Pertussis

Signs and Symptoms, Duration	A cough illness caused by *Bordetella pertussis* typically lacking fever characterized by 3 stages: 1. Catarrhal (1–2 weeks): mild, upper respiratory tract symptoms accompanied by gradual development of an intermittent, non-productive cough. 2. Paroxysmal (1–6 weeks or longer): episodes of coughing that may end with gasping and inspiratory whoop, or post-tussive emesis. Adolescents and adults may have mild, less recognizable symptoms. 3. Convalescent (2–6 weeks or longer): gradual resolution of the paroxysmal episodes. Apnea may occur in young infants and be the only symptom; infants often have elevated white blood count (> 15,000/mm^3). Serious complications among infants include pneumonia, seizures, pulmonary hypertension, encephalopathy, and death.	
Incubation and Transmission	Usually 7–10 days from exposure to onset of symptoms (range 5–21 days). Transmitted person to person via secretions or droplets. Contagious from onset of first symptoms until at least three weeks after the paroxysmal episodes begin. Antibiotic treatment can shorten contagious period.	
Case classification	**Clinical definition:** A cough illness lasting ≥ 2 weeks, with at least one of the following: Paroxysmal cough episodes; OR Inspiratory whoop; OR Post-tussive vomiting; OR Apnea (with or without cyanosis).	

	Confirmed case:
	Acute cough illness of any duration with
	• Isolation of *B. pertussis* from a clinical specimen OR
	• PCR positive for *B. pertussis*
		Probable case:
		• In the absence of a more likely diagnosis, illness meeting clinical criteria OR
		• Illness with cough of any duration, with
		  ○ At least one of the following signs or symptoms:
		  ▪ Paroxysms of coughing; or
		  ▪ Inspiratory whoop; or
		  ▪ Post-tussive vomiting; or
		  ▪ Apnea (with or without cyanosis)
		  AND
		  Contact with a laboratory confirmed case (epidemiologic linkage)

Differential diagnosis	*Bordetella parapertussis*, *Bordetella holmesii*, other *Bordetella* species, adenoviruses, respiratory syncytial virus, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*	
Treatment	See table in Section 2H. A 5-day course of azithromycin is most frequently prescribed. Antibiotics given early in the catarrhal stage may attenuate disease. When given in the paroxysmal stage, communicability is reduced, but there may be little effect on the course or duration of illness.	
Laboratory	Laboratory tests for pertussis can be done commercially. PCR is currently the most commonly used test. Test early in course of illness, if possible. If culture is positive, isolates must be submitted to WA PHL. All specimens shipped to the WAPHL Submit according to PHL requirements: https://doh.wa.gov/public-health-provider-resources/public-health-laboratories/lab-test-menu **Nasopharyngeal swab for culture:** culture is the most specific test and can differentiate between *Bordetella* species, but a negative culture cannot rule out pertussis. Most sensitive in the first two weeks of illness, more sensitive in young children. **Nasopharyngeal swab for PCR:** PCR is more sensitive but less specific than culture and does not differentiate between *B. Pertussis* and *B. Holmseii.* A negative PCR cannot rule out. There is no role for serology in case ascertainment in WA. (DFA is no not used for case identification.)	
Public Health investigation	• Assess the likelihood of pertussis: confirm clinical symptoms, verify vaccination and travel histories. • Exclude cases until completion of a complete course of an appropriate antibiotic. • Assess transmission risk, especially to infants under the age of one or to pregnant women. • Offer chemoprophylaxis to high-risk contacts and recommend symptom watch; test if symptomatic. • Low risk contacts should consult with their healthcare provider about prophylaxis. • See section 7 for guidance on special situations including cases at childcare facilities and schools.	

Pertussis

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To prevent illness and death, particularly among infants younger than 1 year, and among persons who may transmit pertussis to infants.
2. To limit transmission of pertussis in settings with infants or others who may transmit pertussis to infants.
3. To monitor the epidemiology of pertussis in Washington state.

B. Legal Reporting Requirements

1. Health care providers and facilities: notifiable to local health jurisdiction within 24 hours.
2. Laboratories: *Bordetella pertussis* notifiable to local health jurisdiction within 24 hours; submission of culture isolates required, when available (2 business days).
3. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Office of Communicable Disease Epidemiology (CDE) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin routine case investigation within one working day.
2. Prioritize reports to focus on those most likely to be true pertussis and patients who may have exposed high-risk contacts.
3. Make sure the case is appropriately treated and recommend measures to prevent further spread from the case.
4. Identify and evaluate all high-risk contacts; educate and recommend measures to prevent further spread from potentially infected contacts.
5. Report all Confirmed and Probable cases (see Section 3C) pertussis the case report form (https://www.doh.wa.gov/Portals/1/Documents/5100/210-041-ReportForm-Pertussis.pdf) and enter the data in the Washington Disease Reporting System (WDRS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Bordetella pertussis is a fastidious gram-negative, toxin-producing bacillus that causes damage to the respiratory tract.

B. Description of Illness

Classic pertussis, or whooping cough, is characterized by intermittent paroxysms (spasms) of severe coughing lasting from 6–10 weeks. Pertussis typically lacks fever and classically progresses through three stages:

1. Catarrhal (1–2 weeks): mild, upper respiratory tract symptoms gradually develop with an intermittent non-productive cough.
2. Paroxysmal (1–6 weeks or longer): spasms of cough end with a gasp, whoop, or vomiting

(post-tussive emesis). Adolescents and adults may have less dramatic symptoms.

