Montgomery County Health Department
Public Health Advisory

Pertussis (Whooping Cough) Cases in the Lansdale Area of Montgomery County
November 6, 2014

Montgomery County Health Department (MCHD) has identified a Pertussis outbreak at a private high school in the Lansdale area. Although there is no increase above the baseline of total pertussis cases at this time, MCHD did want to remind the healthcare provider community about the appropriate recommendations for the evaluation, testing, treatment, and management of pertussis cases following the identification of this outbreak.

In consultation with the Pennsylvania Department of Health, Montgomery County Health Department recommends the following:

1) Parents should review each child’s health record to determine the vaccination status of the child.

2) When cases occur in school communities, children should be observed over the next 2 weeks for any symptoms such as a runny nose and sudden, uncontrollable bursts or spells of coughing that persist and sometimes cause vomiting. These symptoms should be reported immediately to the child’s pediatrician.

3) If a child comes down with cold symptoms that include a cough, the child should be evaluated by his/her pediatrician. Evaluation should include a nasopharyngeal culture for pertussis.

4) Children diagnosed with pertussis will not be permitted to attend school until 5 days after starting appropriate antibiotics. If their medical condition allows, students may return to school 5 days after starting the antibiotics and must continue taking the antibiotics until completed.

5) All household members and close contacts of a pertussis case should receive preventative antibiotics regardless of their age or vaccination status.

Here are some helpful reminders regarding pertussis-containing vaccine for various groups:

1) Children under the age of 7 who have not received the full recommended vaccination series (DTaP at 2, 4, and 6 months, first booster at 15–18 months and second booster at 4–6 years), please contact your pediatrician and complete the vaccination schedule.

2) Children age 7 – 10 who have not received the full recommended vaccination series should receive a dose of Tdap at the earliest opportunity.

3) Persons age 11 to 64 who have not received a previous dose of Tdap vaccine should receive a single dose. No minimum interval since a previous dose of Td needs to be observed.

4) Persons 65 and older may also receive a single dose of Tdap vaccine, as directed by their primary care physician.
5) **Pregnant women:** CDC now recommends that pregnant women receive pertussis vaccine (called Tdap) during the third trimester of each pregnancy.

**Evaluation/Management**

Consider pertussis when evaluating any infant, child, youth, or adult with an acute cough illness characterized by prolonged cough or cough with paroxysms, whoop, or post-tussive gagging/vomiting. Infants may present with apnea and/or cyanosis.

Pertussis, or whooping cough, is an acute infectious disease caused by the bacterium *Bordetella pertussis*. *B. pertussis* is a small aerobic gram-negative rod. It is fastidious, and requires special media for isolation.

The incubation period of pertussis is commonly 7 to 10 days, with a range of 4 to 21 days, and rarely may be as long as 42 days.

**The clinical course of the illness is divided into three stages.**

- The first stage, the **catarrhal stage**, is characterized by the insidious onset of coryza (runny nose), sneezing, low-grade fever, and a mild, occasional cough, similar to the common cold. The cough gradually becomes more severe, and after 1-2 weeks, the second, or paroxysmal stage, begins.

- It is during the **paroxysmal stage** that the diagnosis of pertussis is usually suspected. Characteristically, the patient has bursts, or paroxysms of numerous, rapid coughs, apparently due to difficulty expelling thick mucus from the tracheobronchial tree. At the end of the paroxysm, a long inspiratory effort may be accompanied by a characteristic high-pitched whoop. During such an attack, the patient may become cyanotic. Children and young infants, especially, appear very ill and distressed. Vomiting and exhaustion commonly follow the episode. The patient usually appears normal between attacks. Paroxysmal attacks occur more frequently at night, with an average of 15 attacks per 24 hours. During the first 1 or 2 weeks of this stage the attacks increase in frequency, remain at the same level for 2 to 3 weeks, and then gradually decrease. The paroxysmal stage usually lasts 1 to 6 weeks, but may persist for up to 10 weeks. Infants under 6 months of age may not have the strength to have a whoop, but they do have paroxysms of coughing.

- In the **convalescent stage**, recovery is gradual. The cough becomes less paroxysmal and disappears over 2 to 3 weeks. However, paroxysms often recur with subsequent respiratory infections for many months after the onset of pertussis. Fever is generally minimal throughout the course of pertussis.

Older persons (i.e., adolescents and adults), and those partially protected by the vaccine may become infected with *B. pertussis*, but usually have milder disease. Pertussis in these persons may present as a persistent (>7 days) cough, and may be indistinguishable from other upper respiratory infections. Inspiratory whoop is uncommon.

The most common complication, and the cause of most pertussis-related deaths, is secondary bacterial pneumonia.
Testing

The diagnostic gold standard for pertussis is a positive culture result. The preferred method to obtain a specimen is with a nasopharyngeal aspirate; however a nasopharyngeal dacron™ swab could also be used. Swabs or aspirate should be placed in Regan Lowe transport media if direct inoculation of selective media is not possible.

