

*State of Alaska
Epidemiology*



Bulletin

*Recommendations
and
Reports*

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Division of Public Health
Peter M. Nakamura, MD, MPH, Director

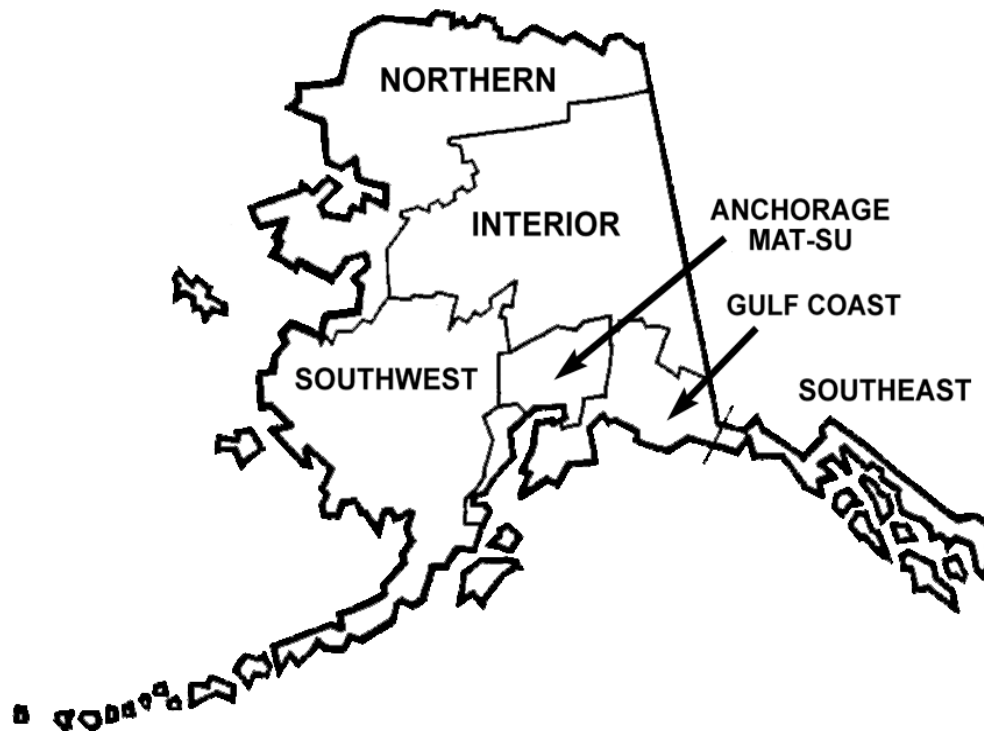
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Tuberculosis in Alaska 1999



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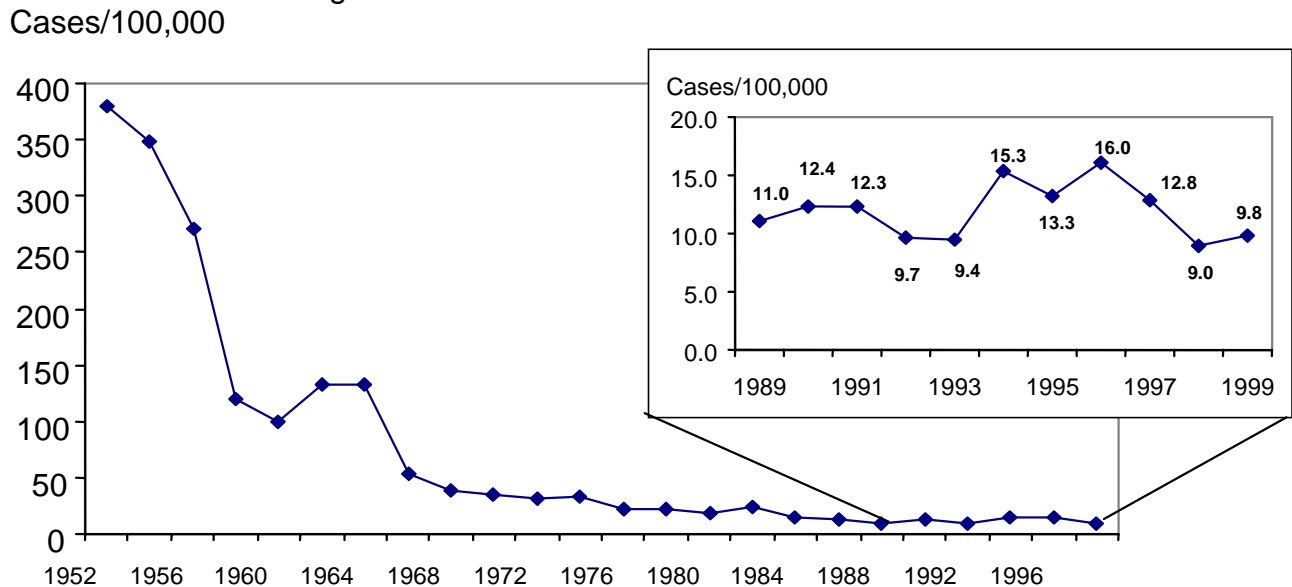
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Tuberculosis in Alaska

I. Incidence of Tuberculosis in Alaska

In 1999, 61 cases of tuberculosis were reported to the Section of Epidemiology, a rate of 9.8 cases per 100,000 population. This was a 10% increase from 1998 when 55 cases (9.0 cases per 100,000 population) were reported. (Figure 1)

