety of jobs not known to present a high risk for TB.

Drug Susceptibilities

Drug susceptibility results were available for all culture-positive TB cases in 2001. Thirteen (13 percent) of the 103 culture-positive cases were resistant to one or more primary drugs. The primary resistance patterns were as follows:

- 2 isoniazid (INH) only
- 2 pyrazinamide (PZA) only
- 1 streptomycin (SM) only
- 6 INH and SM
- 1 INH, rifampin (RIF), SM
- 1 INH, RIF, PZA

A total of 10 isolates were resistant to INH. Two isolates were multi-drug resistant -- defined as being resistant to at least INH and RIF. There have been more cases of multi-drug resistant among foreign-born persons than among those born in the U.S. In 2001, 2.9 percent of the culture-positive foreign-born cases were multi-drug resistant (**Figures 12**).

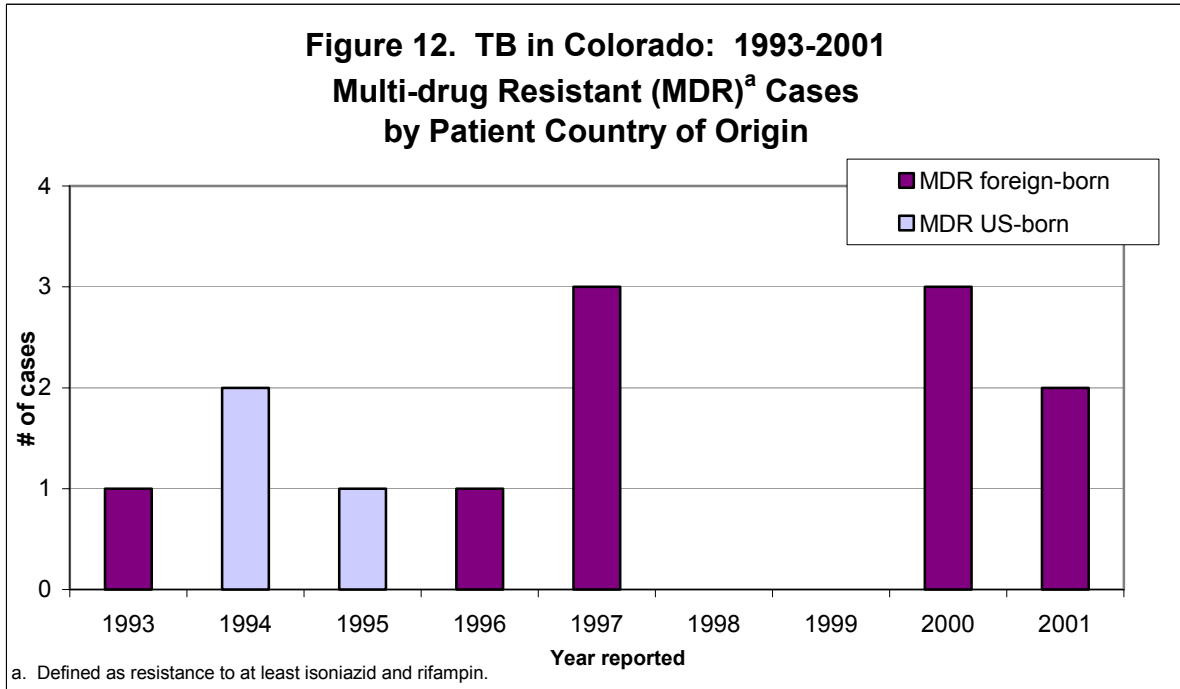


Table 9 describes the 16 cases of multi-drug resistant TB in Colorado from 1993 to 2001. Thirteen of the cases were diagnosed in Colorado and three were diagnosed in other countries.

Table 9. TB in Colorado: 1993-2001 Cases of Multi-drug Resistance (MDR) ^a						
Report year	Age at diagnosis	Sex	County	Country of origin	Resistant to ^b	Completion of therapy
1993	90 years	F	Otero	Mexico	IRS	completed
1994	38 years	F	Jefferson	US	IRPES	completed (31 months)
1994	37 years	M	Jefferson	US	IRPES	died after 18 months of therapy
1995	63 years	M	Denver	US	IRS	completed (26 months)
1996	51 years	F	Arapahoe	Mexico	IRPE	died after 20 months of therapy
transfer ^c 1996	30 years	F	Boulder	China	IR	completed (22 months)
1997	24 years	F	Boulder	India	IRP	moved after 6 months of therapy outcome unknown
1997	48 years	M	Denver	Viet Nam	IRPES	completed (26 months)
1997	28 years	F	Adams	Mexico	IRPE	died after 11 months of therapy
2000	20 years	F	Boulder	Mexico	IRP	currently on therapy ^d
transfer ^c 2000	31 years	F	Larimer	Mexico	IR	currently on therapy ^d
2000	39 years	F	Adams	Mexico	IRPES	currently on therapy ^d
2000	36 years	M	Denver	Mexico	IR	currently on therapy ^d
2001	64 years	F	Denver	China	IRP	currently on therapy ^d
transfer ^c 2001	41 years	M	El Paso	Korea	IRPES	currently on therapy ^d
2001	65 years	M	Adams	Peru	IRS	currently on therapy ^d

a. Defined as resistance to at least isoniazid and rifampin.
b. I=isoniazid, R=rifampin, P=pyrazinamide, E=ethambutol, S=streptomycin
c. Cases not included on graphs of MDR. Cases are counted in the reporting area where they are diagnosed.
d. As of 3/2002.