

## Tuberculosis in Colorado A Summary of Cases Reported in 2000

The number of cases of active tuberculosis (TB) in Colorado increased in 1999 and again in 2000. From 1993 to 1997, the number of cases had declined from 107 to 79. In 1999, however, there was a 10% increase with 88 cases being reported. In 2000, there was again a 10% increase with 97 cases being reported (Figure 1). Table 1 shows a comparison between 1999 and 2000 cases.

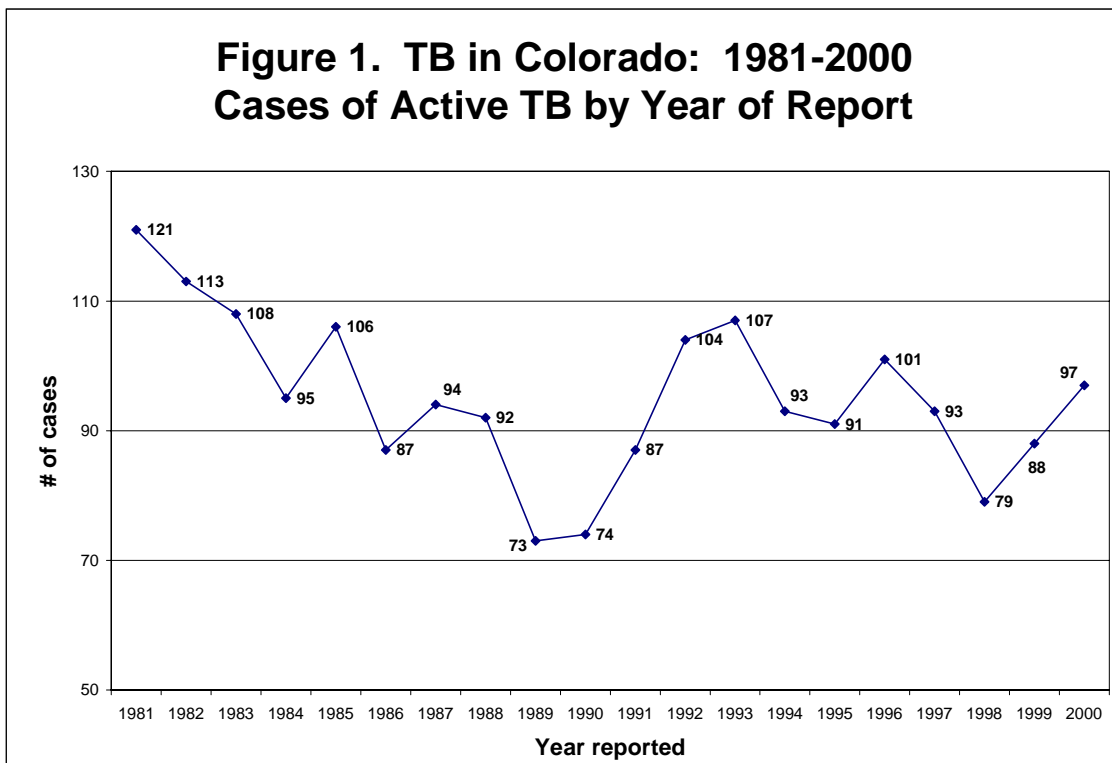
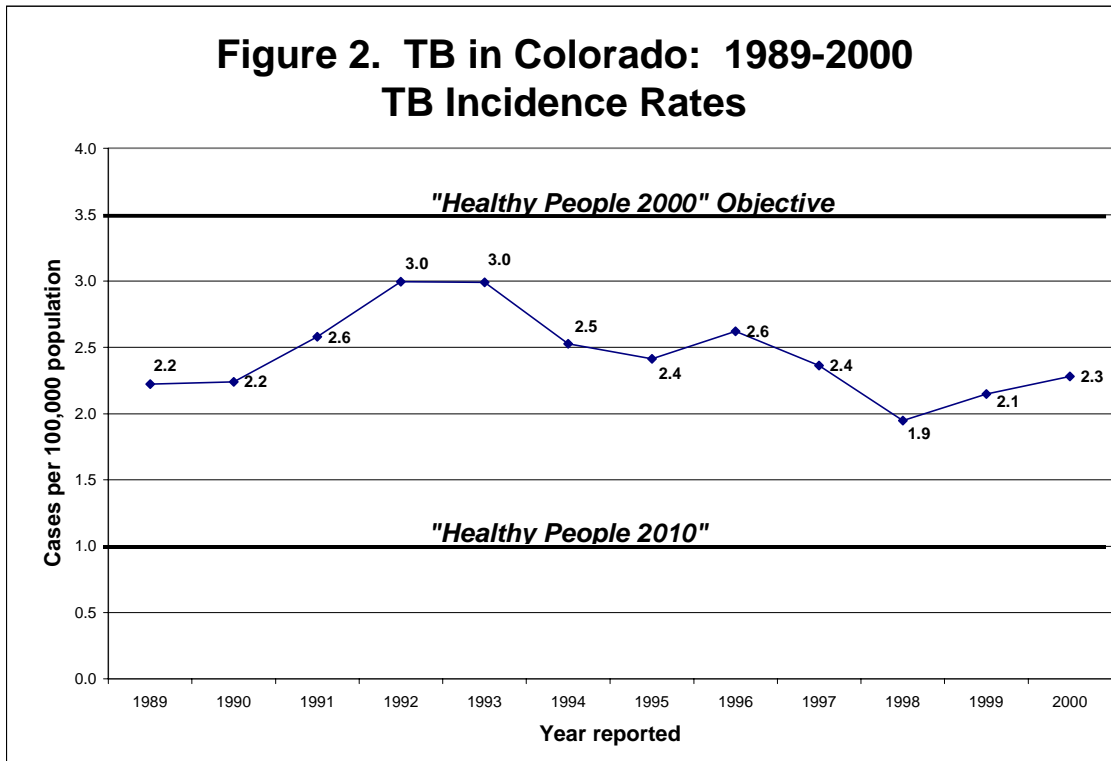


