

**Children's Hospital and Health System, Inc.**  
**Evidence Based Guideline**  
**Urgent Care (UC)**

**SUBJECT: Pertussis & Parapertussis**

	PERTUSSIS	PARAPERTUSSIS
<b>When to Treat</b>	<ul style="list-style-type: none"> <li>Per CDC, treat for positive test within 3 weeks of cough onset (individuals &gt; 1 year) or within 6 weeks of cough onset (individuals &lt; 1 year/pregnant women)</li> <li>Please note that per Red Book, after the paroxysmal cough is established, treatment has no effect on the course of illness, but treatment is still recommended to limit spread to others</li> <li>If &lt; 4 months and either suspect Pertussis or have a positive Pertussis PCR: consult CW ID for possible admission and monitoring as this population is known to develop complications and deteriorate rapidly; consider transfer to ER</li> </ul>	<ul style="list-style-type: none"> <li>All people, especially infants, with positive Parapertussis PCR should receive prompt treatment to help prevent the spread to young infants</li> <li>Treatment is identical to that for pertussis infection</li> </ul>
<b>Post Exposure Prophylaxis (PEP) *</b>  <i>* UC providers should not prescribe PEP for non-UC patients. UC providers should recommend non-UC patients needing PEP call their primary care provider. When possible, please confirm reported positive pertussis or parapertussis results.</i>	<ul style="list-style-type: none"> <li>If UC patient is a close contact to an individual with confirmed pertussis, initiate PEP if last exposure was within 21 days. If pertussis symptoms are present or develop, manage as having a suspected case of pertussis.</li> <li>Close contact is defined as: <ul style="list-style-type: none"> <li>Direct face-to-face contact for a period of time (duration not defined)</li> <li>Shared confined space in close proximity for a prolonged period of time (≥ 1 hour)</li> <li>Direct contact with respiratory, oral, or nasal secretions</li> <li>Contact in a setting with known pertussis transmission (≥ 2 or more cases in same classroom or sports team)</li> <li>Household contacts (including roommates in dorms)</li> </ul> </li> </ul> <p>Note: The above management in this box follows AAP Red Book Guidelines and CW Infectious Disease. The Wisconsin Dept. of Health will often further divide patients into a high risk group when applicable.</p>	<ul style="list-style-type: none"> <li>All infants &lt; 6 months should receive PEP</li> </ul> <p>If any of the contacts are symptomatic, TEST FIRST, then treat due to risk of co-infection with Pertussis</p>
<b>School, Daycare, Work</b>	<p>UC patients being tested for pertussis or with a positive Pertussis PCR should be excluded from school/daycare/work and isolated at home until:</p> <ul style="list-style-type: none"> <li>Completed 5 days of effective antimicrobial therapy</li> <li>If not treated, 21 days if &gt; 1 year old or 42 days if &lt; 1 year old, after onset of cough</li> </ul>	<ul style="list-style-type: none"> <li>No exclusion unless contact with infants &lt; 6 months at work or school</li> <li>If contact with infants less than 6 months, must be excluded until received 5 days of appropriate antibiotic treatment or 21 days since cough onset</li> </ul>
<b>Treatment (used for PEP and positive tests) **</b>  <i>** Note per CW ID: Biaxin (Clarithromycin) x 7 days is an acceptable alternative to Azithromycin. If true allergy (versus avoidance due to side effects), Bactrim x 14 days is the appropriate alternative. See antibiotic chart on page 5.</i>	<p>Regimen is same for PEP, Treatment, Pertussis, Parapertussis</p> <ul style="list-style-type: none"> <li>&lt; 6 months: Azithromycin 10 mg/kg/day single dose x 5 days</li> <li>≥ 6 months: Azithromycin 10 mg/kg/day single dose day 1 (max 500 mg), then 5 mg/kg/day single dose days 2-5 (max 250 mg)</li> <li>Alternate option if over 2 months: TMP 8 mg/kg/day; SMX 40 mg/kg/day divided BID x 14 days</li> <li>Alternate option for adolescent/adult: TMP 320 mg/day; SMX 1600 mg/day divided BID x 14 days</li> </ul>	<p>Regimen is same for PEP, Treatment, Pertussis, Parapertussis</p> <ul style="list-style-type: none"> <li>&lt; 6 months: Azithromycin 10 mg/kg/day single dose x 5 days</li> <li>≥ 6 months: Azithromycin 10 mg/kg/day single dose day 1 (max 500 mg), then 5 mg/kg/day single dose days 2-5 (max 250 mg)</li> <li>Alternate option if over 2 months: TMP 8 mg/kg/day; SMX 40 mg/kg/day divided BID x 14 days</li> <li>Alternate option for adolescent/adult: TMP 320 mg/day; SMX 1600 mg/day divided BID x 14 days</li> </ul>