3. Convalescent (2–6 weeks or longer): gradual resolution of the paroxysmal coughing.

Pertussis can occur at any age, regardless of vaccination history. Apnea rather than cough may be the initial symptom, or the only symptom in young infants. In **infants only**, an elevated white blood count (over 15,000/mm^3) with a predominance of lymphocytes may be observed. Pertussis among older children, adults, and those previously immunized can be milder than classic whooping cough; the symptoms may be no more distinctive than other upper respiratory tract infections.

Death and serious complications from pertussis occur mainly in infants and can include apnea, pneumonia, pulmonary hypertension, seizures, and encephalopathy. Older individuals may suffer from sleep deprivation, syncope, rib fractures, hernia, and urinary incontinence.

The differential diagnosis of pertussis includes other respiratory pathogens such as adenoviruses, respiratory syncytial virus, *Mycoplasma pneumoniae*, *Chlamydophila pneumoniae*, and other *Bordetella* species such as *B. parapertussis* and *B. holmesii*.

B. parapertussis, a less common, non-reportable infection, does not produce the pertussis toxin and therefore generally causes milder symptoms. Limited available data suggest that *B. parapertussis* may be less susceptible to antibiotics than pertussis. Although serious complications are rare with parapertussis, infected infants should be treated and chemoprophylaxis should be considered for infant contacts of parapertussis cases (https://www.cdc.gov/vaccines/pubs/surv-manual/chpt10-pertussis.html). All infected persons should be instructed to avoid contact with infants until they have completed five days of appropriate antibiotic therapy. Pertussis vaccine does not prevent illness from other *Bordetella* species.

C. Recent Pertussis trends in Washington State

The number of cases reported each year varies considerably, ranging from 15 to 4,916 (during the 2012 outbreak) cases a year over the past two decades. There is also variation between health jurisdictions in the rate of reported disease, reflecting local outbreaks.
2022: 76 cases were reported (1.0 cases/100,000population)

https://doh.wa.gov/sites/default/files/2024-01/420-004-CDAnnualReport2022.pdf

2022 final report: https://doh.wa.gov/sites/default/files/2022-07/348-254-PertussisSummaryWA2022.pdf
2023 prelim report: https://doh.wa.gov/sites/default/files/2024-03/348-254-PertussisSummaryWA2023.pdf
Weekly Update: https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/348-254-PertussisUpdate.pdf

D. Reservoirs

Humans.

E. Modes of Transmission

B. pertussis is transmitted from person to person through direct contact with respiratory secretions or via droplets produced from talking or coughing. The risk for transmission of pertussis is a function of multiple factors including clinical features of the source case as they relate to communicability (e.g., stage of illness, character of cough), proximity and duration of contact, ventilation, and use of appropriate infection control measures. Secondary attack rates

can reach 80% among fully susceptible persons (i.e., neither immunized nor previously infected).

F. Incubation Period

Typical incubation period is 7–10 days (range 4–21 days).

G. Period of Communicability

Pertussis is highly contagious. Persons with pertussis are most infectious during the catarrhal period and the first two weeks after cough onset. Communicability then decreases but may continue for three or more weeks after onset of paroxysmal cough. Therefore, cases are contagious from symptom onset to 21 or more days after the start of the paroxysmal cough or until the completion of 5 days of appropriate antibiotic therapy. Approximately 80–90% of persons with pertussis will spontaneously clear *B. pertussis* from the nasopharynx within three to four weeks, but untreated, unvaccinated individuals such as infants can remain culture positive for more than six weeks.

H. Treatment

Antibiotics given early in the catarrhal stage may attenuate the disease. When given during the paroxysmal stage, communicability is reduced but there may be little effect on the course or duration of illness. Early treatment of pertussis cases (within the first two weeks of symptoms) is much more effective in preventing secondary spread than treatment started later. Initiating treatment more than three weeks after onset of paroxysmal cough is unlikely to be beneficial but should be considered in certain situations.

The antibiotics and dosages used for treatment and post-exposure disease prevention are the same (see Table 1 below). Recommended antibiotics for pertussis include azithromycin, clarithromycin, erythromycin, or trimethoprim-sulfamethoxazole (TMP-SMX).

I. Immunity

Whole-cell pertussis vaccines were first licensed in the United States in 1914. Concerns about safety led to the development of more purified (acellular) pertussis vaccines. Acellular pertussis vaccine is combined with tetanus toxoid and diphtheria toxoid as DTaP or Tdap. Since 1997, an acellular pertussis vaccine (DTaP) has been recommended in the United States. No whole-cell vaccine is licensed in the United States at this time. DTaP vaccine efficacy range from 80%-85% with Tdap having similar efficacy. Immunity to pertussis from vaccine or disease wanes over time and persons who have been vaccinated or had disease can become infected. Data on duration of protection from acellular vaccines suggest that waning occurs within several years of vaccination, particularly in persons who have never received whole-cell vaccine.

https://www.cdc.gov/mmwr/volumes/67/rr/rr6702a1.htm

2**Table 1: Recommended antimicrobial treatment and post-exposure prophylaxis for pertussis, by age group**

	Primary agents			Alternate agent*
Age group	Azithromycin	Erythromycin	Clarithromycin	TMP-SMZ
Under 1 month	Recommended agent. 10 mg/kg per day in a single dose for 5 days (only limited safety data available)	Not preferred. Erythromycin is associated with infantile hypertrophic pyloric stenosis. Use if azithromycin is unavailable; 40–50 mg/kg per day in divided doses for 14 days	Not recommended (safety data unavailable)	Contraindicated for infants aged < 2 months (risk for kernicterus)
1–5 months	10 mg/kg per day in a single dose for 5 days	40–50 mg/kg per day in 4 divided doses for 14 days	15 mg/kg per day in 2 divided doses for 7 days	Contraindicated at age <2 months. For infants aged ≥2 months, TMP 8 mg/kg per day, SMZ 40 mg/kg per day in 2 divided doses for 14 days
Infants (6 months and older) and children	10 mg/kg in a single dose on day 1 (maximum: 500 mg/day) then 5 mg/kg per day on days 2–5 (maximum: 250 mg/day)	40–50 mg/kg per day (maximum: 2 g per day) in 4 divided doses for 14 days	15 mg/kg per day in 2 divided doses (maximum: 1 g per day) for 7 days	TMP 8 mg/kg per day, SMZ 40 mg/kg per day in 2 divided doses for 14 days (maximum: adult dose)
Adults	500 mg in a single dose on day 1 then 250 mg per day on days 2–5	2 g per day in 4 divided doses for 14 days	1 g per day in 2 divided doses for 7 days Pregnancy category C	TMP 320 mg per day, SMZ 1,600 mg per day in 2 divided doses for 14 days Pregnancy category C