Table 1. TB in Colorado: 1999-2000 Comparison of 1999 and 2000 Cases			
	Year reported		% change
	1999	2000	
<b>Age Group</b>			
<15	13	5	(61.5)
15-24	5	13	160.0
25-44	26	31	19.2
45-64	22	24	9.1
65+	22	24	9.1
<b>TOTAL</b>	<b>88</b>	<b>97</b>	<b>10.2</b>
<b>Gender</b>			
Male	58	59	1.7
Female	30	38	26.7
<b>TOTAL</b>	<b>88</b>	<b>97</b>	<b>10.2</b>
<b>Race/Ethnicity</b>			
White	26	25	(3.8)
Black	13	12	(7.7)
Hispanic	29	38	31.0
Amer Ind/AK native	1	5	400.0
Asian/Pacific Is	19	17	(10.5)
<b>TOTAL</b>	<b>88</b>	<b>97</b>	<b>10.2</b>
<b>Region</b>			
Denver metro <sup>a</sup>	65	63	(3.1)
Other than Denver metro	23	34	47.8
<b>TOTAL</b>	<b>88</b>	<b>97</b>	<b>10.2</b>
<b>Country of Origin</b>			
United States	41	38	(7.3)
Mexico	14	26	85.7
Vietnam	7	5	(28.6)
Other countries	26	28	7.7
<b>TOTAL</b>	<b>88</b>	<b>97</b>	<b>10.2</b>
<b>HIV Status Among 25-44 Age Group</b>			
Negative	22	21	(4.5)
Positive	2	6	200.0
Refused testing	2	4	100.0
<b>TOTAL</b>	<b>26</b>	<b>31</b>	<b>19.2</b>
<b>Other</b>			
Homeless within past year	11	8	(27.3)
Resident of correctional facility at diagnosis	0	1	-
Resident of long-term care facility	3	4	33.3
Injected drug use within past year	1	2	100.0
Non-injected drug use within past year	5	3	(40.0)
Excess alcohol use within past year	7	11	57.1
Health care worker within past 2 years	2	6	200.0

a. Denver metro includes: Adams, Arapahoe, Denver, Douglas, and Jefferson counties.

## Incidence Rate

In 2000, the incidence rate for TB was 2.3 per 100,000 (**Figure 2**). Although the overall rate is below the "Healthy People 2000" objective of 3.5 cases per 100,000, the rates in certain groups exceeded the "Healthy People 2000" goal. The goal for persons of Asian/Pacific Islander race/ethnicity is 15.0 per 100,000. Colorado's rate in 2000 was 16.7 per 100,000. The rate for persons of Hispanic race/ethnicity was also above the 2000 goal (**Table 2**). The number of new cases of TB among all race/ethnicity groups will have to be reduced to reach the "Healthy People 2010" goal of 1.0 case per 100,000.

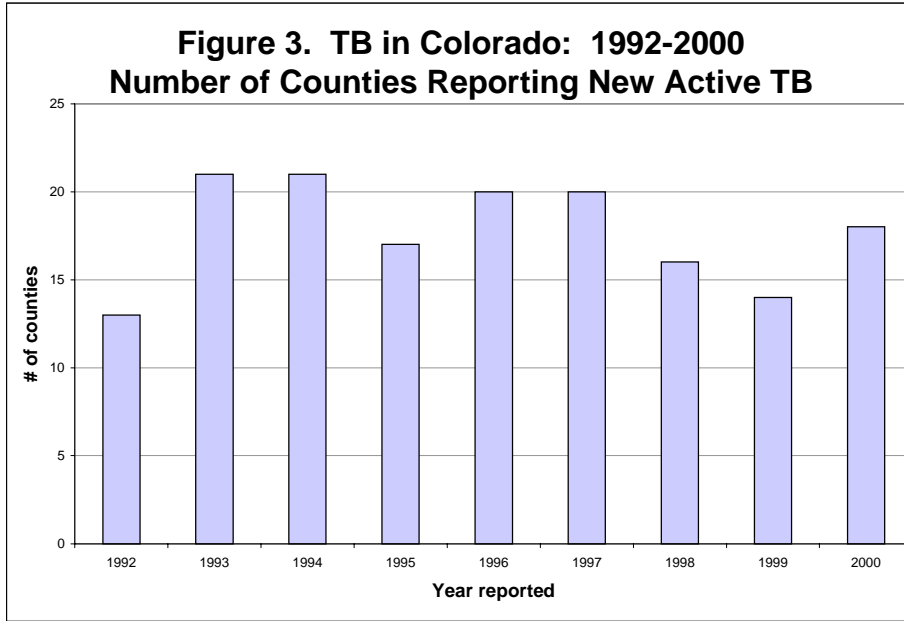


**Table 2. TB in Colorado: 2000**  
**Case Rates (per 100,000) by Race/Ethnicity**

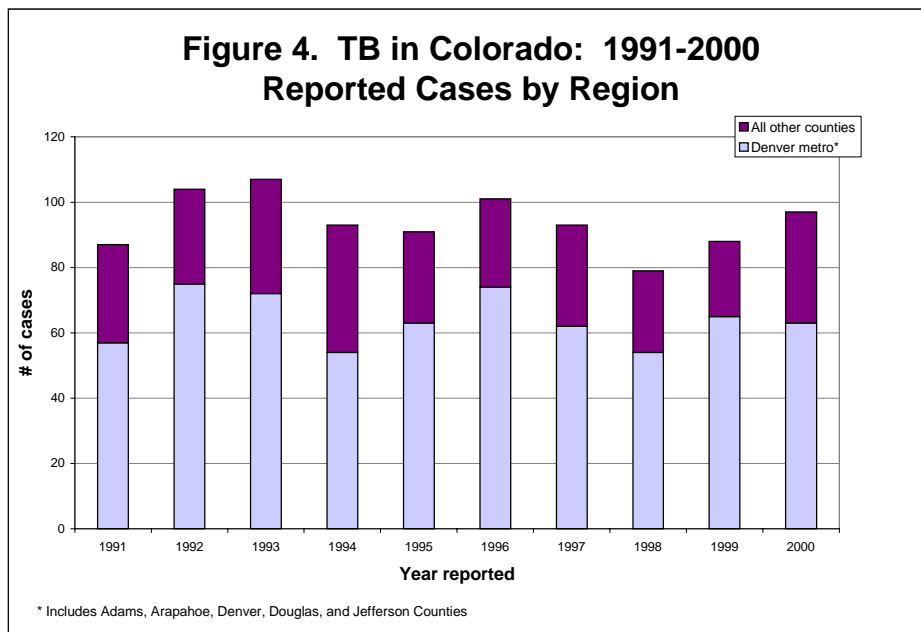
Race/ethnicity	# cases	2000		Year 2000 goal
		Pop est.	Rate	
White	25	3351266	0.7	3.5
Black	12	178427	6.7	10.0
Hispanic	38	582339	6.5	5.0
Asian/Pacific Islander	17	101557	16.7	15.0
Amer Ind/AK native	5	37520	13.3	5.0
<b>TOTAL</b>	<b>97</b>	<b>4,251,109</b>	<b>2.3</b>	<b>&lt;=3.5</b>
<b>Year 2010 goal: &lt;=1.0 cases per 100,000 population</b>				

