



ADVISORY: Recommendations for Diagnosis & Control of Pertussis

To: Healthcare Providers, HMC and Local Boards of Health

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Pertussis, or whooping cough, is a highly contagious respiratory disease caused by *Bordetella pertussis* and is an immediately reportable disease in New Jersey. Pertussis is an endemic disease in the United States, with periodic epidemics every 3 to 5 years and frequent outbreaks. In 2010, 27,550 cases of pertussis were reported in the U.S. with outbreaks occurring in states such as California, Michigan, and Ohio. The New Jersey Department of Health and Senior Services has observed an increase in cases since July 2011. To date, 239 confirmed or probably cases were identified in 2011 compared with 169 cases in 2010. Cases have occurred across all ages: 8% of cases occurred in those < 1 year of age, 7% in 1-4 years, 14% in 5-9 years, 30% in 10-19 years, 4% in 20-29 years, and 38% in >30 years of age. Of all cases < 1 year of age, 68% have been hospitalized. Cases have occurred across the state and in multiple schools. Clusters of cases have occurred in families. Philadelphia, New York City, and New York State have also observed an increase in pertussis cases.

The total number of cases for 2011 is expected to increase as reports currently under investigation are finalized. Final numbers for 2011 will be available Spring 2012.

The New Jersey Department of Health and Senior Services (NJDHSS) would like to remind health care providers of the importance of considering *Bordetella pertussis* infection in the differential diagnosis of a persistent cough. Pertussis is one of the few vaccine-preventable diseases that are still endemic in the U.S., and it is important for health care providers to be vigilant when diagnosing cough illnesses of more than 2 weeks' duration.

The NJDHSS also continues to stress the importance of hand washing, covering coughs and sneezes, and staying home when sick. Hand washing is the single most important prevention method to avoid the spread of disease.

Currently, the pertussis vaccines available in the United States are acellular pertussis antigens in combination with diphtheria and tetanus toxoids (DTaP, DTaP- combination vaccines, and Tdap). The Advisory Committee on Immunization Practices (ACIP) recommends a four-dose primary series of DTaP, administered at 2, 4, 6 and 15-18 months of age, followed by a fifth booster dose given at 4-6 years. In 2005 and 2006, the ACIP recommended the replacement of a single Td booster with a dose of Tdap for adolescents (ages 11-18) and adults (ages 19-64), who have not previously received Tdap.

On October 27, 2010, ACIP expanded Tdap recommendations to include both under-vaccinated children and senior adults. The new recommendations state that children aged 7-10 years who are not up-to-date with their childhood pertussis vaccinations should receive a single dose of Tdap. Additionally, Tdap is recommended for adults aged 65 years and older who anticipate close contact with an infant and who have not previously received the vaccine. ACIP further recommended that Tdap be administered regardless of time since last tetanus and diphtheria-containing booster. On February 23, 2011, ACIP recommended that all healthcare personnel who have not yet received a dose of Tdap, regardless of age, should be vaccinated.

CLINICAL MANIFESTATIONS

Pertussis is highly communicable and can cause severe disease in very young children. It begins with mild upper respiratory tract symptoms and progresses to cough, and can further progress to severe paroxysms, often with a characteristic inspiratory whoop followed by vomiting. Fever is absent or minimal. Among older children and adults, the disease usually results in symptoms that can be mistaken for bronchitis and URI's - persistent cough, but no whoop. In infants younger than 6 months, apnea is a common manifestation and whoop may be absent.

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It is important to remember that while pertussis is most often considered a young child's disease, it can occur at any age. Pertussis should be considered in older children and adults who have a persistent cough lasting more than 7-14 days that cannot be attributed to another specific illness. Untreated, these older children and adults can act as a reservoir for pertussis disease and infect younger children.

INCUBATION PERIOD

5-21 days (average 7-10 days) following exposure

TRANSMISSION

Pertussis is transmitted from person to person via large respiratory droplets generated by coughing or sneezing. Pertussis is highly infectious, with attack rates among exposed, nonimmune household contacts as high as 80-90%. The most infectious periods are the catarrhal and early paroxysmal phases. Untreated patients remain infectious for 21 days from onset of cough or until 5 days of appropriate antibiotics have been completed.

