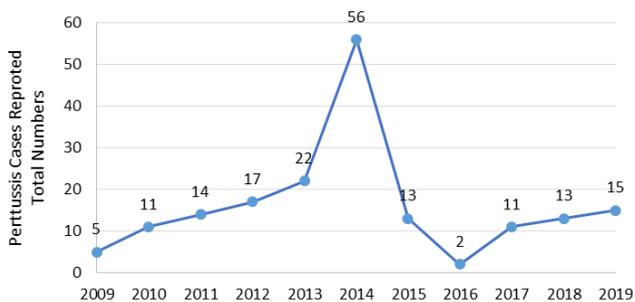


IN THIS ISSUE: PERTUSSIS UPDATE IN WASHOE COUNTY

Background

On October 21, 2019, WCHD declared an outbreak of pertussis associated with Bishop Manogue High School. Due partially to increased awareness in the community, WCHD has seen an increase in testing and reporting of pertussis. This has resulted in a to-date count of 15 cases of pertussis in Washoe County (as of 11/7/19). By comparison, in 2018 there were 13 cases reported. In the last ten years (2009-2019), pertussis cases have ranged from a low of 2 cases (2016) to a high of 56 cases (2014). Further, pertussis has averaged about 16 cases per year within Washoe County in the same time-frame. Currently, Washoe County is within the average number of reported pertussis cases for 2019 and well below the highest reported year.

Figure 1. Count of Reported Cases of Pertussis, Washoe County, 2009-2019*



*Data for 2019 is preliminary and as of 11/7/19.

Although infants have the highest reported rates of pertussis nationally, an increase in the number of reported pertussis cases among children and adolescents has been attributed to the waning of acellular pertussis vaccine-induced immunity, according to the CDC.¹ This increase was first observed in one of the first birth cohorts to exclusively receive 5 doses of acellular pertussis (DTaP) vaccine following the switch from DTP in 1997. As this birth cohort aged, an increase in reported pertussis cases was observed among those aged 13–14 years in 2012.

Healthcare providers are encouraged to be aware of the laboratory confirmed presence of pertussis in the community and to consider it in the diagnosis of patients with symptoms, regardless of vaccination status. Early diagnosis and treatment of

suspect pertussis is essential in controlling this disease. It is foreseeable, as attention to reported pertussis occurs in Washoe County, individuals may seek out guidance and/or treatment. The recently identified outbreak at Bishop Manogue High School consisted of 4 of the 5 confirmed cases being properly and fully vaccinated for pertussis (80%). Washoe County Health District (WCHD) highly recommends that you prescribe an appropriate antibiotic to your patient if they are symptomatic regardless of vaccination history.

Symptoms and Transmission

Pertussis is a highly-communicable respiratory disease caused by *Bordetella pertussis* that is classically 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. Apnea is a common pertussis symptom in infants and might be the only presenting sign of pertussis in young infants with no cough. Adults and adolescents have a more variable presentation, ranging from asymptomatic to classic pertussis.

The incubation period for pertussis is 7 to 10 days, with a range of 5 to 21 days. The catarrhal stage is characterized by coryza, sneezing, low-grade fever and a mild cough, and appears similar to the common cold. After 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 or in children who contract mild cases of illness, despite immunization. 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 2 weeks of their illness, although the organism can be isolated up to 3 weeks after the onset of paroxysmal coughing.

Transmission occurs through contact with respiratory droplets. Pertussis is highly

communicable, as evidenced by secondary attack rates of 80% among susceptible household contacts.²

Laboratory Testing

Pertussis testing should be considered in anybody with a severe or persistent cough. It is appropriate to order testing up to 3 weeks after the onset of paroxysmal coughing. There is no recommendation from WCHD at this time to treat or test for pertussis if someone is asymptomatic.

For patients reporting an exposure to pertussis and exhibiting symptoms, the following guidelines can be followed:

For patients coughing <21 days:

1. Collect nasopharyngeal swabs or aspirate for pertussis PCR testing and/or culture.
2. Do not delay treatment with appropriate antibiotics while waiting for laboratory results if there is no alternative diagnosis.
3. For patients in daycare or school, document and communicate all clinical decisions related to pertussis to the daycare or school (this includes children for whom pertussis has been ruled out).
4. Provide antibiotic prophylaxis for all household members.
5. Provide antibiotic prophylaxis to pregnant women, infants less than 12 months old, or anyone with a weakened immune system that lives in the household.

For patients coughing ≥21 days:

1. Testing for pertussis is not recommended. Testing after 3 weeks of cough is of limited benefit since PCR and culture are only sensitive during the first 2-3 weeks of cough when bacterial DNA is still present in the nasopharynx.
2. Treatment is no longer necessary after 21 days from cough onset, with the following exception: infants and pregnant women in their third trimester should be treated up through 6 weeks after cough onset.
3. The patient is no longer infectious and can return to daycare or school.

There are several tests that can be used for the diagnosis of pertussis. 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 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.

Specimens should be collected from the posterior nasopharynx using a flexible nasopharyngeal swab. For PCR testing, do not use calcium alginate swabs as they may contain substances that inhibit PCR. To avoid contamination of clinical specimens with pertussis containing vaccines, change gloves between vaccine administration and clinical specimen collection, and process clinical specimens in an area separate from pertussis containing vaccine storage and administration. Contact the reference laboratory to identify the appropriate swab and transport media to be used for the test ordered. Additional information on sample collection and best practices for healthcare professionals on the use of PCR for diagnosing pertussis is available on the CDC's website at: <http://www.cdc.gov/pertussis/clinical/diagnostic-testing/index.html>.

Specimen Collection Kits

Please contact the Nevada State Public Health Laboratory for any specimen collection kits at 775-688-1335.

