Pertussis: Whooping Cough

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Overview

- Disease Background
- Transmission
- Clinical Presentation, Diagnosis & Disease Severity
- Prevention & Treatment Considerations

Disease Background: Pertussis

- Pertussis is caused by a fastidious, gram-negative, pleomorphic bacillus, ***Bordetella pertussis***.
- Other *Bordetella* species can cause sporadic prolonged cough illness in people, including *Bordetella parapertussis, Bordetella bronchiseptica* (the cause of canine kennel cough), and *Bordetella holmesii*.
- The bacteria colonize only ciliated cells of the respiratory mucosa, and they multiply rapidly.

Transmission: Pertussis

- Humans are the only known hosts of *B pertussis*.
- Transmission is almost always directly from person to person.
- Transmission occurs by close contact with infected individuals by large respiratory droplets generated by coughing or sneezing.
- Cases occur year-round, typically with a late summer-autumn peak.
- The incubation period is 7 to 10 days, with a range of 5 to 21 days.

Transmission: Pertussis

- Pertussis is highly contagious.
- As many as 80% of susceptible household contacts of symptomatic infant cases are infected with *B pertussis,* with symptoms in these contacts varying from mild to classic pertussis.
- Siblings and adults with cough illness are important sources of pertussis infection for young infants.
- Infected people are most contagious during the catarrhal stage through the third week after onset of paroxysms or until 5 days after the start of effective antimicrobial treatment.

Clinical Presentation: Pertussis

- Pertussis begins with mild upper respiratory tract symptoms similar to the common cold (catarrhal stage)
- Progresses to cough, usually paroxysms of cough (paroxysmal stage), characterized by inspiratory whoop (gasping) after repeated cough on the same breath, which commonly is followed by post-tussive emesis.
- Symptoms wane gradually over weeks to months (convalescent stage).