## Location

In 2000, 18 of 63 (29%) counties reported new active cases of TB. Pitkin County reported one new case and Summit County reported two new 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 2000 (**Figure 3, Table 3**).



Approximately half of the state's population resides in the five metro Denver counties of Adams, Arapahoe, Denver, Douglas, and Jefferson. However, two-thirds of all the cases of TB in Colorado are from the metro Denver metro area. In 2000, 63 of the 97 cases were from the Denver metro area (**Figure 4**).



**Table 3. TB in Colorado: 1995-2000  
Cases by County and Year of Report**

County	Year reported					5-year mean	2000 cases
	1995	1996	1997	1998	1999		
Adams	5	10	10	7	8	8.0	5
Alamosa	0	0	1	0	0	0.2	0
Arapahoe	11	13	10	6	12	10.4	10
Archuleta	0	1	0	0	0	0.2	0
Bent	0	0	0	1	0	0.2	0
Boulder	5	1	6	4	3	3.8	6
Crowley	0	1	0	0	0	0.2	0
Delta	1	1	0	0	0	0.4	2
Denver	45	40	37	34	39	39.0	42
Douglas	0	2	1	1	1	1.0	0
Eagle	1	1	3	0	0	1.0	2
El Paso	3	5	5	4	9	5.2	7
Fremont	1	0	1	1	0	0.6	0
Garfield	0	0	1	1	0	0.4	0
Gunnison	0	0	1	0	0	0.2	0
Jefferson	3	8	4	6	5	5.2	6
La Plata	0	2	0	0	0	0.4	1
Lake	0	1	0	0	0	0.2	0
Larimer	4	0	3	1	0	1.6	2
Las Animas	2	1	2	0	1	1.2	0
Lincoln	0	0	0	1	0	0.2	0
Mesa	1	5	1	2	0	1.8	2
Moffat	0	0	0	0	1	0.2	0
Montezuma	1	0	0	0	0	0.2	1
Montrose	0	1	1	0	0	0.4	2
Morgan	2	1	1	0	0	0.8	1
Otero	0	1	1	2	1	1.0	1
Phillips	0	0	0	0	1	0.2	0
Pitkin	0	0	0	0	0	0.0	1
Pueblo	3	4	1	5	5	3.6	0
Rio Grande	0	0	0	0	1	0.2	0
Routt	0	0	1	0	0	0.2	0
Summit	0	0	0	0	0	0.0	2
Weld	3	2	3	3	1	2.4	4
<b>TOTAL</b>	<b>91</b>	<b>101</b>	<b>94</b>	<b>79</b>	<b>88</b>	<b>90.6</b>	<b>97</b>

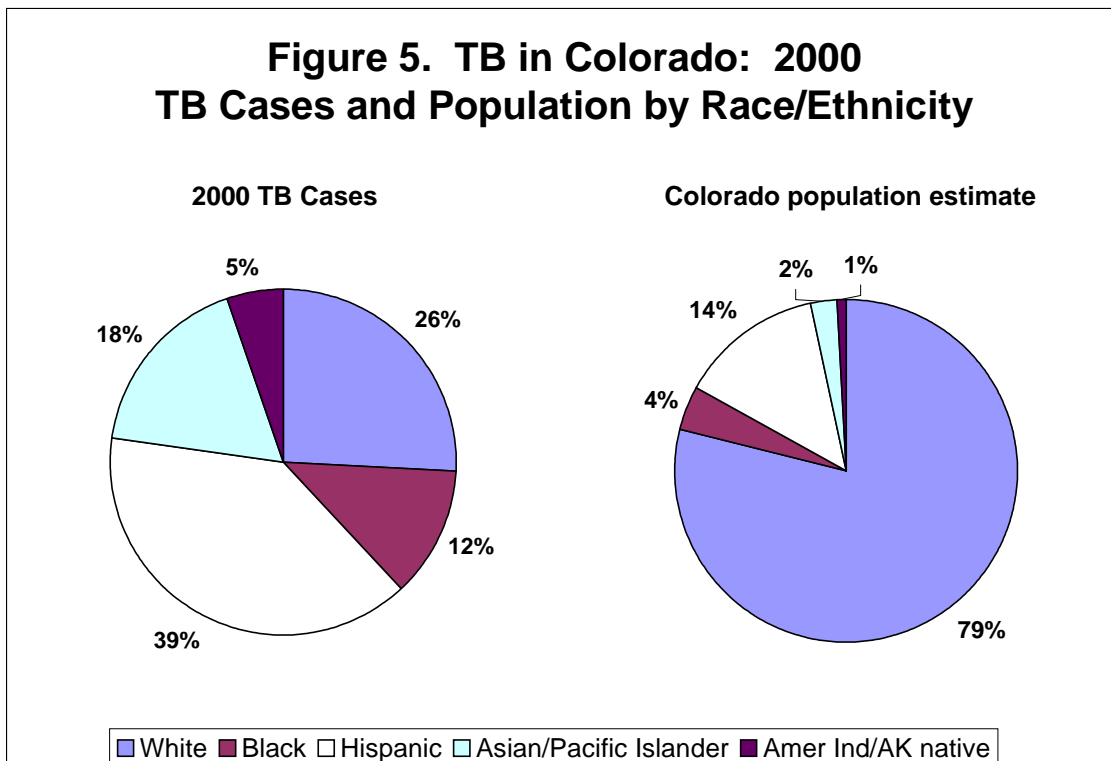
It is statistically tenuous to compare incidence rates between individual counties because the rate in counties with small populations may vary considerably from year to year although the frequency of reports may change by only one or two cases. In order to make a more realistic comparison, the average incidence for counties during the past five years is listed in **Table 4**. At 3.2 cases per 100,000 per year, the incidence rate for the metro Denver counties combined was over twice the rate in the rest of the state (1.4 per 100,000 per year). A map of Colorado counties showing case rates is at the end of this report.