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## UC EVIDENCE BASED GUIDELINE: PERTUSSIS & PARAPERTUSSIS

The most up-to-date recommendations by the CDC can be found at the below link:

<https://www.cdc.gov/pertussis/clinical>

**PURPOSE:** To evaluate and initiate treatment of pertussis and parapertussis

**Pertussis**, or whooping cough, is a very contagious disease found only in humans.

- **Transmission:** It is transmitted by close contact via large respiratory droplets produced by coughing or sneezing. The bacterium attaches to the cilia of the upper respiratory system and releases toxins which paralyze the cilia and cause inflammation, interfering with the ability to clear airway secretions.
- **Symptoms:** Pertussis is known for bursts (paroxysms) of uncontrollable, worsening, violent coughing which can make it hard to breathe. At the end of paroxysmal coughing, one with pertussis will often take a deep breath which may be accompanied with a high-pitched "whooping" sound.
- **Incubation period:** The typical incubation period is 7 to 10 days, with a range of 5 to 21 days.
- **Transmission:** Those aged > 1 year are contagious for 3 weeks after the cough begins, those < 1 year are contagious for 6 weeks after the onset of cough. The duration of classic pertussis is 6 to 10 weeks. Pertussis cases occur year round with a peak in late summer-autumn; occurring endemically with 3-to-5 year cycle of increased disease.
- **Impact:** Pertussis can affect people of all ages, but can be very serious, even deadly, for babies less than one year old. Approximately half of infants with pertussis will require hospitalization; of these, 61% will experience apnea, 23% pneumonia and 1% death.
- **Complications:** The most common complication, and cause of most pertussis-related deaths, is secondary bacterial pneumonia. Many babies who get pertussis are infected by older siblings, parents or caregivers who might not even know they have the disease. Pertussis is highly communicable with secondary attack rates of 80% among susceptible household contacts.
- **Treatment:** Pertussis is generally treated with antibiotics to prevent those infected from spreading the disease. Vaccination offers the best protection against the disease, although neither natural infection nor immunization provides lifelong immunity.

**Parapertussis**, similar to pertussis, is a bacterial illness that may cause prolonged cough, paroxysmal cough, whoop, and vomiting, but is typically milder and shorter in duration (2 weeks versus 6 weeks). Infants < 6 months may experience a more severe course compared with older persons. Rarely, death can occur in infants with underlying health problems or infants with a pertussis coinfection (positive for parapertussis AND pertussis).

## ETIOLOGY

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## UC EVIDENCE BASED GUIDELINE: PERTUSSIS & PARAPERTUSSIS

- **Pertussis**, caused by *Bordetella pertussis* (*B. pertussis*), gram negative bacteria
- **Parapertussis**, caused by *Bordetella parapertussis* (*B. parapertussis*), gram negative bacteria

### DIFFERENTIAL DIAGNOSES

- *Mycoplasma pneumoniae*
- *Chlamydia trachomatis*
- *Chlamydia pneumoniae*
- *Bordetella bronchiseptica* (cause of kennel cough)
- Respiratory tract viruses; specifically, RSV, Adenovirus, Influenza, Parainfluenza, Rhinovirus, Human Metapneumovirus, COVID-19
- Reactive airway disease/asthma
- Allergic or infectious sinusitis
- Gastroesophageal reflux
- Aspiration pneumonia

## Guideline

### SUBJECTIVE DATA/HISTORY

#### Clinical Features

Stage	Length (Total 0-12 weeks)	Clinical Features
Stage 1: Catarrhal  <i>Highly contagious</i>	<ul style="list-style-type: none"><li>• 7-10 days</li><li>• Range 4-21 days</li></ul>	Insidious onset of: <ul style="list-style-type: none"><li>• Coryza (runny nose)</li><li>• Sneezing</li><li>• Fever – absent or minimal</li><li>• Mild, occasional cough (which gradually becomes more severe)</li><li>• Apnea - <i>young infant (&lt; 6 months) often have atypical presentation</i></li></ul>
Stage 2: Paroxysmal  <i>Traditional symptoms</i>	<ul style="list-style-type: none"><li>• 1-6 weeks</li><li>• May persist for up to 10 weeks</li></ul>	<ul style="list-style-type: none"><li>• Paroxysms of numerous, rapid coughs due to difficulty expelling thick mucus from the tracheobronchial tree</li><li>• Long inspiratory effort accompanied by a high-pitched "whoop" at the end of the paroxysms</li><li>• Cyanosis during attack</li><li>• Vomiting and exhaustion</li></ul> Paroxysmal attacks: <ul style="list-style-type: none"><li>• Occur more frequently at night</li></ul>

