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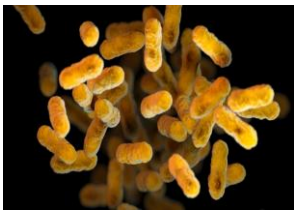
Pertussis

Pertussis, commonly known as whooping cough, is a highly contagious, vaccine-preventable disease caused by the bacterium *Bordetella pertussis*. This fastidious, gram-negative bacillus produces a variety of biologically active toxins and antigens that contribute to the disease's characteristic clinical features.



Bordetella pertussis – CDC.gov

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The Disease

B. pertussis primarily targets the respiratory tract by attaching to the cilia lining the upper airways. The toxins released by the bacteria damage the cilia and lead to inflammation and swelling of the airways, resulting in the severe coughing episodes associated with pertussis. Classic pertussis typically follows a three-stage progression.

Clinical Features of Pertussis

1. **Catarrhal Stage (1 to 2 weeks)**: Mild upper respiratory symptoms develop gradually, often accompanied by an intermittent, non-productive cough. Symptoms are often indistinguishable from a common cold during this stage.
2. **Paroxysmal Stage (1 to 6 weeks or longer)**: Characterized by severe coughing spasms, which may end in a gasp (whoop), vomiting (post-tussive emesis), or apnea. Adolescents and adults may have milder symptoms.
3. **Convalescent Stage (2 to 6 weeks or longer)**: Gradual resolution of paroxysmal coughing.

Pertussis can affect individuals of any age, but infants are at the highest risk for serious complications which include apnea, pneumonia, seizures, pulmonary hypertension, encephalopathy, and death. Notably, apnea may be the only or initial symptom in very young infants. In contrast, pertussis in older children, adults, and previously vaccinated individuals may present as a mild or atypical respiratory illness.

Transmission and Infectious Period

Pertussis is transmitted via respiratory droplets during close contact with an infected person. Factors influencing transmission include the stage and severity of illness in the source case, proximity and duration of exposure, and use of infection control measures. Secondary attack rates among fully susceptible individuals (no immunity from vaccine or infection) can reach 80%.

The incubation period typically ranges from 7 to 10 days but can extend from 4 to 21 days. Individuals are most contagious during the early catarrhal stage and the first two weeks following cough onset. Communicability may persist for more than three weeks unless the infection is treated with appropriate antibiotics. Although the cough may persist, most individuals clear the infection naturally within three or four weeks, but infants and unvaccinated persons may remain culture-positive for a longer period.

Diagnosis and Treatment

Laboratory confirmation of pertussis can be achieved through culture, PCR, or serology:

- **Culture**: Most effective when collected within the first two weeks after cough onset. Results may take up to seven days to become available.
- **PCR**: Highly sensitive; can detect pertussis for up to eight weeks after following cough onset. This is the most commonly used testing method.
- **Serology**: Routine serologic testing is not recommended by the Centers for Disease Control and Prevention (CDC) to diagnose pertussis but can be useful during suspected pertussis outbreaks for confirming diagnosis, 2 to 8 weeks after symptom onset.

Antibiotic treatment, particularly if initiated in the catarrhal stage, can reduce disease severity and prevent transmission. Treatment later in the disease course may not affect illness duration but can limit further spread. Initiating antibiotics more than three weeks after onset of paroxysmal cough is generally of limited benefit but may be recommended in select cases.

High-Risk Groups

Certain populations are at **increased risk for severe pertussis** or may serve as potential **transmitters to high-risk individuals**, including:

- Infants under 12 months (especially under 6 months)
- Pregnant individuals (particularly in the third trimester)
- People with pre-existing respiratory or other high-risk health conditions
- Close contacts of infants, pregnant individuals, or those with health vulnerabilities
- People in high-risk environments, such as:
    - Household members of infants or pregnant persons
    - Childcare workers caring for infants <1 year old
    - Healthcare workers with face-to-face contact with high-risk populations

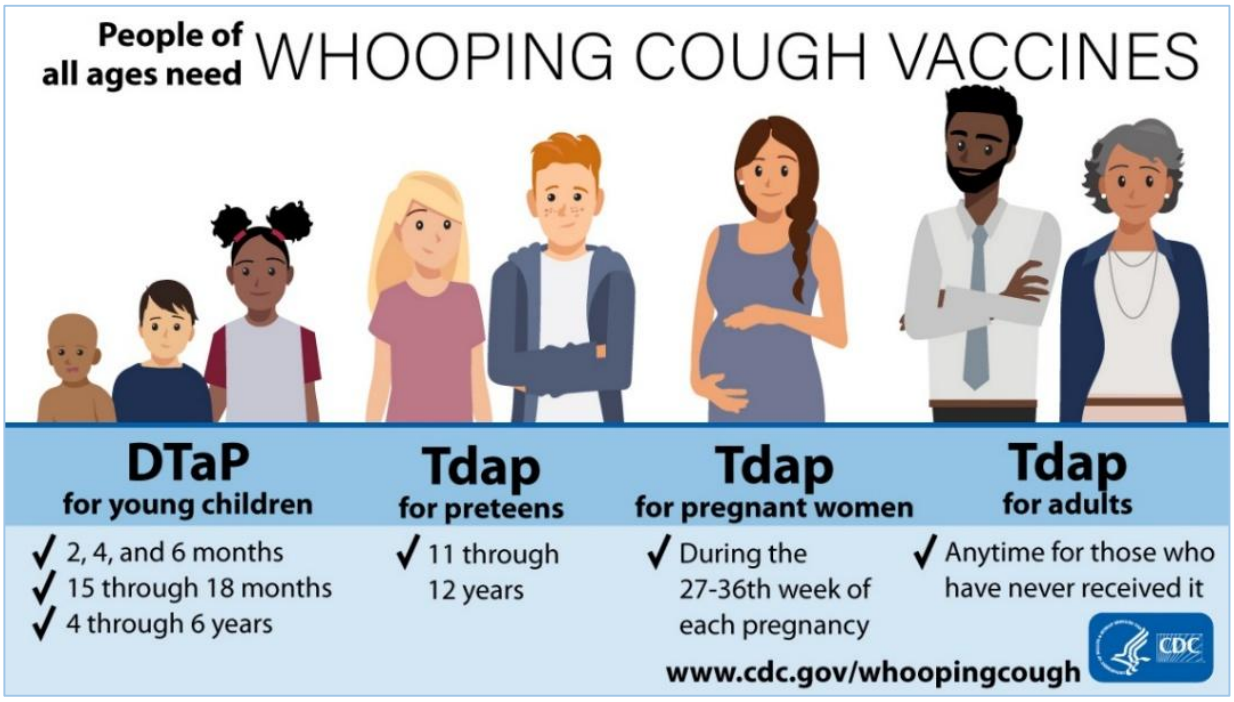
Age and underlying medical conditions can increase someone's risk of having severe complication from pertussis. Unvaccinated or incompletely vaccinated infants younger than 12 months of age have the highest risk for severe complications and death. Among infants younger than 12 months of age who get pertussis, about a third need treatment in a hospital. Hospitalization is most common in infants younger than 6 months of age. Pertussis can also be more severe for infants under 2 months of age if Tdap was not given during pregnancy to the birth parent.