The direct fluorescent antibody (DFA) stain of a nasopharyngeal swab is unreliable so this test should not be used to confirm pertussis.

PCR testing of nasopharyngeal swabs and serologic testing may be available in some commercial labs, but these tests are not standardized. However, since the PCR test is considered valid by local public health authorities, a positive result may be used to laboratory-confirm pertussis.

Treatment/Prophylaxis

All cases and their households/close contacts should receive prophylaxis regardless of age or immunization status. Pertussis immunity is not absolute (100%) and may not prevent infection. Older children and adults with mild illness can transmit the infection. Close contact is defined as face-to-face contact, direct contact with respiratory, oral, or nasal secretions, or being in the same hospital room or open ward with a coughing pertussis case.

Those most at risk of serious and fatal complications are children <6 months of age and immunocompromised individuals of any age. Assuring chemoprophylaxis of these populations is of paramount importance. In addition, exposed individuals who live or work with people in these groups should be targeted for prophylaxis. This includes child care and health care workers. Women in the third trimester of pregnancy should also be targeted for prophylaxis due to the risk of transmission to their newborn infants should they develop pertussis.

The CDC-recommended antibiotic regimens for pertussis cases and their household or close contacts include:

1. **Azithromycin.** Azithromycin is available in the United States for oral administration as azithromycin dihydrate (suspension, tablets, and capsules). It is administered as a single daily dose.

   Recommended regimen:
   
   - Infants aged <6 months: 10 mg/kg per day for 5 days.
   - Infants and children aged ≥6 months: 10 mg/kg (maximum: 500 mg) on day 1, followed by 5 mg/kg per day (maximum: 250 mg) on days 2-5.
   - Adults: 500 mg on day 1, followed by 250 mg per day on days 2-5.
   - Side effects include abdominal discomfort or pain, diarrhea, nausea, vomiting, headache, and dizziness. Azithromycin should be prescribed with caution to patients with impaired hepatic function. All patients should be cautioned not to take azithromycin and aluminum- or magnesium-containing antacids simultaneously because the latter reduces the rate of absorption of azithromycin. Monitoring of patients is advised when azithromycin is used concomitantly with agents metabolized by the cytochrome P450 enzyme system and with other drugs for which the pharmacokinetics change (e.g., digoxin, triazolam, and ergot alkaloids). Drug interactions reactions similar to those observed for erythromycin and clarithromycin have not been reported.
Azithromycin is classified as an FDA Pregnancy Category B drug.

2. **Erythromycin.** Erythromycin is available in the United States for oral administration as erythromycin base (tablets and capsules), erythromycin stearate (tablets), and erythromycin ethylsuccinate (tablets, powders, and liquids). Because relapses have been reported after completion of 7-10 days of treatment with erythromycin, a 14-day course of erythromycin is recommended for treatment of patients with pertussis or for postexposure prophylaxis of close contacts of pertussis patients.

   **Recommended regimen:**
   - Infants aged <1 month: not preferred because of risk for IHPS. Azithromycin is the recommended antimicrobial agent. If azithromycin is unavailable and erythromycin is used, the dose is 40-50 mg/kg per day in 4 divided doses. These infants should be monitored for IHPS.
   - Infants aged ≥1 month and older children: 40-50 mg/kg per day (maximum: 2 g per day) in 4 divided doses for 14 days.
   - Adults: 2 g per day in 4 divided doses for 14 days.

3. **Clarithromycin.** Clarithromycin is available in the United States for oral administration as granules for oral suspension and tablets.

   **Recommended regimen:**
   - Infants aged <1 month: not recommended.
   - Infants and children aged ≥1 month: 15 mg/kg per day (maximum: 1 g per day) in 2 divided doses each day for 7 days.
   - Adults: 1 g per day in 2 divided doses for 7 days.

4. **Alternate agent (TMP-SMZ).** Data from clinical studies indicate that TMP-SMZ is effective in eradicating *B. pertussis* from the nasopharynx. TMP-SMZ is used as an alternative to a macrolide antibiotic in patients aged ≥2 months who have contraindication to or cannot tolerate macrolide agents, or who are infected with a macrolide-resistant strain of *B. pertussis*. Macrolide-resistant *B. pertussis* is rare. Because of the potential risk for kernicterus among infants, TMP-SMZ should not be administered to pregnant women, nursing mothers, or infants aged <2 months.

   **Recommended regimen:**
   - Infants aged <2 months: contraindicated.
   - Infants aged ≥2 months and children: trimethoprim 8 mg/kg per day, sulfamethoxazole 40 mg/kg per day in 2 divided doses for 14 days.
   - Adults: trimethoprim 320 mg per day, sulfamethoxazole 1,600 mg per day in 2 divided doses for 14 days.

The Montgomery County Health Department is requesting that all suspected or confirmed pertussis cases be immediately reported to MCHD’s Division of Communicable Disease Control and Prevention at 610-278-5117 or through PA-NEDSS, Pennsylvania’s version of the National Electronic Disease Surveillance System.