

# Tuberculosis in Alaska

## 2007 Annual Report

CDC TB Elimination Cooperative Agreement  
U52/CCU007863-16



### **STATE OF ALASKA**

Department of Health and Social Services  
Division of Public Health  
Section of Epidemiology

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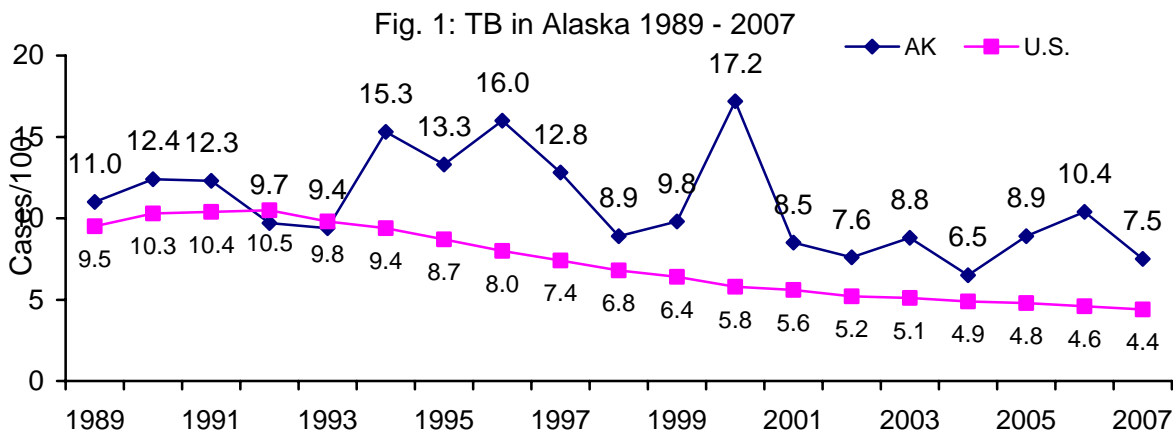
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## TUBERCULOSIS IN ALASKA 2007 Annual Report

### I. Incidence of Tuberculosis in Alaska

In 2007, 51 cases of tuberculosis were reported to the Alaska Tuberculosis Program for an incidence of 7.5 cases per 100,000 population. This was a decrease of 28% when compared to 2006 (10.4 cases/100,000).

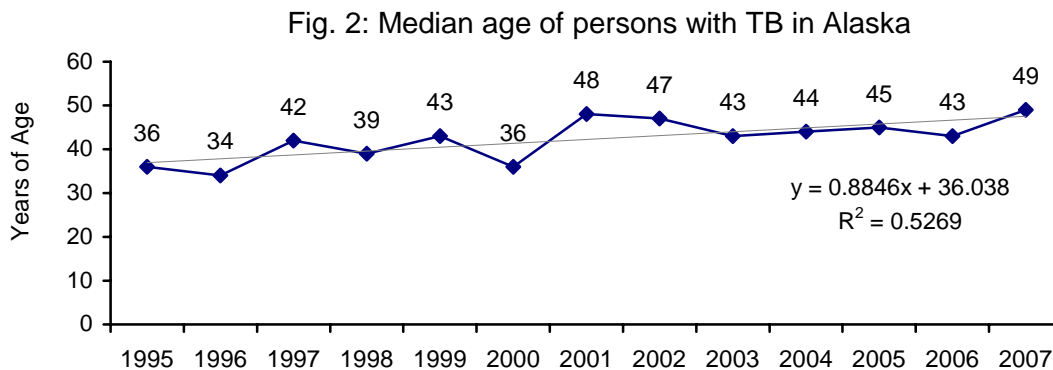
The overall U.S. TB incidence in 2007 was 4.4 cases per 100,000, a 4.4% decline from 2006 (Figure 1). Washington D.C. had the highest rate (10.2 cases/100,000), followed by Hawaii (9.5 cases/100,000). Alaska and California tied for third highest rate at 7.5 cases/100,000.



### II. Demographics of TB in Alaska

#### A. Age

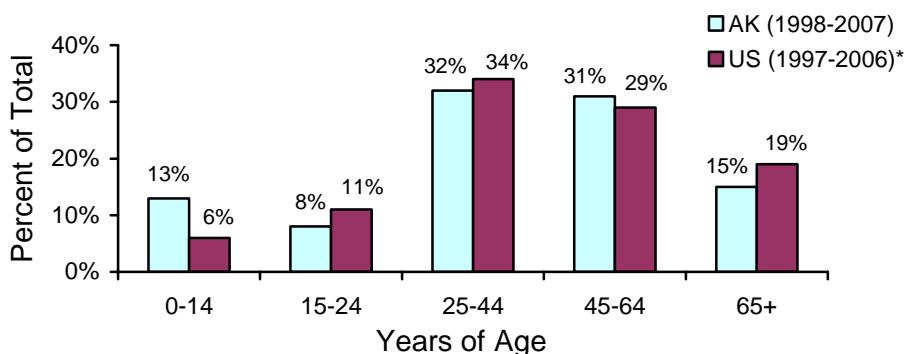
In 2007, the mean age of persons with TB was 47.3 years; the median age was 49 years. Since 1995, the median age has gradually increased (Figure 2).



### B. Pediatric TB

Alaska has a higher proportion of pediatric TB when compared to the U.S. overall. Between 1998 and 2007, 13% of TB cases in Alaska were 0 to 14 years of age, compared with only 6% of cases nationally (Figure 3).

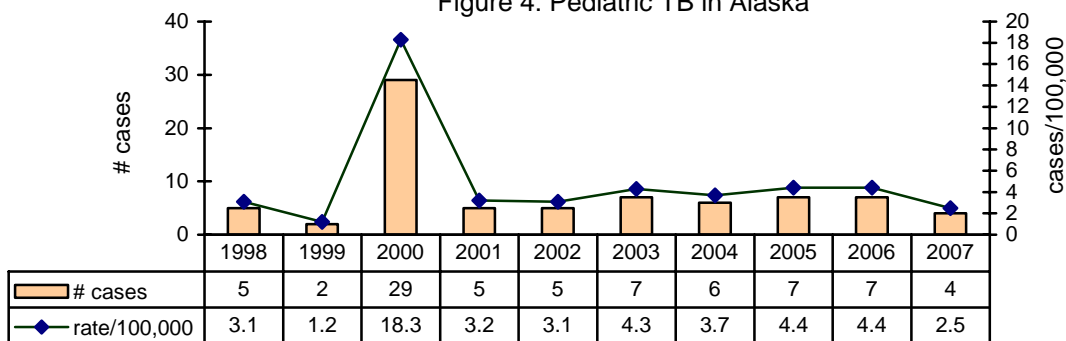
Figure 3: Age of persons with TB: Alaska and U.S.



\*CDC. Reported Tuberculosis in the United States, 2006. Atlanta, GA: U.S. Department of Health and Human Services, CDC, September 2007.

In 2007 four children were diagnosed and treated for tuberculosis, a rate of 2.5 cases per 100,000 children (Figure 4). The rate of pediatric TB has ranged from a high of 18.3 cases per 100,000 children in 2000, to a low of 1.2 cases per 100,000 children in 1999.

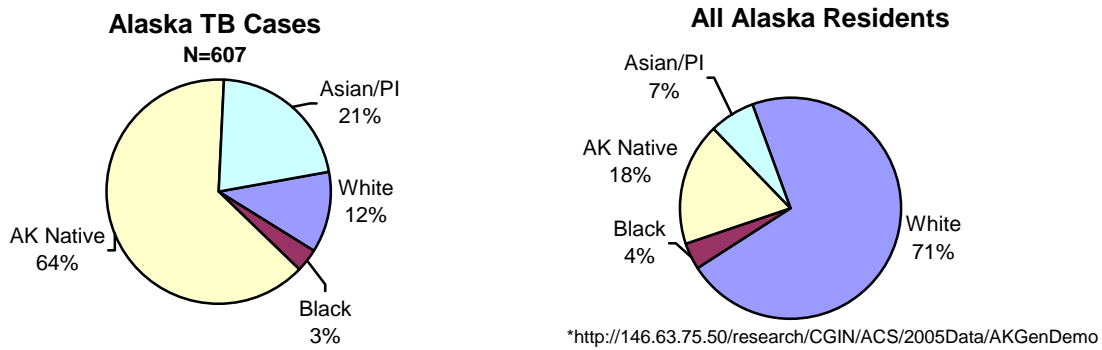
Figure 4: Pediatric TB in Alaska



### C. Race

Alaska Native and Asian/Pacific Islanders continue to bear a disproportionate burden of TB in Alaska (Figure 5). Between 1998 and 2007, a total of 634 cases of TB were reported to the Alaska TB Program. Sixty-four percent, or 386 cases, were Alaska Native, while only 18% of the total population is Alaska Native. Twenty-one percent, or 130 TB case-patients were Asian or Pacific Islander; 7% of Alaskans are of this race. In contrast, 12% (70 cases) of TB case-patients were white and 3% (21 cases) were African American.

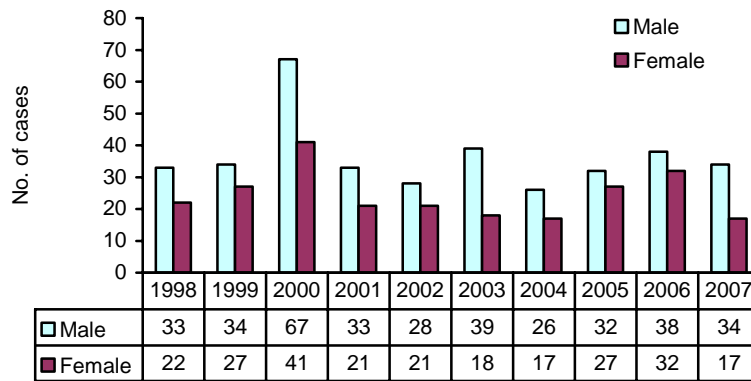
Figure 5: Racial Demographics TB in Alaska from 1998-2007 compared to Alaska 2005 Census Estimates\*



**D. Gender**

In 2007, 67% of Alaskans were male. Over the past 10 years, 59% of cases were male and 41% were female.

Fig. 6: TB Cases in Alaska by Gender



**E. Homelessness**

In 2007, 12 (24%) of 51 TB case-patients were reported as homeless. Eight homeless TB case-patients were from Anchorage and were associated with the homeless TB outbreak that began in December of 2005. Unrelated to the Anchorage outbreak were two individuals (family members) from the Matanuska-Susitna Valley; one person from the Interior Region, and one from the Northern Region. Alaska census data for homelessness is only collected for the Municipality of Anchorage; therefore this is the only geographic region for which a rate can be calculated. In 2007, the estimated incidence of TB in homeless people in Anchorage was 200 cases per 100,000 homeless, a four-fold decline when compared to the 2006 rate of 800 cases per 100,000 (Table 1).