**Table 4. TB in Colorado: 1996-2000  
Mean Case Rates by County**

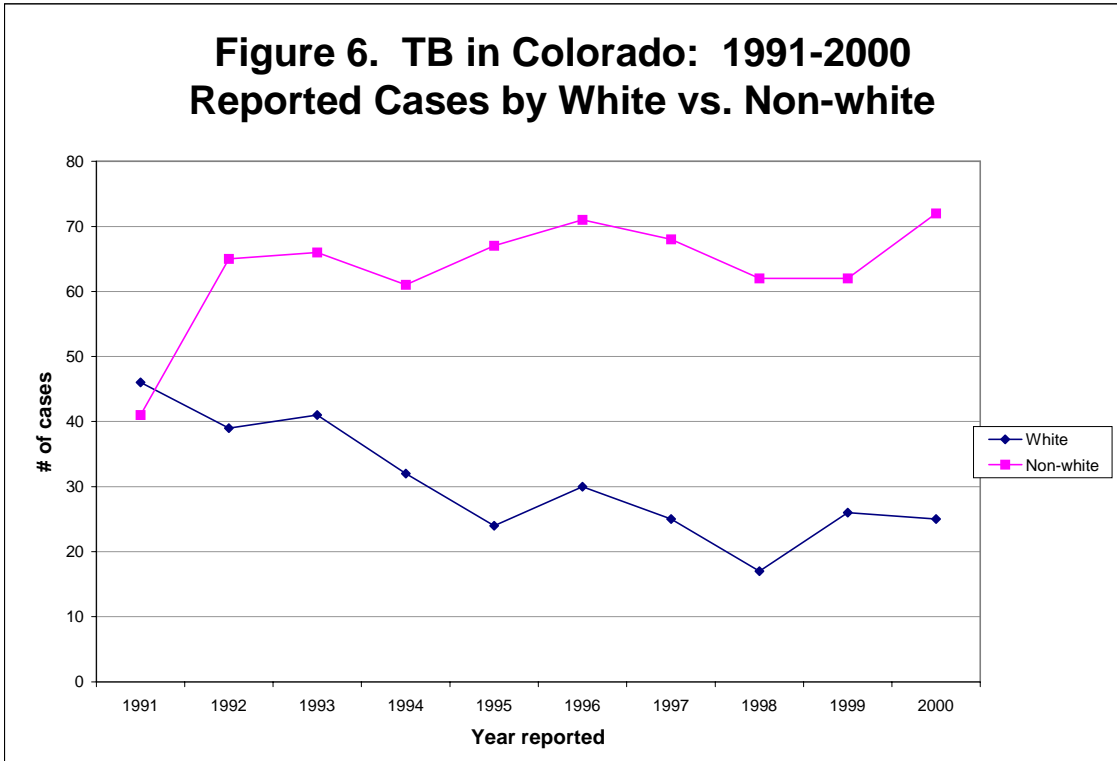
County	Mean cases 1996-2000	1998 population	Cases per 100,000 persons per year
Denver	38.4	521,644	7.4
Otero	1.2	21,302	5.6
Las Animas	0.8	15,916	5.0
Phillips	0.2	4,661	4.3
Crowley	0.2	4,747	4.2
Eagle	1.2	33,877	3.5
Bent	0.2	6,209	3.2
Lincoln	0.2	6,633	3.0
Montrose	0.8	31,544	2.5
Adams	8.0	322,359	2.5
Lake	0.2	8,343	2.4
Morgan	0.6	26,718	2.2
Delta	0.6	26,794	2.2
Pueblo	3.0	136,309	2.2
Archuleta	0.2	9,147	2.2
Arapahoe	10.2	478,574	2.1
Summit	0.4	19,470	2.1
Mesa	2.0	113,385	1.8
Rio Grande	0.2	12,209	1.6
Moffat	0.2	12,694	1.6
Weld	2.6	167,865	1.5
Gunnison	0.2	13,320	1.5
Boulder	4.0	272,839	1.5
La Plata	0.6	41,896	1.4
Pitkin	0.2	14,343	1.4
Alamosa	0.2	16,043	1.2
El Paso	6.0	492,184	1.2
Jefferson	5.8	512,119	1.1
Routt	0.2	17,717	1.1
Garfield	0.4	40,463	1.0
Fremont	0.4	43,273	0.9
Montezuma	0.2	22,797	0.9
Douglas	1.0	146,071	0.7
Larimer	1.2	231,548	0.5
Baca	0.0	4,557	0.0
Chaffee	0.0	15,882	0.0
Cheyenne	0.0	2,469	0.0
Clear Creek	0.0	8,985	0.0
Conejos	0.0	7,938	0.0
Costilla	0.0	3,540	0.0
Custer	0.0	3,366	0.0
Dolores	0.0	1,821	0.0
Elbert	0.0	18,641	0.0
Gilpin	0.0	4,276	0.0
Grand	0.0	10,139	0.0
Hinsdale	0.0	745	0.0
Huerfano	0.0	7,629	0.0
Jackson	0.0	1,789	0.0
Kiowa	0.0	1,780	0.0
Kit Carson	0.0	7,585	0.0
Logan	0.0	18,674	0.0
Mineral	0.0	693	0.0
Ouray	0.0	3,388	0.0
Park	0.0	13,334	0.0
Prowers	0.0	14,002	0.0
Rio Blanco	0.0	7,138	0.0
Saguache	0.0	6,043	0.0
San Juan	0.0	538	0.0
San Miguel	0.0	5,981	0.0
Sedgwick	0.0	2,680	0.0
Teller	0.0	20,642	0.0
Washington	0.0	5,356	0.0
Yuma	0.0	9,765	0.0
<b>TOTAL</b>	<b>91.8</b>	<b>4,054,389</b>	<b>2.3</b>

