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Pertussis

Case Definition – [Pertussis - 2020 Case Definition](#)

Overview

- **Agent** – *Bordetella pertussis* (bacteria)
- **Reservoir** – Humans are the only natural hosts.
- **Environment** – Survives 1-2 hours on surfaces; 3-4 hours in human sputum samples; air - 19 to 20 hours; plastic - 3-5 days; paper - 1 day; in diluted saliva - up to 7 days; inactivated by moist and dry heat; susceptible to many disinfectants, cold temperatures and desiccation.
- **Occurrence** – Pertussis occurs throughout the world, year-round, with a typical late summer-autumn peak in incidence. Infection and/or immunization do not confer lifelong immunity. Increased incidence in school-aged children, adolescents and adults, as well as very young infants, is attributed to waning immunity from acellular pertussis vaccine series, and incomplete vaccination of expectant mothers with Tdap, respectively.
- **Risk Factors** – Children under the age of six months are the group at highest risk for severe complications (including pneumonia, hypoxia, seizures, and encephalopathy) and death. Close contact with contagious siblings and adults are important sources of pertussis infection for young infants.
- **Mode of Transmission** – Most commonly person-to-person through contact with respiratory droplets, or by contact with airborne droplets of respiratory secretions. Less frequently by contact with an infected person's freshly contaminated articles (fomites).
- **Period of Communicability** – Beginning of the catarrhal stage through the third week after the onset of paroxysms, or until 5 days after the start of effective antimicrobial treatment.
- **Incubation Period** – Usually 7-10 days (range 5–21 days).
- **Clinical Illness** – Pertussis is a highly communicable, vaccine-preventable disease, often described as the “100-day cough”. The bacteria attach to the cilia of the respiratory epithelial cells, produce toxins that paralyze the cilia, and cause inflammation of the respiratory tract, which interferes with the clearing of pulmonary secretions. In classic cases, pertussis begins with a runny nose, mild cough, and low-grade fever (the catarrhal stage), which progresses to paroxysmal spasms of severe coughing, inspirational “whooping”, and post-tussive vomiting. The duration of cough for classic pertussis is 6 to 10 weeks. Pertussis may also present as a mild to moderate cough illness in people who are partially immune, which makes diagnosis more elusive to clinicians and can result in unrecognized cases.
- **Laboratory Testing** – Testing for *B. pertussis* includes culture of the organism and Polymerase chain reaction (PCR)-based assays from nasopharyngeal specimens. PCR-based assays can be used on the same specimens used for culture.
- **Treatment** – A 5-day course of azithromycin is the appropriate first-line choice for treatment and post-exposure prophylaxis. After the paroxysmal cough is established, antimicrobial agents have no discernible effect on the course of illness but are recommended to limit the spread of organisms to others. Erythromycin or Clarithromycin are also recommended, or Trimethoprim-sulfamethoxazole can be used as an alternative.

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- **Priority** – Prompt investigation and implementation of control measures required.

Quick References / Factsheets

- Public - [About Pertussis \(CDC\)](#)
- Public - [Pertussis \(Whooping Cough\): Question-&-Answers \(IAC\)](#)
- Health Professionals – [Clinical Overview of Pertussis \(CDC\)](#)
- Health Professionals - [Pertussis: Summary of Vaccine Recommendations \(CDC\)](#)

Forms

- [Disease Case Report \(CD-1\)](#)
- [Pertussis Report Form \(MDHSS - IMMP-25\)](#)
- [Missouri Outbreak Report Form \(MORF\)](#)

Notifications

- Contact the [District Epidemiologists](#) or the Missouri Department of Health and Senior Services (MDHSS) – Bureau of Communicable Disease Control and Prevention (BCDCP), phone (573) 751-6113, or for afterhours notification contact the MDHSS – Emergency Response Center (ERC) at (800) 392-0272 (24/7) immediately if a case of pertussis is identified in a healthcare worker, child care worker/attende, or other high-risk setting, or if an outbreak of pertussis is suspected.
- If a case(s) is associated with a childcare center, BCDCP or the Local Public Health Agency (LPHA) will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377 and the Missouri Department of Elementary & Secondary Education (DESE) Office of Childhood/Child Care Compliance, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a long-term care facility, BCDCP or the LPHA will contact the Section for Long-Term Care Regulation (SLCR), phone (573) 526-8524, Fax (573) 751-8493.
- If a case(s) is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center, BCDCP or the LPHA will contact the Bureau of Health Services Regulation (BHSR), phone (573) 751-6303, Fax (573) 526-3621.