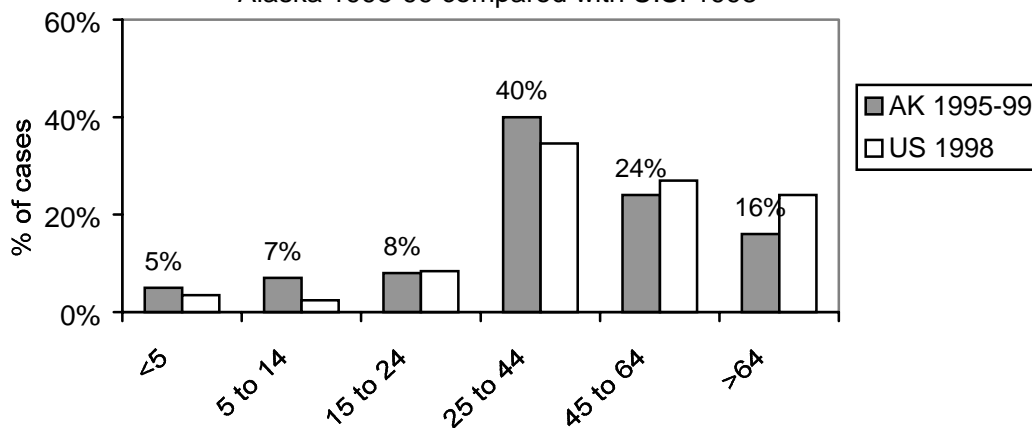
Figure 1: TB in Alaska from 1952-1999



II. Demographics of TB in Alaska

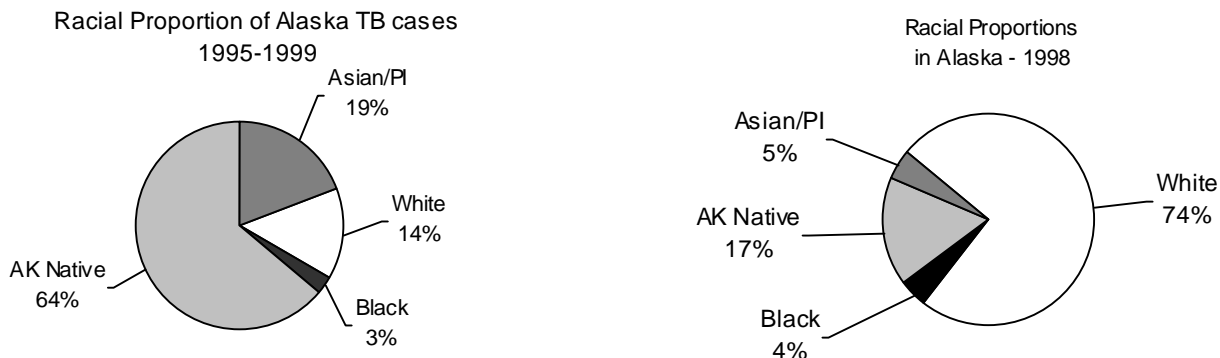
Age: The median age of persons with tuberculosis in Alaska was 40 years. Alaska TB cases continue to be somewhat younger when compared to the U.S. as a whole. From 1995 through 1999, 62% of persons with TB in Alaska were less than 45 years of age, compared to 50% nationally. The proportion of TB cases in children in Alaska also exceeded that of the U.S. (Figure 2)

Figure 2: Age of persons reported with TB
Alaska 1995-99 compared with U.S. 1998



Race: During 1999, 7 of 61 (11%) persons with TB were white, 0 were black, 41 (67%) were Alaska Native, and 13 (21%) were Asian or Pacific Islanders. Alaska Natives represent 17% of Alaska’s population, however, over the past five years, 64% of all TB has occurred in this group. The Asian and Pacific Island populations also bear a disproportionate burden of TB in Alaska. (Figure 3)

Figure 3: Race of TB cases compared to the general population in Alaska



Gender: In 1999, 34 of 61 (56%) persons with TB were male, and 27 (44%) were female. Over the past five years, 61% of 373 persons reported with TB were male.

Regional trends: The highest rates of TB continue to occur in the Northern and Southwest regions of the state. In 1999, the Northern region incidence increased - 84.6 cases per 100,000 in 1999 compared to 30.2 cases per 100,000 in 1998. Some of this increase in TB reflects ongoing transmission in villages in the Norton Sound Region (see Village and community outbreaks, p. 3). TB activity in the Southwest region continues to be high. (Table 1)

Table 1: Number of TB Cases and Rates by Region and State

Region	1995 (cases/100,000)	1996 (cases/100,000)	1997 (cases/100,000)	1998 (cases/100,000)	1999 (cases/100,000)
Anchorage/Mat-Su	25 (8.3)	19 (6.2)	28 (9.1)	24 (7.8)	15 (4.8)
Gulf Coast	1 (1.4)	4 (5.6)	3 (4.2)	3 (4.2)	1 (1.4)
Interior	12 (12.4)	19 (19.6)	8 (8.3)	6 (6.2)	6 (6.1)
Northern	24 (115.9)	31 (136.2)	5 (21.6)	7 (30.2)	20 (84.6)
Southeast	5 (6.8)	6 (8.1)	8 (10.8)	1 (1.3)	2 (2.7)
Southwest	13 (34.7)	18 (47.8)	26 (69.0)	14 (37.2)	17 (44.2)
TOTAL	82 (13.8)	97 (16.0)	78 (12.8)	55 (9.0)	61 (9.8)

Village and community outbreaks: No new village outbreaks were detected during 1997 or 1998. Ongoing intensive village TB screening has continued during 1999 in three villages: Savoonga, Gambell and St. Paul. As a result of these screenings, two new TB cases were detected in Gambell, and four cases in Savoonga. There were no new cases reported from St. Paul.

A cluster of TB cases was reported from the villages of Elim (3 cases) and White Mountain (1 case). One person with infectious TB from Elim traveled to White Mountain regularly. Two TB cases from Elim had a previous history of treated TB, one in the 1950s and one in 1993. The case from White Mountain, a pregnant woman, was a contact to an infectious case from Elim; she had four colonies of *M. tuberculosis* from one of three sputum specimens collected in July 1999. The village of Elim was screened twice in 1999 and again in the spring of 2000; no PPD converters were discovered during the spring 2000 visit. White Mountain was screened in December 1999, and no converters or new cases were discovered.

The village of Kwethluk has had five TB cases between 1997 and 1999. Three of these cases were detected during 1999. No new PPD positive skin tests were found among school children during routine school TB screening in the fall of 1999. Despite this encouraging finding, further screening of this village may be warranted during 2000.