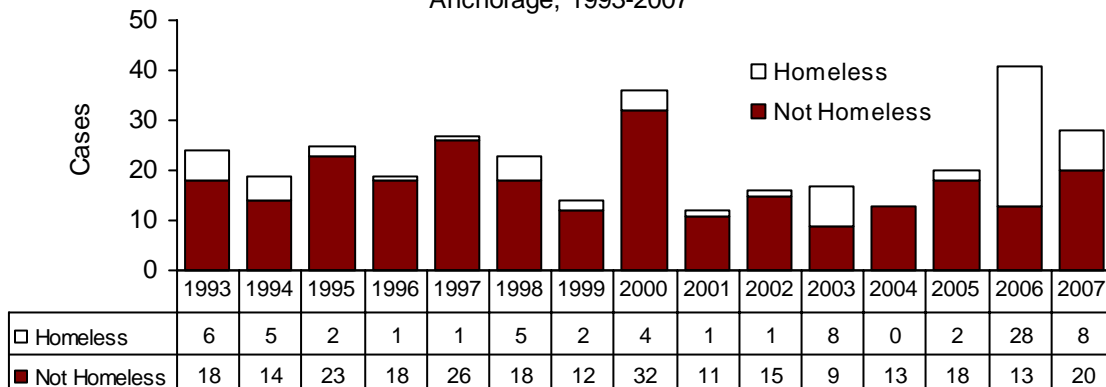
During 2006, 32 TB case-patients were homeless. Twenty-eight cases (88%) were a part of a large homeless outbreak in Anchorage, three were from the Northern Region, and one was from an outlying community in the Municipality of Anchorage.

TB screening for homeless individuals is an ongoing challenge. A disproportionate number of homeless are Alaska Native and are known to have latent TB infection. Therefore TB skin testing is not a useful tool to determine whether TB transmission is occurring in shelters and other organizations that serve the homeless. Symptom screening coupled with sputum tests has been more useful in this population. In previous years, the Municipality of Anchorage Department of Health and Human Services provided annual screening at several sites where homeless individuals receive services. However, an increase in TB among the Anchorage homeless became apparent early in 2006, and TB screening was performed quarterly through 2006. See section G. below for more information about this outbreak among the Anchorage homeless.

Table 1: Number and location of homeless persons with TB over 7 years

| Location               | 2000     | 2001     | 2002     | 2003     | 2004     | 2005     | 2006      | 2007      |
|------------------------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| Anchorage              | 4        | 1        | 1        | 8        | 0        | 2        | 28        | 8         |
| [cases/100,000 pop.]   | [100]    | [ 25]    | [ 25]    | [200]    | 0        | [ 50]    | [650]     | [200]     |
| New Stuyahok           | 1        |          |          |          |          |          |           |           |
| Nome                   |          |          |          |          |          | 1        | 2         | 1         |
| Sitka                  |          |          |          |          | 1        |          |           |           |
| Petersburg             |          |          |          |          | 1        |          |           |           |
| Bethel                 |          |          |          |          | 1        |          |           |           |
| Juneau                 |          |          |          | 1        | 1        |          |           |           |
| Whittier               |          |          |          |          |          |          | 1         |           |
| Circle                 |          |          |          |          |          |          |           | 1         |
| Teller                 |          |          |          |          |          |          | 1         |           |
| <b>Statewide Total</b> | <b>5</b> | <b>1</b> | <b>1</b> | <b>9</b> | <b>4</b> | <b>3</b> | <b>32</b> | <b>12</b> |
| %TB cases homeless     | 5%       | 2%       | 2%       | 16%      | 12%      | 5%       | 46%       | 24%       |

Figure 7. Number of TB cases by Homelessness Status - Municipality of Anchorage, 1993-2007



**F. Regional trends**

The incidence of tuberculosis is not evenly distributed geographically throughout the state. The highest rates are found in the Northern and Southwest regions of the state (Table 2).

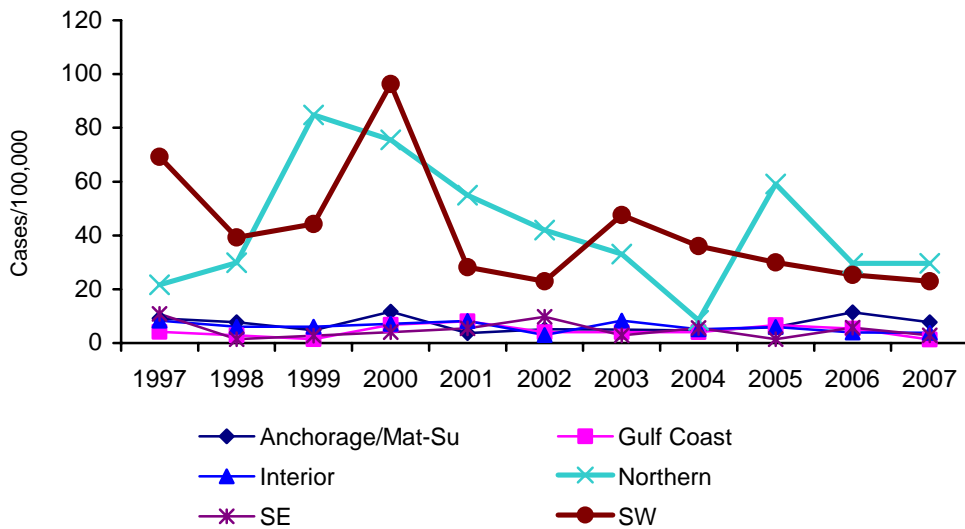
The Northern Region includes the North Slope Borough, Maniilaq and Norton Sound regions. The Norton Sound Region continues to report the greatest number of TB cases, and villages in this region have had recurrent outbreaks of TB over the past 15 years. In 2007, the incidence of TB in the Northern Region was 29.6 cases per 100,000 population, the same incidence as 2006 (Figure 7). Through intensive TB control efforts by the Norton Sound Health Corporation and local public health staff, the incidence of TB has declined, although ongoing vigilance will be necessary to keep TB controlled.

Southwest Alaska includes the Yukon-Kuskokwim (Y-K) Delta, the Bristol Bay Region, and the Eastern Aleutian and Aleutian-Pribilof Islands regions. The 2007 incidence of TB in Southwest Alaska was 23 cases per 100,000; this was a decline from 2006 when the rate was 27.8 cases per 100,000. The Y-K Delta Region reported the majority of TB activity during 2007. In 2005, the Y-K Region implemented a regional TB control program to enhance case finding and treatment for latent TB infection and active TB cases.

Table 2: Number and incidence of TB cases by region and state – 2002-2006

| Region           | 2002<br>(cases/100,000) | 2003<br>(cases/100,000) | 2004<br>(cases/100,000) | 2005<br>(cases/100,000) | 2006<br>(cases/100,000) | 2007<br>(cases/100,000) |
|------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Anchorage/Mat-Su | 17 ( 5.0)               | 17 ( 5.0)               | 15 ( 4.6)               | 21 ( 6.0)               | 41 (11.4)               | 28 ( 7.7)               |
| Gulf Coast       | 3 ( 4.0)                | 3 ( 4.0)                | 3 ( 4.1)                | 5 ( 6.7)                | 4 ( 5.4)                | 1 ( 1.3)                |
| Interior         | 3 ( 3.0)                | 8 ( 8.3)                | 5 ( 5.1)                | 6 ( 5.9)                | 4 ( 3.9)                | 4 ( 3.8)                |
| Northern         | 10 (41.9)               | 9 (33.5)                | 2 ( 8.5)                | 14 (59.1)               | 7 (29.6)                | 7 (29.6)                |
| Southeast        | 7 ( 9.7)                | 2 ( 2.8)                | 4 ( 5.6)                | 1 ( 1.4)                | 4 ( 5.7)                | 2 ( 2.9)                |
| Southwest        | 9 (22.9)                | 19 (74.6)               | 14 (36.0)               | 12 (30.0)               | 10 (25.3)               | 9 (23.0)                |
| STATE TOTAL      | 49 ( 7.6)               | 57 ( 8.8)               | 43 ( 6.8)               | 59 ( 9.0)               | 70 (10.4)               | 51 (7.5)                |

Figure 8: Incidence of TB in Alaska by Region



### G. Village and community outbreaks

An outbreak among homeless individuals was reported in Anchorage in January 2006. The index case was first identified in December 2005. During 2006, 28 (68%) of the 41 TB cases reported in Anchorage were among homeless persons. Eighteen (64%) were male, 25 (89%) were Alaska Native/American Indian, three (11%) were white, and one (4%) was foreign born. The median age at diagnosis was 45 years; four were children, ages 4 months to 8 years. Seventeen (63%) of the patients were alcoholic, and one (4%) was co-infected with HIV. Ten homeless TB patients were identified by contact investigation; five were identified during mass screening at homeless shelters, and four were identified during evaluation for clinical illness at local health care facilities.

During 2007, ongoing screening for TB continued at homeless shelters and agencies that serve this population. Also, providers, particularly those at the Alaska Native Medical Center, had heightened awareness for tuberculosis among patients who were homeless. As a result, eight additional cases were identified in 2007.

### H. Foreign-born persons with TB

In 2007, 8 (16%) of 51 case-patients were foreign-born (Figure 9). Six individuals were from the Philippines, and there was one case from each of the following countries: Mexico and Indonesia. In comparison, nationally 57% of all TB case-patients were foreign-born in 2005.<sup>1</sup>

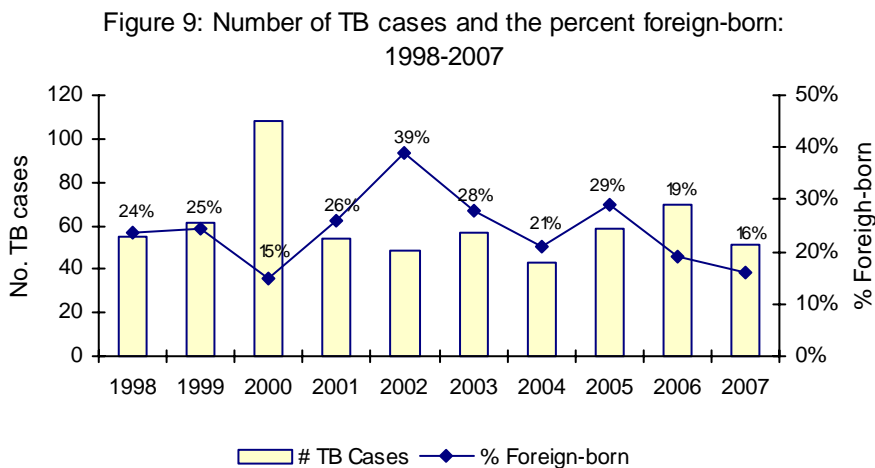


Table 3 gives a detailed listing of countries of origin for foreign borne persons with TB over a 10 year period.