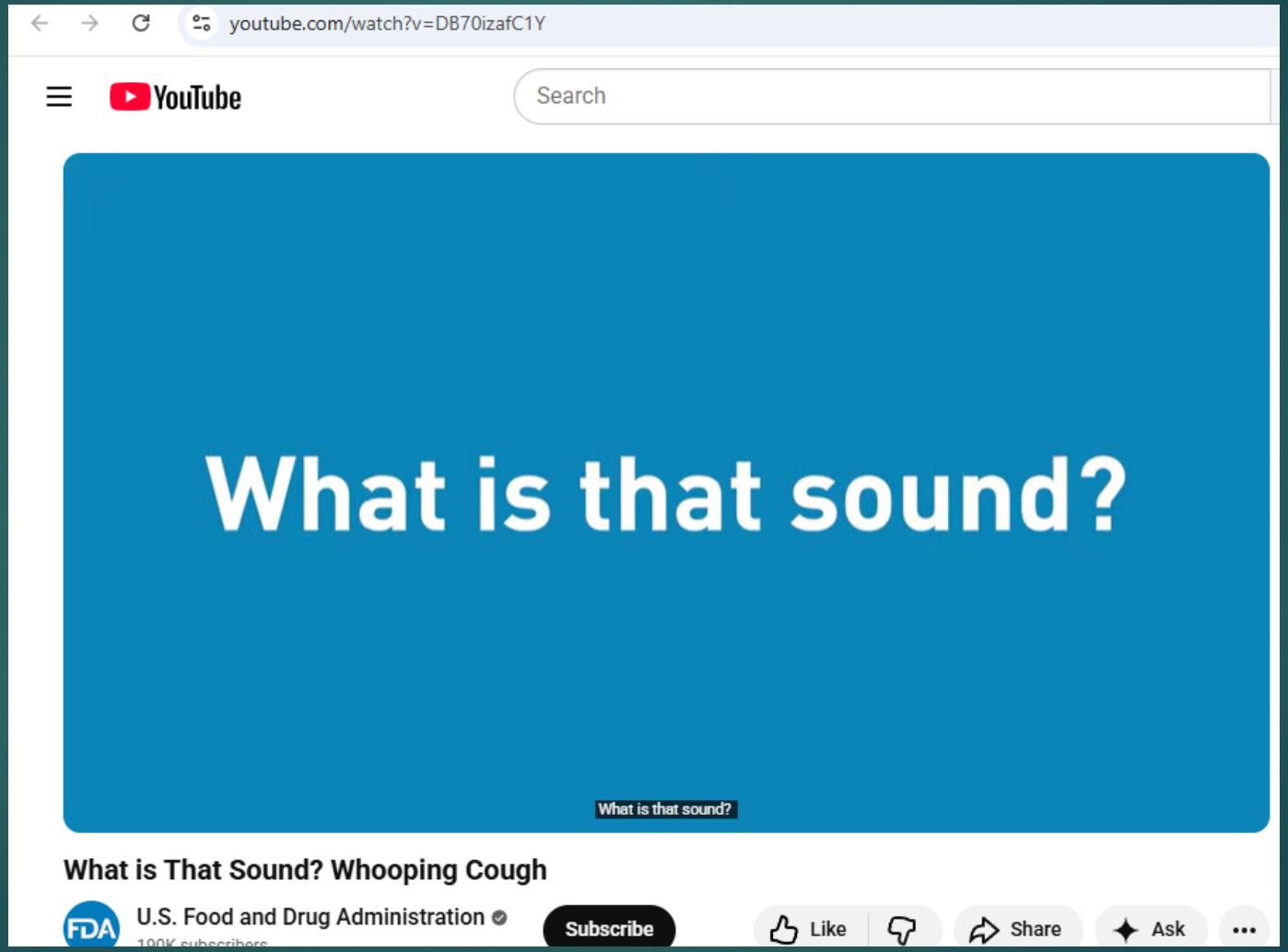
Clinical Presentation: Pertussis

- Fever is absent or minimal.
- Cough illness in immunized children and adults can range from typical to very mild.
- The duration of classic pertussis is 6 to 10 weeks.

Clinical Presentation: Pertussis

Stage 1: Catarrhal 1-2 weeks	Stage 2: Paroxysmal Up to 6 weeks	Stage 3: Convalescent Weeks to months
Coryza Rhinorrhea Low-grade fever Mild, occasional cough Apnea (infants)	Paroxysms of numerous, rapid coughs Long inspiratory effort with "whoop" at the end Cyanosis Exhaustion Post-tussive vomiting	Gradual recovery Less persistent, paroxysmal coughs

Clinical Presentation: Pertussis



Disease Severity: Pertussis

- Pertussis is most severe when it occurs during the first 6 months of life, particularly in preterm and unimmunized infants
- Disease in infants younger than 6 months can be atypical with a short catarrhal stage, followed by **gagging, gasping, bradycardia, or apnea as prominent early manifestations**

Disease Severity: Pertussis

- Complications among infants include **pneumonia**, pulmonary hypertension, and severe coughing spells with associated conjunctival hemorrhage, hernia, and hypoxia.
- Seizures (0.9%), encephalopathy (less than 0.5%), apnea, acute respiratory distress syndrome, and death can occur in infants with pertussis.
- Approximately a third of infants with pertussis in the United States are hospitalized.