Treatment

Antimicrobial treatment for pertussis is most effective in minimizing the duration and severity of illness if administered during the prodromal period prior to the onset of paroxysmal cough. Table 1 contains the treatment and post-exposure prophylaxis recommendations by the AAP and CDC. A patient is no longer considered to be infectious after having taken the appropriate antibiotic for 5 days. Exclude patients with suspect, probable, or confirmed pertussis from childcare, school, and other group activities until after 5 days of effective antibiotic treatment (Table 1). If you have questions about exclusions, please contact the WCHD Communicable Disease Program at 775-328-2447.

Postexposure Prophylaxis

Antimicrobial postexposure prophylaxis (PEP) is effective in preventing illness in persons exposed to pertussis (Table 1). PEP should be administered to close contacts who are at high risk for severe pertussis or who could transmit the disease to persons at high risk for severe pertussis. Because infants <1 year of age are considered to be at highest risk for severe illness they are a high priority for receiving PEP. Pregnant women (particularly in their 3rd trimesters) are also a high priority for receiving PEP because contracting pertussis and being contagious at the time of delivery puts their newborns in danger. Finally, anybody who could expose infants

or pregnant women to pertussis is also considered a high priority for PEP. Initiation of PEP >3 weeks after exposure is probably of no benefit.

Vaccination

Although most children have been vaccinated, immunity wanes with age, and some who are fully vaccinated can become infected. Adults and vaccinated children with pertussis can present with milder symptoms and hence have become a major reservoir for pertussis. In summary, CDC routinely recommends³:

- DTaP at 2, 4, and 6 months, at 15 through 18 months, and at 4 through 6 years.
- Tdap as a single dose for those 11 through 18 years of age with preferred administration at 11 through 12 years of age.
- Any adult 19 years of age or older who has never received a dose of Tdap should get one as soon as feasible. This Tdap booster dose can replace one of the 10-year Td booster doses.
- Pregnant women should get a dose of Tdap during each pregnancy, preferably during the early part of gestation weeks 27 through 36.
- A single dose of Tdap for healthcare personnel who have not previously received Tdap and who have direct patient contact.

Please refer to 2018 ACIP recommendation for detailed vaccination schedules at CDC's website <https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/dtap.html>

For all household contacts of those patients who report pertussis exposure and exhibit symptoms, it is recommended you administer Tdap vaccine to contacts 11 years and older who have not been previously vaccinated with Tdap, or refer for vaccination at Washoe County Health District Immunization Clinic by calling 775-328-2402. You can check on immunization status by visiting <https://izrecord.nv.gov>.

Per Nevada Administrative Code 441A, all known or suspected cases of pertussis should be reported to the WCHD CD Program by calling (775) 328-2447 or faxing (775) 328-3764.

References

- 1) Lian JL, Tejpratap T, Moro P, Messonnier NE, Reingold A, Sawyer M, Clark TA. Prevention of Pertussis, Tetanus, and Diphtheria with Vaccines in the United States: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 2018;67(No. RR-2):1–44.
- 2) CDC. "Epidemiology and Prevention of Vaccine-Preventable Diseases—Pertussis." Accessed 07 Nov 2019. Available at <https://www.cdc.gov/vaccines/pubs/pinkbook/pert.html#pertussis>.
- 3) CDC. "Pertussis: Summary of Vaccine Recommendations." Accessed 07 Nov 2019. Available at <https://www.cdc.gov/vaccines/vpd/pertussis/recs-summary.html>.

Table 1. Recommended Antimicrobial Therapy and Postexposure Prophylaxis for Pertussis in Infants, Children, Adolescents, and Adults^a

Age	Recommended Drugs			Alternative
	Azithromycin	Erythromycin	Clarithromycin	TMP-SMX
Younger than 1 mo	10 mg/kg/day as a single dose daily for 5 days ^{b, c}	40 mg/kg/day in 4 divided doses for 14 days	Not recommended	Contraindicated at younger than 2 mo
1 through 5 mo	10 mg/kg/day as a single dose daily for 5 days ^b	40 mg/kg/day in 4 divided doses for 14 days	15 mg/kg/day in 2 divided doses for 7 days	2 mo or older: TMP, 8 mg/kg/day; SMX, 40 mg/kg/day in 2 doses for 14 days
6 mo or older and children	10 mg/kg as a single dose on day 1 (maximum 500 mg), then 5 mg/kg/day as a single dose on days 2 through 5 (maximum 250 mg/day) ^{b, d}	40 mg/kg/day in 4 divided doses for 7–14 days (maximum 1–2 g/day)	15 mg/kg/day in 2 divided doses for 7 days (maximum 1 g/day)	2 mo or older: TMP, 8 mg/kg/day; SMX, 40 mg/kg/day in 2 doses for 14 days
Adolescents and adults	500 mg as a single dose on day 1, then 250 mg as a single dose on days 2 through 5 ^{b, d}	2 g/day in 4 divided doses for 7–14 days	1 g/day in 2 divided doses for 7 days	TMP, 320 mg/day; SMX, 1600 mg/day in 2 divided doses for 14 days

TMP indicates trimethoprim; SMX, sulfamethoxazole.

^aCenters for Disease Control and Prevention. Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis: 2005 CDC guidelines. *MMWR Recomm Rep*. 2005;54(RR-14):1–16

^bAzithromycin should be used with caution in people with prolonged QT interval and certain proarrhythmic conditions.

^cPreferred macrolide for this age because of risk of idiopathic hypertrophic pyloric stenosis associated with erythromycin.

^dA 3-day course of azithromycin for PEP or treatment has not been validated and is not recommended.

(Source: Red Book 2018)