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## Initial Evaluation of PCR Testing for Pertussis in Alaska

### Background

Pertussis (whooping cough) is an infectious illness caused by the bacterium *Bordetella pertussis*. According to the Centers for Disease Control and Prevention (CDC), a clinical case of pertussis is defined as a cough illness lasting at least two weeks with at least one of the following: paroxysms of coughing, inspiratory whoop, or post-tussive vomiting, without any other apparent cause.<sup>1</sup> Pertussis is transmitted by direct contact with respiratory droplets from an infected person.

Since March 1, 2005, the Alaska State Public Health Laboratory-Anchorage (ASPHL) has been performing polymerase chain reaction (PCR) testing in addition to culture to confirm pertussis diagnosis.<sup>2</sup> Either method is acceptable to confirm a diagnosis of pertussis.

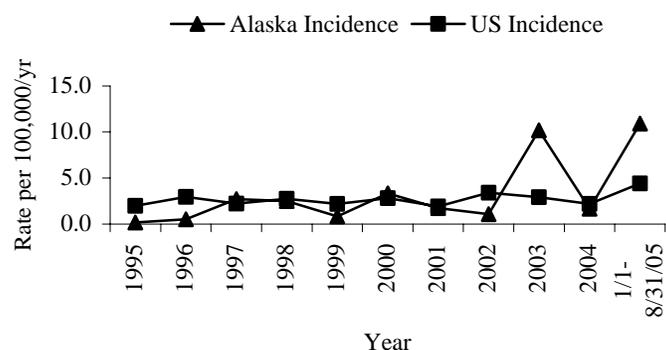
### Methods

A review of reported cases was conducted to characterize the epidemiology of pertussis in Alaska and to determine the impact of PCR testing on pertussis in Alaska.<sup>3</sup> Incidence rates were based on 2000 census data.

### Results

Annual pertussis incidence rates from 1995-2004 were similar for Alaska and the US, with the exception of 2003, when an outbreak of pertussis involving 41 persons occurred in a remote community near Homer (Figure 1).<sup>4</sup> Reports of pertussis identified across Alaska contributed to the increase in pertussis incidence from January through August 2005.

Figure 1. Reported Pertussis Incidence Rates for Alaska and the US, 1995-2005 (2005 incidence adjusted for 8 months of data).



From January 1 thru August 31, 2005, 54 Alaska pertussis case-patients were reported to CDC; 46 (85%) were laboratory-confirmed—6 by culture and 46 by PCR. All culture-positive samples were also PCR-positive. Of 283 clinical samples that were submitted to ASPHL for pertussis testing from January thru August 2005, 46 (16%) were positive. The average turn-around time from the date of specimen receipt by ASPHL to the date of report to the submitting healthcare provider was 2 days for PCR results and 8 days for culture results.

Of the 46 laboratory-confirmed case-patients reported from January through August 2005, 20 (43%) were persons <10 years old (Table 1). Case-patients were identified in nearly all regions of the state during that time period (Table 1).

Table 1. Demographic Profiles of 46 Laboratory-confirmed Pertussis Case-patients—Alaska, January 1 thru August 31, 2005.

	Number (%)
<i>Age</i>	
<1 year	7 (15%)
1-4 years	7 (15%)
5-9 years	6 (13%)
10-18 years	9 (20%)
> 18 years	17 (37%)
<i>Region of Residence</i>	
Anchorage	21 (46%)
Gulf Coast	13 (28%)
Interior	8 (17%)
Mat-Su	3 (7%)
Southeast	1 (2%)

### Discussion

From January thru August 2005, the PCR test increased the laboratory-confirmation of pertussis and shortened the average turn-around time for reporting back to health care providers by six days.

Although the availability of PCR likely contributed to the high number of pertussis case-patients reported during the first eight months of 2005, other factors including improved screening resulting from enhanced healthcare provider awareness and a true increase in the incidence of disease may also have played a role. Furthermore, false-positive results can occur with PCR testing.

Despite the low sensitivity of culture, ASPHL only accepts samples for PCR testing if a corresponding sample for culture is also submitted. This is because recovering *B. pertussis* isolates from infected case-patients enables public health officials to monitor for antimicrobial susceptibility patterns in Alaska and perform “fingerprint” typing using pulsed-field gel electrophoresis during epidemiologic investigations.

### Recommendations

1. Pertussis illness should be suspected in persons of all ages who have had a prolonged cough illness and either paroxysms of coughing, an inspiratory whoop, or post-tussive vomiting.
2. All PCR-positive results should be correlated with patient history to confirm pertussis infection.
3. Specimens should be collected by following the two-swab procedure using polyester-tipped swabs, as described in *Bulletin* No. 18, 2005.<sup>2</sup> Check pertussis collection supplies for expiration dates; contact ASPHL (907-334-2100) to order new supplies.
4. Report all suspected or confirmed cases of pertussis to the Section of Epidemiology at (907) 269-8000 during business hours or (800) 478-0084 after hours.

### References

1. CDC. Vaccine Preventable Diseases Surveillance Manual, 3<sup>rd</sup> Edition, 2002, Chapter 8. Available at: <http://www.cdc.gov/nip/publications/pink/pert.pdf>. Accessed on November 2, 2005.
2. Alaska Section of Epidemiology, State Public Health Lab Launches PCR Testing for Pertussis. *Bulletin* No. 18, July 14, 2005. Available at: [http://www.epi.alaska.gov/bulletins/docs/b2005\\_18.pdf](http://www.epi.alaska.gov/bulletins/docs/b2005_18.pdf).
3. CDC Morbidity and Mortality Weekly Report. Week 52 for years 1995-2004 and Week 35, 2005. Available at: <http://www.cdc.gov/mmwr>.
4. Alaska Section of Epidemiology, Pertussis in Homer Region – Interim Report. *Bulletin* No. 30, October 30, 2003. Available at: [http://www.epi.alaska.gov/bulletins/docs/b2003\\_30.pdf](http://www.epi.alaska.gov/bulletins/docs/b2003_30.pdf).