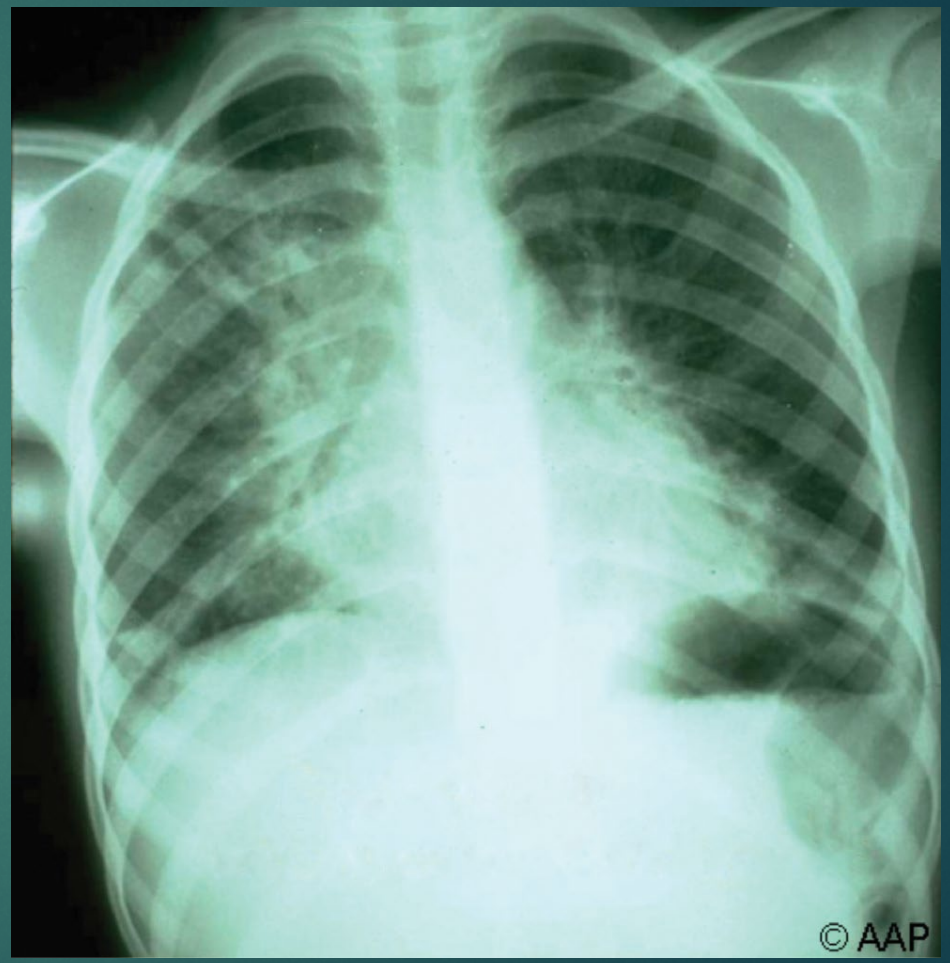


Figure Legend: Pertussis pneumonia in a 7-year-old who was exhausted from persistent coughing. Obliteration of cardiac borders on the chest radiograph is a common radiographic change of pertussis pneumonia.

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Disease Severity: Pertussis

- Case fatality rates are approximately 1.1% in infants younger than 2 months and 0.1 in infants 2 through 11 months of age.
- Immunization with tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap) during each pregnancy and an infant's receipt of at least some doses of pertussis vaccine (Dtap) reduce morbidity and mortality in young infants.