<sup>1</sup> CDC. Reported Tuberculosis in the United States, 2006. Atlanta, GA: U.S. Department of Health and Human Services, CDC, September 2007.

Table 3: Country of Origin for Foreign-born TB Cases: 1997-2006

|                                    | Country of Origin  | TB Cases (%) |
|------------------------------------|--------------------|--------------|
| Asian and Pacific Island Countries | Philippines        | 85 (60%)     |
|                                    | Korea, Republic of | 10 ( 7%)     |
|                                    | Vietnam            | 2 ( 2%)      |
|                                    | Laos               | 6 ( 4%)      |
|                                    | China              | 3 ( 2%)      |
|                                    | Thailand           | 4 ( 3%)      |
|                                    | India              | 1 ( 1%)      |
|                                    | Indonesia          | 3 ( 1%)      |
|                                    | Japan              | 1 ( 1%)      |
|                                    | Cambodia           | 1 ( 1%)      |
|                                    | Singapore          | 1 ( 1%)      |
|                                    | American Samoa     | 1 ( 1%)      |
|                                    | Western Samoa      | 1 ( 1%)      |
|                                    | Guam               | 1 ( 1%)      |
| Latin American Countries           | Mexico             | 6 ( 3%)      |
|                                    | Peru               | 1 ( 1%)      |
|                                    | Guatemala          | 1 ( 1%)      |
|                                    | Haiti              | 1 ( 1%)      |
|                                    | Dominican Republic | 1 ( 1%)      |
|                                    | Honduras           | 1 ( 1%)      |
| Previous Soviet States             | Albania            | 1 ( 1%)      |
|                                    | Ukraine            | 1 ( 1%)      |
|                                    | Russia             | 1 ( 1%)      |
|                                    | Algeria            | 1 ( 1%)      |
| Other                              | Germany            | 1 ( 1%)      |
|                                    | Canada             | 1 ( 1%)      |
|                                    | Sudan              | 1 ( 1%)      |
| Total                              |                    | <b>138</b>   |

### ***I. Non-pulmonary tuberculosis***

From 1998 through 2007, 63 cases or 10% of reported TB cases involved at least one extra-pulmonary site (Table 4). The most common body sites were the cervical lymphatics (24 cases), the pleura (7 cases), the genitourinary tract (6 cases), and bone or joint (5 cases).

Table 4: Body site of non-pulmonary TB: 1997-2006

| Site                     | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
|--------------------------|------|------|------|------|------|------|------|------|------|------|-------|
| Lymphatic: cervical      | 2    | 4    | 4    | 2    | 2    |      | 3    | 2    | 3    | 2    | 24    |
| Lymphatic: other         | 1    |      | 1    |      | 1    |      |      |      |      |      | 3     |
| Lymphatic: intrathoracic |      |      | 1    |      |      |      | 1    | 1    |      |      | 3     |
| Pleural                  |      |      | 3    |      |      |      | 1    |      | 2    | 1    | 7     |
| Genitourinary            | 1    |      |      | 1    | 2    |      |      | 2    |      |      | 6     |
| Bone/Joint               |      | 1    | 2    |      | 1    |      |      |      |      | 1    | 5     |
| Miliary                  |      |      | 2    |      | 1    |      | 1    |      |      |      | 4     |
| Colon                    |      | 1    |      |      |      |      |      |      |      |      | 1     |
| Pericardium              |      | 1    | 1    |      |      | 1    |      | 1    |      |      | 4     |
| Peritoneal               |      | 1    |      | 1    |      |      |      |      |      |      | 2     |
| Meningeal                |      |      |      |      |      | 1    |      |      |      |      | 1     |
| Thyroid/parathyroid      |      |      |      | 1    |      |      |      |      |      |      | 1     |
| Subcutaneous tissue      |      |      |      |      |      |      |      |      | 1    |      | 1     |
| Skin/skin appendages     |      |      |      |      |      | 1    |      |      |      |      | 1     |
| Total for year           | 4    | 8    | 14   | 5    | 7    | 3    | 6    | 6    | 6    | 4    | 63    |

#### ***J. Mortality related to tuberculosis***

During 2007, six individuals died during treatment for TB, or shortly after completion of therapy. None died as a result of tuberculosis.

- Four case-patients had multiple medical problems, including terminal colon cancer, cirrhosis, cardiac disease, and recurrent bacterial pneumonia.
- One individual was co-infected with HIV for which he refused treatment. In addition this case-patient had end-stage renal disease and a long history of ongoing illicit drug use.
- One individual was beaten to death during a bout of excessive alcohol intake.

### **III. National TB Program Objectives**

2007 data were used wherever possible to address the TB Program Objectives. However many of 2007 TB case-patients were still on treatment and contact investigation were in progress at the time of this report. Where 2007 data is not complete, the objectives were addressed using 2006 data.

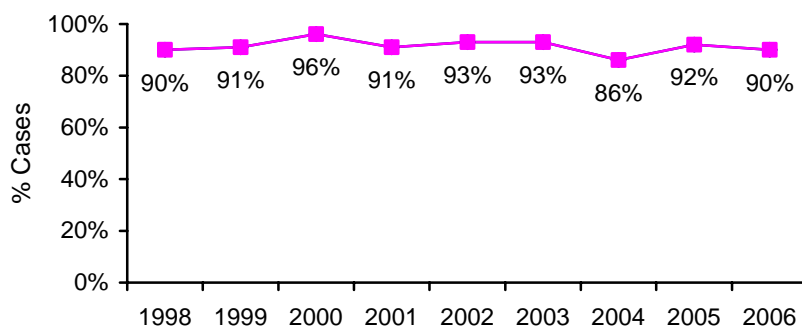
Objectives were written initially with target dates for December 31, 2005. This report institutes new objectives, to be achieved by December 31, 2009. The 2005 objectives can be found in Appendix C.

### A. Treatment and Case Management of Persons with Active TB

**Objective 1:** *By December 31, 2009, at least 95% of persons with newly diagnosed TB, for whom therapy for one year or less is indicated, will complete therapy within 12 months.*

Of 70 TB cases reported in 2006, seven were excluded from analysis. The reasons for exclusion were death during treatment (6 cases) and MDR-TB (1 case). Of the remaining 63 cases, 57 (90%) completed treatment within a 12-month period (Figure 10). Six individuals should have completed treatment within a 12-month period but did not; three had extended treatment due to noncompliance, but did complete treatment. One individual is on a prolonged course due to adverse reactions to the antituberculosis drugs and poor compliance to treatment. Two individuals were lost to follow-up prior to completing an adequate course of treatment.

Figure 10: % TB Cases for whom <12 months treatment was indicated who completed treatment within 12 months



**Objective 2:** *By December 31, 2009, at least 95% of persons with newly diagnosed pulmonary TB will receive an ATS/ISDA/CDC recommended treatment regimen.*

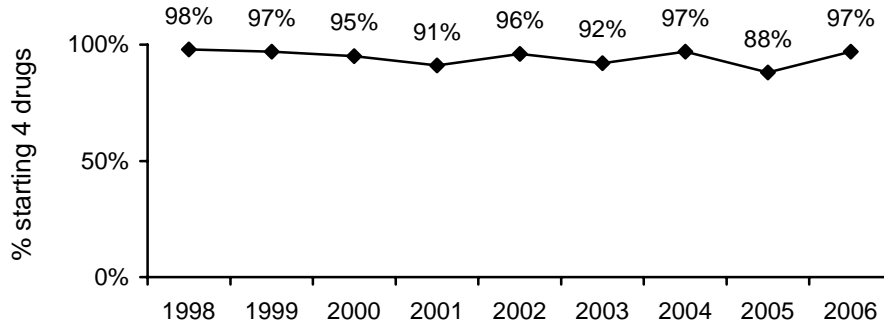
In 2006, of the 70 case-patients who were reported, 60 completed treatment using an ATS/ISDA/CDC recommended regimen. In addition, one individual remains on extended treatment due to MDR-TB. Three individuals were lost during the course of treatment, one during the initiation phase and two during the continuation phase. Six individuals died before (two cases) or during treatment (four cases).

The Alaska TB Program recommends that persons with suspected or confirmed tuberculosis begin a four-drug regimen, pending the results of susceptibility testing. In certain situations, three-drug therapy is warranted: 1) when drug susceptibilities for an epidemiologically linked case are known, 2) when a young child with TB cannot perform color vision screening for ethambutol monitoring, or 3) during pregnancy, when pyrazinamide cannot be used.

Four-drug therapy should have been initiated for 60 of the 68 individuals who started treatment in 2006. Eight cases were excluded from this analysis because they were close contacts to a TB case whose organism was sensitive to all first-line agents. Of the remaining 60 case-patients, 58 (97%) began a four-drug regimen (Figure 11). The two cases who did not begin a four-drug regimen include an individual with cervical lymph node disease and a prior history of an adverse reaction to isoniazid; she was treated with rifampin, ethambutol

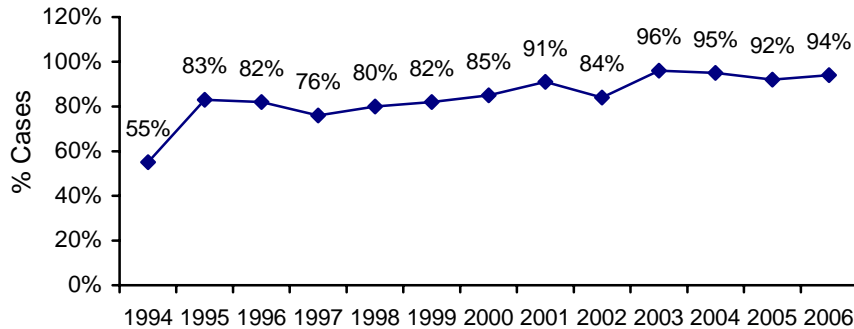
and pyrazinamide using DOT. The other individual had drug-induced hepatitis and was successfully treated for pulmonary tuberculosis using isoniazid and rifampin.

Figure 11: Initiation of 4-Drug anti-TB Therapy



In 2006, 66 (94 %) of 70 TB cases who began treatment were treated using directly observed therapy (DOT) (Figure 12). Two cases were treated using both self and DOT administration. Two individuals died of TB prior to initiation of treatment. DOT is the standard of care for all patients with pulmonary tuberculosis in Alaska. The graph below demonstrates increased acceptance of DOT over the past 13 years.

