



PERTUSSIS (WHOOPING COUGH)

CRUDE DATA	
Number of Cases	438
Annual Incidence ^a	
LA County	4.57
California	8.57
United States	
Age at Diagnosis	
Mean	12.7 years
Median	7.5 years
Range	2 days–86 years
Case Fatality	
LA County	0.46%
United States	N/A

^a Cases per 100,000 population.

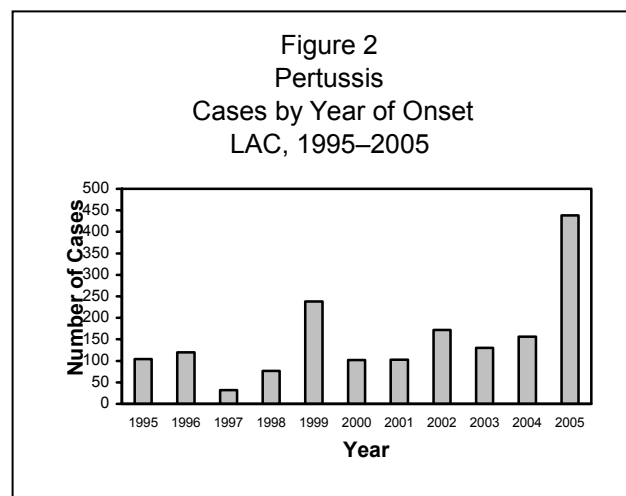
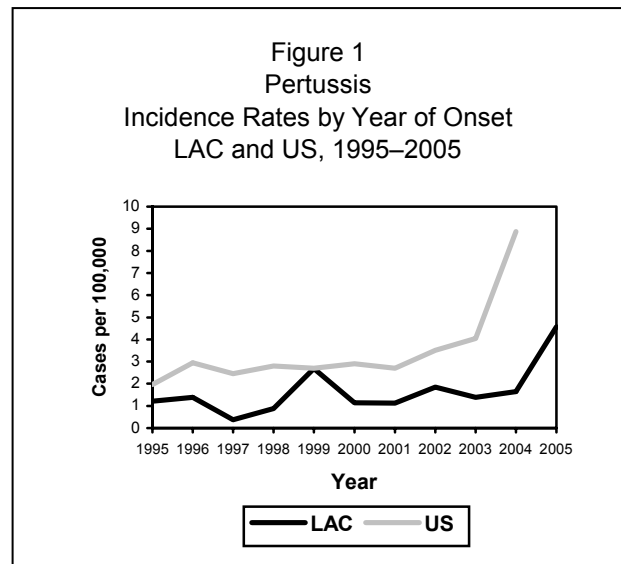
DESCRIPTION

Pertussis, commonly known as whooping cough, is a vaccine-preventable disease spread by close contact with the respiratory secretions of infected individuals. Typical symptoms include paroxysmal coughing, inspiratory whooping, and post-tussive vomiting. Complications include pneumonia, seizures, and encephalopathy. Infants under 1 year of age are at highest risk for developing severe complications.

The minimum clinical criteria for pertussis is a cough lasting at least two weeks with paroxysms of coughing, inspiratory “whoop,” or post-tussive vomiting, without other apparent causes. Pertussis is confirmed by either positive *B. pertussis* culture or PCR.

DISEASE ABSTRACT

- A record-high 438 cases were reported in 2005, which is a three-fold increase over the previous five-year average.
- Preceding their illness, only approximately half of the cases in 2005 indicated contact to a person who had a prolonged cough.
- Of the 2005 cases that could have been fully immunized and protected against pertussis, one fifth were not adequately immunized.





IMMUNIZATION RECOMMENDATIONS

- A pertussis-containing vaccine should be administered at 2 months, 4 months, 6 months, 15–18 months, and 4–6 years of age to provide protection against the disease.
- Immunity conferred by the pertussis component of the DTP/DTaP vaccine decreases over time, with some vaccinated individuals becoming susceptible to pertussis 5–10 years following their last dose.
- In Spring 2005, 2 Tdap vaccines were licensed for use in adolescents and adults, one for persons aged 10-18 years (Boostrix, GlaxoSmithKline) and the other for persons aged 11-64 years (ADACEL, Sanofi Pasteur).

STRATIFIED DATA

Seasonality: Compared to the previous five-year average, record high numbers of cases were reported throughout 2005. Typically, the summer months have the highest pertussis incidence in LAC (Figure 3). In 2005, 46% (n=200) of reported cases had disease onset during the summer months of June, July, August, and September. The <1 year age group accounted for 45% (n=90) of the cases with disease onset during these summer months.

