## Pertussis

### Transmission, Exclusion

- **Large droplets >5μm**
- From upper respiratory tract
- Not by droplet nuclei or fomites
- Asymptomatic cases but minor role

#### Incubation 7d (6-21 d)

- (Infection \(\rightarrow\) Symptom Onset)
- **CATHARRHAL 10-14 d**
  - (Cough, mild URS)
- **PAROXYSMAL 7-14 d**
  - (cough w/ inspiratory whoop & vomit; minimal fever)
- Communicability (mainly through cough)
- 2d<--Symptom Onset----------\(\rightarrow\)21d

- Attack rate household exposure = 90%-100%
- Attack rate school = 50%

#### HCW Exclusion or Watching by Employee Health (even if negative test, might be colonized)
- If no symptoms Watch OK – If symptomatic Exclusion
- In general treatment is best approach, followed by exclusion, then watch
- If treated immediately after exposure, during incubation: No exclusion
- If treated during communicability period: Exclude from Tx + 5 days
- If refused treatment: Exclude from Expo + 6 d up to Exposure +21 days
- If symptomatic & treated: Exclude from Tx + 5 days

### Diagnosis

#### Microbiology

Caused by bacterium *Bordetella pertussis*, Gram-negative aerobic coccobacillus, nutritionally fastidious, cultivated on rich media supplemented with blood, grows slowly and in 3-6 days to form pinpoint colonies.

#### Laboratory Diagnosis

- **Culture: Nasopharynx. Not throat.**
- Culture + from beginning of catarrhal stage \(\Rightarrow\) 3 weeks, positive in 5 days
- nasopharyngeal mucus collected on Dacron or calcium alginate swab then inoculated on special culture media: Bordet Gengou agar with sheep's blood, Regan-Lowe medium, Stuart's transport medium if delay
- **Direct ImmunoFluorescence Assay (DFA) : not as specific or as sensitive as culture**
- **Serology: useless for diagnosis of recent disease**
- **PCR most reliable if accompanied by clinical criteria or epidemiologic link**

#### Differential

- whooping cough syndrome similar to pertussis:
  - *Bordetella parapertussis*, *Bordetella bronchiseptica*, *Bordetella holmsei*
  - *Chlamydia pneumoniae*
  - *Mycoplasma pneumoniae*
  - *Adenoviruses*

#### Case Definition

**Confirmed:** Acute cough illness of any duration, with isolation of *B. pertussis* from a clinical specimen

**OR**

- Cough illness lasting ≥2 weeks, with at least one of the following symptoms:
  - paroxysms of coughing;
  - inspiratory "whoop," or
  - post-tussive vomiting, AND
  - polymerase chain reaction (PCR) positive for pertussis,

**OR**

- Cough illness lasting ≥2 weeks, with at least one of the following symptoms:
  - paroxysms of coughing;
  - inspiratory "whoop," or
  - post-tussive vomiting, AND, contact with a laboratory-confirmed case of pertussis.

**Probable:** In the absence of a more likely diagnosis, a cough illness lasting ≥2 weeks, with at least one of the following symptoms:

- paroxysms of coughing;
- inspiratory "whoop," or
- post-tussive vomiting, AND absence of laboratory confirmation, and no epidemiologic linkage to a laboratory-confirmed case of pertussis.

### Source

- *Human only* 
- *natural source* 

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### Send culture to State Lab

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### http://www.infectiousdisease.dhh.louisiana.gov (800)256-2748
Treatment, Prophylaxis

- Immune persons are protected against new disease but not against infection; they can be transmitters, they need prophylaxis
- Erythromycin po (40 to 50 mg/kg/day in 4 divided doses, maximum 2 g)
  - for 14 days ⊗ compliance poor
  - eliminates carriage, may prevent disease if early
- Azithromycin po 10mg/kg on day one (maximum: 500mg), followed by 5 mg/kg per day (maximum: 250 kg) on days 2-5
- Clarithromycin - 7 days
- Trimethoprim-Sulfamethoxazole alternate
- Penicillin & derivatives ineffective at clearing pertussis from naso-pharynx
- Quinolones and cyclines contra-indicated in children
- Treatment useful for up to 3 wks after exposure. Repeat of Tx OK

Droplet precautions

Control

- Identify close contacts + prophylaxis

Case finding: Cough, URT symptoms
- Patients
- Staff

Household
- Daycare Center
- Patients
- Staff

Case investigation: for confirmed cases and for probable cases when a susceptible population may have been exposed

Outbreak = 2 or more epidemiologically linked cases

Household investigation: Immediately after report (even if suspected); emphasis on infants or potential transmitter to infants; include child's care giver and frequent visitors; ask about unreported cases;

Daycare center and school: 2 or more cases clustered in time and space

1)- Identify High-Risk Contacts and Close Contacts; contacts should be identified on a case by case basis

Close contacts to observe for acute cough illness and to consider for chemoprophylaxis can include the following persons:
1. Household contacts and family members
2. Caregivers, staff, aides and volunteers
3. Close friends, social contacts
4. Students attending a regular after-school care group or a play group
5. Students sitting next to a case-patient in school
8. Bus seat-mates and carpool contacts

One Case
- Child care centers: extensive contact with each other; go for entire class, or entire child care center if no class separation.
- Home child-care settings: All children, child-care provider and members of his/her family
- Schools: chemoprophylaxis to groups with significant exposure to case. Determine any patterns of interaction increasing exposure ;
  If students do not change classes frequently or in high-risk settings (residential schools for developmentally delayed children) prophylaxis
  for entire school
- Extra-curricular activity groups: Teammates =close contacts, chemoprophylaxis to entire team; decision based on extent of exposure;
  - More than one laboratory-confirmed case:
  For classrooms, teams and other groups: prophylaxis for everyone
  Providing chemoprophylaxis to an entire school or child care center is generally not recommended. Widespread chemoprophylaxis may be
  considered if there are a large number of laboratory confirmed cases in multiple classes and a high degree of student interaction across
  classes and grades, or if there is a high absenteeism rate together with a small number of students in the entire school.
  2)- Initiate Active Surveillance: in affected child care center/schools and be continued until 6 weeks after onset of the last confirmed -
  Determine exposed groups:
  3. Assess the immunization status of ≤6yeaers, refer for immunization as needed
  4. Notify class instructor and other staff to refer students with cough illness ≥7 days, or paroxysmal cough
  5. Refer symptomatic and all high-risk contacts to HCP for nasopharyngeal swab, treatment, or chemoprophylaxis.
  3)- Exclusion:
  - Symptomatic persons excluded from child care or school for the first 5days of a full course of antimicrobial treatment.
  - Symptomatic persons who do not take treatment excluded from child care or school for 21 days from onset of cough.
  - Asymptomatic contacts who elect no treatment, or those not up-to-date with pertussis immunizations (especially infants) →exclusion
    from child care or school for 21 days after their last exposure.
  4)- Immunization: confirmed case of pertussis do not need to receive additional pertussis immunizations, use pediatric DT only
  5)- Health care facilities see Epi Manual

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