Figure 12: Percent of TB cases receiving DOT



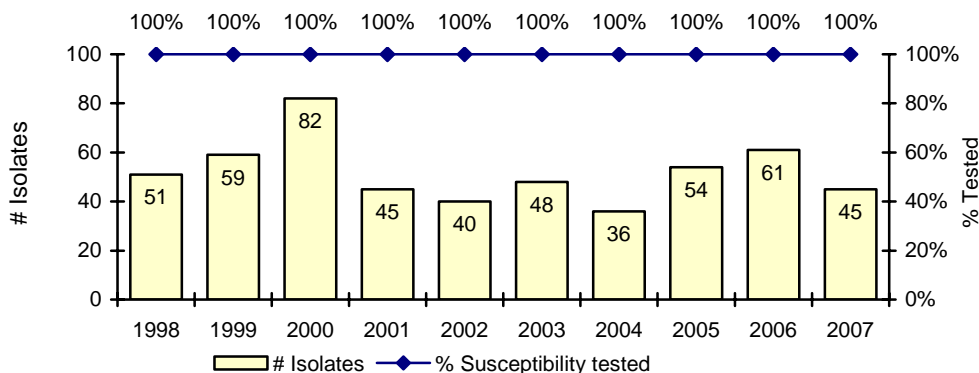
**Objective 3:** By December 31, 2009, at least 90% of all locatable A, B1 or B2 immigrants and refugees will be evaluated within 60 of arrival in the State.

In 2007, the Alaska TB Program received reports of 98 immigrants and refugees who reported to U.S. Customs that they planned to settle in Alaska. Information about all of these individuals was entered into an electronic database. The nearest public health center was notified of these individuals to allow for appropriate follow-up. Of the 60 individuals for whom there was information, the follow-up time between entering the U.S. and evaluation at a public health center was 44.41 days. This is the first year that the Alaska TB Program has measured this objective. Of note: none of these individuals were diagnosed with tuberculosis during 2007.

**Objective 4:** By December 31, 2009, at least 95% of all newly reported culture-positive TB cases will have drug susceptibility testing.

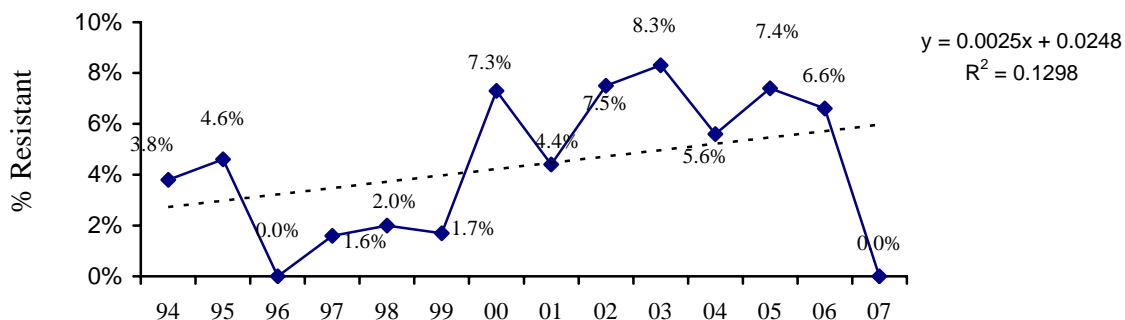
In 2007, 45 (88%) of 51 TB cases were culture positive. All 45 *M. tuberculosis* isolates underwent susceptibility testing (Figure 13). **All 45 isolates were susceptible to all first-line antituberculosis agents.**

Figure 13: *M. tuberculosis* isolates: number and % susceptibility tested



Isoniazid resistance has been increasing over the past 10 years, making it imperative that four drugs are used to initiate treatment (Figure 14). Although no drug-resistant isolates were identified in 2007, this is an anomaly; drug-resistant strains have already been detected in 2008.

Figure 14: Percentage of TB Isolates Resistant to Isoniazid in Alaska



**Objective 5:** By December 31, 2009, HIV status will be reported for at least 85% of all newly reported TB cases age 25-44 years.

In 2007, all six TB case-patients aged 25 to 44 were offered HIV testing. All accepted HIV testing and none were infected with HIV (Table 5).

Table 5: HIV status for TB cases form 25-44 years of age

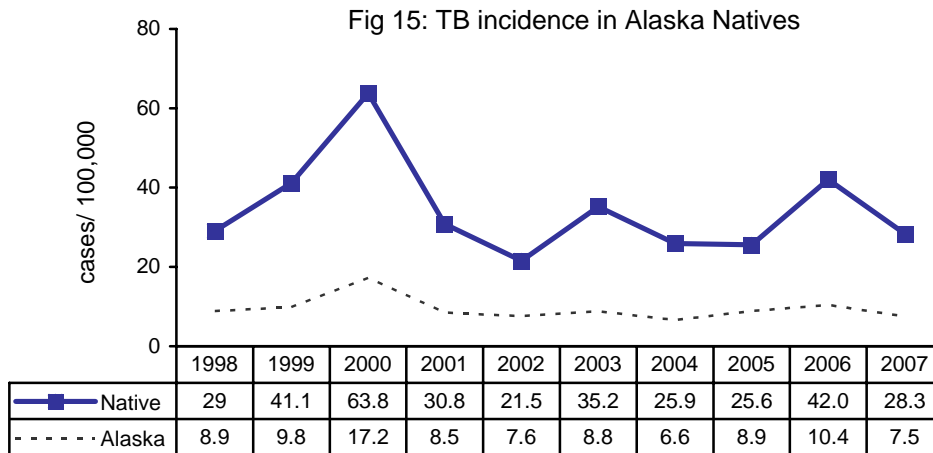
| Year | TB Cases offered HIV testing |       |                 |                |                   | HIV testing not offered | Unknown or blank | Total |
|------|------------------------------|-------|-----------------|----------------|-------------------|-------------------------|------------------|-------|
|      | HIV -                        | HIV + | Refused testing | Result unknown | % Offered testing |                         |                  |       |
| 1997 | 11                           | 2     | 2               | 1              | <b>55%</b>        | 1                       | 12               | 29    |
| 1998 | 12                           | 2     | 3               | 1              | <b>69%</b>        | 1                       | 7                | 26    |
| 1999 | 17                           | 0     | 1               | 1              | <b>73%</b>        | 4                       | 3                | 26    |
| 2000 | 20                           | 2     | 3               | 1              | <b>76%</b>        | 4                       | 4                | 34    |
| 2001 | 11                           | 0     | 1               | 0              | <b>71%</b>        | 2                       | 3                | 17    |
| 2002 | 6                            | 0     | 1               | 0              | <b>77%</b>        | 0                       | 2                | 9     |
| 2003 | 14                           | 1     | 0               | 1              | <b>88%</b>        | 2                       | 0                | 18    |
| 2004 | 14                           | 1     | 0               | 0              | <b>100%</b>       | 0                       | 0                | 15    |
| 2005 | 14                           | 0     | 1               | 0              | <b>100%</b>       | 0                       | 0                | 15    |
| 2006 | 19                           | 1     | 2               | 0              | <b>96%</b>        | 0                       | 1                | 23    |
| 2007 | 6                            | 0     | 0               | 0              | <b>100%</b>       | 0                       | 0                | 6     |

**Objective 6:** *By December 31, 2009, the incidence of TB among Alaska Natives will be reduced to no more than 30 cases per 100,000 population.*

In 2007, the incidence of TB among Alaska Natives was 28.3 cases per 100,000 (Figure 150). This is a decline of more that 30% when compared to 2006 (42.3 cases per 100,000). This decline is, in large part, due to control of the TB outbreak among homeless individuals in Anchorage.

In years when no outbreaks have occurred, (1998, 1999, 2001-2005), the baseline incidence of TB among Native Alaskans ranges from 21.1 to 41.1 cases per 100,000, two to four time greater than the average statewide incidence. This endemic rate of disease is the residual of the tuberculosis epidemic among Alaska Native peoples that occurred during the first half of the 20<sup>th</sup> century. In many communities today most elders are infected with TB as a result of exposure to TB as children. In some rural villages 1/3 or more of residents are TB skin test positive, creating a large reservoir of individuals who may be develop active TB in future years.

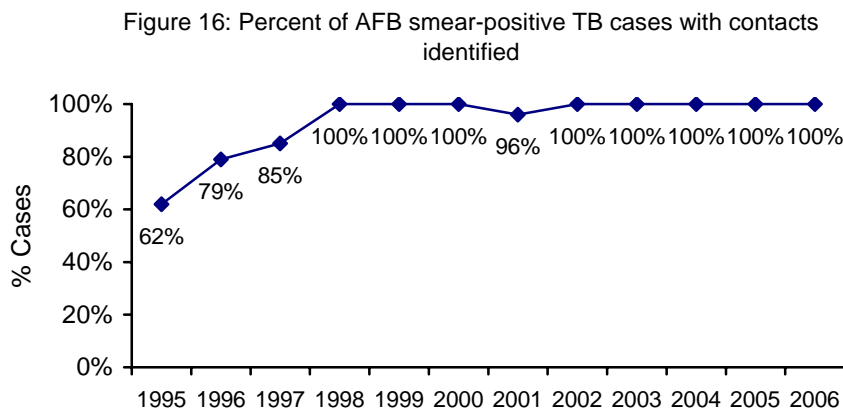
The TB Control Program is working closely with regional public health staff and Alaska Native Health Corporations in the Northern and Southwestern regions of the State. These regions have the highest rates of disease in Alaska. Most of the people who live in these regions are Alaska Native. Enhanced case finding and treatment, thorough contact investigations, and targeted TB screening are critical to effectively control TB in these communities.



### B. Contact Investigation

**Objective 7:** By December 31, 2009, at least 85% of contacts to sputum AFB smear positive TB cases will have completed evaluation of infection and disease within 5 months of diagnosis.

In 2006, 17 (100%) AFB smear positive TB cases had contacts identified. Figure 16 shows that over the past 12 years, there has been considerable improvement in identifying contacts for infectious TB case-patients.



In 2006 there were 293 contacts identified for 17 infectious TB case-patients, an average of 17.2 contacts for each case. Of these 293 contacts, 67% were appropriately examined (Figure 17). This falls below our 2005 goal (70% of contacts are evaluated) and is far from reaching the 2009 goal of 85%.

Alaska presents unique challenges to contact investigation activities. Barriers to completing contact investigations include the huge geographic span of the state, lack of road systems where TB incidence is highest, harsh weather conditions, and a high prevalence of LTBI infection Northern and Southwest regions of the state.

