Local Health Department Guidelines for the Epidemiological Investigation and Control of Pertussis

(Whooping Cough)

Maryland Department of Health
Prevention and Health Promotion Administration
Infectious Disease Epidemiology and Outbreak Response Bureau
Center for Immunization
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Table of Contents

Revisions (February 2018)

CDC Surveillance Case Classification and Definitions

1. Clarified case classifications.
    a. Added information regarding classification in infants <1 year old.
    b. Note on serology and "suspect" classifications.

Testing/Laboratory Diagnosis

2. Clarified timing of laboratory testing and unreliability of commercial serology tests.
3. Added information regarding steps for testing.
    a. Avoid preparing swabs in same space where pertussis vaccinations are prepared.
    b. Acceptable specimen collection for testing at the MDH Laboratory.

Treatment

4. Added table summarizing recommended antimicrobial treatment and postexposure prophylaxis for pertussis by age group.

Prophylaxis

5. Added information regarding who should be targeted for postexposure prophylaxis.

Prevention/Vaccination

6. Added recommendation that women receive Tdap during each pregnancy.

Special Settings

7. Clarified management of pertussis exposure in a healthcare setting.

Reporting

8. Updated VAERS reporting options.

References

9. Updated references.

Introduction

Pertussis is an acute respiratory illness caused by a gram-negative bacterium, *Bordetella pertussis*. Pertussis is endemic in the United States and continues to cause significant morbidity, especially in young infants and unimmunized or under-immunized adolescents and adults. A major goal of pertussis prevention efforts is to prevent infection in infants who have higher rates of complications and deaths.

This document was written to provide guidance to local health departments in Maryland on the investigation of pertussis cases and outbreaks. The recommendations in this document are intended to provide general guidance. Pertussis incidents should be evaluated on an individual basis, with the consultation of local and state infection control staff if needed, to determine the appropriate steps for pertussis prevention and control.

Questions regarding these guidelines can be directed to:

Center for Immunization
Maryland Department of Health
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Baltimore, MD 21201
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Disease Description

Mode of transmission: Pertussis is highly contagious. Transmission occurs via the respiratory route, when infectious respiratory droplets which have been expelled into the air through coughing are breathed in by close contacts. Transmission can also occur through direct contact with respiratory secretions. Humans are the only known reservoir for pertussis.

Epidemiology: The epidemiologic pattern of pertussis is cyclical, with peaks occurring every 3-4 years. Vaccination is the most effective way to prevent infection and limit the size of outbreaks. However, neither vaccination nor natural infection provides life-long immunity to pertussis. Waning immunity following vaccination as well as lack of vaccination coverage in communities contributes to the occurrence of pertussis cases and outbreaks.

Incubation Period: The incubation period of pertussis is 7-10 days (range: 4-21 days).

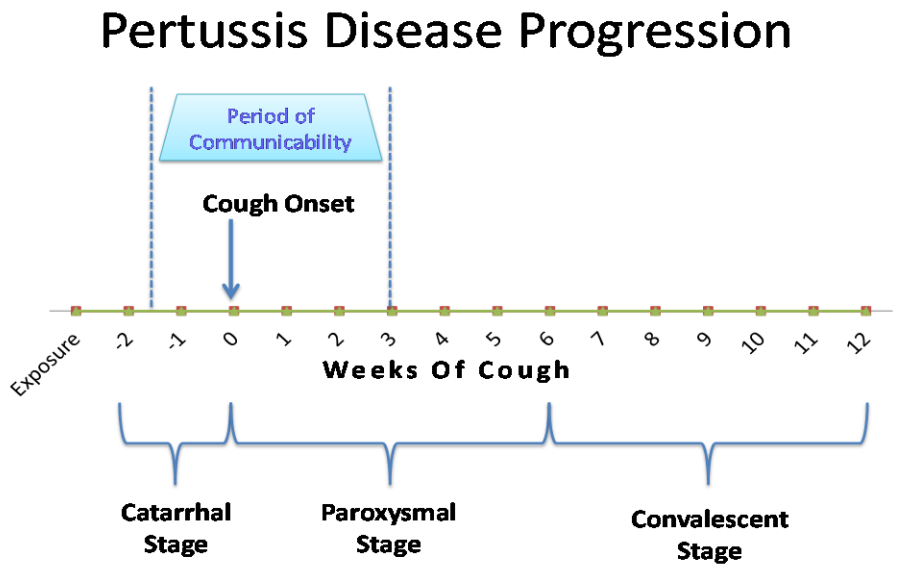
Clinical Manifestation: Pertussis illness consists of 3 stages: catarrhal, paroxysmal and convalescent. The entire course of illness is typically 6-10 weeks, although young children and infants may take longer to recover fully.