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Stage	Length (Total 0-12 weeks)	Clinical Features
		<ul style="list-style-type: none"> <li>Increase in frequency during the first 1-2 weeks, remain at the same frequency for 2-3 weeks, and then gradually decrease</li> </ul> <p>Paroxysmal attacks continued:</p> <ul style="list-style-type: none"> <li>Infants &lt; 6 months may not have enough strength to have a whooping sound</li> </ul> <p><i>Often appear well in-between coughing fits.</i></p>
Stage 3: Convalescent	<ul style="list-style-type: none"> <li>7-10 days</li> <li>Range of 4-21 days</li> </ul>	<ul style="list-style-type: none"> <li>Gradual recovery</li> <li>Less persistent, paroxysmal cough disappears in 2-3 weeks</li> </ul> <p><i>Paroxysms often recur with subsequent respiratory infections for many months after the onset of pertussis.</i></p>

### OBJECTIVE DATA/PHYSICAL EXAM

Suspect pertussis and/or parapertussis in the following patients:

- Infants < 6 months:
  - Cough that is not improving (any duration)
  - Gagging or gasping
  - Pneumonia
  - Apnea, seizures, cyanosis, vomiting, or poor weight gain
  - Leukocytosis with lymphocytosis  
(WBC count  $\geq 20,000$  cells/mL with  $\geq 50$  percent lymphocytes)
- Children/Adults > 6 months:
  - Paroxysmal nonproductive cough of  $\geq 7$  days duration
  - A cough illness with whoop, apnea, posttussive vomiting, subconjunctival hemorrhage, or sleep disturbance
  - Cyanosis
  - Sweating episodes between paroxysms

### DIAGNOSTIC STUDIES

- Per Wisconsin Division of Public Health (WDPH), only symptomatic persons should have specimens collected for pertussis testing
- Asymptomatic close contacts of confirmed cases of pertussis should not be tested and testing of contacts should not be used for post-exposure prophylaxis decisions
- Note: All tests sent for pertussis automatically include testing for parapertussis at CW (turn-around-time is 24 hours)
- PCR (polymerase chain reaction) via nasopharyngeal specimen (NP swab)
- PCR provides timely results with improved sensitivity over culture

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- **For Pertussis**, optimal sensitivity during the first 3 weeks of cough or up to 4 weeks of cough in infants or unvaccinated persons; testing is typically negative after 21 days from onset of cough, or 5-7 days of appropriate antibiotic therapy

*Pertussis (whooping cough) is nationally-notifiable and cases will be reported to the appropriate health department (done by CW lab and Infection Preventionist). Parapertussis is no longer a reportable disease.*

### TREATMENT

See table page 1

Also from <https://www.dhs.wisconsin.gov/publications/p01992.pdf>:

#### Treating pertussis

Recommended antimicrobial treatment and post-exposure prophylaxis for pertussis, by age group.<sup>1,2</sup>

Age group	Azithromycin	Erythromycin	Clarithromycin	TMP-SMX (Alternative)
<1 month	10 mg/kg/day as a single dose daily for 5 days <sup>3,4</sup>	40 mg/kg/day in 4 divided doses for 14 days	Not recommended	Contraindicated for infants younger than 2 mo
1-5 months	10 mg/kg/day in a single dose for 5 days <sup>3</sup>	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 months or older and children	10 mg/kg as a single dose on day 1 (max: 500 mg) then 5 mg/kg/day as a single dose on days 2-5 (max: 250 mg) <sup>3,5</sup>	40 mg/kg/day in 4 divided doses for 7-14 days (max: 2 g/day)	15 mg/kg/day in 2 divided doses for 7 days (max: 1 g/day)	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 2-5 <sup>3,5</sup>	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

<sup>1</sup>CDC. Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis: 2005 CDC guidelines. MMWR 2005.

<sup>2</sup>Committee on Infectious Diseases, American Academy of Pediatrics. David W. Kimberlin, MD, FAAP, ed. 2024. Red Book: 2024-2027 Report of the Committee on Infectious Diseases - 33rd Ed. American Academy of Pediatrics. ISBN 978-1-61002-734-2. eISBN 978-1-61002-735-9. ISSN 1080-0131.

<sup>3</sup>Azithromycin should be used with caution in people with prolonged QT interval and certain proarrhythmic conditions.

<sup>4</sup>Preferred macrolide for this age because of risk of idiopathic hypertrophic pyloric stenosis associated with erythromycin.

<sup>5</sup>A 3-day course of azithromycin for PEP or treatment has not been validated and is not recommended.

