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Pertussis

Current Situation

The state of California is currently experiencing an outbreak of pertussis within the state. The California Department of Public Health has announced that as of mid-June, 916 confirmed cases have been reported, compared to 219 cases for the same period last year. In addition, over 600 possible cases have been reported. Five infants, all under three months of age, have died from the disease in 2010.

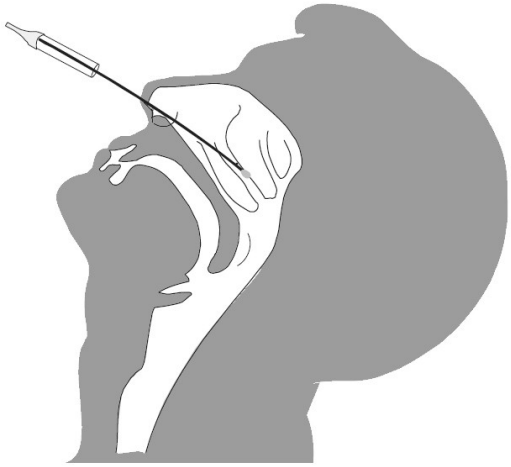
Two cases of pertussis have recently been reported in Southern Nevada, although widespread transmission of disease has not yet been identified. We have not identified any direct links between these cases and California cases. Pertussis often goes undiagnosed, especially in older patients, and providers are encouraged to include pertussis in their differential diagnosis of respiratory illness.

Symptoms and Transmission

Pertussis is a highly-communicable respiratory disease caused by *Bordetella pertussis* that is typically manifested by paroxysmal spasms of severe coughing, whooping, and posttussive vomiting. Major complications are most common among infants and young children and include hypoxia, apnea, pneumonia, seizures, encephalopathy, and malnutrition. Adults and adolescents have a more variable presentation, from asymptomatic to classic pertussis.

The incubation period for pertussis is 9 to 10 days, with a range of 6 to 20 days. The catarrhal stage is characterized by coryza, sneezing, low-grade fever and a mild cough, and appears similar to the common cold. After about a week, the cough becomes more severe and the patient enters the paroxysmal stage of the disease. This stage is characterized by paroxysms of coughing, followed by a long inspiratory effort accompanied by a characteristic high-pitched whoop and/or posttussive vomiting. The inspiratory whoop is generally not present in adults. Pertussis is a toxin-mediated disease, and the symptoms may persist for as long as 10 weeks even with treatment.

Figure 1. Specimen Collection from the Posterior Nasopharynx



Patients are most infective during the catarrhal stage and the first two weeks of their illness. Transmission occurs through contact with respiratory droplets.

Laboratory Testing

There are several tests that can be used for the diagnosis of pertussis. Specimens should be collected from the posterior nasopharynx (see Figure 1) using a flexible nasopharyngeal swab. For Polymerase Chain Reaction (PCR) testing, do not use calcium alginate swabs as they may contain substances that inhibit PCR. Contact the reference laboratory to identify the appropriate swab and transport media to be used for the test ordered. (see Table 1 for swab and transport media types by local reference lab).

Culture is considered the gold standard, and is the most specific of the available tests. However, culture may take as long as two weeks, limiting the usefulness of the results in a clinical setting. PCR testing is more sensitive than culture, and can give results much sooner. The Centers for Disease Control and Prevention (CDC) recommends that PCR testing be performed in **addition to, not instead of,** culture.

DFA testing, although widely available, has very poor specificity and should not be used for laboratory confirmation of disease.

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Prevention

Table 1. Available Pertussis Laboratory Testing

Lab Corp	**Test Code**
B. pertussis and *B. parapertussis*, real-time DNA PCR Nasopharyngeal or throat swab in universal transport or bacterial transport medium Nasopharyngeal aspirate/wash in sterile container	138677
B. pertussis culture Nasopharyngeal swab in special charcoal containing transport media (available from laboratory)	180224
Quest	
B. pertussis and *B. parapertussis*, DNA, Qualitative, real-time PCR Nasopharyngeal swab in liquid Amies transport media Nasopharyngeal aspirate in sterile container	11365
B. pertussis culture Nasopharyngeal swab in Regan Lowe transport media (available from the laboratory)	151555
Nevada State Health Laboratory	
B. pertussis and parapertussis real time PCR Nasopharyngeal swab – no transport media	No Code

To be adequately protected, children need five does of DTaP by kindergarten and an adolescent booster. DTaP doses are recommended at 2 months, 4 months, 6 months, 15-18 months, and at 4-6 years of age (prior to school entry), and a single dose o f Tdap is recommended for adolescents 11 or 12 years of age (in place of a Td booster).

It is also recommended that adults 19 through 64 years of age receive a single dose of Tdap to replace a single dose of Td for booster immunization against tetanus, diphtheria and pertussis. Tdap may be given at an interval less than 10 years since receipt of the last tetanus toxoid-containing vaccine to protect against pertussis.

The current complete immunization schedule, including catch-up recommendations, can be found on the CDC's website at http://www.cdc.gov/vaccines/recs/schedules/child-schedule.htm.

Post-Exposure Prophylaxis

Depending on a person's age, immunization status, and type of contact with ill individuals, post-exposure chemoprophylaxis with or without vaccination may be appropriate for household and close contacts. Please contact the Office of Epidemiology at 759-1300, option 2, for assistance in determining if post-exposure prophylaxis is appropriate.

Treatment

The medical management of pertussis cases is primarily supportive, although antibiotics are of some value (see Table 2 for a list of effective antibiotics). This therapy eradicates the organism from secretions, thereby decreasing communicability and, if initiated early, may modify the course of the illness. It is important to ensure that patients complete the full course of therapy to prevent bacteriologic relapse. As the disease is toxin-mediated, symptoms may persist after treatment.

Reporting

Per Nevada Administrative Code 441A, all known or suspected cases of pertussis should be reported to the Southern Nevada Health District Office of Epidemiology at (702) 759-1300, option #2. This number is available 24-hours a day, seven days a week. Please contact the Office of Epidemiology if you would like additional information or have questions about pertussis.

References

- Epidemiology and Prevention of Vaccine-Preventable Diseases, 11th edition. 2009. CDC.
- Broder K et. al. Preventing Tetanus, Diphtheria, and Pertussis Among Adolescents: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccines. MMWR. 55(RR03); 1-34.
- Kretsinger K et. al. Preventing Tetanus, Diphtheria, and Pertussis Among Adults: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine. MMWR. 55(RR17).
- Recommended Antimicrobial Agents for the Treatment and Postexposure Prophylaxis of Pertussis. MMWR 54(RR14). 1-16.

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Table 2. Recommended Antimicrobial Treatment and Postexposure Prophylaxis for Pertussis by Age Group. (Adapted from The 2009 Red Book Online published by the American Academy of Pediatrics and the CDC Recommendations set forth in Recommended Antimicrobial Agents for the Treatment and Postexposure Prophylaxis of Pertussis. MMWR 54(RR14). 1-16.)

Age group	Primary Agents			Alternate Agent*
	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 1,600 mg per day in 2 divided doses for 14 days
Preparation	Oral suspension: 20 mg/mL 40 mg/mL Capsules: 250 mg 600 mg	Oral suspension and tablets (many preparation strengths)	Oral suspension: 25 mg/mL 50 mg/mL Tablets: 250 mg 500 mg	Oral suspension: TMP 8 mg/mL and SMZ 40mg/ mL Tablets: Single Strength: TMP 80 mg and SMZ 400 mg Double Strength: TMP 160 mg and SMZ 800 mg

*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*.