Age: Although the majority of reported cases are still in children less than one year of age, the proportion of cases in the <1 age group is smaller in 2005 (41%) compared to the previous five year average (64%). Cases are increasing among adolescents and adults, as evidenced by the fact that 33% (n=143) of the cases were over 14 years of age (Figure 4) in 2005 compared to an average of 24% (n=24) in the previous five years. Increased recognition and diagnosis of pertussis in older age groups has probably contributed to the increase in reported cases among adolescents and adults.

Sex: The male-to-female case ratio was approximately 1:1.2.

Race/Ethnicity: After adjusting for the age differential in the cases, incidence rates in 2005 for all races were at least 2.5 times higher than the previous 5-year averages (Figure 5). Only rates among Latinos and Whites were higher than the total LAC rate. However, the LAC population proportion of Whites (30%) is much lower than that for Latinos (47%).

Figure 3
Pertussis
Cases by Month of Onset
LAC, 2005

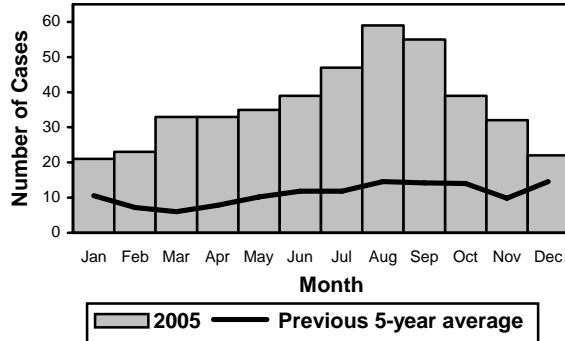


Figure 4
Pertussis
Cases by Age Group
LAC, 2005

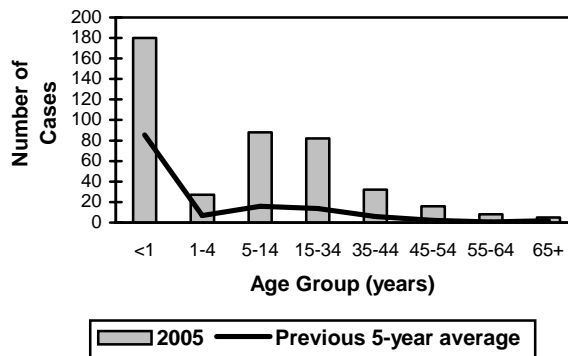
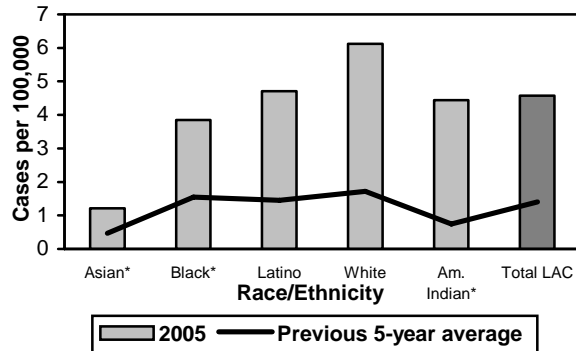


Figure 5
Pertussis
Age-Adjusted Incidence Rates by
Race/Ethnicity
LAC, 2005



*Rates unreliable due to small number of observations.



Location: Antelope Valley SPA 1 had the highest incidence rate of 13.4 cases per 100,000 (n=46). Of the 46 cases reported, 44% (n=20) were epi-linked to at least two other pertussis cases living within the same household. The second highest incidence rate occurred in South SPA 6 with 5.9 cases per 100,000 (n=61), followed by South Bay SPA 8 with 5.6 cases per 100,000 (n=62), San Fernando Valley SPA 2 with 5.3 cases per 100,000 (n=112), West SPA 5 with 4.8 cases per 100,000 (n=31), Metro SPA 4 with 3 cases per 100,000 (n=37), San Gabriel Valley SPA 3 with 2.9 cases per 100,000 (n=50), and East SPA 7 with 2.8 cases per 100,000 (n=39). The clustering of cases in specific geographic areas is influenced in part by the active reporting efforts of local hospitals.

