

# CONTAGIOUS COMMENTS

## Department of Epidemiology

### Series on the Top 5 Questions Regarding Pediatric Infectious Diseases

#### Topic # 3: Pertussis

Sarah Parker, MD

##### 1. How common is pertussis?

Over 20,000 cases of pertussis are reported each year (and about 10 deaths) in the United States (1,200 in Colorado). This is felt to be a gross under estimate, and some experts estimate the actual number to be about one million in the U.S. per year.

##### 2. What is the classic clinical picture?

An incubation period of 5 to 7 days (range 4 to 21) is followed by a catarrhal stage lasting 7-14 days, and then the classic paroxysmal stage, with whoops and post-tussive emesis, lasting 1 to 6 weeks. The convalescent stage can last weeks to months, and exacerbations with other URIs/irritants (like cigarette smoke!) can be seen for at least a year.

##### 3. What about atypical presentations?

In partially immune children, symptoms can be very mild and look like a typical URI. Many adults are diagnosed with "atypical pneumonia" without further testing. In emergency room studies, adults presenting with a cough of more than 2 weeks had a 25% chance of having pertussis. Another special case is the neonate, who may present with apnea, seizures, encephalopathy or sepsis. A recent family history of paroxysmal cough or atypical pneumonia can be a clue in these cases, as most neonates catch pertussis from a household member.

##### 4. What is the differential diagnosis?

Adenovirus (though co-isolation is not uncommon), parainfluenza, mycoplasma and chlamydia can all mimic pertussis. *Bordetella parapertussis*, which does not make functional pertussis toxin, can still cause pertussis-like symptoms. In the immunocompromised, *B. holmesii* and *B. bronchiseptica* are uncommon causes of disease. Generally, *B. bronchiseptica*, which causes kennel cough in dogs, is not considered contagious to humans.

##### 5. What is the best test?

Nasal wash for PCR. Our test will pick up *Bordetella pertussis*, the classic agent of Whooping Cough, and *B. holmesii*. It does not pick up *B. parapertussis*. PCR will remain positive for 4 days in 90% of cases after treatment is started and in 60% of cases for 7 days after treatment started. Nasal swabs for PCR are not as sensitive as nasal wash, and will not be accepted by our laboratory. Classic leukocytosis is only present in approximately 35%, but is a risk factor for severe disease.

##### 6. How is the test obtained, when is it run, and can I do it in my office?

A child can be sent for a nursing visit to the TCH ED for nasal wash, or it can be done in the office setting and sent in a sterile container to the TCH micro lab. The PCR is run daily, Monday through Friday, at 6:30 am with results by 5 pm. Instructions for obtaining the specimen can be obtained from the micro lab (303-861-6704).

##### 7. Is there ever a role for culture?

Culture takes about three days and requires special media. There may be a role for culture in a "relapsed" patient to document a medication failure (as PCR may still be positive though the bacteria is dead), and there is a role in special cases if you are looking for *B. parapertussis* or *B. bronchiseptica* in an immunosuppressed patient.

##### 8. How contagious is pertussis?

The attack rate in a susceptible household member is at least 80%. In a person immunized in the last three years, the attack rate is approximately 20%, and in a person immunized more than 12 years previous it is back up to more than 80%. Lest you think wild type disease provides fabulous immunity, the attack rate is more than 50% after 15 years.

##### 9. Who should get prophylaxis?

All household contacts should receive prophylaxis, regardless of immunization status. Vaccinations should also be updated. In addition, all "close contacts" should receive prophylaxis. The TCH definition of "close contact" is: no droplet precautions used and direct face-to-face contact (within 3 feet) of a contagious patient or direct contact with the secretions of the patient. For daycare, these definitions may also apply, and state health should be involved.

##### 10. Which medications should be used?

Please see the Colorado Department of Public Health and Environment's "[Guidance on the Treatment and Prophylaxis of Pertussis Cases and Contacts](http://www.cdph.state.co.us/dc/Epidemiology/Pertussis/PertProphy1205.pdf)," information included (<http://www.cdph.state.co.us/dc/Epidemiology/Pertussis/PertProphy1205.pdf>).

##### 11. What about IHPS (idiopathic hypertrophic pyloric stenosis)?

Erythromycin is a motilin agonist and may increase the incidence of hypertrophic pyloric stenosis, as well as other GI symptoms, in infants on erythromycin. Other macrolides also are motilin agonists, but not to the same degree as erythromycin, thus these agents are now recommended in that age group.