The catarrhal stage begins with mild respiratory symptoms similar to the common cold, such as runny nose, sneezing, congestion, and/or mild coughing. Coughing gradually becomes more severe and frequent, and in the paroxysmal stage, paroxysmal coughing (bursts of rapid

coughing), violent coughing fits followed by an inspiratory “whoop”, and/or post-tussive vomiting can occur. In the convalescent stage, recovery is gradual. The cough becomes less paroxysmal and usually disappears after an additional 2 to 3 weeks.

Pertussis may be difficult to diagnose in its early stages since symptoms resemble those of a common cold or other respiratory infection. Illness may also be difficult to recognize in infants younger than 6 months of age since they may have atypical symptoms such as apnea, gasping and absence of whoop. Symptoms are often milder in adolescents, adults and individuals who have received pertussis vaccine.

Stage	Catarrhal	Paroxysmal	Convalescent
Duration	1-2 weeks	2-6 weeks	Weeks to months
Symptoms	Symptoms similar to minor respiratory tract illness: Nasal congestion, runny nose, sneezing, minimal or no fever, mild sore-throat, intermittent dry cough Infants may have atypical symptoms.	Paroxysmal coughing (succession of coughs) terminating with inspiratory “whoop”. Post-tussive vomiting	Paroxysms gradually decrease in frequency and intensity, but occasional coughing bouts may occur. Non-paroxysmal coughs persist for 2-6 weeks or longer



Click here to hear pertussis: Sound of Pertussis Link

The most common complication from pertussis illness is secondary bacterial pneumonia. Infants are at the highest risk for pertussis-associated complications, hospitalizations and deaths. Infants are at higher risk for neurologic complications, such as seizures and encephalopathy, stemming from reduced oxygen to the brain after prolonged and frequent coughing fits. Some of the direct effects of violent coughing include: urinary incontinence, hernias, rib fracture, pneumothorax, epistaxis (nose bleed), subdural hematoma, and rectal prolapse.

Communicability Period: A person infected with pertussis is:

- Infectious 2 weeks before to 3 weeks after onset of cough
- Most infectious during the catarrhal (early) stage and during the first 2 weeks after onset of cough
- No longer infectious after 5 days of treatment with an antibiotic effective against pertussis

Even though adolescents and adults may have milder symptoms, they can still transmit the disease to others. Oftentimes, an adult is the source of infection for under-immunized or unimmunized infants and children.

CDC Surveillance Case Classification and Definitions

CDC Surveillance Case Classification of Pertussis (2014)

Probable: In the absence of a more likely diagnosis, a cough illness lasting ≥ 2 weeks, with

1) At least one of the following symptoms:
    a. Paroxysms of coughing
    b. Inspiratory "whoop"
    c. Post-tussive vomiting
    d. Apnea (For infants aged <1 year only)

AND

2) No laboratory confirmation **AND** no epidemiologic linkage to a lab-confirmed case.

OR, for infants aged <1 year only:

1) Acute cough illness of any duration, with paroxysms of coughing, inspiratory "whoop," post-tussive vomiting, or apnea (with or without cyanosis)

AND

2) PCR positive for pertussis, **OR** contact with a lab-confirmed case of pertussis.

Confirmed:

1) Acute cough illness of any duration, with isolation of *B. pertussis* from a clinical specimen

   OR

2) Cough lasting ≥ 2 weeks with at least one of the following symptoms: paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting (or apnea, for infants aged <1 year only)

   AND

   A positive PCR result **OR** contact with a lab-confirmed case of pertussis.

The most up-to-date CDC case definitions can be found at the following website: https://wwwn.cdc.gov/nndss/conditions/.

Notes

- Positive serology results do not count as lab confirmation, and have no bearing on case classification.
- The clinical case definition above is appropriate for endemic or sporadic cases. In outbreak settings, a case may be defined differently (see outbreak section below).
- There is no longer a "Suspect" classification for pertussis, and pertussis investigations should never be closed as such. (They may be temporarily classified as "Suspect" if the investigation is still open and ongoing.)