Table 2: A summary of Alaska tuberculosis over five years

Year	1995	1996	1997	1998	1999
Number of TB cases	82	97	78	55	61
Number of outbreak cases	22	17	12	4	*
Alaska population	603,453	607,800	611,300	611,300	621,400
Alaska case rate/100,000	13.6	16.0	12.8	9.0	9.8
U.S. case rate/100,000	8.7	8.0	7.4	6.8	6.4
Population 0-14 years old	164,312	163,345	163,824	163,605	165,605
Number 0-14 y.o. with TB (% total) (rate/100,000)	3 (4%) (1.8)	24 (25%) (14.6)	10 (13%) (6.1)	5 (9%) (3.1)	2 (3%) (1.2)
Number foreign born with TB (% total)	12 (15%)	12 (12%)	19 (24%)	13 (24%)	14 (23%)
Number homeless, Anchorage with TB (rate/100,000)	2 (50)	1 (25)	1 (25)	6 (150)	2 (50)
Resistant to one drug	4	1	0	2	2
Resistant to two or more drugs	0	0	1	0	0
Number co-infected with HIV	1	0	2	2	0
Number drug use (IV & non-IV)	10	4	2	5	6
Number excess alcohol use (% total)	30 (37%)	26 (27%)	13 (17%)	25 (45%)	23 (38%)

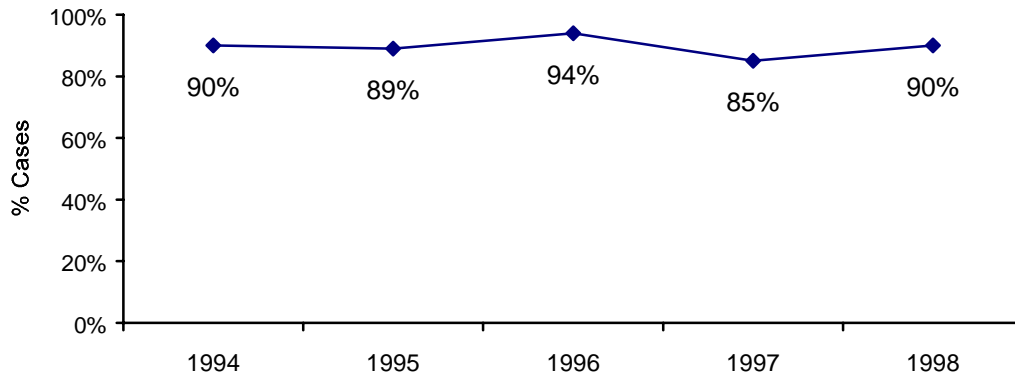
*Outbreak investigations pending

III. National TB Program Objectives

A. At least 90% of persons with newly diagnosed TB, for whom therapy for one year or less is indicated, will complete therapy within 12 months.

From 1994 through 1998, an average of 90% of persons with TB completed therapy within 12 months (range 85 - 94 %). (Figure 4) During 1998, 45 of 50 (90%) persons who were eligible for treatment regimens of less than 12 months completed treatment in 12 months or less. Two individuals required a longer, medically indicated regimen; one person moved out of the country; one person was lost to follow-up; and one person died of end-stage AIDS.

Figure 4: Percent of cases for whom ≤ 12 months treatment was indicated who completed treatment within 12 months



During 1999, 28 (46%) of 61 persons with TB have open cases and several remain on therapy. To date, thirty (49%) successfully completed treatment within a 12 month period. One person with TB moved out of the country and was provided with medication to complete a course of self-administered therapy. Two individuals died before TB treatment was completed, one from end-stage heart disease and one from cancer. (Table 3)

Table 3: Time period for treatment of TB for years 1998 and 1999

Year	Currently on treatment	Unknown status	Completed treatment ≤ 12 months	>12 month treatment: non-compliance or complications	>12 months treatment indicated	Moved**	Lost to follow-up	Died ***
1998	0	1	45	4	2	1	1*	1
1999	24	4	30	0	0	1	0	2

*Foreign-born person who probably left the State. No information to make referral for ongoing care.

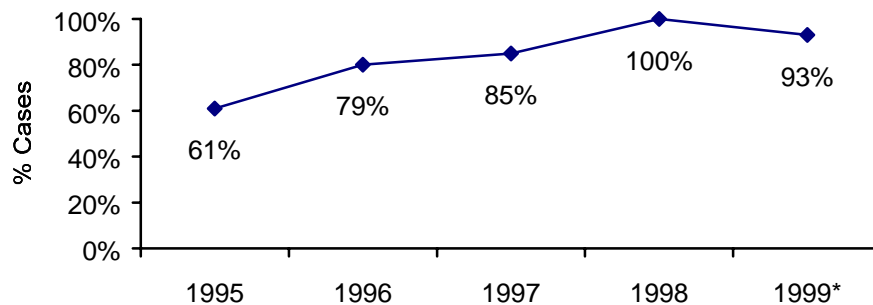
**Medications provided to complete course. Moved out-of-country.

***Causes of death: AIDS, end-stage CAD, cancer.

B. At least 90% of persons with newly reported sputum AFB-smear positive TB will have contacts identified.

This objective was met in 1998 and 1999. (Figure 5) Because several TB cases were not identified and reported until the last quarter of 1999, several contact investigations are still ongoing and all results have not been reported.

Figure 5: Percent of TB cases with contacts identified



* 1999 data incomplete

C. At least 95% of contacts to sputum AFB-smear positive TB cases will be evaluated for infection and disease.

In 1997 and 1998 there was a significant increase in the proportion of contacts to AFB smear positive TB cases who were adequately examined. (Figure 6) (Table 4) We attribute at least part of this improvement to increased emphasis on documentation and data entry. In addition, we believe that case management and contact investigation training for PHNs has been valuable.

Contact follow-up results for 1999 are incomplete. More than 40% of TB cases reported in 1999 remain open and contact investigations are being completed for many of these cases. A high proportion of persons with TB live in remote parts of the State, accessible only by small aircraft. Contact investigations are often at the mercy of the weather and also compete with limited resources that may be directed to other public health emergencies.