Reporting Requirements

- Pertussis is a Category 2 (A) disease and shall be reported to the local health authority or to MDHSS within one (1) calendar day of first knowledge or suspicion; for after-hours notification, contact the MDHSS - ERC at (800) 392-0272 (24/7).
- Pertussis is a nationally notifiable condition in the standard reporting category. The MDHSS reports confirmed and probable cases to the CDC by routine electronic transmission.
- Pertussis reporting includes the following:
 1. For all cases, complete a “[Disease Case Report](#)” (CD-1).

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2. For confirmed and probable cases, complete the “[Pertussis Report](#)” (IMMP-25), enter information into WebSurv, and attach the completed Pertussis Report form to the record in WebSurv.
3. All outbreaks or suspected outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the [District Epidemiologists](#).
4. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the [District Epidemiologists](#).

Laboratory Testing and Diagnosis

Laboratory confirmation of pertussis is important because other pathogens can cause symptoms similar to pertussis. Several laboratory tests have been developed to test for pertussis and each of the methods have limitations. A properly obtained nasopharyngeal (NP) swab or aspirate is essential for optimal results. CDC has developed two short training videos for collection of NP aspirate and swab specimens, which can be accessed on the CDC [Laboratory Testing for Pertussis](#) website. Tests for Pertussis include:

- **Culture:** Culture of *B. pertussis* was previously considered the “gold standard” diagnostic test of pertussis, but it is not optimally sensitive and has largely been replaced by nucleic acid amplification tests (NAATs). An NP specimen for culture should ideally be collected within the first two weeks of illness, and it should be directly plated or immediately placed into transport medium. Results may take as long as 7-10 days.
- **Polymerase Chain Reaction (PCR):** PCR is the most commonly used laboratory method for detection of *B. pertussis* because of greater sensitivity and more rapid turnaround time. An NP specimen ideally should be collected within 3 weeks of illness onset, and immediately placed in transport medium.
- **Serology:** Commercial serologic tests for pertussis infection can be helpful for diagnosis, especially later in illness, but are not commonly used. There is no commercial kit approved by the U.S. Food and Drug Administration (FDA) for diagnostic use.

The Missouri State Public Health Laboratory (MSPHL) performs PCR and culture testing for pertussis. Testing for pertussis at MSPHL should be coordinated through the Microbiology Unit (573) 751-3334 before specimen submission <http://health.mo.gov/lab/pertussis.php>.

Conducting the Investigation

1. **Verify the diagnosis.** Contact the physician, hospital and/or laboratory as needed to obtain demographic, clinical and laboratory information needed to verify diagnosis and to proceed with the investigation. Early diagnosis and treatment may limit disease spread. If pertussis is strongly suspected, attempts to identify and provide prophylaxis to close contacts should proceed without waiting for laboratory confirmation. When suspicion of pertussis is high, prophylaxis of infants and their household contacts should not be delayed because pertussis can be severe and life-threatening to young infants.

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2. **Identify potential sources of exposure.** Contact the case and ask about potential exposure to persons with cough illness in the three weeks prior to illness onset. Ask if the case traveled to an area where there is a known outbreak or increased pertussis activity.
3. **Review surveillance data.** Determine whether there have been other cases in the same geographic area or institution. When cases are related by person, place, or time, efforts should be made to identify a common source.
4. **Provide information regarding the prevention of pertussis.** Efforts should be made to promote pertussis awareness and provide prevention information to contacts, medical providers, and the public as needed to reduce the risk of disease. Pertussis can cause serious and potentially life-threatening complications in infants and young children who are not fully vaccinated.
5. **Identify exposed household members, close contacts at high-risk of severe illness, and potential settings for transmission.**
 - Identify symptomatic household and other close contacts and obtain or recommend specimen collection and testing, as appropriate.
 - Determine if the case or a member of the case's household attend a child care center, nursery school, or any other school setting.
 - Determine if the case or a member of the case's family works as a health care provider or in another type of high risk setting.
6. **Determine susceptibility of exposed contacts.**
 - Determine the immunization status of the case and close contacts.
 - Determine if the case and all appropriate close contacts have been treated with an antibiotic recommended for pertussis (see *Treatment and Post-exposure Prophylaxis (PEP)*). Antimicrobial therapy options are the same for treatment and prophylaxis, and should be recommended for cases and appropriate contacts regardless of immunization history.
7. **Post-exposure prophylaxis of susceptible, possibly exposed contacts.** Refer to the Post-Exposure Prophylaxis information in the *Control Measures* section of this document for guidance.