3) Outbreak: An outbreak of pertussis is defined as:

≥2 laboratory confirmed (by culture or PCR) cases clustered in time (i.e. within 42 days of each other) and space (e.g. in one building) where transmission is suspected to have occurred in that setting (e.g. nosocomial transmission in a hospital)

OR

1 laboratory confirmed (by culture or PCR) case AND 1 epi-linked case with cough illness lasting ≥2 weeks with one of the following: paroxysms of cough, inspiratory whoop, or post-tussive vomiting.

Definitions

Parapertussis: Parapertussis, which is a milder pertussis-like illness, is caused by *Bordetella parapertussis*. Parapertussis is not a reportable condition. Public health investigation of parapertussis is not required.

Testing/Laboratory Diagnosis

Culture and PCR are the recommended tests for laboratory diagnosis of pertussis. Both tests should be done for all suspected pertussis cases. These tests are described below and summarized in Table 1.

Currently, culture is the gold standard for diagnosing pertussis as it is 100% specific for *B. pertussis*. Since pertussis infection may occur concurrently with other illnesses, and since symptoms of pertussis are similar to symptoms of other respiratory infections, isolation of *B. pertussis* is important to make an accurate diagnosis, especially in outbreak situations.

To enhance the possibility of detecting *B. pertussis* in culture, specimen collection should occur as soon as possible, within 3-4 weeks of cough onset. Culture sensitivity decreases two weeks after cough onset, while PCR sensitivity diminishes rapidly after four weeks of cough, increasing the risk of false-negatives.

Since culture results take 1-2 weeks, PCR results (which are available in 1-2 days) are most helpful for usage by practitioners, in conjunction with clinical symptom evaluation, to make a preliminary diagnosis and to make appropriate treatment and public health recommendations.

PCR has greater sensitivity than culture and produces a greater number of false positive results. However, B*. pertussis* does not need to be viable in order to be detected by PCR so PCR is less affected by antibiotic therapy as compared to culture.

DFA and serologic testing should ***not*** be used as methods for laboratory diagnosis of pertussis. Direct fluorescent antibody (DFA) testing has a low sensitivity and is no longer recommended. Commercial serologic tests can detect the presence of IgM and/or IgG antibodies, especially late in the course of infection. However, since vaccination can induce the production of IgM and IgG antibodies, serologic testing is not useful for differentiating exposure to pertussis from vaccination and from natural infection. To date, no commercial serologic test has been FDA-approved, has had reliable cutoffs established, or has shown adequate specificity and sensitivity. If vaccination occurred greater than 2 years prior to specimen collection, a positive IgG may indicate recent infection with pertussis. However, serologic testing should not be used as a method for confirming pertussis infection.

Recommended steps for testing:

1) At first contact with a suspected case of pertussis, obtain a specimen from the posterior nasopharynx for PCR and culture testing (see Figure 1). Proper PPE (paper surgical mask and eye protection) should be donned during collection. Ideally, specimen should be obtained as soon as possible (within 3 weeks of cough onset) and prior to the patient receiving antibiotic treatment. PCR specimens can still be obtained if the case has been on antibiotics for up to 5 days.
2) Follow specimen collection and handling procedures carefully to ensure a viable specimen and accurate results. Avoid preparing swabs in the same space where pertussis vaccinations are prepared. The specimen for culture should be obtained using a Dacron or calcium aginate swab. Culture specimens can also be obtained by aspiration. The specimen for PCR should be obtained using a Dacron swab or nasal wash. Calcium aginate swabs should *not* be used to obtain PCR specimens. Cotton swabs should *not* be used for the collection of PCR or culture specimens. After obtaining a nasopharyngeal specimen from the patient, the specimen should be placed in a transport medium such as Regan-Lowe agar or Bordet-Gengou medium, and transported to a laboratory facility for testing. Best results are obtained by transporting specimen at room temperature the same day taken. Cooled transport of the specimen significantly decreases the number of bacteria.

Note: the Maryland Department of Health Laboratory accepts only specimens collected with Dacron swabs in Regan-Lowe media, which are included in the MDH laboratory pertussis testing kits.