## Race/Ethnicity

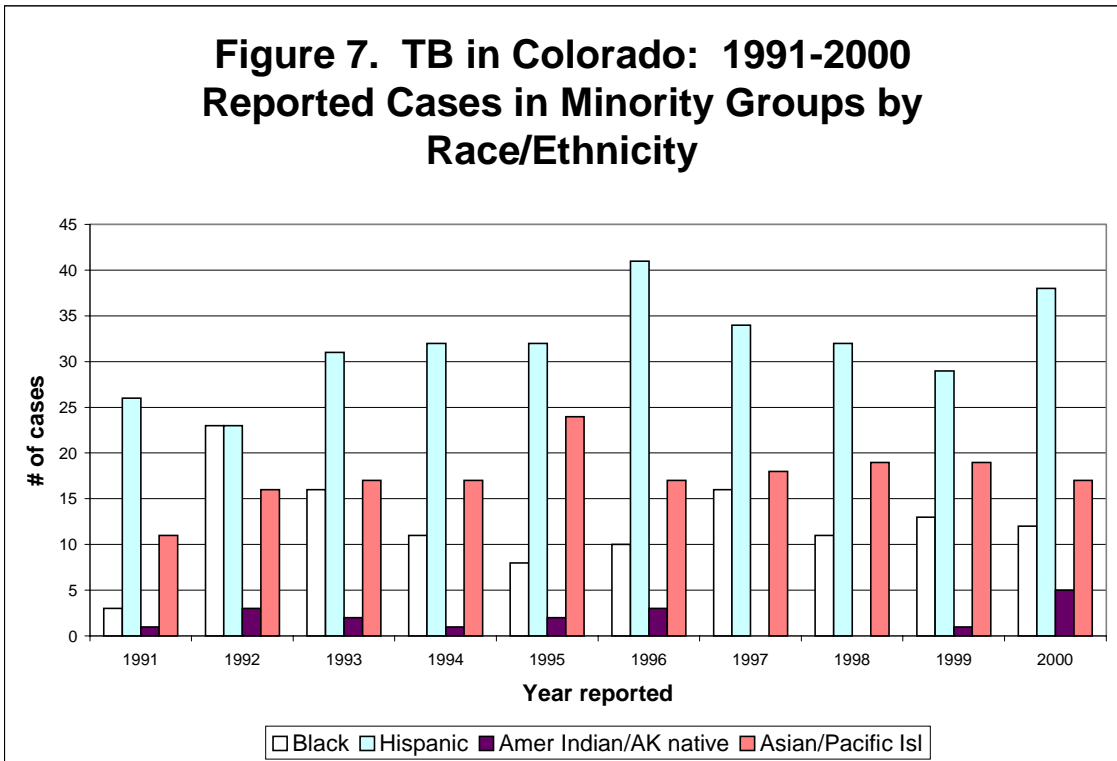
Of the 97 cases reported in 2000, 38 (39%) were Hispanic, 25 (26%) were non-Hispanic white, 17 (18%) were Asian/Pacific Islander, 12 (12%) were black, and 5 (5%) were American Indian/Alaskan native. As compared to Colorado's population, which is approximately 79% non-Hispanic white, minorities are over-represented (**Figure 5**). Since 1991, there has been an overall decrease in cases in white race/ethnicity while cases in non-white race/ethnicity are increasing (**Figure 6**). The number of cases by minority race/ethnicity since 1991 are shown in **Figure 7**.



**Figure 6. TB in Colorado: 1991-2000  
Reported Cases by White vs. Non-white**



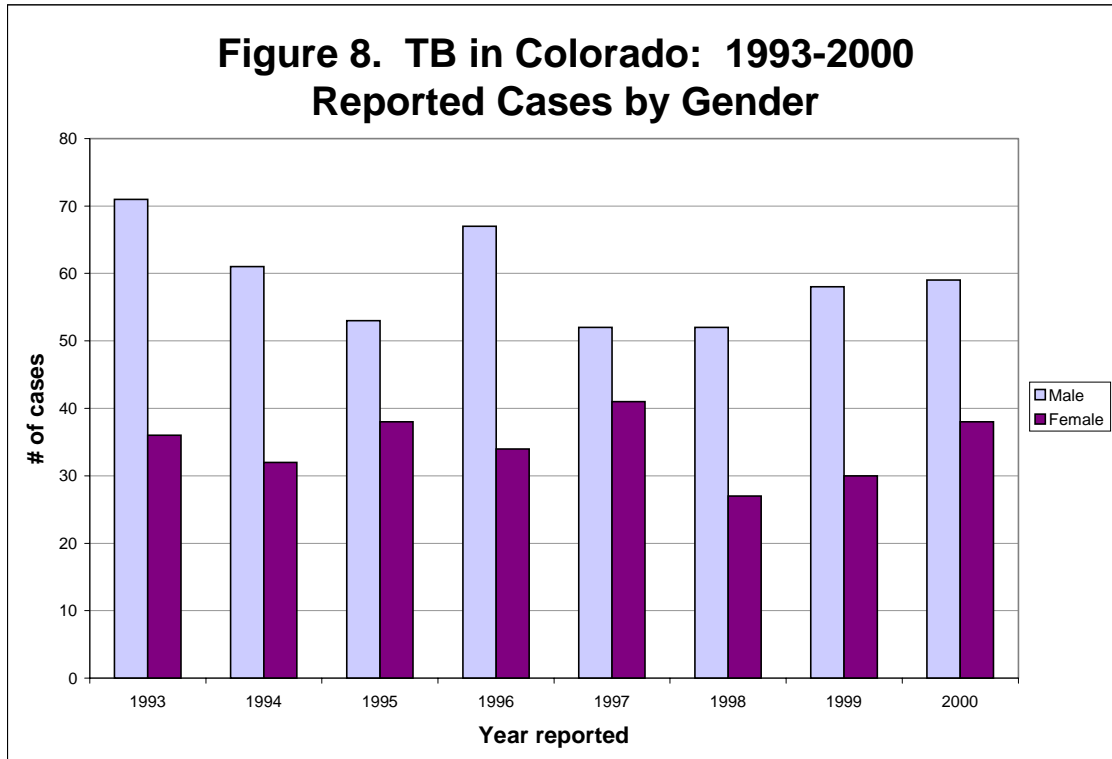
**Figure 7. TB in Colorado: 1991-2000  
Reported Cases in Minority Groups by  
Race/Ethnicity**