* Trimethoprim sulfamethoxazole (TMP-SMZ) can be used as an alternative agent to macrolides in patients aged ≥ 2 months who are allergic to macrolides, who cannot tolerate macrolides, or who are infected with a rare macrolide-resistant strain of *B. pertussis*.

David W. Kimberlin MD, FAAP, ed. 2021. Red Book: 2021-2024 Report of the Committee on Infectious Diseases - 32nd Ed. Printed in the United States of America. American Academy of Pediatrics. ISBN-10: 1-61002-521-0. eISBN-10: 1-61002-522-9. ISSN 1080-0131. STAT!Ref Online Electronic Medical Library. https://online.statref.com/document/SbKWn-zzQFFnPKhuxp6Q0t

3. CASE AND CONTACT DEFINITIONS

A. Clinical Criteria for Diagnosis of Cases (clinical case definition)

In the absence of a more likely diagnosis, a cough illness lasting ≥2 weeks, with at least one of the following signs or symptoms:

paroxysms of coughing; OR

inspiratory whoop; OR

post-tussive vomiting; OR apnea (with or without cyanosis).

B. Laboratory Criteria for Diagnosis of Cases

- Isolation of *Bordetella pertussis* from clinical specimen or
- Positive polymerase chain reaction (PCR) for *B. pertussis*.

Note: Isolation of *B. parapertussis* or *B. holmesii* is not reportable.

C. Case Definition (2020)

1. **Probable:**
   - In the absence of a more likely diagnosis, illness meeting the clinical criteria,

   OR

   - Illness with cough of any duration, with at least one of the following signs or symptoms: paroxysms of coughing; or inspiratory whoop; or post-tussive vomiting; or apnea;

     and

     Contact with a laboratory confirmed case (epidemiologic linkage)
2. **Confirmed:**

   Acute cough illness of any duration, with:
   - Isolation of *B. Pertussis* from a clinical specimen OR
   - PCR positive for *B. Pertussis*

   Comments:
   - "Epidemiologically linked" is having close contact with a "Confirmed" case that had a positive pertussis lab test (either culture or PCR). Persons who present with an "epidemiological link" and present with any duration of cough should be classified as "probable". Without an "epidemiological link", persons who present with cough of at least two weeks and at least one of the clinical symptoms of pertussis should also be classified as "probable". An "epidemiological link" without lab confirmation should not be classified as "confirmed".
   - Serologic tests are not case defining for national reporting purposes.

D. Close Contact (of a pertussis case)

Direct face-to-face contact within 21 days of cough onset in the index patient. This includes all household contacts and immediate family members, boyfriends/girlfriends, and childcare contacts (those who spend many hours together or sleep under the same roof).

1. An obvious exposure that involves direct contact with respiratory, oral, or nasal secretions from a case-patient during the contagious period (e.g., a cough or sneeze in the face, sharing eating utensils, sharing water bottles, kissing, mouth-to-mouth resuscitation, or performing intubation or nasotracheal suctioning without a mask).
2. Close proximity for a prolonged period of time with a case-patient during the contagious period. Risk of exposure increases with longer duration and closer proximity of contact.

   Examples of non-household members who may be considered close contacts:

   - close friends or other social contacts
   - some passengers during shared transportation
   - some contacts at community activities or at a place of employment
   - some healthcare workers caring for a case-patient without wearing a mask
   - children attending an after-school care group or play group on the same days

Note: Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

E. High-risk Cases and Contacts

Increased-risk persons include those at increased risk for severe pertussis and those who may transmit pertussis to persons at high risk for severe pertussis. High risk is defined as:

- Infants under the age of 1
- Those in their third trimester of pregnancy
- All persons with pre-existing conditions that may be exacerbated by a pertussis infection
- Contacts who have close contact with infants under the age of 1 year, those who are pregnant or with people with pre-existing health conditions that put them at risk for severe illness or complications.
- Anyone in high-risk settings who may expose infants < 1 year old or pregnant women
  - (e.g., members of a household with infants or pregnant women, child care workers who take care of infants < 1 year old, health care workers with face-to-face contact with infants < 1 year old or pregnant women, childcare educators)

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

Isolation of *B. pertussis* by culture and detection of *B. pertussis* by polymerase chain reaction (PCR) are the only ways to confirm the diagnosis of pertussis for case classification purposes. DFA and serologic tests are not case defining.

1. **Nasopharyngeal Culture:** Culture is the most specific test for pertussis and can differentiate between *B. pertussis* and other *Bordetella* species. Culturing specimens from

the posterior nasopharynx is most sensitive in the first two weeks of illness and is more sensitive in young children than in adolescents and adults. However, positive nasopharyngeal cultures have occasionally been obtained from untreated adults up to six weeks after the onset of any symptoms. Because *B. pertussis* is fastidious and its isolation in culture is easily obscured by the growth of other nasopharyngeal organisms, proper specimen collection and subsequent handling of the specimen improve the rate of recovery. Specimens collected after the initiation of antibiotic therapy are less likely to yield *B. pertussis*. Since so many factors can affect the sensitivity of culture for *B. pertussis*, a negative culture result should not be considered evidence that pertussis has been 'ruled out'. (Throat and anterior nares swabs have unacceptably low rates of recovery of *B. pertussis* and should not be used.)