Figure 1: Proper technique for obtaining a nasopharyngeal specimen for isolation of *Bordetella pertussis*

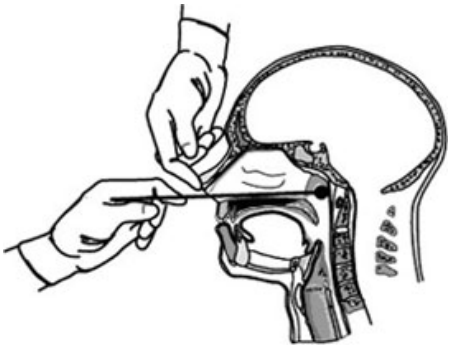


Image: Manual for the Surveillance of Vaccine-Preventable Diseases, 4th ed., 2008

Interpretation of results:

A false negative **culture** result may be obtained if:

a) the specimen for the culture is taken more than 2 weeks after cough onset

b) the patient is taking antibiotics

c) the patient has been vaccinated for pertussis

d) the specimen was not collected, handled or processed properly.

Table 1: Laboratory Testing for Pertussis – Culture and PCR

	Culture	PCR
Time of specimen collection	Ideally, within 2 weeks of cough onset	Ideally, within 3 weeks of cough onset
Site of specimen collection	Posterior nasopharynx (not throat)	Posterior nasopharynx (not throat)
Method of collection	1) aspiration, or 2) Dacron swab, or 3) Calcium alginate swab	1) nasal wash, or 2) Dacron swab
Time to results	1-2 weeks	1-2 days
Benefits	100% specific for *B. pertussis*; the "gold standard" for pertussis testing	Rapid results, increased clinical usefulness
Limitations	Slow processing time (up to 2 weeks); improper specimen collection, handling and isolation techniques can affect yield of culture; limited clinical usefulness; less likely to be positive if specimen is collected more than 2 weeks after cough onset	High rates of false positive results, especially in previously immunized patients Less affected by antibiotic therapy than culture

Treatment

Treatment of pertussis illness is important for disease control, and may also lessen the severity of symptoms if administered early in the course of illness. Antibiotics administered during the catarrhal stage, before the onset of paroxysmal coughing, may shorten the intensity or duration of disease. Although initiating antibiotics after the catarrhal stage will not affect the progression of the disease, it is still recommended for symptomatic patients to limit the spread of illness to others. Antibiotics eliminate the shedding of infectious agents from secretions and reduce the communicability period to 5 days after the onset of treatment. Once antibiotic treatment has been initiated, the patient should be isolated and should follow droplet precautions for 5 days to limit the spread of disease to others.

The CDC recommends three antibiotics for the treatment of pertussis: azithromycin, erythromycin and clarithromycin. Azithromycin is the most commonly used antibiotic for treating pertussis, and involves one dose a day for 5 days. Trimethoprim-sulfamethoxazole (TMP-SMZ) may be used if antibiotic-resistance is suspected; however, resistance of *Bordetella pertussis* to antibiotics is rare. TMP-SMZ may also be used if the use of other antibiotics is contraindicated. Cases who are younger than 6 months of age, are pregnant, or immunocompromised, should consult in further detail with their physician about the most appropriate treatment. A summary of recommended treatments may be found on the following page (Table 2).

Table 2: Recommended antimicrobial treatment and postexposure prophylaxis for pertussis, by age group

	Primary agents			Alternate agent*
Age group	**Azithromycin**	**Erythromycin**	**Clarithromycin**	**TMP-SMZ**
<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 4 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 (aged ≥6 months) and children	10 mg/kg in a single dose on day 1 then 5 mg/kg per day (maximum: 500 mg) on days 2-5	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
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	TMP 320 mg per day, SMZ 1600 mg per day in 2 divided doses for 14 days

***** 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 *Bordetella pertussis.*

Table: Centers for Disease Control and Prevention. Recommended Antimicrobial Agents for the Treatment and Postexposure Prophylaxis of Pertussis: 2005 CDC Guidelines. MMWR 2005; 54(RR14):1-16.

Prophylaxis

Antibiotics can also be used as chemoprophylaxis for individuals who may have been exposed to pertussis. The need for chemoprophylaxis can be determined based on an evaluation of the source of pertussis, degree and type of exposure, as well as presentation of symptoms of pertussis.