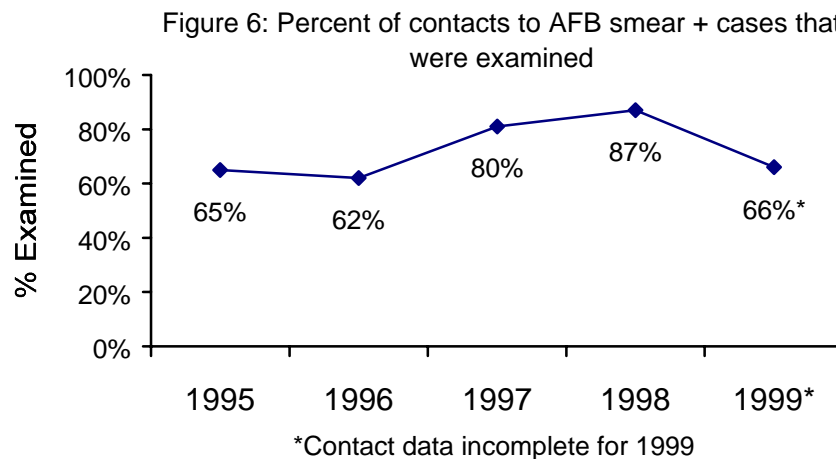


Table 4: Contact Investigation Report for 1995 – 1999

Year	% Cases with contacts	% Contacts examined	# Contacts per case	% Contacts infected	% Infected contacts on therapy for LTBI	% Contacts with TB disease
1995	62	65	13	1	0	1
1996	79	62	20	12	50 ⁺	3
1997	85	80	9	13	0	0
1998	100	87	15	43	17 ⁺	4
1999*	93	66	17	26	75 ⁺	2

* Contact investigation data incomplete for 1999.

⁺ Some infected contacts were found to have disease and were started on 4-drug therapy.

D. At least 85% of infected contacts to sputum AFB-smear positive TB cases will complete therapy.

We have not been successful in meeting this objective. Completion rates have ranged from a low of 56% to a high of 89% over the past five years. (Table 5) If data from 1997 are excluded (lost data), the average completion rate for 1995, 1996 and 1998 is 81%. For 1999, several individuals are still completing treatment for LTBI.

Over the past five years, there were 29 persons who failed to complete treatment for LTBI after being identified as contacts to AFB smear positive cases. Twelve (41%) stopped on their own initiative, and 13 (45%) stopped because of medical advice unrelated to adverse side effects from the medication. We will need to investigate the reasons for failure to complete treatment for LTBI in this high-risk population before appropriate interventions can be implemented.

Table 5: Treatment completion for latent TB infection for contacts of AFB+ cases

Year	# Starting Rx for LTBI	# completing Rx for LTBI (% completing)	Incomplete Rx for LTBI		
			Lost, unable to locate	Patient stopped on own initiative	Stopped on medical advice (other than adverse reactions)
1995	33	25 (76)	3	4	1
1996	18	16 (89)	0	1	1
1997*	9	5 (56)	0	0	4
1998	27	22 (81)	1	0	4
1999+	35	11 (33)	0	7	3

* data linking 10 contacts to cases not available in database

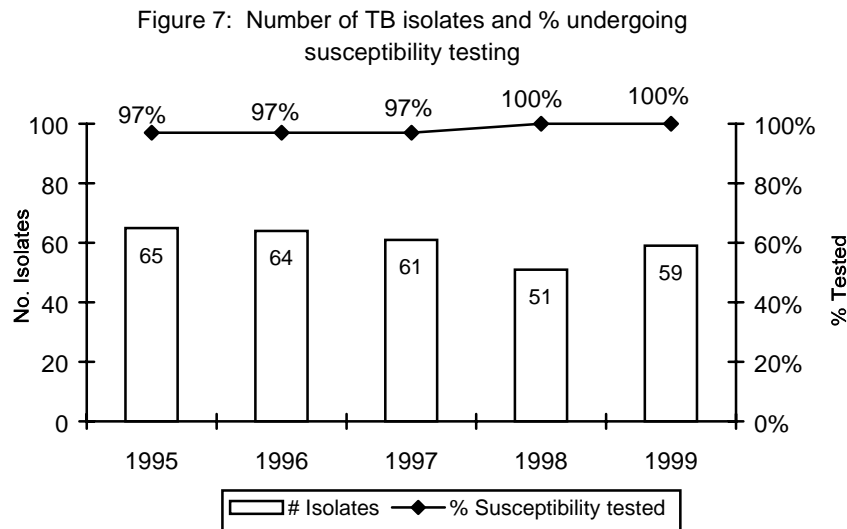
+ data incomplete for 1999

E. 100% of newly diagnosed cases of TB will be reported to CDC using the CDC-developed electronic reporting system and at least 95% of specified variables will be reported to the CDC annually.

During 1999, all 61 cases were reported to the CDC using the CDC electronic reporting system. On average, 85% of all specified variables were reported, although this ranged from 31.1% to 100.0%. Several fields such as “directly observed therapy” and “reason therapy stopped” had low reporting frequencies for 1999 because some persons are still being treated and their cases remain open.

F. For at least 90% of all newly reported culture-positive TB cases, drug susceptibility results will be reported.

This objective was met over the past five years. (Figure 7) Most TB specimens in Alaska are sent to the Alaska State Public Health Laboratory. The State Laboratory routinely performs susceptibility testing on all *M. tuberculosis* isolates. The Alaska TB Program actively follows specimens sent to out-of-state laboratories to ensure susceptibility testing is performed for all *M. tuberculosis* isolates.



During 1999, only two of 59 isolates of *M. tuberculosis* demonstrated single drug resistance. The first was resistant to streptomycin, and the second to isoniazid. Both isolates were from patients who emigrated to the U.S. from the Philippines.

Over the past five years, 294 of 300 (98%) isolates of *M. tuberculosis* underwent susceptibility testing. Only 12 (4%) demonstrated antimicrobial resistance. None of the 12 isolates was resistant to rifampin. Five (2%) isolates were resistant to isoniazid only. Only one isolate was resistant to more than one drug (isoniazid, ethambutol and streptomycin); this isolate was from a patient from India. Of the twelve patients with resistant *M. tuberculosis*, five (42%) were from the U.S., five (42%) were from the Philippines, one (8%) was from India, and one (8%) from American Samoa.