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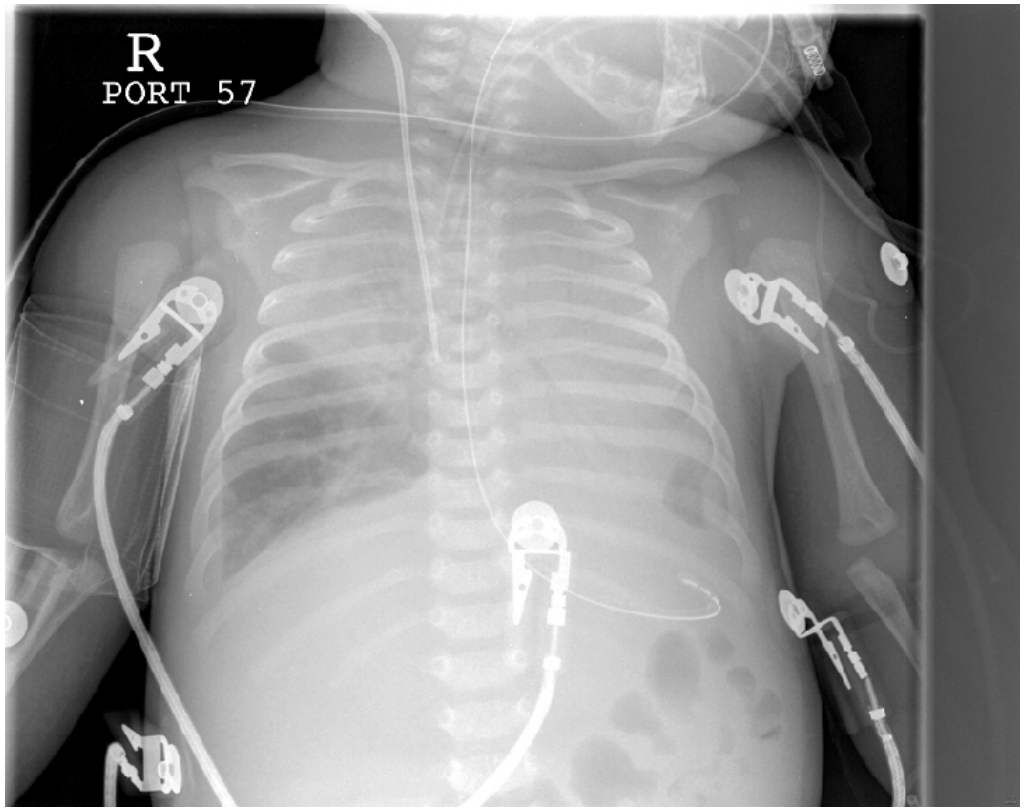

Figure Legend:

Pertussis pneumonia in a 2-month-old 2 days after hospital admission. His mother had been coughing since shortly after delivery. Courtesy of Carol J. Baker, MD, FAAP

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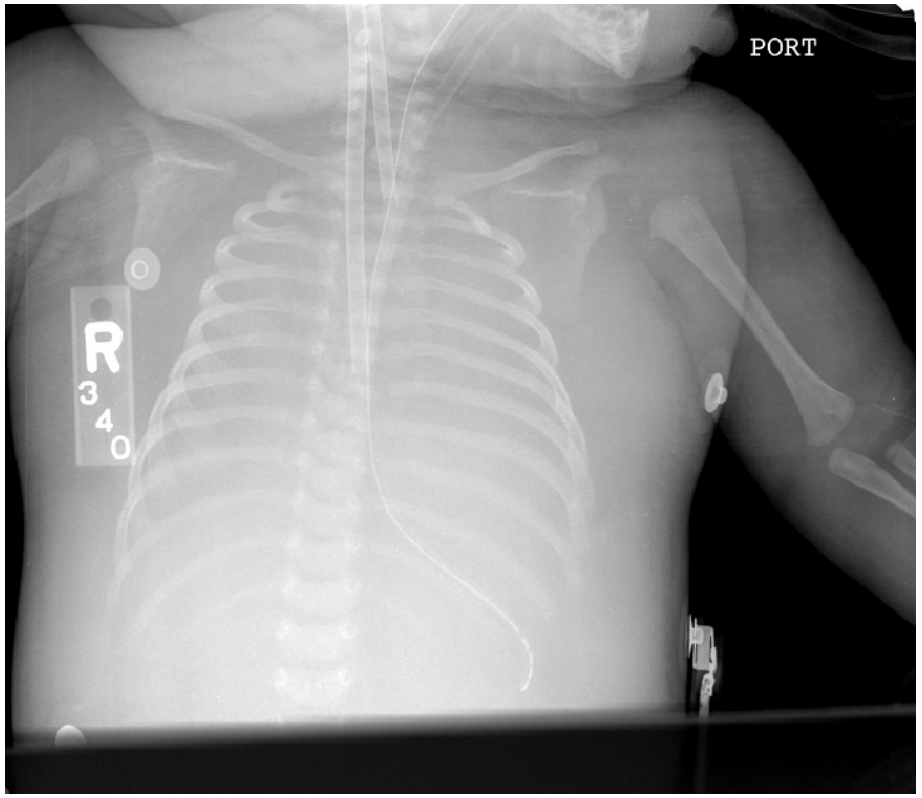