2. **Polymerase Chain Reaction (PCR):** PCR testing for *B. pertussis* is generally more sensitive than culture but less specific. PCR assays that amplify a single gene target (IS481) do not differentiate between *B. pertussis a*nd *B. holmesii.* False positive PCR can also occur by contamination from accidental transfer of DNA from environmental surfaces to a clinical specimen. Interpretation of PCR results, especially those with high Ct values, should be done in conjunction with an evaluation of signs and symptoms, knowledge of PCR methodology used by the lab, and available epidemiological information. See "Best Practices for Health Care Professionals on the use of Polymerase Chain Reaction (PCR) for Diagnosing Pertussis" for information on avoiding contamination of clinical pertussis specimens, available at: https://www.cdc.gov/pertussis/php/pcr-bestpractices/?CDC_AAref_Val=https://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-pcr-bestpractices.html
3. **Direct Fluorescent Antibody (DFA) Testing:** A DFA test lacks sensitivity and specificity for *B. pertussis*. Use of this test is discouraged.
4. **Serology: The lack of standardization of these antibody tests and their unknown correlation with pertussis illness limits their current usefulness.** However, a positive serology result in a person with recent pertussis symptoms who may expose infants or pregnant women warrants investigation. The optimal time for obtaining pertussis serology is two or more weeks after symptom onset. Local health jurisdiction (LHJ) discretion is advised about the need for further investigation of non-high-risk persons who have a positive serologic test. The best approach in such a situation may be to find an untreated contact with a recent onset of illness and collect specimens for culture and PCR.
5. **Susceptibility Testing:** Routine susceptibility testing of *B. pertussis* isolates is not recommended since resistance to macrolide antibiotics is rare. Consult with the Office of Communicable Disease Epidemiology (CDE) if a patient has a positive *B. pertussis* culture after completion of an appropriate course of antimicrobial therapy and patient compliance with therapy has been verified.

B. Tests Available at the Washington State Department of Health Public Health Laboratories (PHL)

PHL can perform microbiologic cultures and PCR for pertussis on posterior nasopharyngeal specimens. PHL can also confirm that pure isolates submitted from other laboratories are *B.*

pertussis.

Only diagnostic samples meeting criteria below and approved by the local health jurisdiction (LHJ) will be accepted at PHL. LHJs should notify CDE when they have given approval for pertussis testing at PHL. It is essential to use the PHL-approved collection kits, available upon request from PHL, since these kits may differ from those used by clinical laboratories.

After LHJ approval, PHL will perform pertussis PCR testing and culture on specimens from the following patients with suspected pertussis:

1. Healthcare workers.
2. Persons who may have exposed high-risk persons, such as infants < 1 year old, pregnant women, or others who may expose infants or pregnant women (e.g., a new mother who was coughing at the time of delivery, the ill person works in the infant room in a daycare, or the ill person teaches prenatal classes to expectant couples).
3. Infants < 1 year old and pregnant women without healthcare insurance.
4. Patients suspected of being part of an outbreak (per LHJ discretion).

When no other testing options are available, PHL will perform pertussis culture on specimens from any patient with suspected pertussis after approval from the LHJ.

C. Specimen Collection

Instructions for proper specimen collection is available in Appendix A.
Clinical specimens are subject to rejection per WAC 246-101-215 without prior approval.
Clinical specimens shipped to the WAPHL must be ordered through WAPHL LWP Portal.

5. ROUTINE CASE INVESTIGATION

The primary goal of public health agencies is to prevent disease and deaths due to pertussis in infants. Therefore, if resources are limited, public health agencies should focus on case investigation activities most likely to prevent pertussis in high-risk persons.

A. Evaluate the Diagnosis

Review the clinical presentation and laboratory test results. Prioritize reports to focus on those most likely to be true pertussis and patients who may have exposed high-risk contacts (see Section 3E). **Reports with an indication of exposure to high-risk contacts should be highest priority.**

DOH recommends that local health jurisdictions conduct a public health investigation for the following pertussis reports:

- Culture- or PCR-positive cases (includes those whose illness does not yet meet the clinical case definition)
- Epi-linked cases that meet the clinical case definition
- Infants < 1 year of age

DOH also encourages local health jurisdictions to investigate the following reports as

resources permit, in order of priority:

1. Cases that meet the clinical case definition but have no epi-link or laboratory confirmation ('Probable' cases)
2. Cases with classic symptoms (paroxysmal cough, post-tussive emesis, whoop, or apnea) and < 2 week cough duration with no testing or a negative test
3. Symptomatic contacts of a case that do not yet meet the clinical case definition.

B. Manage the Case

- Ensure that the case has been recommended to receive antibiotic treatment if it is <21 days since cough onset
- Educate the patient about mode of transmission, period of communicability, and need to avoid high risk persons/settings.
- Work, School and Child-Care Restrictions: Recommend that all cases and symptomatic contacts avoid public settings, including child-care, school and work settings, until after completing five days of an appropriate antibiotic (i.e., until day six after starting treatment) or until 21 days after onset of cough if antibiotics are not taken.
- Recommend that patients with proven or suspected pertussis are cared for using droplet precautions in healthcare settings; health care workers should wear surgical masks and eye protection when evaluating these patients. Droplet precautions should be maintained until the patient has completed five days of appropriate antibiotic therapy.
- Report all Confirmed, Probable and PCR-positive Suspect cases to the Office of Communicable Disease Epidemiology (CDE) through WDRS using the pertussis case report form (https://www.doh.wa.gov/Portals/1/Documents/5100/210-041-ReportForm-Pertussis.pdf). Enter the vaccination history for all patients younger than 1 year and other patients, if possible, especially those 18 years of age and under and pregnant women with pertussis. (Please note pregnancy, when applicable, in the shared notes field).
- As resources permit, follow-up with PCR-positive suspect cases two weeks after onset to determine if they meet the clinical case definition.