The CDC supports targeting post-exposure antibiotic use to people at high risk of developing severe pertussis, as well as people who will have close contact with others at high risk of developing severe pertussis, **regardless of age or vaccination status**. The following groups should be given post-exposure prophylaxis (PEP):

- All household contacts of a pertussis case, within 21 days of onset of cough in the index patient.
- High-risk people and people in close contact with high-risk people, within 21 days of exposure to an infectious pertussis case-patient. High risk people include:
    - Infants and women in their third trimester of pregnancy
    - All people with pre-existing health conditions that may be exacerbated by a pertussis infection (including, but not limited to, immunocompromised people and those with moderate to severe medically treated asthma)
    - People who will 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 under 12 months or women in the third trimester of pregnancy. These include, but are not limited to, neonatal intensive care units (NICUs), 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, monitor people exposed to pertussis for onset of pertussis signs and symptoms for 21 days.

A close contact is defined as someone who has had face-to-face contact, or exposure within 3 feet, for at least one hour with a symptomatic case-patient or had contact with respiratory secretions from a symptomatic person. Contact with respiratory secretions can occur in many ways, including through an explosive cough or sneeze in the face, sharing food or eating utensils, mouth to mouth resuscitation and conducting a medical exam which includes nose and throat examination. This includes household contacts as well as other individuals who may have had

interactions with the case during his/her communicability period, including healthcare workers and medical personnel.

For household contacts: If 21 days have elapsed since the onset of cough in the index case, prophylactic treatment with antibiotics may have limited use, but should still be considered for young infants, pregnant women, and people who have contact with infants and children.

For non-household contacts: If 21 days have elapsed since the last day of exposure to the index case, prophylactic treatment with antibiotics may have limited use, but should still be considered for young infants, pregnant women, and people who have contact with infants and children.

In February 2011, ACIP updated their prophylaxis recommendations to state that healthcare workers exposed to a confirmed case of pertussis, who are likely to expose high risk patients, should receive post-exposure prophylaxis regardless of their vaccination status. Healthcare workers who are exposed to pertussis but do not have contact with high risk patients can either receive post-exposure prophylaxis or be monitored for 21 days after exposure and be treated at the onset of symptoms.

Contacts who are younger than 6 months of age should consult in further detail with their physician about the most appropriate steps for prophylaxis and follow-up.

Prevention/Vaccination

Vaccination remains the most effective way to prevent pertussis infection. Children should get 5 doses of DTaP, one dose at each of the following ages: 2, 4, 6, and 15-18 months and 4-6 years. Adolescents 11-18 years of age (preferably at age 11-12 years) and adults 19 through 64 years of age should receive a single dose of Tdap. CDC also recommends Tdap for pregnant women during **each** pregnancy, ideally during the early part of gestational weeks 27 through 36.

However, neither natural infection nor vaccination confers lifelong immunity against pertussis. Antibodies from natural infection wane after approximately 7 years, and although reinfection is rare and usually results in mild symptoms, it is possible for individuals to be infected with pertussis more than once. Immunity from childhood DTaP vaccination typically wanes by adolescence. As a result, the CDC recommends that adolescents and adults obtain a one-time Tdap booster dose. Individuals who are not up-to-date on their booster shots are at increased risk for pertussis infection.

In October 2010, the Advisory Committee on Immunization Practices (ACIP) expanded the use of Tdap to include the following recommendations: 1) use of Tdap regardless of interval between the last tetanus or tetanus-toxoid containing vaccine, 2) use of Tdap in adults over the age of 65 who have close contact with infants, and 3) use of Tdap in undervaccinated children aged 7 to 10 years.

It is especially important for healthcare workers and others who work closely with children, pregnant women and immunocompromised individuals to be up-to-date on their pertussis immunizations.

Case/Outbreak Investigation

When a patient is suspected of having pertussis, a case investigation should be started immediately. Timely and thorough case investigation should: confirm the patient's diagnosis; ensure appropriate medical follow-up for affected persons; identify the source of infection; locate persons who may have been exposed; and isolate potentially infectious persons to prevent transmission of illness in the community.

Information about all cases and contacts can generally be gathered by interviewing the patients and/or their healthcare providers. Additional information can be obtained by reviewing laboratory and medical records, as well as reports of immunization history. Information obtained during case investigations should be documented thoroughly on case report forms and/or patient charts.