Figure Legend:

The same infant in prior figure required mechanical ventilation because of respiratory failure. Courtesy of Carol J. Baker, MD, FAAP

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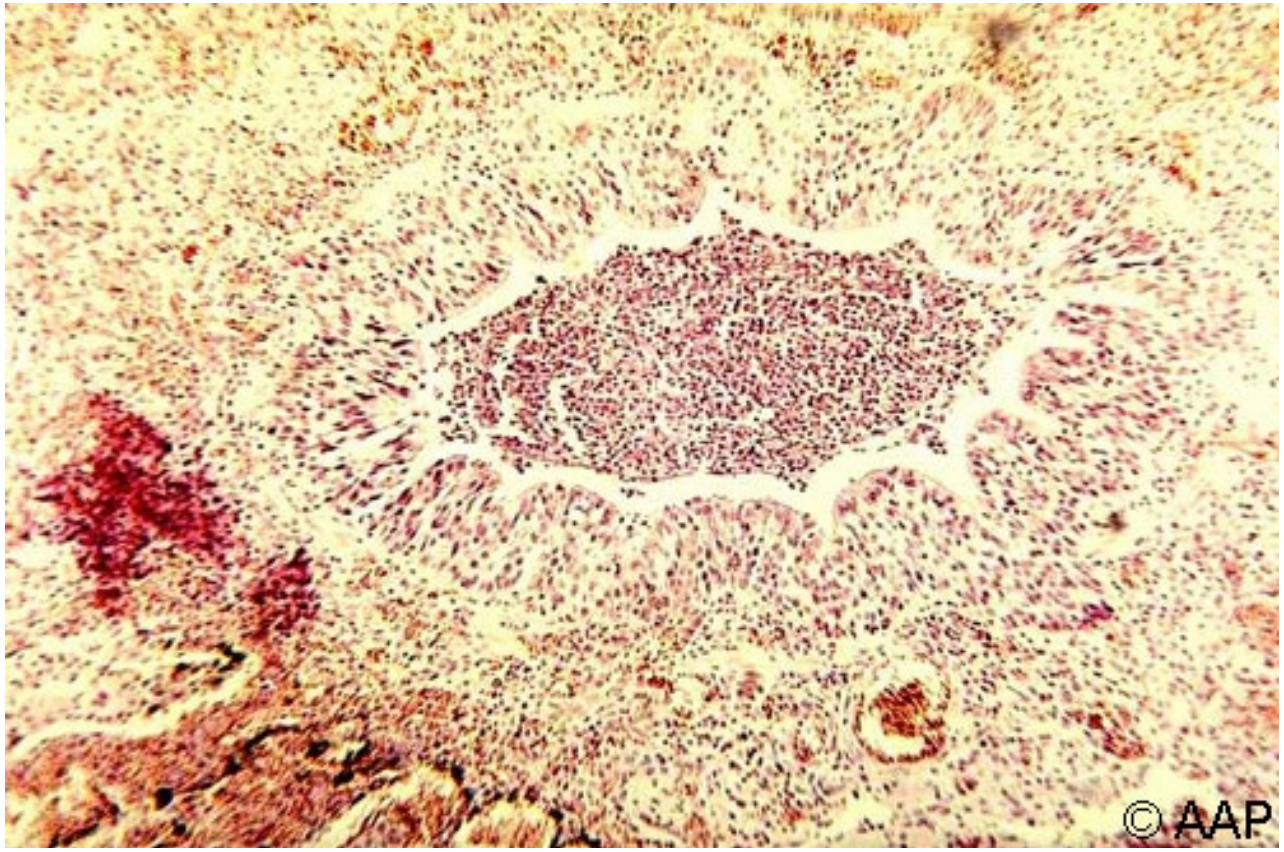

Figure Legend:

Bronchiolar plugging in the neonate in prior figure who died of pertussis pneumonia. Neonates, infants, and children often acquire pertussis from an infected adult or sibling contact.