C. Identify Potentially Exposed Persons

1. **High-risk close contacts:** secondary attack rates in households are high even among vaccinated persons because of this, it is recommended for all household contacts, regardless of age or immunization status.

   All household contacts of a pertussis case within

   Infants and those in their third trimester of pregnancy

   All persons with pre-existing conditions that may be exacerbated by a pertussis infection.

   Contacts who have close contact with infants under the age of 1 year, those who are pregnant, or with people with pre-existing health conditions that put them at risk for severe illness or complications.

   All contacts in high-risk settings such as neonatal intensive care, maternity wards, or childcare centers (lint is not all-inclusive)

2. Low-risk contacts can be identified and managed per local Health Officer discretion.

6. MANAGEMENT OF CONTACTS

A. Guidance on Management of Pertussis Contacts

Most pertussis in adults and adolescents is neither diagnosed nor reported. Because antibiotic prophylaxis does not control the transmission of pertussis when it is widespread in the community, DOH recommends that LHJs focus resources on ensuring chemoprophylaxis for high-risk contacts. Chemoprophylaxis to low-risk contacts is at LHJ/provider discretion and may depend on available resources.

Targeted postexposure antimicrobial prophylaxis (PEP) is recommended for all household contacts and those who are at high risk for developing severe disease. Chemoprophylaxis is recommended within 21 days of exposure.

B. Management of High-Risk Contacts

1. Inform high-risk close contacts of their potential exposure and educate them regarding pertussis.
2. In general, all high-risk close contacts of a pertussis case receive chemoprophylaxis, regardless of immunization status. Chemoprophylaxis should be implemented as soon as possible and within 21 days of last exposure to the infectious case (see Table 1 for recommended chemoprophylaxis regimens).
3. Counsel high-risk close contacts to watch for signs or symptoms of pertussis occurring within 21 days after the last exposure, even if they have taken chemoprophylaxis, and to contact their healthcare provider if symptoms develop.
4. Facilitate evaluation, testing, treatment, and exclusion of high-risk symptomatic contacts. If these contacts meet the confirmed case definition at the time of initial interview, report them through WDRS.
5. Remind contacts to make sure they are up to date on their pertussis immunizations (see Section 8). Post-exposure vaccination does not replace the need for antibiotic post-exposure chemoprophylaxis but will help prevent future infections.

C. Management of Low-Risk Contacts

1. At a minimum, instruct cases with no high-risk close contacts to inform their household contacts and other close contacts of the exposure. Asymptomatic contacts should seek guidance from their own healthcare provider regarding the need for chemoprophylaxis. When low risk contacts have been exposed and there is some likelihood that these exposed contacts will not receive chemoprophylaxis, local health jurisdictions may consider advising all exposed persons to avoid contact with high-risk persons for at least 21 days unless antibiotic chemoprophylaxis is taken. (See section 2.G.) Symptomatic contacts should be evaluated by their healthcare provider for testing and treatment.

   Note: The method for communicating with contacts will depend on the situation; schools, childcare settings and organized groups can often be efficiently contacted by letter or email in collaboration with the respective administrators or leaders.

2. If symptomatic contacts of laboratory-confirmed pertussis cases meet the confirmed case

definition at the time of initial interview, report them through WDRS if resources permit.

7. MANAGING SPECIAL SITUATIONS

A. Case(s) Works at or Attends Childcare Facility with Children < 1 Year

1. Investigate each case as described in Sections 5 and 6.
2. If a case was present in the childcare while contagious, let them know that the facility must be notified.
3. Notify childcare facility of each case.
   a. Provide pertussis disease control and prevention information to childcare facilities.
   b. Remind childcare facility of obligation to notify parents of the potential exposure (WAC 170-295-3030) and assist facility with preparation of the notification letter.
   c. Ask about recent cases of cough illnesses among staff and attendees of the facility.
4. Exclude all Confirmed and Probable cases, along with PCR-positive persons who may not yet meet case definition, from childcare until after five days of appropriate antibiotics are completed (the sixth day after starting treatment) or until 21 days after cough onset if antibiotics are not taken.
5. Refer staff and attendees with cough illness for evaluation by a healthcare provider and recommend exclusion from the facility and other public places until pertussis has been treated or another cause of symptoms has been identified.
6. Assess potential exposures in the facility, recommend prophylaxis to all childcare contacts, and ensure prophylaxis to classrooms with children < 1 year of age.
7. Implement prospective surveillance for additional cases of cough illness in the childcare facility for 42 days (two incubation periods) from last date of possible exposure in the facility.
8. If cases continue to occur, consult with the Office of Communicable Disease Epidemiology (CDE) regarding management.

B. Case(s) Works at or Attends Childcare Facility without Children < 1 Year.

1. Investigate each case as described in Sections 5 and 6.
2. If a case was present in the childcare while contagious, let them know that the facility must be notified.
3. Notify childcare of each case
   a) Provide pertussis disease control and prevention information to childcare facilities.
   b) Remind childcare facility of obligation to notify parents of the potential exposure (WAC 170-295-3030) and assist facility with preparation of the notification letter, if needed.
   c) Ask about recent cases of cough illnesses among staff and attendees of the facility.
4. Exclude all “Confirmed” and “Probable” cases, along with PCR-positive persons who may not yet meet case definition, from childcare until after five days of appropriate

antibiotics are completed (the sixth day after starting treatment) or until 21 days after cough onset if antibiotics are not taken.