Note: Investigators should make every attempt to collect information on paroxysms of cough, whoop, post-tussive vomiting, and duration of cough as these variables are required to determine whether an individual meets the clinical criteria for pertussis. When feasible, case investigations initiated shortly after cough onset should include follow-up calls to collect information on cough duration. Follow-up calls should be done regardless of confirmatory test results so that cases meeting the clinical case definition can be reported.

Note: In the absence of a diagnostic test or epidemiologic linkage to a confirmed case, it is important to determine duration of cough, specifically whether it lasts 14 days or longer, in order to determine if a person's illness meets the definition of a clinical case. If the first interview of a

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suspect pertussis case is conducted within 14 days of cough onset and cough is still present at the time of interview, it is important to follow-up at 14 days or later after onset.

Control Measures (General Setting)

The best way to prevent pertussis is by being fully vaccinated and practicing good cough etiquette. Infected people should be isolated from infants and other people at high risk for pertussis complications. Treatment of infectious persons and prophylaxis of exposed persons in high-risk groups are important control measures. Guidance for public health professionals on the investigation and control of pertussis is available at: [Public Health Considerations for Pertussis](#).

Pre-exposure Vaccination. Routine immunization with a pertussis-containing vaccine is an important control measure that has resulted in a dramatic decrease in the incidence of pertussis in the United States. Pertussis vaccines are licensed for people 6 weeks of age and older. For additional information on the vaccination schedule and use, or the contraindications and precautions to vaccination, see: [Centers for Disease Control and Prevention, Epidemiology and Prevention of Vaccine-Preventable Diseases](#) and the pertussis VIS resources [Vaccine Information Statements \(CDC\)](#). While pertussis vaccine is recommended for persons of all ages, members of the following groups are either at high risk of severe disease or at increased risk of transmitting the disease to infants:

- Infants under the age of one year.
- Persons who are immunocompromised and/or have chronic lung disease.
- Family members and caregivers of infants.
- Pregnant women (one dose of Tdap recommended during each pregnancy).
- Health care workers (especially those who work with infants 12 months of age or younger).

Note: A complete summary of the recommended pertussis vaccine schedule for all ages is available at: <https://www.cdc.gov/pertussis/hcp/vaccine-recommendations/>.

Treatment and Post-exposure Prophylaxis (PEP). Early treatment of pertussis is very important. If a patient starts treatment for pertussis early in the course of illness, during the first 1 to 2 weeks before coughing paroxysms occur, symptoms may be lessened. Clinicians should strongly consider treating prior to test results if clinical history is strongly suggestive or patient is at risk for severe or complicated disease (e.g., infants). If a clinician diagnoses the patient late, antibiotics will not alter the course of the illness and, even without antibiotics, the patient should no longer be spreading pertussis. See American Academy of Pediatrics *Red Book* for treatment and PEP recommendations.

The primary objective of post-exposure prophylaxis (PEP) should be to prevent death and serious complications from pertussis in individuals at increased risk of severe disease (chiefly infants). Antimicrobial therapy options are the same for treatment and prophylaxis, and should be recommended for cases and appropriate contacts regardless of immunization history. Current

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treatment and PEP guidance is available at: [Treatment of Pertussis \(CDC\)](#) and [Postexposure Antimicrobial Prophylaxis \(CDC\)](#). CDC supports targeting PEP antibiotic use to persons at high risk of developing severe pertussis and to persons who will have close contact with those at high risk of developing severe pertussis, including:

- **All household contacts of a pertussis case.** Within families, studies demonstrated that secondary attack rates are high, even when household contacts are current with immunizations. Administration of antimicrobial prophylaxis to asymptomatic household contacts within 21 days of onset of cough in the index patient can prevent symptomatic infection.
- **High risk contacts within 21 days of exposure to an infectious pertussis case.** High risk persons are those who personally are at high risk of developing severe illness, or those people who will have close contact with people at high risk of severe illness. High risk persons include:
 - Infants and women in their third trimester of pregnancy — severe and sometimes fatal pertussis-related complications occur in infants aged <12 months, especially among infants aged <4 months. Women in their third trimester of pregnancy may be a source of pertussis to their newborn infant.
 - All people with pre-existing health conditions that may be exacerbated by a pertussis infection (for example, but not limited to, immunocompromised people and those with moderate to severe medically treated asthma).
 - People who themselves have close contact with either infants under 12 months, pregnant women or individuals with pre-existing health conditions at risk of severe illness or complications.
 - All people in high-risk settings that include infants aged <12 months or women in the third trimester of pregnancy. These include, but are not limited to neonatal intensive care units, childcare settings, and maternity wards.
- A broader use of PEP may be appropriate in limited closed settings when the number of identified cases is small and when a community-wide outbreak is not ongoing. However, when continued transmission of pertussis is evident, multiple rounds of antibiotics would not be recommended. Rather than repeating a course of antibiotics, you should monitor people exposed to pertussis for onset of pertussis signs and symptoms for 21 days.