Recommended case investigation procedures:

(Refer to *Special Settings* Section for additional guidance on case investigation procedures relevant to schools, hospitals, and settings where close contact may facilitate transmission of pertussis.)

1) Confirm pertussis diagnosis/Initiate pertussis control measures

- Obtain nasopharyngeal specimen for lab testing if patient is experiencing clinical symptoms of pertussis (Refer to *Testing/Laboratory Diagnosis* Section for details)
- Provide treatment for pertussis (Refer to *Treatment* Section for additional information)
- Symptomatic case-patient should be isolated for the entire communicability period (21 days following cough onset) or until 5 days of antibiotic treatment have been completed.

2) Interview the case-patient and identify source of infection

- Interview patient about contact with other known pertussis cases or persons with symptoms of pertussis.
- Utilize the CDC Pertussis Surveillance Worksheet (attached) to guide the interview and collect other relevant information (i.e. demographics, clinical details, vaccine history, etc.).

3) Identify exposed persons

Initiate a contact investigation to identify persons who may have been exposed to pertussis through contact with the case-patient.

- Interview the case-patient regarding contact with others during his/her infectious period (2 weeks before to 3 weeks after cough onset)
- If the case-patient reports travel (e.g. via plane) during his/her infectious period, contact staff at Maryland Department of Health Center for Immunization for assistance in identifying passengers and persons in other jurisdictions/locations who may need to be contacted.
- Obtain and document immunization histories for case-patient and all contacts.
- All symptomatic contacts should be tested for pertussis and followed as suspected pertussis cases.

4) Initiate pertussis control measures

Evaluate the need for post-exposure prophylaxis in individuals who were exposed to pertussis. Identification and vaccination of household contacts can occur immediately and should not be delayed because of pending laboratory results. However, waiting for laboratory confirmation of pertussis infection prior to vaccination and prophylaxis of non-household contacts (e.g. schoolmates) may be reasonable; nevertheless, this should be evaluated on a case-by-case basis.

- Provide post-exposure prophylaxis to exposed persons. Treatment of all close contacts of a confirmed pertussis case, including household contacts, is recommended, regardless of age and vaccination status. (Refer to *Prophylaxis* section for guidance)
  - For confirmed pertussis cases, all contacts should be offered post-exposure prophylaxis.
  - For probable pertussis cases, close contacts should be offered post-exposure prophylaxis.
- Symptomatic contacts should be tested and isolated for the entire communicability period or until 5 days of antibiotic treatment has been completed.
- Provide DTaP or Tdap immunization, according to age-appropriate recommendations, to individuals with incomplete immunization. Although vaccination after exposure has not been proven to reduce chances of infection or lessen severity of symptoms, vaccination is important to prevent infection during subsequent exposures.
- During an outbreak, asymptomatic, exposed close contacts who decline prophylaxis for pertussis may be quarantined and monitored for the development of symptoms consistent with pertussis for 21 days after last contact with the infected person. Consult with MDH.

5) Conduct surveillance

Active surveillance should be maintained for at least 2 incubation periods (42 days) after the last reported confirmed case to ensure that all cases are identified.

Special Settings

In addition to the recommended steps for case investigation described above, the following pertussis control measures should be conducted for cases and outbreaks occurring in settings where pertussis can be transmitted easily due to crowding and/or close contact of individuals.

1) Schools and Childcare Centers

- Assess immunization status of staff and students.
- Provide age-appropriate immunizations to staff and students with no immunity to pertussis.
- Students and staff with symptoms of pertussis should be treated and excluded from school until they have completed 5 days of antibiotic treatment.
- Persons who are not treated should be considered for exclusion from school for 21 days after last contact with the infected person. Consult with MDH.
- Request that the school notify parents/guardians that a pertussis case has been identified in the school. A letter and pertussis fact sheet should be sent to each parent/guardian.

2) Healthcare Settings

- All healthcare workers with unprotected exposure to a confirmed case of pertussis should receive post-exposure prophylaxis, regardless of their vaccination status.
    a. Healthcare workers with unprotected exposure who cannot take, or object to, antimicrobial therapy should be excluded for 21 days from last exposure.
- Staff with symptoms of pertussis should be treated and excluded from work until they have completed 5 days of antibiotic treatment, or 21 days from cough onset, whichever is shorter.
- Assess immunization status of all staff, including persons involved in direct patient care (e.g. nurses, physicians, phlebotomists) as well as persons who work in the patient care setting (e.g. clerical staff, front office staff, technicians).
- Provide age-appropriate immunizations to staff with no immunity to pertussis.