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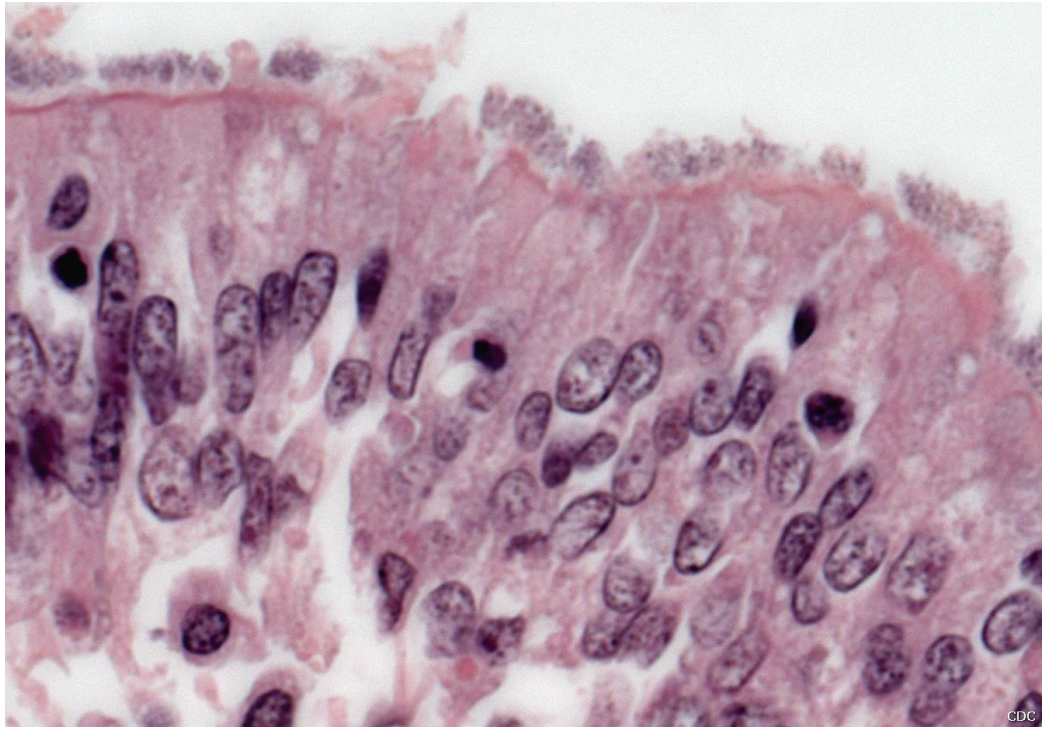

Figure Legend:

Bordetella pertussis bacteria enmeshed in the cilia of respiratory epithelial cells lining a bronchiole in an infant with fatal pertussis (hematoxylin-eosin stain, original magnification ×100). Courtesy of Christopher Paddock, MD

Diagnosis: Pertussis

- Often the diagnosis is clinical and based on the paroxysmal cough and whoop that is characteristic of pertussis.
- Three tests available:
  - Nasopharyngeal culture sent within the first 2 weeks of symptoms; results take several days. Was considered the "gold standard" for lab diagnosis, not optimally sensitive and has largely been replaced by nucleic acid amplification tests
  - Serology is accurate from 2-8 weeks after cough onset but will not be helpful early in the illness.
  - PCR testing on nasopharyngeal specimens is the most reliable in the first 3 weeks of cough onset and provides rapid results.
- Pertussis is a nationally notifiable condition.

Prevention & Treatment Considerations: Pertussis

Immunization

- DTaP and Tdap (both are a combination of diphtheria, tetanus and acellular pertussis).
- Routine DTaP vaccination for all infants and children younger than 7 years old.
- The 5-dose DTaP series, includes 1 dose at each of the following ages: 2 months, 4 months, 6 months, 15 through 18 months, and 4 through 6 years.*
- Single dose of Tdap at 11 to 12 years of age.*

*WV Childcare and School Immunization Policy State Code

Prevention & Treatment Considerations: Pertussis

Immunization

- A single dose of Tdap is recommended during every pregnancy, preferably during weeks 27 through 36.
- Single dose of Tdap for adults who have never received Tdap.

