Office of Epidemiology
Phone 702.759.1300
Fax 702.759.1414

Technical Bulletin: Pertussis **CORRECTED** July 26, 2007

Pertussis

Current Situation

On July 19, the Nevada State Health Division announced an increase in pertussis cases in Northern Nevada. A total of 18 cases, 12 in West Wendover and 6 in Ely, were identified earlier this month (the combined population of Ely and West Wendover is around 9,000 people). Although pertussis cases are sporadically reported in Clark County, the increased cases in Nevada, as well as a national increase in pertussis cases over the past couple of years has brought pertussis to the forefront of public health concerns. As early identification is the key to preventing disease, the Southern Nevada Health District is requesting the assistance of the medical community in the prompt identification and reporting of pertussis cases.

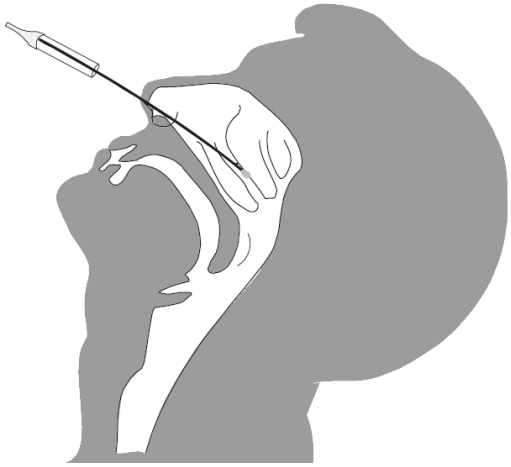
Symptoms and Transmission

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.

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

Figure 1. Specimen Collection from the Posterior Nasopharynx



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 Dacron® or calcium alginate swabs and transported in the appropriate transport media (see Table 1 for approved swab and transport media types by lab). Specimens should not be collected from the throat or on cotton swabs.

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. Polymerase chain reaction (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.

Prevention

The primary series of DTaP vaccine consists of four doses, the first three doses given at 4- to 8-week intervals (minimum of 4 weeks), beginning at 6 weeks to 2 months of age. The fourth dose is given 6–12 months after the third to maintain adequate

Table 1. Available Pertussis Laboratory Testing

Lab Corp	**Test Code**
B. pertussis and *B. parapertussis* real time PCR Nasopharyngeal swab in viral transport medium Nasal aspirate in sterile plastic container	138677
B. pertussis culture Nasopharyngeal swab in special charcoal containing transport media (available from laboratory)	180224
Quest	
B. pertussis and *B. parapertussis* DNA Nasopharyngeal swab – no calcium alginate Nasal aspirate	11365
B. pertussis culture Nasopharyngeal swab in Regan Lowe transport media (available from the laboratory)	151555
Nevada State Health Laboratory	
B. pertussis real time PCR Nasopharyngeal swab – no calcium alginate	No Code

immunity for the ensuing preschool years. The Centers for Disease Control and Prevention (CDC) recommends that adolescents 11–12 years of age should receive a single dose of Tdap instead of Td. Adolescents 13–18 years who have not received Tdap should receive a single dose of Tdap as their catch-up booster instead of Td if they have completed the recommended childhood DTaP/DTP vaccination series, and have not yet received a booster.

ACIP recommends 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. Special emphasis should be placed on Tdap vaccination of adults who have close contact with infants, such as childcare and healthcare personnel, and parents. Ideally, Tdap should be given at least 1 month before beginning close contact with the infant.

Post-Exposure Prophylaxis

An antibiotic effective against pertussis (see Table 2) should be administered to all close contacts of persons with pertussis, regardless of age and vaccination status. It is important to ensure that patients complete the full course of therapy to ensure complete eradication of the organism. All close contacts younger than 7 years of age who have not completed the four-dose primary series should complete the series with the minimal intervals. Close contacts who are 4–6 years of age and who have not yet received the second booster dose (usually the fifth dose of DTaP) should be vaccinated. The administration of Tdap to persons 10 through 64 years of age who have been exposed to a person with pertussis is not contraindicated, but the efficacy of postexposure use of Tdap is unknown.

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, 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. 2007. 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.

Table 2. Recommended Antimicrobial Treatment and Postexposure Prophylaxis for Pertussis by Age Group. (Adapted from 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: 25 mg/mL 50 mg/mL Tablets: 250 mg 500 mg	Oral suspension and tablets (many preparation strengths)	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*.