5. Refer staff and attendees with cough illness for evaluation by a healthcare provider and recommend exclusion from the facility and other public places until pertussis has been treated or another cause of symptoms has been identified.
6. Centers for Disease Control and the American Academy of Pediatrics recommend prophylaxis for all childcare contacts of pertussis cases. Local Health Officers can determine how aggressively to ensure prophylaxis to these contacts. When low risk contacts have been exposed and there is some likelihood that these exposed contacts will not receive chemoprophylaxis, local health jurisdictions may consider advising all exposed persons to avoid contact with high-risk persons for at least 21 days unless antibiotic chemoprophylaxis is taken. (See section 2.G.)
7. If multiple cases are identified:
    a. Ensure that parents have been notified and assist with notification letter as needed.
    b. Implement prospective surveillance for additional cases of cough illness in the childcare facility for 42 days (two incubation periods) from last date of possible exposure in the facility.

C. Case(s) Works at or Attends a School

1. Investigate each case as described in Sections 5 and 6.
2. If a case was present in the school while contagious, the school should be notified
3. Notify the school nurse of each case
    a. Provide pertussis disease control and prevention information to the school.
    b. Ask about other recent cough illnesses among staff and attendees of the school.
4. Exclude all Confirmed and Probable cases, along with PCR-positive persons who may not yet meet case definition, from school until after five days of appropriate antibiotics are completed (the sixth day after starting treatment) or until 21 days after cough onset if antibiotics are not taken.
5. Refer staff and attendees with cough illness for evaluation by a healthcare provider and recommend exclusion from the facility and other public places until pertussis has been treated or another cause of symptoms has been identified.
6. If cases continue to occur:
    a. Ensure that parents have been notified and assist with notification a letter as needed.
    b. Promote Tdap vaccine for all adolescents and adults including school staff, teachers and coaches
    c. Implement prospective surveillance for additional cases of cough illness in the school for 42 days (two incubation periods) from last date of possible exposure in the facility.

D. Case is a Health Care Worker

1. Investigate each case as described in Sections 5 and 6.
2. If the case worked while contagious, let them know that their employer must be notified.
3. Ensure that the facility Infection Preventionist (IP) has been notified of the case. If the facility has no IP, the LHJ may consult with CDE for guidance.
4. The case should be told to stay away from the workplace until five days of antibiotic therapy have been completed unless pertussis can be excluded as a cause of their symptoms.

   The Centers for Disease Control and Prevention recommend chemoprophylaxis for high-risk close contacts of a pertussis case, including patients (see Section 6A). If patients or healthcare personnel have been exposed in a healthcare setting, chemoprophylaxis is the responsibility of the healthcare facility, in consultation with the LHJ. LHJs with resources to manage low-risk contacts may do so per local Health Officer discretion.
5. Healthcare personnel contacts may remain in the workplace if they comply with prophylaxis and lack respiratory symptoms; they should be under surveillance for 21 days after their last known exposure. When low risk contacts have been exposed and there is some likelihood that these exposed contacts will not receive chemoprophylaxis, local health jurisdictions may consider advising all exposed persons to avoid contact with high-risk persons for at least 21 days unless antibiotic chemoprophylaxis is taken. (See section 2.G.)
6. The IP of the involved facility should identify and refer all symptomatic close contacts (patients and coworkers) for medical evaluation and presumptive treatment immediately.
7. All health care workers with direct patient contact should receive (or have already received) a dose of Tdap unless contraindicated.

E. Outbreak Situations

Pertussis is endemic in the United States with peaks of recorded cases every few years. The CDC does not have a pertussis outbreak definition. Pertussis outbreaks, as defined by LHJs are reportable to WA DOH

Though not included in the CSTE pertussis case classifications, it may be helpful to use the following "Suspect" classification in specific situations as identified by the investigating county.

Suspect:

- Cough lasting at least two weeks with no other symptoms, OR
- Cough of any duration with one of the case-defining symptoms without lab confirmation or epi-link, OR
- Epi-link with cough of any duration and no other symptoms and no lab confirmation, OR
- PCR positive for B. Pertussis but no documentation of cough or case-defining symptoms

CDC guidance on outbreak management is available at: https://www.cdc.gov/vaccines/pubs/surv-manual/chpt10-pertussis.html#outbreak-control.

8. ROUTINE PREVENTION

A. Immunization Recommendations

https://www.cdc.gov/mmwr/volumes/69/wr/mm6903a5.htm

https://www.cdc.gov/vaccines/vpd/pertussis/recs-summary.html

1. Children < 7 years

Immunization with acellular pertussis vaccines in combination with diphtheria and tetanus toxoids as DTaP is recommended for all children younger than seven years of age according to the ACIP schedule.
https://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

Routine DTaP Vaccination Schedule

Dose	Age	Minimal Interval
Primary 1	2 months	N/A
Primary 2	4 months	4 weeks
Primary 3	6 months	4 weeks
Primary 4	15–18 months	6 months
Booster*	4–6 years	

* The booster dose is not needed if the fourth dose is given on or after the fourth birthday

For additional information regarding use of the DTaP vaccine during childhood, adverse reactions and contraindications see the most recent Pink Book.