G. For at least 75% of all newly reported TB cases, age 25-44, HIV status will be reported.

In 1998, 18 (69%) of 26 persons with TB disease between the ages of 25 and 44 were offered HIV testing. Of those, two were HIV antibody positive. Although we are still completing data collection for persons diagnosed with TB in 1999, to date, 16 (62%) of 26 persons ages 25 through 44 were offered testing; none were HIV positive. (Table 6) A match was performed between the TB and HIV/AIDS databases. No additional persons with TB/HIV co-infection were detected.

Table 6: HIV status for TB cases from 25-44 years of age.

Year	TB Cases offered HIV testing					HIV testing not offered	Unknown if tested	Total
	HIV -	HIV +	Refused testing	Result unknown	% Offered testing			
1995	4	0	1	6	30%	2	24	37
1996	11	0	5	0	47%	2	16	34
1997	11	2	2	1	55%	1	12	29
1998	12	2	3	1	69%	1	7	26
1999	15	0	0	1	62%	1	9*	26

* 1999 data incomplete

H. At least 75% of persons with latent TB infection found through targeted skin testing and started on treatment for latent TB infection will complete therapy.

The Alaska TB Program participated in targeted PPD skin testing in six villages during 1999: Elim, Gambell, Kaktovik, Savoonga, St. Paul, and White Mountain. A total of 26 individuals began treatment for LTBI. Follow-up is still underway, and currently only 2 individuals have been documented to complete therapy. (Table 7)

Table 7: Treatment completion for TB infection in persons detected through targeted screening

Year	Starting INH	Exclusions	Completing INH (% completion rate)	
1995	94	4	85	(94)
1996	48	6	36	(85)
1997	20	2	15	(83)
1998	19	0	14	(73)
1999*	27	1	2	(8)

* treatment data incomplete

I. 100% of initial *M. tuberculosis* complex isolates obtained by the Alaska State Public Health Laboratories will be reported to CDC using the electronic reporting system developed by CDC. For at least 95% of the isolates, all information specified in the Mycobacterium module of the Public Health Laboratory Information System (PHLIS) will be completed.

The Alaska State Public Health Laboratory reports 100% of all *M. tuberculosis* isolates to the CDC using the electronic reporting system PHLIS. All information that is available for each isolate is submitted through PHLIS.

J. For at least 80% of initial diagnostic specimens received by the public health laboratory for TB diagnosis, the following turnaround times will be met:

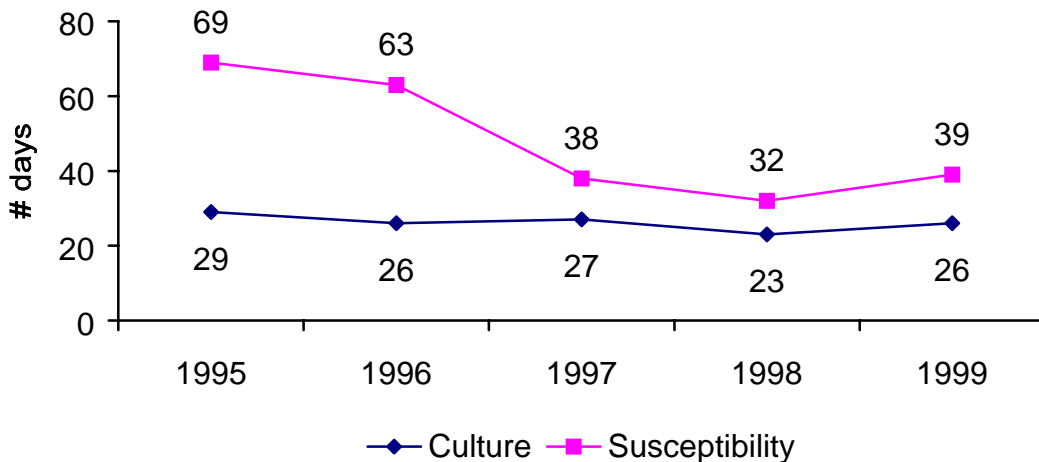
1. *Results of acid-fast examination of specimens, both smear-positive or smear-negative, will be reported within 24 hours of specimen receipt;*

The Laboratory performs AFB smears on all TB specimens within 24 hours of receipt. AFB-positive specimen results are called to the submitting health care provider and to the Alaska TB Program. AFB-negative specimen results are reported by fax and printed reports.

2. *Results of culture-positive specimens, both *M. tuberculosis* complex and other mycobacterium, will be reported within 14-21 days from specimen receipt;*

During 1999, 59 of 61 persons with TB were culture-confirmed. Twenty-five (42%) of 59 diagnostic isolates (first positive culture report) were reported within 21 days of specimen receipt. Thirty-nine (66%) were reported within 28 days of specimen receipt. Figure 8 illustrates the average number of days required to report a positive *M. tuberculosis* culture from the State Laboratory; in 1999 this was 26 days, an increase of three days from the average report time in 1998.

Figure 8: Average number of days to report of *M. tuberculosis* culture and susceptibilities



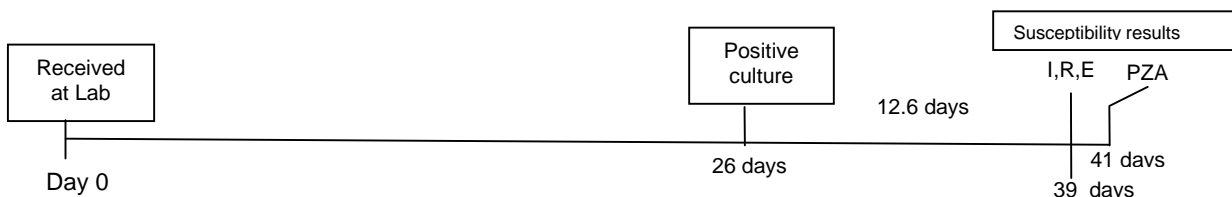
There are several possibilities for delays in reporting positive *M. tuberculosis* cultures that are due to unique geographic conditions in Alaska. From 50 to 70% of all persons with TB live in parts of Alaska that are only accessible by small aircraft. It is not unusual for clinical specimens from remote parts of the State to take a week or longer to arrive at the Laboratory. During these transit delays, specimens may go through one or more freeze-thaw cycles. Both the delays in planting specimens in culture media and repeated freezing and thawing may decrease the viability of *M. tuberculosis* organisms.