Prevention and Treatment Considerations: Pertussis

Azithromycin is the antibiotic of choice for pertussis. 5 day course.

Second line therapies include clarithromycin and trimethoprim-sulfamethoxazole.

Antibiotics are only effective in the first 1-2 weeks of illness, before the paroxysms start.

Prevention & Treatment Considerations: Pertussis

Table 3.46. Recommended Antimicrobial Therapy and Postexposure Prophylaxis for Pertussis in Infants, Children, Adolescents, and Adults[a]

Age	Recommended Drugs			Alternative
	Azithromycin	**Erythromycin**	**Clarithromycin**	**TMP-SMX**
Younger than 1 mo	10 mg/kg/day as a single dose daily for 5 days[b,c]	40 mg/kg/day in 4 divided doses for 14 days	Not recommended	Contraindicated at younger than 2 mo
1 through 5 mo	10 mg/kg/day as a single dose daily for 5 days[b]	40 mg/kg/day in 4 divided doses for 14 days	15 mg/kg/day in 2 divided doses for 7 days	2 mo or older: TMP, 8 mg/kg/day; SMX, 40 mg/kg/day in 2 doses for 14 days
6 mo or older and children	10 mg/kg as a single dose on day 1 (maximum 500 mg), then 5 mg/kg/day as a single dose on days 2 through 5 (maximum 250 mg/day)[b,d]	40 mg/kg/day in 4 divided doses for 7–14 days (maximum 2 g/day)	15 mg/kg/day in 2 divided doses for 7 days (maximum 1 g/day)	2 mo or older: TMP, 8 mg/kg/day; SMX, 40 mg/kg/day in 2 doses for 14 days
Adolescents and adults	500 mg as a single dose on day 1, then 250 mg as a single dose on days 2 through 5[b,d]	2 g/day in 4 divided doses for 7–14 days	1 g/day in 2 divided doses for 7 days	TMP, 320 mg/day; SMX, 1600 mg/day in 2 divided doses for 14 days

SMX indicates sulfamethoxazole; TMP, trimethoprim.

[a]Centers for Disease Control and Prevention. Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis: 2005 CDC guidelines. *MMWR Recomm Rep.* 2005;54(RR-14):1–16

[b]Azithromycin should be used with caution in people with prolonged QT interval and certain proarrhythmic conditions.

[c]Preferred macrolide for this age because of risk of idiopathic hypertrophic pyloric stenosis associated with erythromycin.

[d]A 3-day course of azithromycin for PEP or treatment has not been validated and is not recommended.

Prevention & Treatment Considerations: Pertussis

- Recommended personal protective equipment (PPE) for pertussis is Droplet + Standard precautions.
- Duration of isolation is until 5 days after initiation of effective antibiotic therapy.
- Consideration should be given to post-exposure prophylaxis for household contacts and health care professionals with prolonged exposure to respiratory secretions.

Thank you!
References

- 2024. "Pertussis (Whooping Cough)", Red Book: 2024–2027 Report of the Committee on Infectious Diseases, Committee on Infectious Diseases, American Academy of Pediatrics, David W. Kimberlin, MD, FAAP, Ritu Banerjee, MD, PhD, FAAP, Elizabeth D. Barnett, MD, FAAP, Ruth Lynfield, MD, FAAP, Mark H. Sawyer, MD, FAAP
- (2025, May 15). *Pertussis (whooping cough) resources*. American Medical Association. https://www.ama-assn.org/public-health/infectious-diseases/pertussis-whooping-cough-resources
- Finger H, von Koenig CHW. Bordetella. In: Baron S, editor. Medical Microbiology. 4th edition. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. Chapter 31. Available from: https://www.ncbi.nlm.nih.gov/books/NBK7813/
- YouTube - U.S. Food and Drug Administration. (2022, April 22). *What is That Sound? Whooping Cough*. YouTube. https://www.youtube.com/watch?v=DB70izafC1Y