2. Persons ≥ 7 years

a. Children 7–10 years of age who are not fully vaccinated against pertussis should receive a single dose of Tdap and continue with Td as needed to complete the series. For complete information on catch up vaccination, see https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html#note-tdap

b. Persons aged 11–18 years should receive a single dose of Tdap, preferably at a preventative care visit at age 11–12 years of age. To ensure continued protection against tetanus and diphtheria, one booster dose of either Td or Tdap should be administered every ten years throughout life.

c. All persons aged 19 or over, regardless of the interval since their last tetanus or diphtheria toxoid-containing vaccine, who never received a dose of Tdap should receive one dose of Tdap. If never vaccinated against pertussis, tetanus, or diphtheria, these persons should receive a series of three tetanus and diphtheria toxoid-containing vaccines, which includes at least one Tdap dose to ensure that there is continued protection against tetanus and diphtheria, booster shots of Td or Tdap should be administered every ten years throughout life.

d. Pregnant women should be vaccinated with one dose of Tdap during each pregnancy, regardless of history of vaccination. Tdap should be administered at 27–36 weeks' gestation, preferably during the earlier part of this period.

e. Healthcare personnel in hospitals and ambulatory care settings with direct patient contact who have not previously received Tdap should receive a dose regardless of the interval since the most recent Td.

f. For additional information regarding the ACIP DTaP/Tdap/Td ACIP Vaccine Recommendations: https://www.cdc.gov/vaccines/vpd/dtap-tdap-td/hcp/recommendations.html

B. Prevention Recommendations

In addition to immunization, persons should practice "respiratory etiquette" or good health manners to stop the spread of respiratory pathogens.

Persons can keep respiratory pathogens to themselves by:

- Covering the nose and mouth with a tissue when sneezing, coughing or blowing the nose.
- Throwing out used tissues in the trash as soon as possible.
- Always washing hands after sneezing, blowing the nose, or coughing, and after touching used tissues or handkerchiefs.
- Washing hands often when sick.
- Using warm water and soap or alcohol-based hand sanitizers to wash hands.
- Staying home if sick.
- Seeing a healthcare provider if febrile or coughing is prolonged, and following their instructions, including taking medicine as prescribed and getting lots of rest.
- If requested, using face masks provided in medical offices or clinic waiting rooms.

Persons can keep pathogens away by:

- Washing hands before eating, or touching eyes, nose or mouth.
- Washing hands after touching anyone else who is sneezing, coughing, blowing their nose, or whose nose is running.
- Not sharing things like cigarettes, towels, lipstick, toys, or anything else that might be contaminated with respiratory germs.
- Not sharing food, utensils or beverage containers with others.

ACKNOWLEDGEMENTS

This document is a revision of the Washington State Guidelines for Notifiable Condition Reporting and Surveillance published in 2002 which were originally based on the Control of Communicable Diseases Manual (CCDM), 17th Edition; James Chin, Ed. APHA 2000. We would like to acknowledge the Oregon Department of Human Services for developing the format and select content of this document.

UPDATES

December 2007:

Section 3D: Revisions were made to the examples of close contact.

Section 6C(2): "Regardless of immunization status" was added to the following statement, "All household members and high-risk asymptomatic close contacts of pertussis cases should receive antibiotic prophylaxis either from their healthcare provider or from the LHJ regardless of immunization status."

December 2008:

Section 3C: Persons with a positive PCR test and a paroxysmal cough of less than 2 weeks duration should be classified as a "suspect" case.
Section 4C: The link to the PHL Microbiology form was updated.

March 2009:

Section 4B: The policy for testing for pertussis at PHL was revised.

October 2009:

Section 4B: The policy for testing for pertussis at PHL was clarified.

January 2011:

The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision.

June 2012:

Sections 5, 6, and 7: Major revisions were made throughout all sections of the guidelines. Recommendations for case and contact management were changed to focus limited public health resources on prevention of pertussis in high-risk persons.

July 2012:

Section 8: The recommendation for Tdap among persons over 64 years old was updated.

February 2014:

Section 2: Information was included about a 2013 primate study which found that individuals (baboons) vaccinated with acellular pertussis vaccine were protected from severe symptoms but not infection and readily transmitted *B. pertussis* to contacts.
Section 3: The case definition was revised for infants less than one year old in accordance with the January 2014 CSTE changes.
Section 5: Enhanced guidance for entering the vaccination history for all patients younger than one year and other patients if possible, especially for those 18 years of age and under and pregnant women with pertussis.
Section 8: Updated to include the recommendation that pregnant women receive a Tdap each pregnancy.

February 2016:

Section 3. C: A comment regarding use of the "Outbreak Case Definition" to classify an epi-linked case with a 2 week cough but without any other case-defining symptoms as a "confirmed" case was removed. Beginning January 1, 2015 these cases are classified as "suspect" in Washington State.
Here is the language that was removed:

"The clinical case definition is appropriate for endemic or sporadic cases. **In outbreak settings, including households, the clinical case definition may be defined as a cough illness lasting ≥2 weeks.**
For these reports, the "outbreak-related" box and the "epi-linked" box must both be checked on the WDRS record and cluster/outbreak details should be noted in the LHJ shared notes section, including the name and/or WDRS number of the laboratory-confirmed person to whom the case is epi-linked. An LHJ cluster name/number can be assigned as well. To use the outbreak-related clinical case definition, there must be at least one laboratory confirmed case in the cluster."

February 2021:

Section 3: The case definition was revised in accordance with the January 2020 CSTE update. With this change, cases presenting with cough of any duration with lab confirmation (PCR or culture) should be classified as "confirmed. Apnea (with or without cyanosis) will no longer be an infant specific clinical symptom and is now a clinical feature applicable to all ages. Cough of any duration with clinical features of Pertussis and epi-link will now be classified as "probable". Cases presenting with at least two weeks of cough or cough and one of the clinical features of Pertussis will be classified as "suspect".
Section 8: Revised immunization recommendations based on the updated ACIP DTaP/Tdap/Td Vaccine Recommendations from January 2020.