During 1999, 17 of 59 (31%) persons with culture-confirmed TB had their initial positive culture reported more than 28 days after specimen submission. The mean time between receipt of the specimen and report of a positive culture was 41.9 days (range 35 to 61 days) for these 17 isolates. Thirteen of the 17 patients resided in remote Alaska at the time of their diagnosis.

3. *Results of drug susceptibility tests will be reported for first-line drugs within 15 to 35 days of specimen receipt.*

Twenty-six (44%) of 59 diagnostic isolates (first positive culture report) had susceptibilities reported for isoniazid, rifampin and ethambutol within 35 days of specimen receipt. On average, susceptibilities for these three drugs were reported 39 days after the specimen was received. (Figure 8) The mean time between a report of a positive culture and report of susceptibility results was 12.6 days (range 0-43 days). (Figure 9) Susceptibility reports for pyrazinamide lagged behind reporting of I, R, E results by a mean of 2 days (range: 0 to 55 days). In 52 cases, the pyrazinamide susceptibility report was available on the same day as the other three drugs. For the most part, susceptibility reports were delayed beyond 35 days of receipt when culture results were not reported within 21 days.

Figure 9: Mean time periods for reporting of positive TB cultures and susceptibility results: 1999

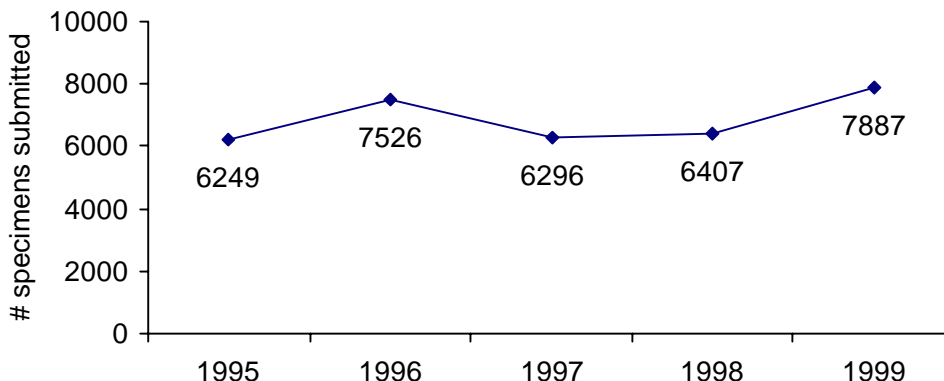


K. For at least 80% of isolates of mycobacteria referred to the public health laboratory for diagnostic testing, specified turnaround times will be met:

The Alaska Public Health Laboratory in Anchorage remains the only laboratory in the state with mycobacterial capacity. As a result, the Laboratory did not receive any referred isolates.

The number of specimens submitted to the Laboratory increased by 19% from 1998 to 1999. (Figure 10) At one point all incubators were filled to maximum capacity and no additional specimens could be accepted. By the end of January 2001, we hope to occupy new laboratory space with two processing rooms, a room dedicated to amplification tests, and a separate culture room with more space of incubators. This will increase our specimen processing capacity significantly.

Figure 10: TB specimens submitted to the Alaska Public Health Laboratory

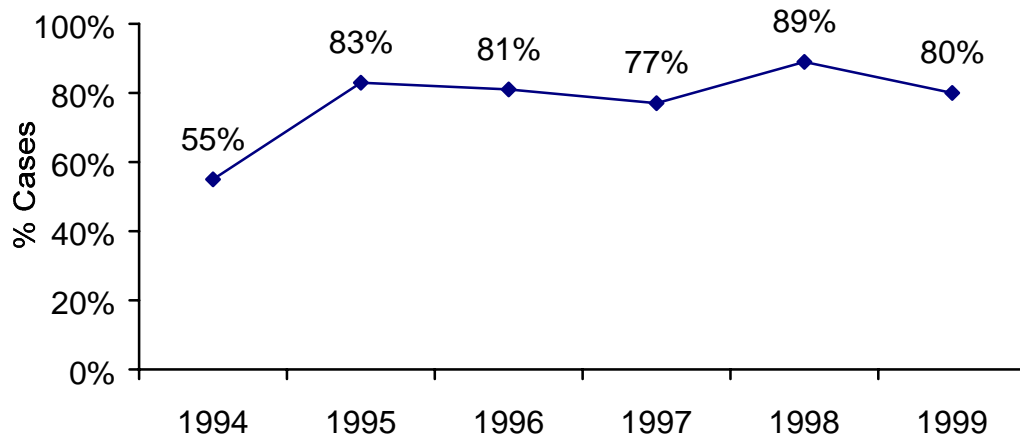


IV. Alaska TB Control Program Objectives

L. At least 80% of Alaska's reported cases of TB disease will complete their recommended courses of anti-TB therapy under direct observation.

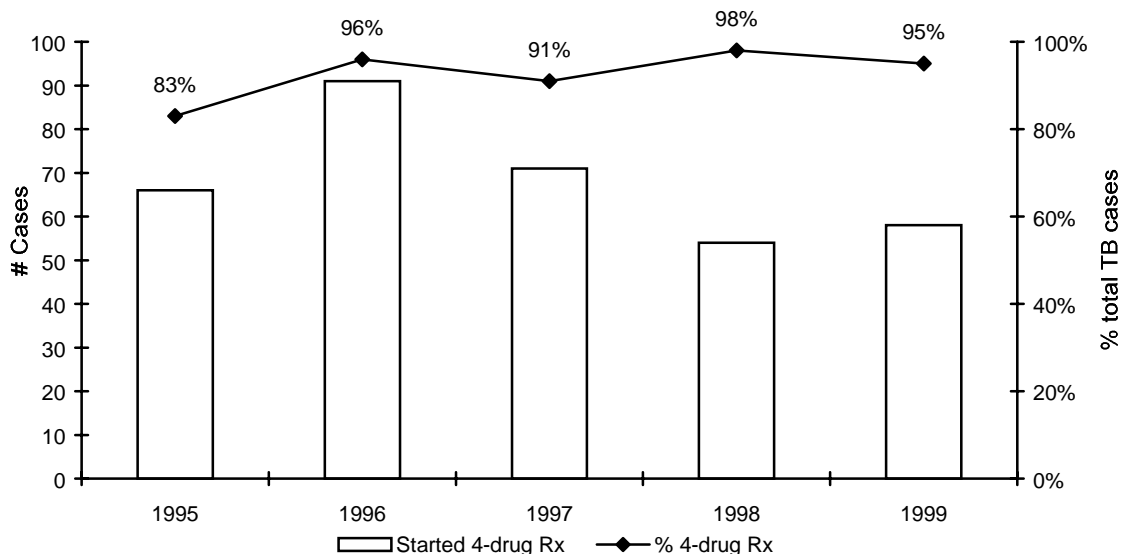
This objective was met during 1999; 80% of all persons with TB received DOT. One individual with lymph node tuberculosis received self-administered treatment. Six individuals had a combination of DOT and self-administration, one person because he returned to his home in Mexico, and one because he spent several weeks in the Philippines. DOT has been well received by Alaska health care providers. (Figure 11)