## Gender/Age

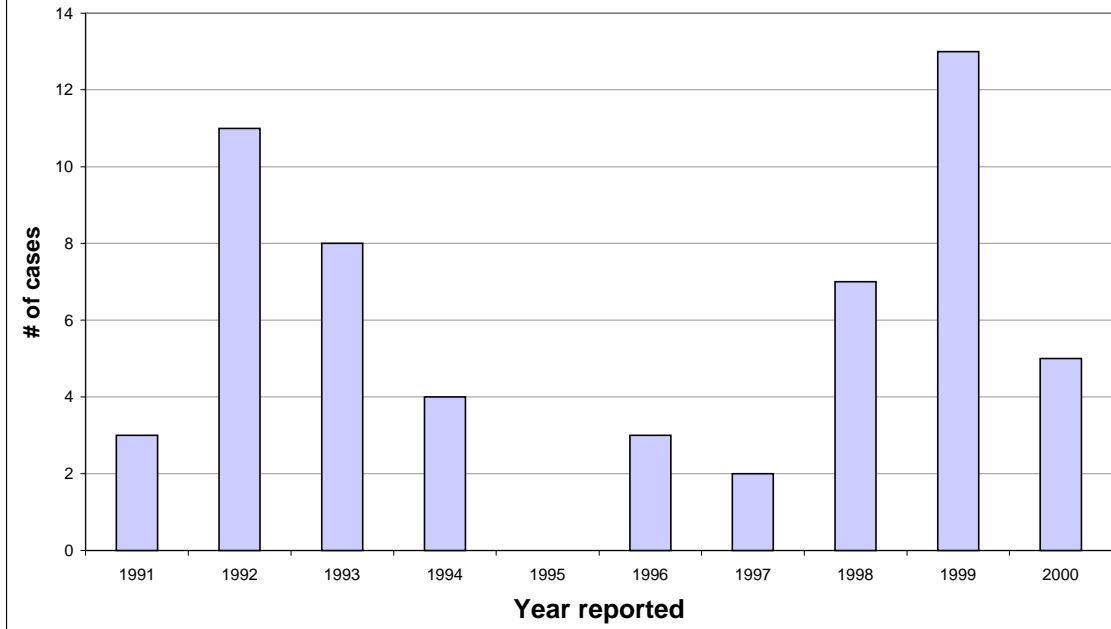
The number of cases occurring among males is 1.6 times that occurring among females (**Figure 8**). The ages of persons reported with TB in 2000 ranged from 1 year to 92 years with the average age being 46 years.



In 2000, 5 (5%) of the cases were reported in children less than 15 years of age. Three of the five children were born outside of the United States (**Figure 9**). Cases in this age group are an indicator of recent disease transmission.

The incidence rate for this age group was 0.5 per 100,000 population. Generally, incidence rates increased with age with the highest incidence rates occurring in the 85 years and older age group. The largest number of cases for 2000 was in the 35-44 year age group (**Table 5**).

**Figure 9. TB in Colorado: 1991-2000  
Reported Cases in Children < 15 Years of Age**



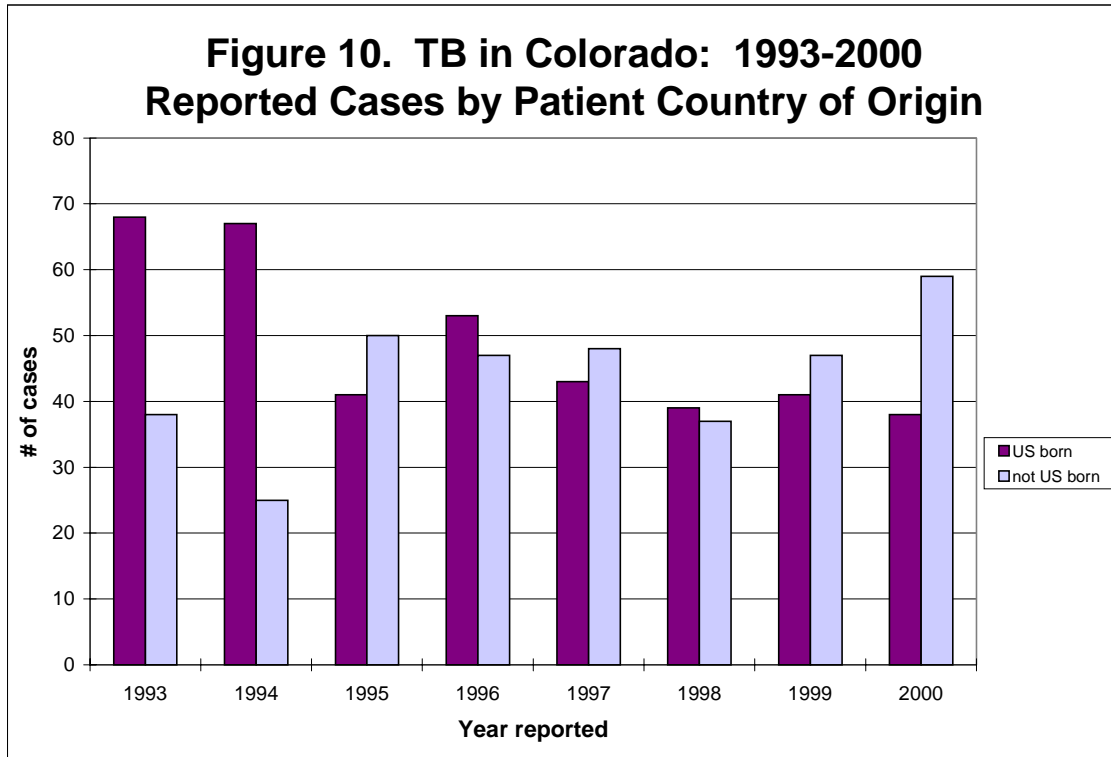
**Table 5. TB in Colorado: 2000  
Cases and Case Rates by Age Group and Gender**

Age group	2000			Pop.est.	Rate*
	Male	Female	Total		
0-14	2	3	5	924,783	0.5
15-24	6	7	13	635,630	2.0
25-34	9	3	12	581,579	2.1
35-44	12	7	19	730,820	2.6
45-54	9	4	13	618,447	2.1
55-64	6	5	11	347,060	3.2
65-74	8	3	11	231,205	4.8
75-84	5	4	9	139,037	6.5
85+	2	2	4	42,548	9.4
<b>TOTAL</b>	<b>59</b>	<b>38</b>	<b>97</b>	<b>4,251,109</b>	<b>2.3</b>

\* Cases per 100,000 persons.