Pertussis Vaccines and Prevention Strategies

Pertussis vaccines have significantly reduced disease burden since their introduction. Whole-cell vaccines were first licensed in the United States in 1914. Acellular vaccines replaced them due to safety concerns and have been in use since 1997. The acellular pertussis vaccine is administered in combination with tetanus and diphtheria vaccines:

- **DTaP**: Diphtheria, tetanus toxoid, and acellular pertussis vaccine – recommended for children.
- **Tdap**: Tetanus, diphtheria, and acellular pertussis vaccine – recommended as a booster for adolescents and adults.

Vaccine efficacy ranges from 80% to 85%. However, immunity wanes over time and individuals can become susceptible again, especially if they didn't receive a whole-cell vaccine in childhood.



In addition to vaccination, good health hygiene helps reduce the spread of respiratory pathogens:

- Cover the mouth and nose when coughing or sneezing
- Wash hands frequently
- Stay home when ill
- Follow healthcare provider instructions, including medication adherence
- Use face masks in medical settings when requested

Pertussis Surveillance in Washington

Local health jurisdictions in Washington conduct case investigations for pertussis including any appropriate public health actions such as ensuring appropriate recommendations for antibiotic treatment of the case and prophylaxis for high-risk close contacts. Case reporting follows the national case definition for the disease.

Case Definitions

- **Clinical Case**: A cough illness lasting ≥2 weeks with one or more of the following: paroxysmal cough, inspiratory whoop, post-tussive vomiting, or apnea (with or without cyanosis).
- **Confirmed Case**: Acute cough illness of any duration AND a positive culture or PCR for *B. pertussis*.
- **Probable Case**: A clinically consistent illness without a more likely diagnosis OR cough illness of any duration with at least one typical symptom AND epidemiologic linkage to a lab-confirmed case.

Washington State Trends

In 2024, Washington experienced a significant resurgence of pertussis, reporting the sixth highest incidence rate in the nation at 26.1 cases per 100,000 population—more than double the national average of 10.6 per 100,000. Preliminary 2024 data show a total of 2,261 confirmed and probable cases reported statewide, a 25-fold increase from the 87 cases reported in 2023. The burden of disease was especially high among infants under one year of age, with an incidence of 194.5 per 100,000. Tragically, in 2024, the state recorded its first pertussis-related death since 2011.

As of July 5, 2025, preliminary surveillance data indicate continued high activity in 2025, with 1,472 pertussis cases reported statewide compared to 454 during the same period in 2024. The year-to-date incidence is 18.5 per 100,000 residents, and among infants (<1 year of age), the incidence is 128.9 per 100,000. A total of 106 infant cases have been reported in 2025; among the 95 infants who were age-eligible for pertussis vaccination, only 24 (23%) had received at least one dose. Pertussis activity has been reported in 32 of Washington's 39 counties.

Pertussis remains an endemic and highly contagious disease. High pertussis activity will likely continue to occur, especially in communities with waning immunity or low vaccination coverage. Vaccination remains the most effective strategy for preventing pertussis and mitigating its severity, particularly among vulnerable populations such as infants.

Resources

Washington State Department of Health

Pertussis weekly report:
https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/348-254-PertussisUpdate.pdf

Annual pertussis summary (preliminary):
https://doh.wa.gov/sites/default/files/2025-05/348-254-PertussisSummaryWA2024.pdf

Pertussis information:
https://doh.wa.gov/public-health-provider-resources/notifiable-conditions/pertussis

Pertussis vaccine information:
https://doh.wa.gov/you-and-your-family/immunization/diseases-and-vaccines/tetanus-diphtheria-and-pertussis

Centers for Disease Control and Prevention

Symptoms of whooping cough: https://www.cdc.gov/pertussis/signs-symptoms/index.html

Pertussis surveillance: https://www.cdc.gov/pertussis/php/surveillance/index.html

Pertussis information: https://www.cdc.gov/pertussis/index.html