Figure 11: Percent of TB cases receiving DOT



Although drug resistance to isoniazid has remained well below 4%, the Alaska TB Program continues to recommend the use of a four-drug regimen to initiate treatment for suspected or confirmed cases of TB. During 1999, four-drug therapy was initiated for 95% of the 61 reported TB cases. (Figure 12)

Figure 12: Initiation of 4-drug anti-TB therapy



M. The incidence of tuberculosis among the homeless in Anchorage will be reduced to no more than 50 cases per 100,000.

The number of persons who were homeless and had tuberculosis decreased from 10 in 1998 to 2 in 1999. Over the past five years, an average of four persons with TB were homeless, ranging from 1 to 10 persons per year. The rate of TB among the homeless can be calculated for Anchorage; the 1990 census estimated that 4000 homeless persons live in Anchorage. In 1999, the incidence of TB among Anchorage homeless was 50 cases per 100,000. Estimates for TB and homelessness are not available for other communities in Alaska. (Table 8)

The Municipality of Anchorage Department of Health and Human Services works closely with several social service agencies that serve the homeless in Anchorage. The Alaska TB Control Program provides housing for homeless TB clients throughout the state when no other resources can be found. Our goal is to assure that the patient receives DOT; provision of housing often enhances the attainment of this goal.

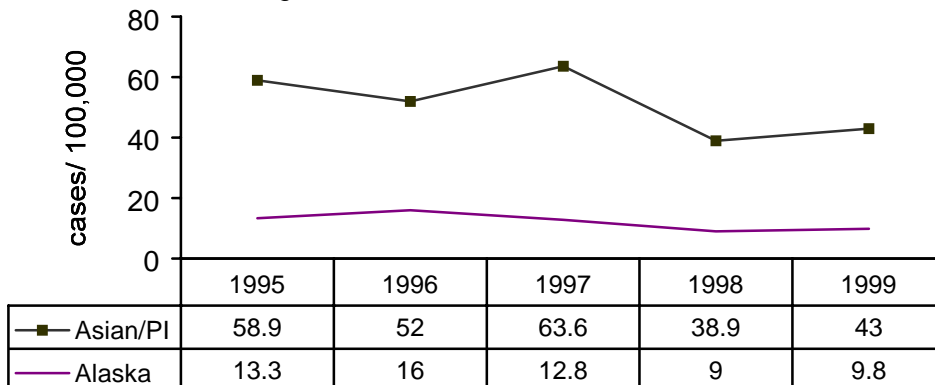
Table 8: Number and location of homeless persons with TB over 5 years

Location (population)	1995	1996	1997	1998	1999
Anchorage (254,849)	2	1	1	6	2
[cases/100,000 pop.]	[50]	[25]	[25]	[150]	[50]
Fairbanks (31,850)	1			2	
Nome (3,595)		1		2	
Yakutat (833)	1				
Manokotak (387)	1				
Statewide Total	5	2	1	10	2
%TB cases homeless	6%	2%	1%	18%	2%

N. The incidence of tuberculosis among Asians/Pacific Islanders in Alaska will be reduced to no more than 30 cases per 100,000.

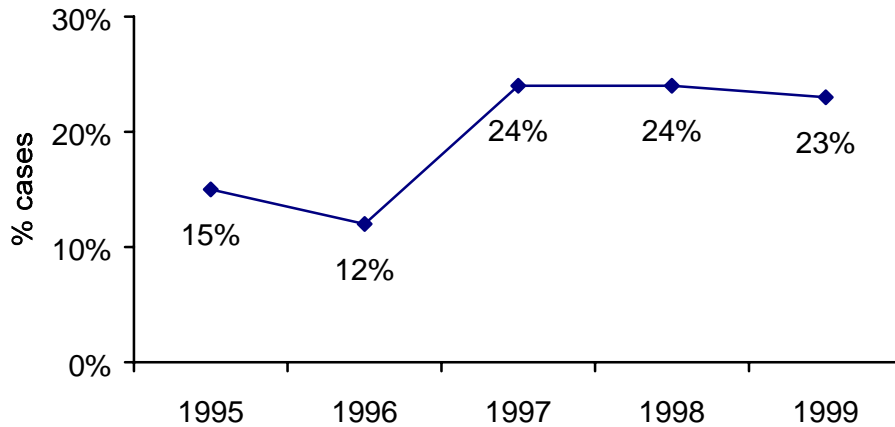
During 1999, 13 persons who were Asians or Pacific Islanders were reported to have TB. The rate of TB for this group was 43.0 per 100,000 population. (Figure 13) TB disease continues to be a significant public health problem in this population. The rate of disease has remained consistent over the past five years, with a low of 38.9 persons per 100,000 in 1998 and a high of 63.6 persons per 100,000 in 1997. From 1995 through 1999, 46 Asians and Pacific Islanders were reported with TB. Of these 46 individuals, 36 (78%) emigrated to the U.S. within the previous five years. The Asian and Pacific Islander population is increasing in Alaska through ongoing immigration; we expect to see continued high rates of TB in this population.