Reporting

All suspected pertussis cases must be reported to staff at the Maryland Department of Health Center for Immunization within 24 hours after initial notification. All case investigations should be promptly entered into NEDSS (National Electronic Disease Surveillance System) and the information reviewed for completeness and accuracy. All possible outbreaks should be reported to MDH.

Table 3: Summary of information to collect during case investigation

Type of Information	Information to be collected and reported
Demographic	Name Address Date of birth Sex Race/Ethnicity Country of birth Reporting source Jurisdiction Date reported
Clinical	Pre-existing medical conditions Medications Date of cough onset Duration of cough Other symptoms Hospitalizations Complications
Laboratory information	Virus isolation test dates and results, if applicable PCR test dates and results, if applicable
Epidemiologic	Transmission setting Source of transmission Vaccination status of source patient
Vaccination Status	Number of doses of pertussis containing vaccine Date(s) of vaccination Type and manufacturer of vaccine Vaccine lot number If not vaccinated, reason
Outcome	Case classification Date of death, if applicable

Vaccine Adverse Events

Adverse events that occur after administration of the pertussis vaccine should be reported to the Vaccine Adverse Event Reporting System (VAERS), a passive reporting system use to monitor vaccine safety. Any clinically significant events, unexpected events following vaccination, and/or events listed on the vaccine manufacturer's package insert should be reported to VAERS. Adverse events may be reported by submitting a VAERS form online. Visit http://vaers.hhs.gov for detailed instructions on reporting.

Activation and Deactivation of Emergency Response Operations

The Infectious Disease Epidemiology and Outbreak Response Bureau (IDEORB), in consultation with the Director and Deputy Director of the Prevention and Health Promotion Administration, will activate emergency response operations when one or both of the following criteria are met:

- Existing staffing is inadequate to assign responsibilities to maintain critical operations for more than three operational periods
- Resources (financial or material or operational) required to mount and/or sustain an ongoing response are needed from outside of the Bureau or Administration
- A non-infectious disease event substantially disrupts critical operations of the unit

IDEORB, in consultation with the Director and Deputy Director of the Prevention and Health Promotion, will deactivate emergency response operations when one or more of the following criteria are met:

- Public health problem is contained or resolved
- Emergency response is incorporated into normal operations and adequate resources are available to sustain all ongoing responses
- Non-infectious event is over and disruption impacting critical operations no longer exists

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Pertussis Case Definition available at:
https://wwwn.cdc.gov/nndss/conditions/

Sample letter to parents:

Dear Parents,

We have just been notified of a case of pertussis (whooping cough) in your child's school. Pertussis is a highly contagious illness that begins with mild, cold-like symptoms including cough and runny nose. These first symptoms typically appear 7-10 days after a person is exposed. The cough typically worsens over the following weeks and becomes spasmodic. The cough may be followed by a "whooping" sound. The spasms of cough may also be followed by vomiting. Some persons with pertussis may have very mild symptoms (mild cough with no other symptoms) and may not realize that they are sick or contagious. Pertussis is most severe in infants and can even cause death.

Pertussis is spread through coughing or sneezing. It can also be spread by sharing food or eating utensils with someone with pertussis.

Pertussis is treated with antibiotics. Students who have symptoms and are prescribed antibiotics for suspected pertussis can return to school following the fifth day of treatment. Without antibiotics, a person with pertussis is considered to be contagious, and can spread pertussis to others, for three weeks after the cough starts. It is important that ill students stay at home away from others (especially infants and young children) during this time.

Pertussis vaccine is administered to children in combination with diphtheria and tetanus vaccine (DTaP) in a five-dose series and protects children against whooping cough. For children 7 years or older, a Tdap booster is recommended at age 11-12 years. Please check with your health care provider to make sure your child's shots are up-to-date.

Please watch your child for any symptoms of pertussis (mild, cold-like symptoms) over the next several weeks. If you notice any of these symptoms in your child, please notify your primary care physician and the (typically, school nurse and/or county health department) at (phone number) as soon as possible.

Sincerely,