Figure 17: Percent of contacts to AFB smear positive cases who were examined

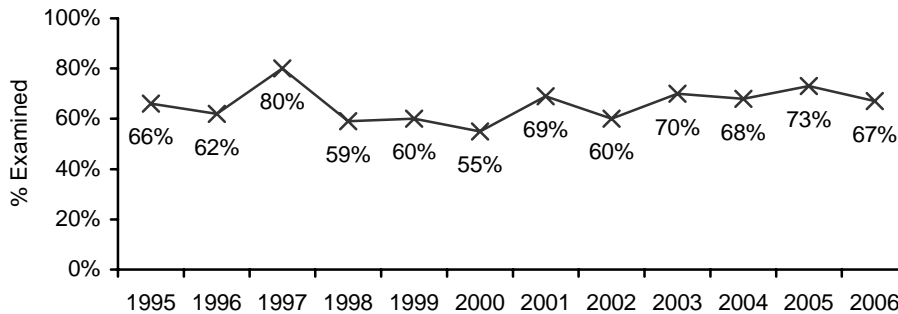


Table 6: Contact investigation data for TB cases who are smear positive

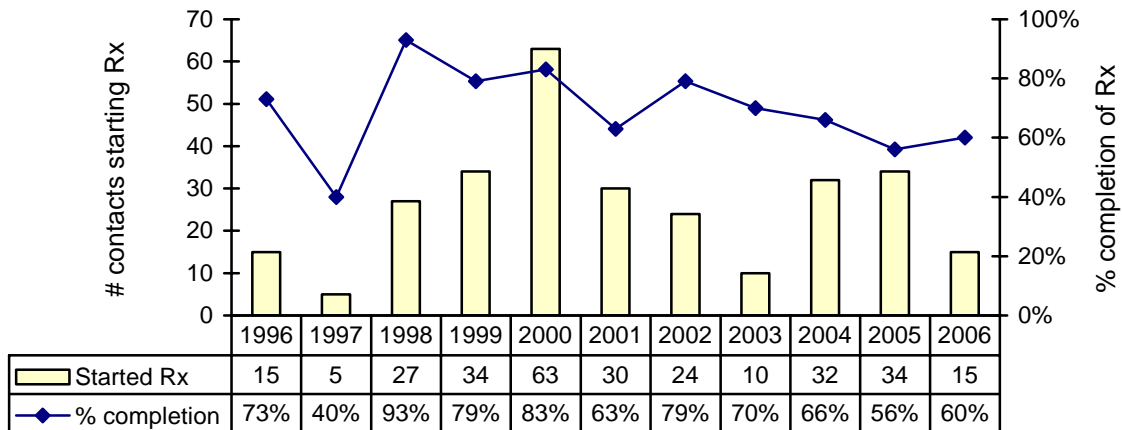
| Year  | % Cases with contacts | % Contacts examined | # Contacts per case | % Contacts infected | % Contacts with TB disease |
|-------|-----------------------|---------------------|---------------------|---------------------|----------------------------|
| 1995  | 61.54                 | 65.90               | 13.00               | 0.74                | 0.74                       |
| 1996  | 78.57                 | 62.19               | 19.95               | 11.72               | 2.56                       |
| 1997  | 85.00                 | 79.50               | 9.47                | 13.28               | 0.00                       |
| 1998  | 100.00                | 59.37               | 14.32               | 55.61               | 3.74                       |
| 1999  | 100.00                | 60.04               | 16.96               | 55.64               | 3.64                       |
| 2000  | 100.00                | 54.97               | 18.48               | 50.16               | 6.98                       |
| 2001  | 95.65                 | 68.72               | 24.41               | 28.18               | 1.08                       |
| 2002  | 100.00                | 60.08               | 12.53               | 51.05               | 2.80                       |
| 2003  | 100.00                | 69.75               | 14.95               | 48.40               | 2.28                       |
| 2004  | 100.00                | 68.00               | 21.67               | 37.10               | 2.71                       |
| 2005  | 100.00                | 72.94               | 14.17               | 41.40               | 5.38                       |
| 2006  | 100.00                | 66.89               | 18.31               | 37.24               | 2.55                       |
| 2007* | 84.21                 | 52.66               | 19.94               | 33.93               | 2.38                       |

\* data incomplete

**Objective 8:** By December 31, 2009, at least 85% of infected contacts to sputum AFB smear positive TB cases will complete therapy.

During the years 1997 through 2006, 274 contacts who were exposed to AFB smear-positive TB began treatment for latent TB infection (LTBI); 200 (73%) completed treatment. Since 2000, the rate of LTBI treatment completion fluctuated from a high of 83% to a low of 56% (Figure 18). The reasons for this variability are unknown.

Figure 18: Completion of LTBI treatment for contacts to AFB smear-positive TB cases



### C. TB Surveillance/Reporting

**Objective 9:** By December 31, 2009, all isolates will be sent to the regional genotyping laboratory for genotyping.

During 2007, all *M. tuberculosis* isolates from the Alaska State Public Health Laboratories were sent to the State of California Genotyping Laboratory for analysis. Every effort was made to obtain isolates from out-of-state laboratories for genotyping.

**Objective 10:** By December 31, 2009, 95% of all cases of TB will be detected through usual disease reporting and surveillance systems (e.g. telephone, Rapid Telephone Reporting system, or facsimile reports or through electronic laboratory reporting).

In 2007, all case-patients with tuberculosis were discovered through usual disease reporting activities and existing public health surveillance systems.

**Objective 11:** By December 31, 2009, 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 completed.

In 2007, all cases of TB were reported to CDC using the CDC electronic reporting system. To date, for 2007, 92% of all specified data fields were transmitted for those cases (Appendix B). Additional data for 2007 will be transmitted as cases that are still open complete treatment.

**Objective 12:** By December 31, 2005, 100% of all suspected and confirmed cases of TB will be maintained in a secure, confidential TB registry that contains the elements needed for the national TB case report, Report of Verified Case of Tuberculosis (RVCT).

All data about tuberculosis cases is maintained in a CDC-developed program, the Tuberculosis Information Management System (TIMS). This is a secure electronic system that generates reports (objective 11) to the CDC. These reports are confidential, and no names or other identifiers are transmitted to CDC.

**Objective 13:** By December 31, 2005, 100% of TB/HIV co-infections will be detected through ongoing collaboration between the Alaska TB Program and the Alaska HIV/AIDS Program.

There was one individual with both tuberculosis and HIV infection in 2007. The Alaska TB Program and the Alaska HIV/AIDS Program collaborated in the detection and follow-up of this case-patient.

The same analyst-programmer manages data from the TB registry database and the HIV/AIDS databases. He crosschecks these disease registries annually. In addition, program staff from the two programs routinely communicate about case-patients that are co-infected.

#### ***D. Human Resource Development***

***Objective 14.*** *The Alaska TB Program will develop a plan for TB Training and Education within 3 months after the cooperative agreement award, or some other specified date pending development of federal resources.*

The TB Training and Education Plan was completed. A progress report is attached as Appendix D.

#### ***E. Program Evaluation Activities***

***Objective 15.*** *The Alaska TB Program will develop a program evaluation plan, which will be completed in 2005 or at a later date, pending development of evaluation tools.*

A program evaluation plan was developed and submitted to the CDC TB Elimination Program. A progress report is attached as Appendix E.

## **IV. TB Public Health Laboratory**

### **A. Current Laboratory Activities**

Tuberculosis in Alaska has always been higher than the national average (see Incidence of Tuberculosis in Alaska, page 3). During the five-year period from 2003 to 2007 there were 224 cases of tuberculosis reported in Alaska. The Alaska State Public Health Laboratory (ASPHL) contributed laboratory data (either smear, culture and/or susceptibility data) for 48, 32, 45, 58, and 41 patients (2003-2007). For the first three months of calendar 2008, ASPHL provided laboratory data on 13 newly positive TB patients.

Testing for tuberculosis by the ASPHL is performed in a Biosafety Level 3 (BSL3) facility located in Anchorage, Alaska, which was built in 2000. Specimens are received either from courier services (Anchorage/Mat-Su area only), US Postal Service (rural Alaska) and commercial express (FedX<sup>TM</sup>, UPS<sup>TM</sup>, WPX<sup>TM</sup>, etc.) delivery services (Fairbanks and Juneau). All non-Anchorage originating specimens are shipped via air cargo following International Air Transportation Association (IATA) regulations. All specimen packages are opened under a Biological Safety Cabinet (BSC), pre-analytic screening is performed for mislabeled, unlabeled and/or low volume samples that are unsatisfactory for testing. ASPHL works closely with the submitter to ensure that collection guidelines are followed and that collection and shipping instructions are clear.

Specimens are delivered to the TB laboratory suite, and unique bar code numbers are assigned to each sample for processing. Specimens are processed in type II/B BSCs following decontamination and concentration procedures. Concentrated acid fast smears are stained by the fluorochrome method using the Wescor<sup>TM</sup> Aerospray<sup>TM</sup> Acid Fast Slide Stainer and are reported the same day the specimen is received by the laboratory. NAAT (Nucleic Acid Amplification Testing) is not currently being performed on smear-positive samples.

Processed samples are inoculated into MGIT 960<sup>TM</sup> liquid culture media and Middlebrook 7H10 biplates. Initial growth in either liquid or solid media is confirmed using Genprobe<sup>TM</sup> Accuprobe<sup>TM</sup> tests and/or Agilent MIDI<sup>TM</sup> high performance liquid chromatograph (HPLC) mycolic acid analysis utilizing Sherlock Identification software from Agilent MIDI<sup>TM</sup>.

TB specimen processing occurs Monday through Friday. All specimens received by 8:30 am are processed the same day as received. The laboratory has achieved 100% same-day turn-around time for smear reporting (both positive and negative) since 1999. Positive smears are called to the submitter and to the Section of Epidemiology as soon as they are observed.

Results are entered into the Laboratory Information Management System (LIMS). Hardcopy reports are generated the day of reporting and mailed to each submitter. Cultures are reported as soon as a positive identification is made. Negative cultures have a preliminary report at three weeks and a final report after six weeks.

Susceptibilities are performed on all first positive specimens. First-line drugs are performed using the MGIT 960<sup>TM</sup> liquid culture system. All drug resistant isolates are repeat tested and an indirect susceptibility test performed. Results are immediately reported to the providers and TB control. The data are also entered into the PHLIS database on regular intervals.