March 2022:

Section 3.C: Guideline formatting was changed, and language clarified to make the criteria for each of the two options under the probable case definition more distinct.

May 2024

Updated case definition to reflect CSTE, “suspect” removed but maintained wording as optional use in an outbreak situation

Updated Washington State information

Updated lab submission process

June 2024

CDC links updated

APPENDIX A: SPECIMEN COLLECTION PROCEDURES

The Washington State Public Health Laboratories (WAPHL) can perform pertussis PCR testing and culture for diagnostic purposes. **Healthcare providers must receive approval from their local health jurisdiction prior to submitting specimens to WAPHL.**

After approval from the local health jurisdiction, WAPHL will perform pertussis PCR testing and culture on specimens from the following patients with suspected pertussis:

1. Healthcare workers.
2. Persons who may have exposed high-risk persons, including infants <1 year old, pregnant women or others who may expose infants or pregnant women (e.g., a new mother who was coughing at the time of delivery, the ill person works in the infant room in a daycare, or the ill person teaches prenatal classes to expectant couples)
3. Infants <1 year old and pregnant women without healthcare insurance.
4. Patients suspected of being part of an outbreak (per local health jurisdiction discretion).

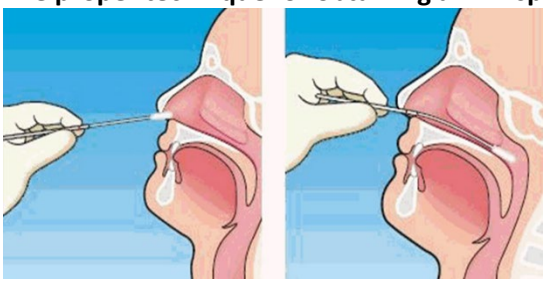
When no other testing options are available, WAPHL will perform pertussis culture on specimens from any patient with suspected pertussis after approval from the local health jurisdiction.

Specimen collection

1. If needed, request a *Bordetella pertussis* Collection Kit from WAPHL by calling 206-418-5579.
2. Collect posterior nasopharyngeal specimens as soon as possible after symptoms develop using appropriate infection control procedures. Ideally, specimens should be collected within three weeks of onset and before antibiotics are started.

   Note: Throat specimens, nasal swabs, and sputum samples are unacceptable specimens and will not be processed.
3. Obtain swab from the posterior nasopharynx for culture
4. See directions from the collection kit for instructions on specimen collection

The proper technique for obtaining an NP specimen for isolation:



1. Tilt head back
2. Gently insert the sterile swab
3. Keep the swab near the septum floor of the nose while gently pushing the swab into the posterior nasopharynx
4. Rotate the swab several times and remove from nostril

Brunner & Suddarth's (2010). Handbook of laboratory and Diagnostic Test. New York: Lippincott Williams & Wilkins

The WAPHL is open to receive pertussis specimens Monday through Friday 8am–5 pm and Saturday 10am–12pm. Specimens should be shipped to:

Washington State Public Health Laboratories

1610 NE 150th Street

Shoreline, WA 98155

Questions?

Please contact the Special Pathogens Unit of the Communicable Disease Microbiology Laboratory at PHL (general: 206-418-5400, direct 206-418-5452) for handling and transport issues not specifically addressed in these guidelines.

Additional resources

Best Practices for Health Care Professionals on the use of Polymerase Chain Reaction (PCR) for Diagnosing Pertussis

https://www.cdc.gov/pertussis/php/pcr-bestpractices/?CDC_AAref_Val=https://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-pcr-bestpractices.html

Pertussis Specimen Collection (includes a video demonstrating proper techniques for collecting and transporting nasopharyngeal specimens for pertussis testing)
https://www.cdc.gov/pertussis/php/laboratories/index.html

APPENDIX B: FLOW CHART FOR PERTUSSIS CASE INVESTIGATIONS

Triage reports of pertussis

An indication of a high-risk contact/setting will increase the priority of a report.

Investigations need to be performed even if resources are extremely limited for:

- Culture- or PCR-positive cases (includes those whose illness does not yet meet the clinical case definition)
- Epi-linked cases that meet the clinical case definition
- Infants < 12 months of age

Investigations can be temporarily suspended if resources are limited for (in order of importance):

(Reports should be entered in WDRS as usual whether further investigated or not.)

1. Cases that meet the clinical case definition but have no epi-link or lab confirmation ('probable' cases)
2. Cases with classic symptoms (paroxysmal cough, post-tussive emesis, or whooping) and < 2 week cough duration with no testing or a negative test
3. Cases with an epi-link that do not yet meet the clinical case definition (symptomatic contacts of a case)

Contact Provider

- Verify that patient is aware of the diagnosis
- Request pertussis immunization history and pertinent clinical information
- Ask about high-risk* contacts/settings
- Verify appropriate treatment
- Determine what exclusion recommendations were made
- Determine whether high-risk household contacts received chemoprophylaxis

Interview Patient

Case

- Determine clinical symptoms and onset of illness
- Provide education about period of communicability, method of transmission, and avoidance of high-risk persons/settings
- Recommend avoiding all public settings until 5 days of antibiotics (Day 6) or 21 days after onset of cough if not treated

Contacts

- Identify high-risk close contacts* or setting for follow-up
- If no high-risk close contacts or setting are identified, instruct patient to inform contacts of exposure and to seek advice from their own healthcare provider regarding chemoprophylaxis

High-risk Close Contacts*

Symptomatic

Activities

- Educate
- Facilitate evaluation, testing, treatment, and exclusion as appropriate
- Notify facility if high-risk setting identified
- Report those who meet clinical case definition

Asymptomatic

Activities

- Educate
- Advise symptom watch
- Facilitate chemoprophylaxis

*See Section 3E for definition of high-risk contact