## 12. Who should get vaccinated?

The early childhood schedule calls for vaccination at 2, 4, 6, 15 to 18 months and 4 to 6 years. If exposure occurs, vaccination should be updated. Vaccination is now also recommended for adolescents aged 11 to 18. Boostrix is licensed for individuals 10 to 18 years, while Adacel is licensed for 11 to 64 years. Parents and other caretakers of infants may also be interested in the vaccine.



## Guidance on the Treatment and Prophylaxis of Pertussis Cases and Contacts

Colorado Department of Public Health and Environment Communicable Disease Epidemiology Program

CDPHE Recommended Regimens for Treatment or Prophylaxis of Pertussis				
Preference	Drug	Age Group	Dosage	Duration
1 <sup>st</sup> Choice(s):	Azithromycin (Zithromax)	Less than 1 month <sup>+</sup>	10mg/kg in single dose. <i>(Preferred drug and limited safety data available.)</i>	5 days
		1 to 5 months	10mg/kg in single dose.	5 days
		More than 6 months	10mg/kg in single dose on day 1 (maximum = 500mg) <b>and</b> then 5mg/kg in single dose (maximum = 250mg) on days 2 to 5.	5 days
	Clarithromycin (Biaxin)	Less than 1 month <sup>+</sup>	Not recommended. <i>(Safety data unavailable.)</i>	N/A
		More than 1 month	15mg/kg/day in 2 divided doses (maximum 500mg/dose).	7 days
2 <sup>nd</sup> Choice:	Erythromycin	Less than 1 month <sup>+</sup>	<i>Not usually recommended, use associated with increased risk of IHPS*. Only use as alternate drug for infants less than 1 month in doses listed below.</i>	N/A.
		More than 1 month	40 – 50mg/kg/day in 4 divided doses (maximum 2gm/day).	14 days
3 <sup>rd</sup> Choice:	Trimethoprim-sulfamethoxazole (Bactrim or Septra)	Less than 2 months	<i>Should not be used due to risk of kernicterus.</i>	N/A
		More than 2 months <sup>¶</sup>	8mg/kg/day of trimethoprim (maximum = 320mg), sulfamethoxazole 40mg/kg/day (maximum = 1600) in 2 divided doses.	14 days

<sup>+</sup> All infants less than 1 month of age who receive any macrolide should be monitored for development of IHPS.  
<sup>\*</sup> Infantile hypertrophic pyloric stenosis.  
<sup>¶</sup> Trimethoprim-sulfamethoxazole should not be given to pregnant women, nursing mothers or infants less than 2 months of age due to the risk of kernicterus.

**For purposes of release from isolation, 5 days of treatment is required.** The release from isolation assumes 100% compliance. The dosages as provided above should be used.

**Notes:**

1. *These guidelines differ from the American Academy of Pediatrics 2003 Red Book regarding azithromycin dosages for persons more than 6 months of age.*
2. *Please refer to the Physicians' Desk Reference (PDR) or a pharmacist for information regarding contraindications to these antibiotics.*

**References:**  
Centers for Disease Control and Prevention. Recommended Antimicrobial Agents for the Treatment and Prophylaxis of Pertussis, 2005 CDC Guidelines. **MMWR** 2005; 54 (No. RR-14): 1-16.

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## Healthcare Worker Issues

Ann-Christine Nyquist, MD, MSPH

Provisional recommendations for pertussis vaccination in adults have recently been made by the ACIP. Adults 19-64 years of age should receive Tdap replacing the next booster dose of tetanus and diphtheria toxoids vaccine (Td). Healthcare personnel who have direct patient contact should also receive a single dose of Tdap as soon as feasible with priority given to those with direct contact with infants less than 12 months of age. Tdap can be given as soon as 2 years from the last dose of Td. TCH will be offering Tdap vaccination for our healthcare

workers beginning with those with the highest risk of exposure to pertussis (Emergency Department, Child Health Clinic, Newborn Center). Staff who are not properly utilizing personal protective equipment and are exposed to pertussis still require antibiotic prophylaxis despite Tdap vaccination. The CDC is currently studying healthcare worker Tdap vaccination in the hospital to determine whether this will be necessary in the future.





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