Workload for the ASPHL TB laboratory is summarized in the table below.

| ASPHL TB Statistics  | Year |      |      |      |      |         | 5 Year Average |
|--|------|------|------|------|------|---------|----------------|
|  | 2003 | 2004 | 2005 | 2006 | 2007 | 2008YTD |                |
| (a) Number of patients for whom the laboratory confirmed an initial diagnosis of TB by culturing <i>M. tuberculosis</i> from a primary patient specimen                              | 48   | 32   | 45   | 58   | 41   | 13      | 45             |
| (b) Number of patient specimens processed and cultured   | 7728 | 3879 | 4444 | 4524 | 4689 | 792     | 5053           |
| (c) Number of patients for whom cultures were processed for mycobacterial identification testing, and/or whose isolates were referred to other lab for identification testing        | 2256 | 1262 | 1730 | 1928 | 2200 | 372     | 1875           |
| (d) Number of patients whose specimens produced cultures containing any species of Mycobacterium   | 74   | 55   | 67   | 83   | 69   | 19      | 70             |
| (e) Number of patients whose specimens produced cultures containing <i>M. tuberculosis</i>   | 48   | 32   | 45   | 58   | 41   | 13      | 45             |
| (f) Number of patients for whom <i>M. tuberculosis</i> drug susceptibility tests were performed and/or whose isolates were referred to other laboratories for susceptibility testing | 48   | 32   | 45   | 58   | 41   | 13      | 45             |
| (g) Number of patients for whom nucleic acid amplification tests confirmed the presence of <i>M. tuberculosis</i> in a primary patient specimen.                                     | 0    | 0    | 0    | 0    | 0    | 0       | 0              |

**B. Progress Towards Meeting CDC Recommendations as Described in Tenover, et al. and Styr et al.**

**1. Promote rapid delivery of specimens to the laboratory (goal TAT is 24 hours from collection of specimen).**

Turn around time (TAT) continues to be a challenge for the ASPHL. All specimens received by the laboratory, with the exception of those originating in the Anchorage area, arrive via air transport. Over 67% of all TB specimens originate outside of the Anchorage area. IATA and new Department of Transportation (DOT) and US Postal Service (USPS) have stringent

regulations regarding the shipment of diagnostic specimens and infectious agents. These regulations present some very real difficulties in rural Alaska. The ASPHL continues to provide leadership and training in the proper packaging and shipping of diagnostic specimens and infectious substances by providing regular workshops and training materials to all regions in the State. In addition to regulatory challenges, the physical nature of Alaska has obstacles difficult to overcome.

The ASPHL, located in Anchorage, is the only in-state TB laboratory. Many of our TB positive samples originate from villages over 700 air miles from Anchorage. Not only is sheer distance a factor, but travel to and from these areas is difficult in that terrain and lack of roads makes surface and even air travel difficult. It is not unusual for a sample to travel several hours by all terrain vehicle (ATV) or snow machine (snowmobile) to reach a village with a dirt airstrip; then loaded onto a single-engine fixed wing aircraft to fly another several hours to a larger population center that has a hard-surface runway that can handle jet aircraft. The sample is then transferred to a jet aircraft (approximately 14 locations, some with only one flight per day) for, some instances over 2 hours, airtime. IATA regulations allow the aircraft pilot to determine what flies and what does not. Weather conditions also play a significant role in air travel schedules. It is not unusual for specimens to arrive in the laboratory a week or more after collection. Thus, when the specimens actually arrive there is an abundance of bacterial growth found in the sample, resulting in the *M. tuberculosis* organism, if present, not being healthy enough to grow on the culture media or appear in the liquid media within 21 days for testing.

These unusual conditions contribute to the delay in recovering the *M. tuberculosis* organism from the original specimen within the goal TAT of the CDC grant guidelines. Within the Municipality of Anchorage, the ASPHL employs a private courier service to transport specimens from major providers to the laboratory. TB specimens originating from Anchorage are usually processed and smears reported within 24 hours of collection. Time in transit and turn-around time data is now available since ASPHL has moved to a new LIMS system starting May 21, 2007. ASPHL was unable to track this data with our previous LIMS. Receiving specimens from rural Alaska within 24 hours of collection is not possible under current conditions. The vast majority of TB specimens are transported via USPS service. Commercial express services such as UPS<sup>™</sup>, FedEx<sup>™</sup>, WPX<sup>™</sup>, etc. are available to only larger Alaskan communities of Fairbanks and Juneau. All specimens are currently, and will continue to be processed and smears reported within 24 hours of receipt in the laboratory.

**2. Use Fluorescent acid-fast staining and promptly transmit results by phone, fax, or electronically (goal TAT is 24 hours from receipt of the specimen).**

The ASPHL has had 100% of TB specimens stained by the fluorescent acid-fast staining technique since 1999. Additionally, all positive smear results are transmitted by phone and negative results transmitted by fax within 24 hours of receipt in the laboratory, exclusive of Saturdays and Sundays.

**3. Inoculate a liquid medium as one of the primary cultures.**

All samples are currently, and will continue to be, inoculated into MGIT 960<sup>™</sup> culture media and Middlebrook 7H10 biplates. The MGIT 960<sup>™</sup> system allows for continued monitoring

of mycobacterial growth in liquid media.

**4. Identify growth as acid-fast and use rapid methods to identify isolates as *M. tuberculosis* as soon as possible (goal TAT is 14-21 days from receipt of specimen).**

As stated in (c) above, positive signals from the MGIT 960™ are acid-fast stained and identified using Genprobe™ Accuprobe™ and/or the Agilent MIDI™ HPLC mycolic acid analysis identification test the day a positive signal is noted. No testing is performed on weekends or holidays. From January 1, 2008 to April 24, 2008, ASPHL has identified 8 (61.5%) of the 13 positive MTC patients within 21 days.

In 2007, the ASPHL identified 41 isolates of *M. tuberculosis*. Thirty-six (88%) positive results were reported within 21 days of receipt. Five (12%) of the 41 isolates were identified and reported more than 21 days after specimen receipt in the laboratory (range 24-31 days). Delayed reporting of *M. tuberculosis* is due to factors unique to Alaska (see (a) above).

**5. Determine the susceptibilities of initial *M. tuberculosis* isolates to primary drugs in a rapid culture system (goal TAT is 21-28 days from receipt of the specimen).**

All initial isolates of *M. tuberculosis* are tested for primary anti-mycobacterial drug susceptibilities using the rapid MGIT 960™. All drug resistant isolates are repeat tested and an indirect susceptibility test performed. Multi-drug resistant isolates are sent to a reference laboratory in the lower 48 States for further testing.

In 2007, the ASPHL identified 41 isolates of *M. tuberculosis*. Twenty-three (56%) susceptibility results were reported within 21-28 days of receipt. Eighteen (44%) of the 41 isolates were identified and reported more than 28 days after specimen receipt in the laboratory (range 31-53 days). Delayed reporting of *M. tuberculosis* is due to factors unique to Alaska (see (a) above).

**6. Report the results of drug susceptibility testing to the clinician as soon as they are available by phone, fax, or electronically.**

All susceptibility reports are reported to the clinician and TB control as soon as results are available via telephone. Verbal results are followed up by fax and hard copy sent via USPS.

**C. Baseline Activities and Progress Toward Accomplishing Health People 2010 Objectives.**

**1. Number and percent of specimens received by the laboratory within 24 hours of collection.**

ASPHL was unable to track this data with our previous LIMS. ASPHL began using the new LIMS system May 21, 2007. Specimen time in transit data is now available from May 21, 2007 to April 24, 2008 as baseline information. During the time period stated, 42% (1715/4116) of the total number of samples submitted to ASPHL for testing were received within 24 hours of collection. The target goal is to have at least 50% of samples received within 24 hours of collection by 2009. For comparison, 66% (2732/4116) of samples were received within 3 days of collection, and 85% (3524/4116) of samples were received within 5 days of collection.

**2. Number of patient specimens tested using rapid detection and identification tests.**

All specimens received will be tested using liquid culture systems such as the MGIT 960™ system. Additionally, all specimens that are acid-fast stained using the fluorochrome method are reported the same day they are received (exclusive of weekends and holidays). Future plans call for the implementation of using direct NAAT on all AFB positive smears pending availability funding and personnel resources. In order to meet goal (b), the ASPHL will endeavor, over the next five years, to regain lost staff and increase General Fund allocations and increase federal assistance. If federal funding for additional personnel and supplies is available, NAAT Testing will be established with the goal of 100% testing.

**3. Number of patients for whom laboratory confirmation of TB was provided within 48 hours.**

Currently, laboratory confirmation of TB takes 5-31days (average 14 days) from receipt in the laboratory. Pending the implementation of direct NAAT testing on AFB positive smears, no progress is expected. Without federal funding, implementation of direct NAAT Testing is not in the foreseeable future.

**4. Number of patients for whom the laboratory confirmed TB by isolation of *M. tuberculosis* from a patient specimen.**

Currently, 100% of laboratory diagnosis of TB is accomplished by isolation of *M. tuberculosis*. As non-culture methods become available (direct NAAT), confirmation of results will be by isolation of *M. tuberculosis* in culture.

**D. Update on TB Public Health laboratory Recipient Activities.**

**Objective:** 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 ASPHL reports all *M. tuberculosis* isolates to the CDC using PHLIS. All available information for each isolate is submitted through PHLIS.

**Objective:** 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 and smear-negative will be reported within 24 hours of receipt.
2. Results of culture-positive specimens, both *M. tuberculosis* complex and other mycobacterium, will be reported with 14-21 days from specimen receipt.
3. Results of drug susceptibility will be reported for first-line drugs within 15-35 days of receipt of the specimen.

TAT for smear results within 24 hours has been 100% successful. However, TAT for culture and susceptibility testing continues to be problematic for reasons stated earlier. The ASPHL will still continue to assist providers in the proper collection and prompt shipment of TB samples to reduce contamination and delays.

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

The ASPHL in Anchorage is the only laboratory in Alaska with mycobacterial capacity. As a result, the ASPHL does not receive referred isolates.

## **E. Components**

### **Component 1: Accomplishment of CDC Recommended Laboratory Activities and Turnaround Times:**

#### **Program Need**

The State of Alaska needs to improve TAT from the time of collection to the time of receipt by the ASPHL. Many factors are out of the control of the ASPHL and cannot be addressed. ASPHL will address TAT through training, updated collection information sheets, and in-house technology enhancement.

#### **Objectives**

1. By 2009, at least 50% of all specimens for TB testing will be received in the ASPHL within 24 hours of collection.
2. By 2009, at least 70% of all specimens for TB testing will be received in the ASPHL within 3 days of collection.
3. At least 95% of all specimens for TB testing received by ASPHL will have AFB-smears reported within 24 hours of receipt in the laboratory.
4. At least 75% of all specimens for TB testing received by ASPHL, resulting in a positive culture of *M. tuberculosis* complex and other mycobacterium will be reported within 14-21 days from specimen receipt.
5. At least 75% of all clinical specimens for TB susceptibility testing received by ASPHL, will be reported within 15-35 days from specimen receipt.

#### **Methods**

ASPHL will provide collection, packaging and shipping material to non-Anchorage-based providers.

ASPHL will provide training to all providers on proper shipping and handling procedures for diagnostic specimens and infectious substances.

#### **Evaluation**

1. At least a 10% per year improvement in the reduction of specimen receipt time is realized for 2007.
2. At least a 5% per year improvement in the reduction of specimen receipt time is realized. However, due to Alaska's rural geographical demographics, receipt of specimens within a 3-day time frame has not yet been achieved.
3. Objective 3 is immediately met.