### POSTEXPOSURE PROPHYLAXIS (PEP)

See table page 1

### EDUCATION of Patient/Family

- Pertussis is treated with antibiotics to prevent the spread of the disease
- Patient may continue to cough; treatment may not shorten the duration of illness
- Do not use cough medications (See UC Guideline: Pharmacologic Agents in the Treatment of Cough and Cold Symptoms in Children)

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- Avoid irritants for cough (smoke, known allergens, etc.)
- Clean, cool mist vaporizer will help loosen mucus
- Encourage fluids

### TRANSMISSION

Treated with appropriate antibiotic therapy?	Age of patient	Start of infectious period	End of infectious period
YES	All ages	7 days before cough onset	After day 5 of treatment
NO	$\geq 1$ year	7 days before cough onset	21 days after cough onset
NO	$< 1$ year	7 days before cough onset	42 days after cough onset

Day 0 = day of cough onset

### RETURN TO SCHOOL

See table page 1

### PREVENTION

- Routine vaccination with DTaP and Tdap
  - Does not provide lifelong immunity for pertussis
  - Still recommended for people with natural disease
  - Does not protect against parapertussis
  - Vaccine efficacy: 80-85%
- Appropriate and timely PEP
- Good personal hygiene

### FOLLOW-UP

- As needed

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*This guideline is designed to serve as a reference for clinical practice and does not represent an exclusive course of treatment nor does it serve as a standard of medical care. Providers should apply their professional judgment to the management of individual patient conditions and circumstances. Children's Hospital and Health System (CHHS) does not make any representation with respect to any sort of industry recognized standard of care for the particular subject matter of this clinical guideline. Additionally, CHHS form documents are subject to change, revision, alteration, and/or revocation without notice.*

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References

- American Academy of Pediatrics. (2021). Pertussis (Whooping Cough). In D.W. Kimberlin, E.D. Barnett, R. Lynfield, & M.H. Sawyer, (Eds.), *Red Book: 2021-2024 Report of the Committee on Infectious Diseases*, (578-589). Itasca, IL: American Academy of Pediatrics.
- Blain, A., Skoff, T., Cassiday, P., Tondella, M.L., Acosta, A. (2020). Pertussis. *Manual for the Surveillance of Vaccine-Preventable Diseases*. Retrieved from: <https://www.cdc.gov/vaccines/pubs/surv-manual/chpt10-pertussis.html>.
- Centers for Disease Control and Prevention (2022). Pertussis (Whooping Cough). Retrieved from: <http://www.cdc.gov/pertussis/materials/hcp.html>
- Cherry, J.D., Wendorf, K., Bregman, B., Lehman, D., Nieves, D... Harriman, K. (2018). An observational study of severe pertussis in 100 infants  $\leq$  120 days of age. *Pediatric Infectious Disease Journal*. Retrieved from: <https://doi.10.1097/INF.0000000000001710>
- Hamborsky, J., Kroger, A., & Wolfe, C. (2015). *Epidemiology and prevention of vaccine-preventable diseases*. Public Health Foundation.
- Krishnan, S.G., Fun, W.H., Ramadras, M.D., Yunus, R., Lye, Y.F., & Sararaks, S. (2019). Pertussis clinical case definition: Time for change in developing countries? *PlosOne*. Retrieved from: <https://doi.org/10.1371/journal.pone.0219534>
- Winter, K., Zipprich, J., Harriman, K., Murray, E.L. Gornbein, J.... Cherry, J.D. (2015). Risk factors associated with infant deaths from pertussis: a case control study. *Clinical infectious diseases: an official publication of the Infectious Diseases Society of America*. Retrieved from <https://doi.10.1097/INF.0000000000001710>

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Wisconsin Department of Health Services (2023). Vaccine-Preventable Diseases, Surveillance and Control-Pertussis. Retrieved from [dhs.wisconsin.gov/publications/p0/p00637.pdf](https://dhs.wisconsin.gov/publications/p0/p00637.pdf)

Wisconsin Department of Health Services (2024). Communicable Diseases Case Reporting and Investigation Guidance for Clinicians. Retrieved from <https://www.dhs.wisconsin.gov/publications/p01992.pdf>

Yeh, S. (2022). Pertussis infection in infants and children: Clinical features and diagnosis. *UpToDate*, Retrieved from: <http://www.uptodate.com>

Yeh, S. (2021). Bordetella pertussis infection in infants and children: Treatment and prevention. *UpToDate*. Retrieved from: <http://www.uptodate.com>

*Treatment information also provided by Brittany Player, Infectious Disease Fellow, Children's Wisconsin (personal communication, October 2023 and October 2024).*

*Treatment information also provided by Frank Zhu, Medical Director, Infection Control and Prevention, Children's Wisconsin & Assistant Professor of Pediatrics, The Medical College of Wisconsin, (personal communication, October 2023).*

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