Control Measures (Special Settings)

Outbreak Control:

Pertussis outbreaks can be difficult to identify and manage. Other respiratory pathogens often cause clinical symptoms similar to pertussis, and co-circulation with other pathogens does occur. To respond appropriately (e.g., provide appropriate prophylaxis), it is important to confirm that *B. pertussis* is circulating in the outbreak setting and to determine whether other pathogens are contributing to the outbreak. PCR tests vary in specificity, so obtaining culture confirmation

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of pertussis for at least one suspected case is recommended any time there is suspicion of a pertussis outbreak.

During outbreaks, prevention measures should focus on efforts to improve Tdap coverage during pregnancy to reduce severe illness and possible deaths in vulnerable infants.

Extensive contact tracing and broad-scale use of post-exposure prophylaxis (PEP) among contacts may not be an effective use of limited public health resources. While antibiotics may prevent pertussis disease if given prior to symptom onset, there are no data to indicate that widespread use of PEP among contacts effectively controls or limits the scope of pertussis outbreaks. Another important consideration is the overuse of antibiotics; CDC promotes the judicious use of antibiotics among healthcare providers and parents. Given these considerations, CDC supports targeting PEP through the following measures to persons at high risk of developing severe pertussis and to persons who will have close contact with those at high risk of developing severe pertussis as described in the above section on ***Treatment and Post-exposure Prophylaxis (PEP)***.

Active screening for symptomatic patients with suspected pertussis can be considered during outbreaks in settings such as schools, daycare centers, and hospitals. Active screening for suspected cases potentially reduces exposure to persons with pertussis, encourages timely medical evaluation and treatment of cases, and promotes prompt administration of antibiotics to close contacts at high risk.

Note: Fact sheets for parents/guardians and providers are available in the document: [Prevention and Control of Communicable Diseases: A Guide for School Administrators, Nurses, Teachers, Child Care Providers, and Parents and Guardians](#).

Note: Recommendations for the control of pertussis and pertussis outbreaks in health care settings can be found at <http://www.cdc.gov/mmwr/pdf/rr/rr6007.pdf> and https://www.cdc.gov/infection-control/hcp/guidance/index.html#cdc_listing_res7-setting-specific.

Resources

1. American Academy of Pediatrics. *Pertussis (Whooping Cough)*. In: Kimberlin DW, Barnett ED, Lynfield R, Sawyer MH, eds. *Red Book: 2021 Report of the Committee on Infectious Disease*, 32nd ed. Itasca, IL: American Academy of Pediatrics; 2018: 578-589.
2. American Public Health Association. *Pertussis*. In: Heymann D Ed. *Control of Communicable Diseases Manual*. 21st ed. Washington, D.C. American Public Health Association, 2022: 477-483.
3. Bennett, JE, Dolin R, Blaser, MJ, and Bennett (ed.). *Pertussis*. In: *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 9th ed. Philadelphia PA: Elsevier Saunders, 2019:2793-2802.
4. CDC. National Notifiable Diseases Surveillance System (NNDSS) and Case Definitions: Pertussis. <https://ndc.services.cdc.gov/case-definitions/pertussis-2020/> (3/2023).

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5. CDC. Pertussis: Summary of Vaccine Recommendations for Health Care Professionals. <https://www.cdc.gov/pertussis/hcp/vaccine-recommendations/> (5/2025)
6. CDC. Manual for the Surveillance of Vaccine-preventable Diseases. <https://www.cdc.gov/surv-manual/php/table-of-contents/chapter-10-pertussis.html> (5/2025).
7. CDC. Pertussis (Whooping Cough). <http://www.cdc.gov/pertussis/> (3/2023).
8. CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases (The Pink Book). Pertussis. <https://www.cdc.gov/pinkbook/hcp/table-of-contents/chapter-16-pertussis.html> (5/2025).