4. At least a 5% per year improvement in the reduction in TAT is realized. ASPHL's ability to successfully complete testing resulting in a positive culture of *M. tuberculosis* complex and other mycobacterium will be reported within 14-21 days from specimen receipt. ASPHL met this objective this past year due to having two full-time microbiologists in the TB Department to successfully handle the patient workload and testing.
5. At least a 5% per year improvement in the reduction TAT is realized. ASPHL's TAT for this objective went from 51% in 2005 to 67% in 2006 (16% improvement for 2006). ASPHL continues to strive towards meeting this objective.

**Component 2: Accomplishment of the Health People 2010 TB Laboratory Goal:**

**Program Need**

ASPHL needs a competent workforce and appropriate technology and supplies to fulfill the following objectives.

**Objectives**

1. Increase the percentage of specimens received by ASPHL within 24 hours of collection.
2. Assure that all specimens received for mycobacterial testing are done so using rapid detection and identification methods.
3. Assure that all patients with laboratory confirmed TB have results transmitted to providers and TB control within 48 hours.
4. Assure that all patients for whom the laboratory diagnoses TB are confirmed by culture of *M. tuberculosis*.

**Methods**

1. Fulfill objectives.
2. Develop and implement direct NAAT testing on all AFB-positive smears and measures of TAT.
3. (a) Continue to report all AFB-positive smears by telephone/fax the same day the specimen is received in the laboratory. (b) Continue to report positive culture information by phone as soon as results are available. (c) Develop TB module for new LIMS to allow for electronic laboratory reporting.

**Evaluation**

1. Achieving a 5% per year reduction in TAT.
2. Anticipated Laboratory Technician position eliminated by legislature.
3. Anticipated Public Health Microbiologist II position eliminated by legislature.
4. Implementation of direct NAAT Testing not feasible in the foreseeable future.
5. (a) Report all AFB-positive smears by telephone the same day the specimen is received in the laboratory. (b) Report all positive culture information by phone as soon as results are available. (c) Completed development and implementation of the TB module for new LIMS May of 2007, to allow for electronic laboratory reporting

of all TB results to Epidemiology TB Control.

**Component 3: Development of a System to Provide Timely and Reliable Laboratory Testing in Support of TB Treatment and Control Efforts:**

**Program Need**

The ASPHL is the only TB laboratory in the State. It is imperative that the Laboratory continue to provide state-of-the-art TB testing in a timely manner. To this end, the ASPHL is in need of adequate numbers of qualified staff including Public Health Microbiologists (I & II) and Laboratory Technicians. The ASPHL also needs sufficient consumables such as media, reagents, and packing and shipping materials. Finally, sufficient funds for contractual obligations such as express mail and courier services are needed.

**Objectives**

1. All specimens will be microscopically examined using fluorochrome method for AFB smears.
2. All culturing will be done using the liquid MGIT 960™ system for culture and anti-mycobacterial susceptibility testing.
3. All liquid cultures will be augmented with solid Middlebrook biplates.
4. All non-culture direct rapid tests will be confirmed with culture, isolation, and identification of *M. tuberculosis*.
5. All positive results will be conveyed to the clinician and TB control the same day a result is obtained.

**Methods**

1. Continue using fluorochrome method for AFB smears.
2. Using the liquid MGIT 960™ system for culture and anti-mycobacterial susceptibility testing and/or the Agilent 1100 HPLC mycolic acid analysis instrumentation for atypical *Mycobacterium* species.
3. Augmented liquid cultures with solid Middlebrook biplates.
4. As non-culture direct rapid tests are implemented, confirm with culture, isolation, and identification of *M. tuberculosis*.
5. Continue reporting to the clinician and TB control the same day a result is obtained.

**Evaluation**

1. Objects 1-3 continue to be met in 2007.
2. Objective 4 is not feasible for implementation in the foreseeable future.
3. 100% of all positives are reported the same day results are obtained.

## **V. Appendices**

Appendix A: Summary information about tuberculosis in Alaska: 1998 – 2007

Appendix B: Surveillance Completeness Summary Report

Appendix C: Alaska TB Control Objectives

Appendix D: TB Program Training and Human Resource Strategy Plan

Appendix E: TB Evaluation Plan Progress Report

**Appendix A: Summary information about tuberculosis in Alaska: 1998-2007**

|   | 1998             | 1999             | 2000               | 2001             | 2002             | 2003             | 2004             | 2005             | 2006             | 2007             |
|---|------------------|------------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| No. of TB cases                               | 55               | 61               | 108                | 54               | 49               | 57               | 43               | 59               | 70               | 51               |
| No. of cases associated with outbreaks        | 4                | 0                | 36                 | 0                | 0                | 0                | 0                | 0                | 28               | 8                |
| Alaska population                             | 617,082          | 622,000          | 627,697            | 632,241          | 640,544          | 647,747          | 656,834          | 663,253          | 670,053          | 676,987          |
| Alaska case rate (per 100,000)                | 8.9              | 9.8              | 17.2               | 8.5              | 7.6              | 8.8              | 6.6              | 8.9              | 10.4             | 7.5              |
| USA case rate (per 100,000)                   | 6.8              | 6.4              | 5.8                | 5.6              | 5.2              | 5.1              | 4.9              | 4.8              | 4.6              | 4.4              |
| Alaska population 0-14 years                  | 163,628          | 162,691          | 158,500            | 159,258          | 159,491          | 159,791          | 160,722          | 160,376          | 160,168          | 161,576          |
| No. 0-14 yrs old (% total)<br>(cases/100,000) | 5 ( 9%)<br>(3.1) | 2 ( 3%)<br>(1.2) | 29 (27%)<br>(18.3) | 5 ( 9%)<br>(3.1) | 5 (10%)<br>(3.1) | 7 (12%)<br>(4.4) | 6 (14%)<br>(3.7) | 7 (12%)<br>(4.4) | 7 (10%)<br>(4.4) | 4 ( 8%)<br>(2.5) |
| No. foreign born (% total)                    | 13 (24%)         | 13 (25%)         | 15 (14%)           | 13 (24%)         | 19 (39%)         | 16 (28%)         | 9 (21%)          | 17 (29%)         | 12 (17%)         | 8 (16%)          |
| No. homeless in Anchorage<br>(cases/100,000)  | 5<br>(125)       | 2<br>(20)        | 4<br>(100)         | 1<br>( 25)       | 1<br>( 25)       | 8<br>(200)       | 0<br>( 0)        | 1<br>( 25)       | 28<br>(650)      | 8<br>(200)       |
| No. with isoniazid-resistant TB               | 1                | 1                | 5                  | 2                | 3                | 2                | 2                | 2                | 2                | 0                |
| No. with multiple drug resistant TB (MDR-TB)* | 0                | 0                | 1                  | 0                | 0                | 1                | 0                | 0                | 1                | 0                |
| No. offered HIV testing (% of total)          | 34 (62%)         | 37 (61%)         | 55 (51%)           | 29 (54%)         | 31 (63%)         | 41 (72%)         | 33 (77%)         | 46 (78%)         | 51 (73%)         | 36 (71%)         |
| No. TB cases infected with HIV                | 2                | 0                | 2                  | 1                | 0                | 1                | 2                | 0                | 1                | 1                |
| No. drug use (IV & non-IV)<br>(% total)       | 5 ( 9%)          | 7 (11%)          | 7 (6%)             | 0 ( 0%)          | 2 ( 4%)          | 6 (11%)          | 4 ( 9%)          | 2 ( 3%)          | 2 ( 3%)          | 6 (12%)          |
| No. excessive alcohol use (% total)           | 25 (45%)         | 26 (43%)         | 31 (29%)           | 13 (24%)         | 10 (20%)         | 21 (37%)         | 12 (28%)         | 8 (14%)          | 30 (43%)         | 20 (39%)         |

\* MDR-TB indicates resistance to both isoniazid and rifampin.

**Appendix B: Surveillance Completeness Summary Report**

| Field                          | % Completed |        |        |        |        |
|--------------------------------|-------------|--------|--------|--------|--------|
|                                | 2003        | 2004   | 2005   | 2006   | 2007   |
| Birth date                     | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Sex                            | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Ethnicity                      | 94.74       | 97.67  | 100.00 | 100.00 | 94.12  |
| Race                           | 98.20       | 97.67  | 100.00 | 100.00 | 100.00 |
| Country                        | 100.00      | 100.00 | 100.00 | 100.00 | 98.04  |
| Date entered U.S.              | 68.75       | 88.89  | 100.00 | 100.00 | 87.50  |
| Status                         | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Previous TB                    | 80.00       | 95.35  | 100.00 | 100.00 | 98.04  |
| Major site of disease          | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Sputum smear                   | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Sputum culture                 | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Microscopic exam               | 100.00      | 97.67  | 100.00 | 100.00 | 100.00 |
| Culture of tissue              | 100.00      | 97.67  | 100.00 | 100.00 | 98.04  |
| Chest x-ray                    | 100.00      | 100.00 | 100.00 | 98.57  | 100.00 |
| Skin test                      | 100.00      | 97.67  | 93.22  | 98.57  | 100.00 |
| HIV Status                     | 98.25       | 88.37  | 96.61  | 90.00  | 84.31  |
| HIV Status – ages 24-44        | 100.00      | 100.00 | 100.00 | 95.65  | 100.00 |
| Homelessness                   | 100.00      | 100.00 | 100.00 | 100.00 | 98.04  |
| Injecting drug use             | 91.23       | 95.35  | 100.00 | 100.00 | 94.12  |
| Non-injecting drug use         | 92.98       | 95.35  | 100.00 | 98.57  | 94.12  |
| Alcohol                        | 100.00      | 97.67  | 100.00 | 100.00 | 94.12  |
| Correctional institution       | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Long term care                 | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Initial drug regimen           | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Start therapy date             | 100.00      | 100.00 | 100.00 | 100.00 | 98.04  |
| Occupation                     | 68.42       | 83.72  | 94.92  | 97.14  | 94.12  |
| Drug susceptibility done       | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Drugs susceptibility tested    | 100.00      | 100.00 | 100.00 | 100.00 | 100.00 |
| Sputum conversion              | 100.00      | 100.00 | 100.00 | 100.00 | 72.09  |
| Stop therapy date              | 100.00      | 97.62  | 93.22  | 97.06  | 49.00  |
| Reason therapy stopped         | 100.00      | 100.00 | 94.92  | 97.06  | 50.00  |
| Healthcare Provider            | 100.00      | 100.00 | 100.00 | 100.00 | 60.78  |
| DOT                            | 100.00      | 100.00 | 100.00 | 100.00 | 64.00  |
| <i>Mean field completeness</i> | 96.74       | 97.90  | 99.18  | 99.17  | 91.77  |

## **Appendix C: Alaska TB Control Objectives**

### **(A) Treatment and Case Management of Persons with Active TB**

1. 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 by December 31, 2005.
  - 1.1. At least 95% of persons with newly diagnosed TB, for whom therapy for one year or less is indicated, will complete therapy within 12 months by December 31, 2009.
2. At least 95% of persons with newly diagnosed TB will receive an ATS/ISDA/CDC recommended regimen of treatment using directly observed therapy (DOT) by December 31, 2005.
  - 2.1. This objective will remain the same for December 31, 2009.
3. All A, B1, or B2 immigrants and refugees will be entered into a secure and confidential electronic database by December 31, 2005.
  - 3.1. At least 90% of all locatable A, B1, or B2 immigrants and refugees will be evaluated and within 60 days of arrival in the State by December 31, 2009.
4. For at least 95% of all newly reported culture-positive TB cases, drug susceptibility results will be reported by December 31, 2005.
  - 4.1. This objective will remain the same for December 31, 2009.
5. For at least 80% of all newly reported TB cases age 25-44 years, HIV status will be reported in 2005.
  - 5.1. For at least 85% of all newly reported TB cases age 25-44 years, HIV will be reported in 2009.
6. By December 31, 2005, the incidence of TB among Alaska Natives will be reduced to no more than 35 cases per 100,000 population.
  - 6.1 By December 31, 2009, the incidence of TB among Alaska Natives will be reduced to no more than 30 cases per 100,000 population.

