

California's whooping cough epidemic

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The California Department of Public Health has announced an epidemic of whooping cough throughout the state. According to the agency, there were 5,393 *reported* cases for the year as of July 8. These figures are double that for all of 2013. Over 800 cases were reported in the first two weeks of June alone, reaching 1,000 within the next 10 days.

Whooping cough occurs historically from the months of May to September, usually peaking in July, according to Dr. Gil Chavez, California's state epidemiologist.

Whooping cough is a highly contagious respiratory infection caused by the bacterium *Bordetella Pertussis*. It is spread from one person to another by sneezing and coughing. In an interview with *Live Science*, Dr. Cameron Grant, pediatrician at the Starship Children's Hospital and the University of Auckland, New Zealand, said that one person infects, on average, twelve others. Those most at risk are infants, with three-quarters of those infected under six months of age being hospitalized.

The first indications of pertussis are a cough and runny nose that go on for one or two weeks. Any fever present is usually mild. It can be mistaken for a common cold with sneezing. In the weeks or months that follow, rapid coughing fits or spells increase, sometimes ending in vomiting, gagging or a loud gasp, like a whooping sound, hence its name.

So far, three infants have died of the disease, one from the Sacramento area in northern California, and the other two from Riverside and Placer counties in southern California. The last epidemic, in 2010, claimed the lives of 10 infants statewide.

The latest statistics concerning whooping cough cases in California list Sonoma, Napa and Marin counties having the highest rates in the state, with Sonoma topping them all at 552 cases as of early last week. Counties with over 250 cases include Santa Clara,

Napa, Marin, Contra Costa and Alameda, all in northern California.

Marin County, with the second highest level of pertussis, also saw a doubling of its cases in the year 2013 alone. Most of the outbreaks were traced to schools, but not confined to any particular area, said Dr. Matt Willis, Marin County's public health officer. In 2013, most of the students affected were freshmen and sophomores in high school.

Whooping cough is on the rise in southern California as well. In San Diego County, for example, the cases diagnosed so far this year are also double that of last year's record, 730 cases by the beginning of July this year compared to 408 last year.

The rising levels of whooping cough in California are not a new phenomenon. In 2010, there were over 9,100 confirmed cases of pertussis, the highest rate since 1947, according to the California Department of Public Health. Wide-scale vaccination in the US only began after the invention of the first combined vaccine of pertussis, diphtheria and tetanus in 1942.

The current outbreak could be even larger than the 2010 epidemic, continuing a trend of larger outbreaks that began in 2003 when the nationwide number of cases broke 10,000 for the first time since the 1960s, reaching a peak of 48,277 in 2012.

There are multiple reasons for the growing infection rate. One difficulty has been a decreasing rate of vaccination. A 2013 study published in *Pediatrics* showed a correlation between outbreak clusters and parents who had opted out of immunizing their children. Many of the most affected counties have lower immunization rates than the 90 percent estimated as necessary to prevent outbreaks.

It has become easier for parents to opt-out of vaccination since Jerry Brown insisted that the new vaccination law be weakened for religious exemptions. Parents can now simply check a box on a form instead

of requiring a statement from a doctor or nurse that the parent has been informed of the benefits of vaccination and still refuses on the basis of personal belief.

At the same time the newest, acellular version of the vaccine is proving less effective than the older whole-cell version, that used deactivated pertussis cells to train the immune system. The change in vaccines was driven by safety concerns. The newer version uses inactive toxins to inoculate the immune system.

According to Dr. Mark Sawyer, an infectious disease specialist at Rady's Children's Hospital and a member of the Pertussis Vaccines Working Group at the US Centers for Disease Control and Prevention, data shows that the older version of the vaccine was far more effective at keeping the bacterium at bay, but had more side effects. Those side effects, according to the World Health Organization, can cause high-pitched crying "for more than three hours" in about 1 percent of children. Other, more rare, side effects are high fever and convulsions. "No parent wants to get their child vaccinated and have those side effects," explained Sawyer, "so I don't think going back to the old vaccine is the answer."

In 2012, the Centers for Disease Control (CDC) was investigating whether or not the rise in cases of pertussis was connected to the effects of the vaccines wearing off much earlier after the US switched in 1997 from a wholesale pertussis vaccine to an acellular version. Pre-teen groups that were the first to receive the acellular version dating from that time began exhibiting increasing rates of infection in the 10 and 13-14 year-old age groups. The investigation was first launched in Washington state.

Health officials are recommending adults receive booster shots if they have not done so since their school days, but with increasing poverty and health care costs pushing families away from routine health care, widespread adult immunization is unlikely.

According to the CDC, throughout the United States, whooping cough cases have spread, with a 24 percent increase nationally this year compared to January through April of last year.



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