LABORATORY TESTING

Whenever possible, a nasopharyngeal swab or aspirate should be obtained from all persons with suspected cases. A properly obtained nasopharyngeal swab or aspirate is essential for optimal results. Additional information on specimen collection may be found on CDC's website:

<http://www.cdc.gov/pertussis/clinical/diagnostic-testing/specimen-collection.html>

Culture:

Isolation of *B. pertussis* by bacterial culture is the standard pertussis diagnostic laboratory test. A positive culture for *B. pertussis* confirms the diagnosis of pertussis. Although bacterial culture is specific for diagnosis, it is relatively insensitive. Fastidious growth requirements make *B. pertussis* difficult to isolate. Isolation of the organism using direct plating is most successful during the catarrhal stage (i.e., first 1-2 weeks of cough). Success in isolating the organism declines if the patient has received prior antibiotic therapy effective against *B. pertussis*, if specimen collection has been delayed beyond the first 2 weeks of illness, and if the patient has been vaccinated. A nasopharyngeal aspirate or swab should be obtained from the posterior nasopharynx, not the throat, for culture. Specimens should be obtained using polyester, rayon, nylon, or calcium alginate (not cotton) swabs and should be plated directly onto selective culture medium or placed in transport medium. Regan-Lowe agar or freshly prepared Bordet-Gengou medium is generally used for culture: half-strength Regan-Lowe should be used as the transport medium.

Polymerase Chain Reaction (PCR):

Due to the increased sensitivity and faster reporting of PCR results, many laboratories are now using this method exclusively. PCR should be used in addition to, and not as a replacement for culture. No PCR product has been approved by the FDA, and there are no standardized protocols, reagents, or reporting formats for pertussis PCR testing. Consequently, PCR assays vary widely among laboratories and some results may or may not differentiate between *B. pertussis* and other organisms (for example, *Bordetella holmesii*). Continued use of culture is essential for confirmation of PCR results

Collection methods for PCR are similar to those for culture, and often the same sample can be used for both tests. However, calcium alginate swabs cannot be used to collect nasopharyngeal specimens for PCR. Like culture, PCR is also affected by specimen collection. An inappropriately obtained nasopharyngeal swab will likely be negative by both culture and PCR. Nasopharyngeal aspirates might be preferred for both culture and PCR because they tend to recover larger numbers of bacteria. For more information, see :

[BEST PRACTICES FOR HEALTH CARE PROFESSIONALS ON THE USE OF POLYMERASE CHAIN REACTION \(PCR\) FOR DIAGNOSING PERTUSSIS, WHICH IS LOCATED AT THE CDC PERTUSSIS WEB SITE: http://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-pcr-bestpractices.html](http://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-pcr-bestpractices.html)

Serology:

Serologic testing may be useful in adults and adolescents who present late in the course of their illness, when both culture and PCR are likely to be negative. The currently available serologic tests measure antibodies that could result from either infection or vaccination, so a positive serologic response simply means that the person has been exposed to pertussis by either recent or remote infection or by recent or remote vaccination. Since vaccination can induce both IgM and IgA antibodies, use of such serologic assays cannot differentiate infection from vaccine response. At this time, serologic test results should not be relied upon for case confirmation of pertussis infection.

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TREATMENT AND POSTEXPOSURE PROPHYLAXIS

A macrolide (erythromycin, clarithromycin and azithromycin) is the preferred antimicrobial for postexposure prophylaxis and treatment of pertussis. Antimicrobial treatment administered in the early (catarrhal) phase of the illness can modify the severity of the symptoms. An antimicrobial generally does not modify the severity or the course of the illness after paroxysmal cough is established but is used to eliminate *B. pertussis* and halt transmission. Without use of an effective antimicrobial, *B. pertussis* can be recovered for 6 weeks or longer from infant patients and for 21 days or longer from adult and adolescent patients. Detailed prophylaxis and treatment guidelines can be found in the CDC's MMWR entitled Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis: 2005 CDC Guidelines MMWR 2005:54 (No.RR-14).

CDC recommends administration of chemoprophylaxis to all close contacts and all household members of a pertussis case-patient, regardless of age and vaccination status: this might prevent or minimize transmission. A close contact is anyone who had face-to-face contact or shared a confined space for a prolonged period of time with an infected person or had direct contact with respiratory secretions from a symptomatic person.

REPORTING

Pertussis is an immediately reportable disease as per N.J.A.C 8:57 which can be accessed at:
<http://www.nj.gov/health/cd/reporting.shtml>

Please report all suspect cases to your local health department. If unable to reach the local health department, notify the NJDHSS/Vaccine Preventable Disease Program (during regular business hours) at (609) 826-4860. If after-hours or on the weekend, call NJDHSS at (609) 392-2020.

ADDITIONAL RESOURCES:

Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine from the Advisory Committee of Immunization Practices, 2010
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6001a4.htm>

Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine (Tdap) in Pregnant Women and Persons Who Have or Anticipate Having Close Contact with an Infant Ages < 12 Months - Advisory Committee of Immunization Practices (ACIP), 2011
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6041a4.htm>

Recommended Antimicrobial Agents for Treatment and Postexposure Prophylaxis of Pertussis which can be accessed at:
<http://www.cdc.gov/mmwr/PDF/rr/rr5414.pdf>

NJDHSS Handwashing Materials
<http://www.nj.gov/health/cd/handwashing.shtml>

NJDHSS Immunization Requirements
<http://www.nj.gov/health/cd/imm.shtml>

New Jersey Immunization Information System (NJIIS)
<https://njiis.nj.gov/njiis/>