COMMENTS

Despite high rates of pertussis vaccination among children, the number of pertussis cases reported annually has risen. In 2005, Los Angeles County (LAC) experienced a significant increase in the number of reported cases of pertussis, with a similar trend evidenced throughout California and the United States. There was a three-fold increase in the number of cases reported in 2005 compared to the previous five-year average. Not since the 1970s has LAC experienced this magnitude of pertussis morbidity. In addition, cases are being reported more among adolescents and adults. Whether this increase in pertussis incidence represents a true increase in disease or improved recognition and reporting remains unclear.

Because immunity induced by the childhood pertussis vaccine decreases over time, adolescents and adults can develop infection and serve as a source of transmission to infants who are not adequately immunized. The need to protect infants from pertussis infection is underscored by the fact that there were 2 pertussis-related deaths among infants less than 2 months of age. The licensure of 2 Tdap vaccines for use as pertussis boosters in adolescents and adults is cause for great optimism. Widespread use of the Tdap vaccine should protect adolescents and adults as well as protect infants from exposure to pertussis.

Greater media and general public awareness of vaccine-preventable diseases has increased the detection and reporting of pertussis cases. During 2005, much effort was invested in urging providers to be more diligent in observing, confirming, and reporting suspect pertussis cases in individuals of all ages. Outreach to providers included:

- 1) a pertussis health alert to LAC providers via the Health Alert Network on March 9, 2005;
- 2) creation of a Pertussis Fact Sheet in April 2005 and ongoing distribution throughout the year;
- 3) publication of an article in the May edition of The Public's Health newsletter;
- 4) a pertussis symposium held on May 18, 2005;
- 5) release of a statewide health alert by the California Department of Health Services on September 19, 2005;
- 6) release of a second health alert to LAC providers via the Health Alert Network on September 20, 2005;
- 7) distribution of the September health alert and fact sheet to all LAC hospital infection control practitioners via fax.

Trends: Pertussis incidence normally peaks every 3 to 5 years. Between 1990 and 1999, there was an annual average of 101 cases reported, with the highest incidence occurring in 1999 (n=238). During the previous five years (2000 – 2004), an annual average of 133 cases was reported, with the highest incidence occurring in 2002 (n=172). In 2005, 438 cases were reported, which was the highest number of cases reported in more than 35 years.

Laboratory Confirmation: More than half of the reported cases (52%, n=226) were not laboratory confirmed by either *B. pertussis* culture or PCR.

Vaccination Status: Less than one fifth of cases (18%, n=77) were younger than two months of age and were too young to receive pertussis vaccine. About 33% (n=143) of cases were 15 years of age or older; so even if they were fully immunized in early childhood, they would not have had complete immunity against pertussis in 2005 and would thus be eligible for Tdap vaccine.



Approximately 21% (n=92) of cases were between 2–6 months of age. Of these, 55% (n=51) were up to date with pertussis vaccination for their age, but would not have developed full immunity against pertussis. Of the 126 children who could have had full immunity from vaccination (7 months to 15 years old), 102 (81%) were fully up to date. The previous 5-year trend has indicated that, on average, 62% of cases 7 months to 15 years of age were adequately immunized.

Complications/Hospitalization: Approximately 35% (n=155) were hospitalized, with an average hospital stay of 9 days (range 1-54 days). Among the hospitalized cases, 92% (n=142) were less than one year of age. Of the 34 cases who developed pneumonia, 28 (82%) were infants less than 1 year of age. Three cases developed seizures and 1 case had encephalopathy.

Case Fatalities: There were two pertussis-related deaths in 2005. The first case fatality was in a 23-day-old Hispanic male. The case died 13 days after cough onset in February. The case was a previously healthy baby who was hospitalized for severe respiratory distress, cardiac failure, and septic shock. Causes of death as listed on the death certificate were renal failure, shock, pneumonia, and pertussis. The second case fatality was in a one-month old Hispanic male. The case died 6 days after cough onset in September. The case had a pre-existing medical condition and was previously hospitalized for coarctation of aorta repair. Causes of death as listed on the death certificate were cardiorespiratory failure, pulmonary hypertensive crisis, leukocytosis, and pertussis. Both cases had exposure to family members who were coughing but were too young to receive pertussis vaccine.

ADDITIONAL RESOURCES

Additional information is available at:

- National Immunization Program – www.cdc.gov/nip
- Immunization Action Coalition – www.immunize.org
- LAC DHS, Immunization Program – www.lapublichealth.org/ip

Map 10. Pertussis Rates by Health District, Los Angeles County, 2005*

