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EDMUND G. BROWN JR.  
Governor

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Dear Doctor,

Since 2010, over 2,500 infants younger than four months of age in California have been reported with pertussis infections. Seventeen of these infants have died, and more than half have been hospitalized.

**Please consider the following measures to protect infants against pertussis.**

**Prevention:** The risk of infections and deaths in infants can be reduced through administration of

- Tdap vaccine to women during each pregnancy between 27 and 36 weeks of gestation.
- The first dose of DTaP vaccine to infants promptly at 6-8 weeks of age (also complete the series on time).

**Evaluation and Treatment:** Pertussis should be considered in any infant without documented fever who presents with coryza and cough (See Tables 1 and 2). While documentation of fever in clinic is atypical, parents may report fever at home. If pertussis is a possibility, obtain a pertussis PCR and a WBC count with a differential. A WBC count over 10,000 cells/mm<sup>3</sup> with >50% lymphocytes should be repeated 24 hours later. If the WBC count is >15,000 cells/mm<sup>3</sup> with >50% lymphocytes, begin treatment with azithromycin (10mg/kg/day in a single dose for 5 days) while awaiting the PCR results. Concomitant viral infections can confuse the diagnosis; consider testing infants with paroxysmal cough for pertussis, and treating them as described above, even if they have fever and expiratory distress, as seen more commonly in bronchiolitis.

## Table 1. Pertussis in Young Infants

- Initially infants looks deceptively well; coryza, sneezing, clearing throat, *no fever*, mild cough
- Paroxysmal stage: gagging, gasping, eye bulging, bradycardia, cyanosis, vomiting
- Leukocytosis with lymphocytosis
- Apneic episodes
- Seizures
- Respiratory distress with paroxysms
- Pneumonia
- Adenovirus or RSV coinfection can confuse picture

## Table 2. Clues in the Clinical Diagnosis of Pertussis in Young Infants

- They have a cough illness *without fever*
- They don't have wheezing unless there is a concomitant viral infection
- They have a rapidly rising WBC count with a lymphocytosis. Therefore, do a WBC count and differential on all infants with a new afebrile cough illness
- Most often there is a family member with an afebrile cough illness



### **Summary of Recent Related Findings**<sup>1,2</sup>

In recent years, of infants younger than 4 months of age in California who eventually received critical care for pertussis:

#### Presenting symptoms:

- All but one infant presented with a complaint of cough; for some cough was the only complaint.
- About half of infants were reported as having congestion or rhinorrhea.
- Few infants had reported difficulty breathing, color change, or emesis.
- Only 6% had a history of fever.

#### Delayed diagnosis and consequences:

- More than 60% were initially misdiagnosed with other conditions
- The median age of infants with pertussis who were misdiagnosed was 34 days (range 2-114 days).
- Cases initially presented to their primary provider, an urgent care clinic, or emergency departments.
- Of those who received medical care prior to hospitalization, 89% were not tested or treated for pertussis.
- Many infants received albuterol, oral prednisolone, or nasal suctioning for presumed bronchiolitis or viral upper respiratory tract infection. Others received ranitidine for presumed gastroesophageal reflux.
- All were re-evaluated up to 5 times before being diagnosed with pertussis; in the meantime their illnesses worsened.
- 31% had severe disease (severe leukocytosis, pulmonary hypertension, pneumonia, organ failure, or seizures).
- 5% of these infants died.

#### Immunization associated with survival:

- No deaths occurred among infants who had received DTaP prior to illness onset nor among infants born to mothers who were vaccinated with Tdap between 27 and 36 weeks of pregnancy.

Further information and clinical guidance for pertussis can be found on our website, [www.cdph.ca.gov/healthinfo/discond/pages/pertussis.aspx](http://www.cdph.ca.gov/healthinfo/discond/pages/pertussis.aspx). A recap of immunization priorities is at [www.cdph.ca.gov/HealthInfo/discond/Documents/ImmunizationPrioritiesToPreventInfantPertussis.pdf](http://www.cdph.ca.gov/HealthInfo/discond/Documents/ImmunizationPrioritiesToPreventInfantPertussis.pdf).

Thank you for caring for these most vulnerable infants.

Sincerely,



Sarah Royce, MD  
Chief, Immunization Branch  
California Department of Public Health

### **References**

1. Murray EL, Nieves D, Bradley JS, et al. Characteristics of severe *Bordetella pertussis* infection among infants  $\leq 90$  days of age admitted to pediatric intensive care units – Southern California, September 2009-June 2011. J Pediatric Infect Dis Soc. 2013; 2:1-6. [jpid.oxfordjournals.org/content/2/1/1.long](http://jpid.oxfordjournals.org/content/2/1/1.long)
2. Winter K, Zipprich J, Harriman K, et al. Risk Factors Associated With Infant Deaths From Pertussis: A Case-Control Study. Clin Infect Dis. 2015 Oct 1;61(7):1099-106.