## Foreign-born

In 2000, over half (61%) of the TB cases were among persons known to have been born outside the United States (**Figure 10**). Though most of these cases were born in Mexico, there were cases reported in persons born in 21 other countries (**Table 6**).



**Table 6. TB in Colorado: 2000  
Patient Country of Origin**

Country	# of cases	Country	# of cases
Bosnia	1	Korea	2
Cambodia	1	Kenya	1
Canada	1	Mexico	26
China	3	Nigeria	1
Croatia	1	Phillipines	1
Egypt	1	Soviet Union	1
Ethiopia	3	Sudan	1
Guatemala	1	Uganda	1
Honduras	3	United States	38
India	3	Vietnam	5
Indonesia	1		
Ireland	1	<b>TOTAL</b>	<b>97</b>

There are several differences between the characteristics of U.S.-born and foreign-born. In 2000:

- The mean age of foreign-born cases was 38 years (46% less than 35 years) and the mean age for U.S.-born cases was 59 years (8% less than 35 years).
- 12% (7/59) of the foreign-born cases were of white race/ethnicity as compared to 47% (18/38) of the U.S.-born cases.
- 18% (9/49) of the culture-positive foreign-born cases were resistant to one or more primary drug as compared to 3% (1/33) of the U.S.-born cases.

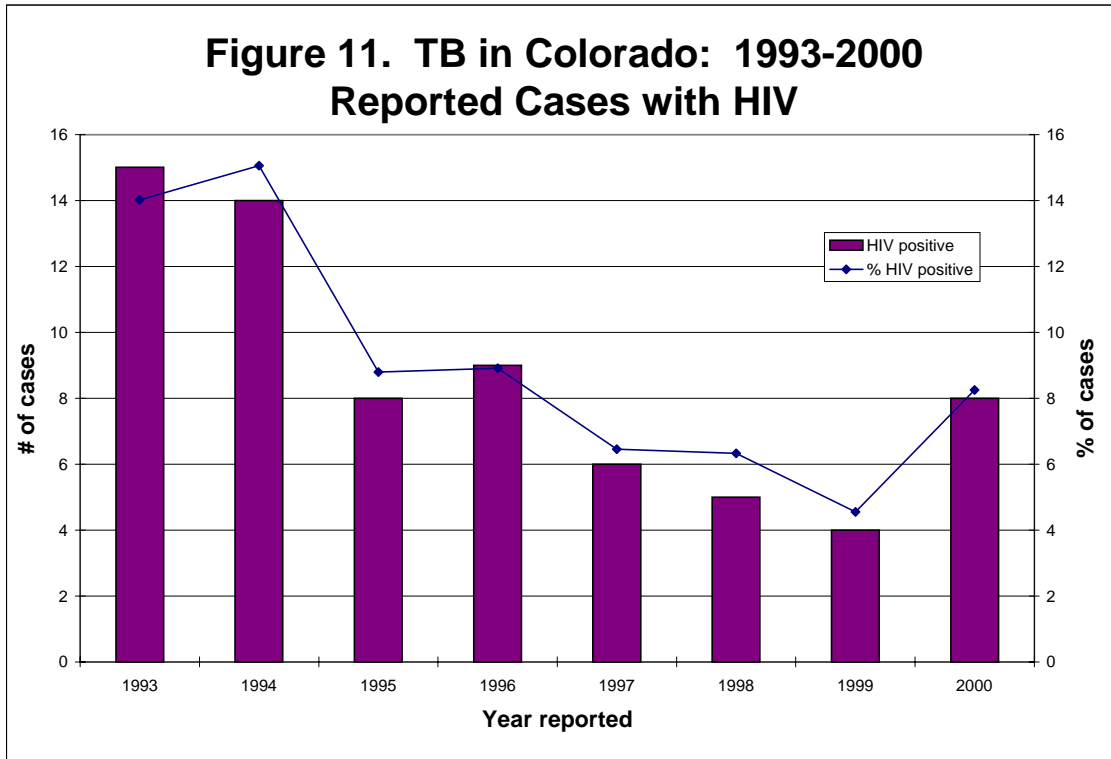
**Table 7** shows the number of cases by age group for those born in the United States and those born outside the United States.

<b>Age Group</b>	<b>USA</b>	<b>Foreign</b>	<b>Total</b>
0-4	2	3	5
5-14	0	0	0
15-24	1	12	13
25-34	0	12	12
35-44	7	12	19
45-54	5	8	13
55-64	5	6	11
65-74	7	4	11
75-84	8	1	9
85+	3	1	4
<b>TOTAL</b>	<b>38</b>	<b>59</b>	<b>97</b>

Elapsed time since entry into the U.S. was available for 58 of 59 (98%) foreign-born cases reported in 2000. Twenty-three (40%) were in the U.S. less than one year, 15 (26%) had been in the U.S. 1-5 years, and 20 (34%) had been in the U.S. for over 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 cases known to be HIV-positive doubled from 1999 with eight cases being reported (**Figure 11**).