**Note:** Alaska has not had 50 or greater cases annually in U.S.-born African Americans.

### **(B) Contact Investigation**

7. By December 31, 2005, at least 70% of contacts to sputum AFB smear positive TB cases will have completed evaluation of infection and disease within 5 months of diagnosis.
  - 7.1. By December 31, 2009, at least 85% of contacts to sputum AFB smear positive TB cases will have completed evaluation for infection and disease within 5 months of diagnosis.

8. At least 70% of infected contacts to sputum AFB smear positive TB cases will complete therapy by December 31, 2004.

8.1. At least 85% of infected contacts to sputum AFB smear positive TB cases will complete therapy by December 31, 2009.

### **(C) TB Surveillance/Reporting**

9. All isolates will be sent to the regional genotyping laboratory for genotyping by December 31, 2004.

9.1. This objective will remain the same for December 31, 2009.

10. By December 31, 2004, 90% of all cases of TB will be detected through usual disease reporting and surveillance systems (e.g. telephone, Rapid Telephone Reporting system, or facsimile reports or through electronic laboratory reporting).

10.1. By December 31, 2009, 95% of all cases of TB will be detected through usual disease reporting and surveillance systems.

11. 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.

11.1 This objective will remain the same for December 31, 2009.

12. By December 31, 2004, 100% of all suspected and confirmed cases of TB will be maintained in a secure, confidential TB registry that contains the elements needed for the national TB case report, Report of Verified Case of Tuberculosis (RVCT).

12.1 This objective will remain the same for December 31, 2009.

13. By December 31, 2004, 100% of TB/HIV co-infections will be detected through ongoing collaboration between the Alaska TB Program and the Alaska HIV/AIDS Program.

13.1 This objective will remain the same for December 31, 2009.

### **(D) Human Resource Development**

14. The Alaska TB Program will develop a plan for TB Training and Education within 3 months after the cooperative agreement award, or some other defined date pending development of federal resources.

### **(E) Program Evaluation Activities**

15. The Alaska TB Program will develop a program evaluation plan which will be completed in 2005 or some other defined date pending development of federal tools.

**Appendix D: TB Program Training and Human Resource Strategy Plan  
Progress Report 5/15/07**

**Goal I:**

**Establish and improve existing in-service TB training and human resource development**

Objective 1: By January 31, 2005, a TB training focal point/coordinator will be designated.

This objective has been met. Karen Martinek is the TB Training Focal point. She has received advanced training at the Francis J Curry Center and National Jewish. She attends the Annual TBETN Conferences each year, including the Focal Point Meetings.

Objective II: By 12/31/05, new TB Program staff will enroll in epidemiology or specific TB training at CDC, Francis Curry or National Jewish.

This objective has been met. All Nurse Consultants have received advanced training in epidemiology in addition to TB training at the Francis j Curry Center.

Objective III: By 8/30/05, an assessment of the educational needs of state and grantee PHN staff will be completed.

This objective has been met. A formal needs assessment was completed with assistance from the Francis J Curry Center. Educational priorities have been identified.

Objective IV: By December 31, 2005, training sessions for at least two educational priorities will be developed and pilot tested with TB Program staff and at least one PHN region.

This objective has been met. Training sessions have included Webinars, sponsored by the Francis J Curry Center, presentations at PHN manager and staff meetings as well as online "PHN Academy" sessions and individualized training in Bethel, Fairbanks and Mat-Su.

**Goal II:**

**Establish evaluation strategies to improve existing systems and to identify ongoing training and human resource needs.**

Objective 1: By 12/31/05, indicators for the assessment and evaluation of PHN performance after training will be identified.

This objective has been met. The Section of Nursing (SON) has included TB goals and objectives in its annual management plan which reflect the priorities of the TB Control Program. The SON also hired a Quality Assurance and Improvement Coordinator who will work with the Focal Point to monitor PHN practice and performance. The Focal Point also works with the SON Education Coordinator to offer TB training and updates.

### **Goal III:**

#### **Establish and improve patient education and communications capacity within the program.**

Objective 1: By 12/31/05, the TB Program will begin collaboration with PHNs to update at least two types of educational materials specific for Alaska Native peoples.

This objective is still in progress. TB calendars with culturally appropriate TB educational messages are produced each year in collaboration with Norton Sound. In 2006, a large outbreak of TB among homeless Alaska Native persons in Anchorage during 2006 prompted the development of collaborative outreach and screening activities for that population. Due to funding reductions, it is unlikely that new projects will occur at this time.

### **Goal IV:**

#### **Coordinate training related to TB control with training for other disease control interventions such as HIV/AIDS and STD.**

Objective 1: By December 31, 2005, collaborate with the AIDS/STD Program to explore training needs.

This objective has been met. TB and HIV/AIDS staff interacts regularly regarding co-infected individuals. Training needs are addressed informally.

### **Goal V:**

#### **Target other health care providers or organizations serving high-risk populations.**

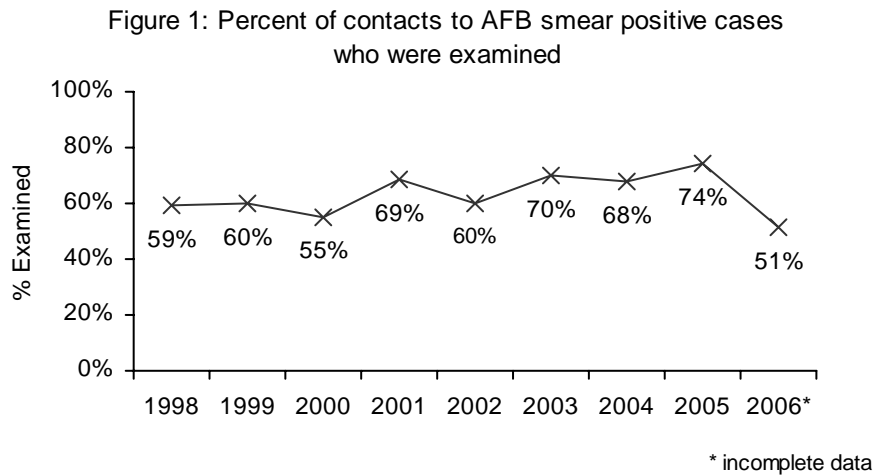
Objective 1: By 12/31/05, provide training about the diagnosis and treatment of TB to providers in at least three of the 12 regional Native Corporation areas where TB incidence is highest.

This objective has been met. Webinars, PHN Academies and Face-to face Training have occurred in more than three regions. A "Nurse to Nurse" Training sponsored by the Francis J Curry Center is scheduled for October 2007.

## Appendix E: TB Evaluation Plan Progress Report

### Enhanced Contact Investigation Project (ECIP)

The overall goal of the ECIP is to improve performance in Objective C of the Alaska TB Program Grant which states that “At least 70% of contacts to sputum AFB-smear positive TB cases will be evaluated for infection and disease”. This objective has not been met for seven of the past nine years (Figure 1).



### Objectives and Status:

Objectives for Phase 1 of the ECIP include the following:

1. Identify barriers to the identification and evaluation of contacts to AFB smear positive cases of TB by 6/30/06.  
*This objective has been met. Public health nurse (PHN) focus group/work group identified real and perceived barriers to identification and evaluation of contacts to AFB smear positive cases.*
2. Explore options and strategies for increasing the number of contacts to AFB smear positive TB cases who are evaluated for infection and disease by 6/30/06.  
*This objective has been met. PHN work group reviewed available information and materials from other jurisdictions in addition to brainstorming uniquely Alaskan strategies for increasing the number of contacts to smear positive cases that are evaluated.*
3. Develop new contact investigation standards and forms by 9/30/06.  
*This objective has been met. The PHN work group identified strengths and weaknesses of the current contact investigation guidelines and data collection form. The group thoroughly reviewed the new Centers for Disease Control and Prevention. Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis: Recommendations*

from the National Tuberculosis Controllers Association and CDC, and Guidelines for Using the QuantiFERON–TB Gold Test for Detecting *Mycobacterium tuberculosis* infection, United States. MMWR 2005;54(No. RR-15):[1-47]. *Additionally, contact investigation protocol and forms from many other jurisdictions were collected and integrated into the new contact investigation (CI) form. The 2005 CDC Guidelines were also endorsed by the group.*

4. Implement new contact investigation standards and data collection forms by 10/31/06. *This objective remains in process. The State Section of Nursing (SON) made a decision in the Fall of 2006 NOT to replace the current CI Form with the revised version. Some PHNs use the current form for required data entry for time and activity tracking. While the SON endorses the use of the revised form as a thorough and updated “worksheet”, they were not willing to forgo the old CI form. As a result, completion of this objective has been delayed. It is expected that the revised CI form and guidelines will be finalized before the October 2007 “Nurse to Nurse” training which will be done by the Francis J Curry Center in Anchorage. Contact investigation, including the new form and guidelines, is one of the three focus areas for this important training event. While work continues on this objective, several PHNs have begun using the revised CI form, although in draft format, since it is user-friendly and more complete. A joint TB Control/SON Committee will be convened to complete the CI form and guidelines.*
5. Increase the percentage of contacts to AFB smear positive TB cases who are evaluated for infection and disease according to new standards to 75% by 12/31/06. *This objective remains in process due to the delay in Objective 4. The SON has identified several TB goals and objectives as part of its current Management Plan, including tracking of the number of contacts to AFB smear positive that are identified and evaluated. Baseline and regional data were first presented to Regional SON Managers in September 2006. Quarterly data have subsequently been generated and reviewed by TB Control staff. Sarah Hargrave, the newly hired Quality Assurance and Improvement Coordinator for SON, will work with TB Control Program staff to monitor progress with this objective.*

Phase 2 objectives will be developed will be based upon the successful achievement of Phase 1 objectives.