Figure 13: TB incidence in Asians & Pacific Islanders



In 1999, 14 of 61 (23%) TB cases occurred among foreign-born individuals. Eighty-six percent of foreign-born cases occurred in Asians and Pacific Islanders. Although the proportion of TB in foreign-born persons in Alaska is not as great as reported nationally, it has clearly increased over the past five years. (Figure 14) From 1995 through 1999, 70 TB cases were foreign-born and 49 (70%) immigrated to the U.S. within five years of developing disease.

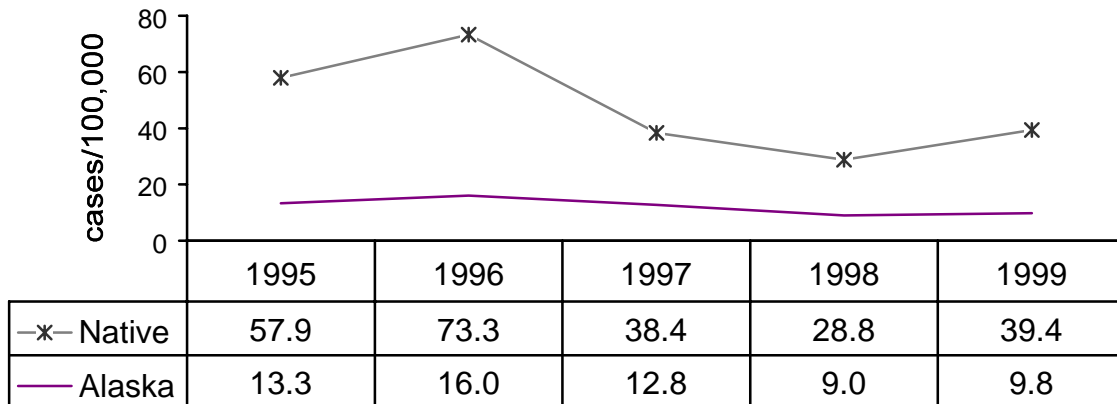
Figure 14: Percent of TB Cases who were Foreign-Born



O. The incidence of tuberculosis among Alaska Natives will be reduced to no more than 35 cases per 100,000.

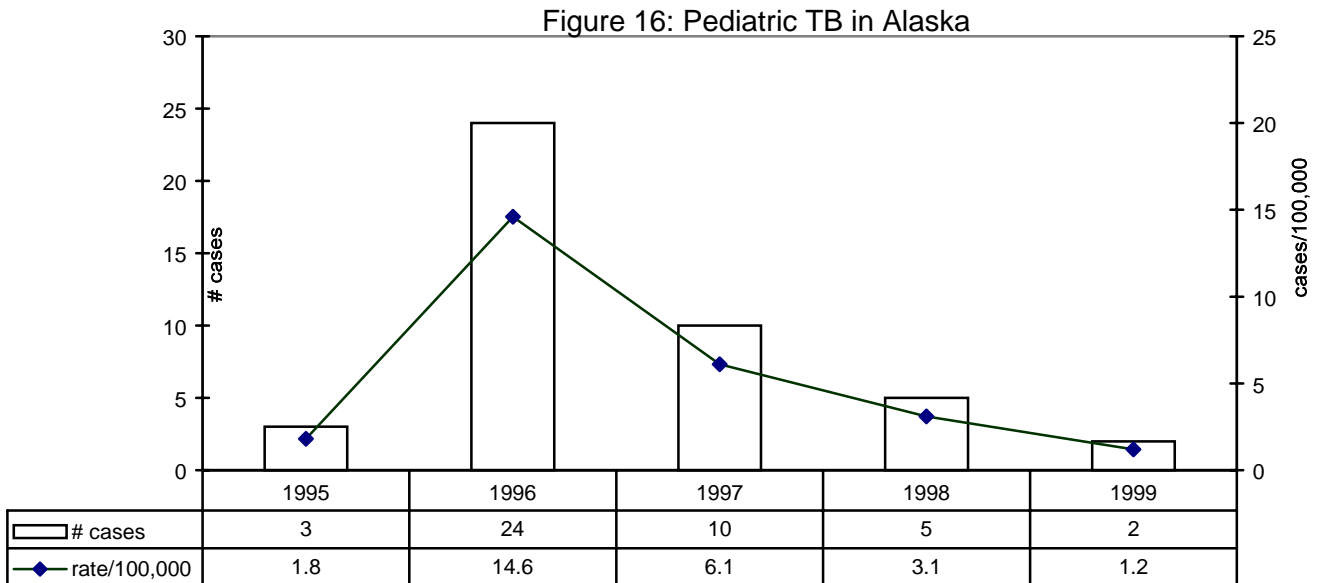
The rate of TB among Alaska Natives during 1999 was 39.4 cases per 100,000 population. (Figure 15) Although we did not achieve our objective, the last three years saw a noticeable decline in the rate of disease in this group. This decline has largely been due to the control of several village outbreaks that were first identified during the fall of 1994. In spite of this, 67% of the 61 cases reported in 1999 were Alaska Native. Over the past five years, 240 of 373 (64%) of TB cases occurred in this population.

Figure 15: TB incidence among Alaska Natives



P. The incidence of tuberculosis among Alaska’s children < 15 years of age will be reduced to no more than 2 cases per 100,000.

During 1999, 2 persons less than 15 years of age were reported with TB, a rate of 1.2 cases per 100,000 population. (Figure 16) This decline in pediatric TB resulted from the control of several village outbreaks discovered during the fall of 1994.



Q. The Alaska TB Committee will meet regularly to direct TB prevention, control and elimination activities.

During 1999 the Alaska TB Committee met on a quarterly basis. Participants included representatives from:

- Alaska Division of Public Health
 - Epidemiology
 - Public Health Nursing
 - Laboratories
- Municipality of Anchorage Department of Health and Human Services
- Alaska Department of Corrections
- Norton Sound Health Corporation Public Health
- Alaska Native Medical Center
- Association for Professionals of Infection Control and Epidemiology, Midnight Sun Chapter

This committee has addressed issues such as TB screening for homeless persons, targeted TB testing, the new school TB skin testing regulations, discharge planning for persons with TB, and distribution of anti-tuberculosis medications.