## Occupation

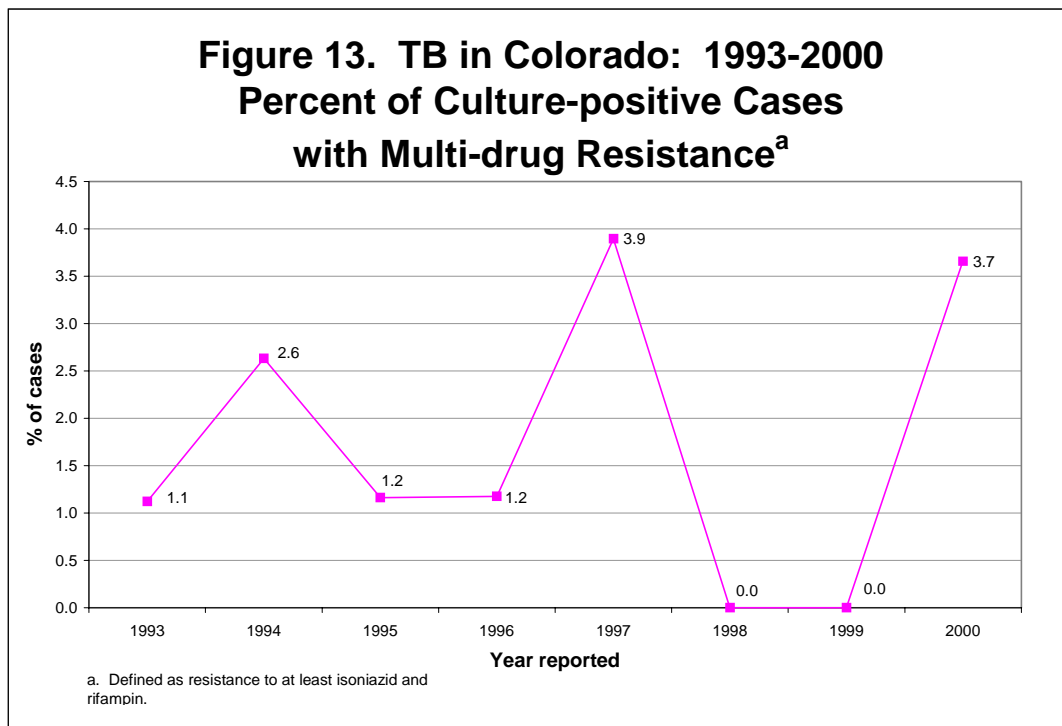
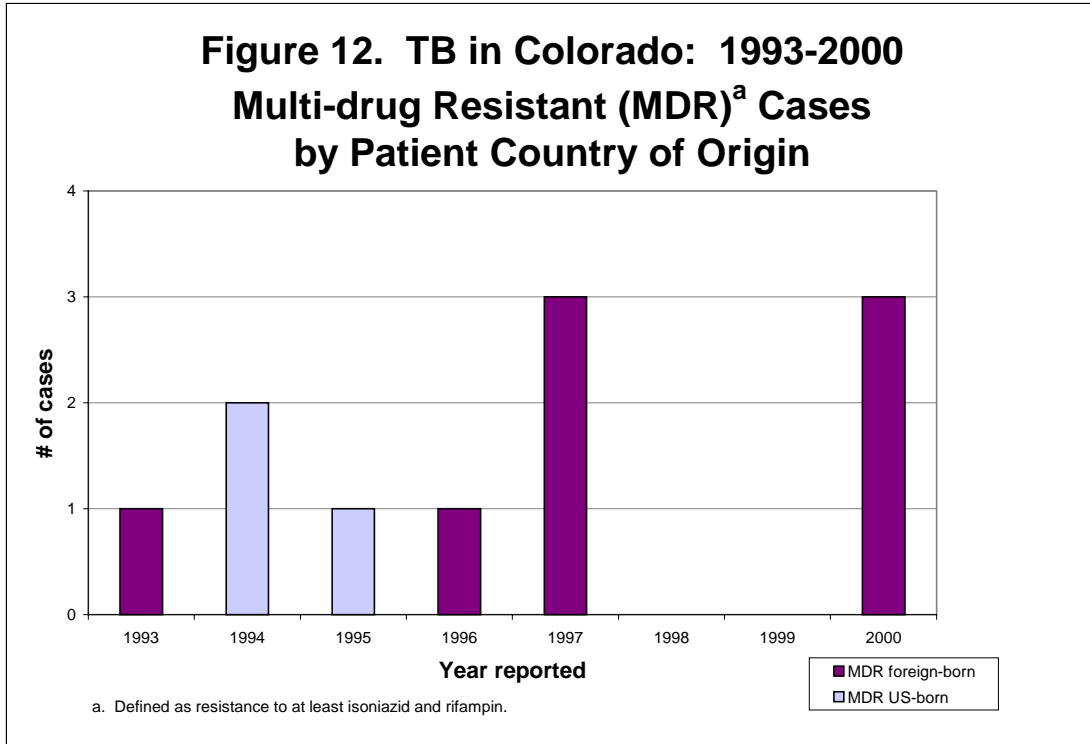
The occupational status is known for all 97 cases in 2000. Six cases were health care workers (currently or within the past two years), 2 cases were migrant farm workers (currently or within the past two years), 49 were unemployed (including children and retired persons), and 40 worked at a variety of jobs not known to present a high risk for TB.

## Drug Susceptibilities

Drug susceptibility results were available for all culture-positive TB cases in 2000. Ten (12%) of the 82 culture-positive cases were resistant to one or more primary drugs. The primary resistance patterns were as follows:

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

A total of 7 isolates were resistant to INH. Three isolates (3.7%) were multi-drug resistant (MDR) - defined as being resistant to at least INH and rifampin. There have been more cases of MDR among foreign-born than in those born in the United States. In 2000, 6% of the culture-positive foreign-born cases were MDR (Figures 12 and 13).



**Table 8** describes the 13 cases of MDR TB in Colorado from 1993-2000. Eleven of the cases were diagnosed in Colorado and two were diagnosed in other countries.

<b>Table 8. TB in Colorado: 1993-2000 Cases of Multi-drug Resistance (MDR)<sup>a</sup></b>						
<b>Report year</b>	<b>Age at diagnosis</b>	<b>Sex</b>	<b>County</b>	<b>Country of origin</b>	<b>Resistant to<sup>b</sup></b>	<b>Completion of therapy</b>
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 <sup>c</sup> 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 <sup>d</sup>
transfer <sup>c</sup> 2000	31 years	f	Larimer	Mexico	IR	currently on therapy <sup>d</sup>
2000	39 years	f	Adams	Mexico	IRPES	currently on therapy <sup>d</sup>
2000	36 years	M	Denver	Mexico	IR	currently on therapy <sup>d</sup>

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 3/2001.

# TB in Colorado: 1996 - 2000 5 Year Mean Case Rates by County

