PERTUSSIS FOLLOW-UP FOR LOCAL BOARDS OF HEALTH SEPTEMBER 2022

Julie Coco, MPH

Division of Epidemiology
Massachusetts Department of Public Health
State Laboratory Institute
305 South Street - 5th Floor
Jamaica Plain, MA 02130-3597

Photo Credit: Pertussis Vaccine Efficacy Varies by Age, Wanes Over Time (medscape.com)
Outline:

- What is Pertussis?
- Morbidity
- Testing for Pertussis
- Control Measures
  - Infectious Period
  - Prophylaxis
  - Determining Close Contacts
- Follow-Up in MAVEN
- Common issues with pertussis
  - Serologies
  - PCRs with no other symptoms
  - Testing of contacts
  - No duration of cough
  - Additional Symptoms Needed
  - Other species
- Resources
- Questions
PERTUSSIS:
WHOOPING COUGH

Picture credit: The Immunization Advisory Centre, NZ
What is Pertussis?

- Illness with cough of any duration, which may include one or more of the following symptoms:
  - Paroxysms of Coughing
  - Inspiratory whoop
  - Post–tussive vomiting
  - Apnea (with or without cyanosis)

Long infectious period - up to 28 days
- 7 days prior to cough onset and 21 days after cough onset
- Infected people are most contagious up to about two weeks after the cough begins
Pertussis: Epidemiology

• Transmission occurs by close contact with infected individual via large respiratory droplets generated by coughing or sneezing.
• Cases occur year-round, typically with a late summer-fall peak.
• As many as 80% of susceptible household contacts of symptomatic infant cases are infected with B pertussis, with symptoms.
• The incubation period is 7-10 days, with a range of 5-21 days.
Probable/Confirmed Pertussis Cases By Year in Massachusetts (All Species)*

*Other Bordetella species included
Pertussis in Massachusetts

![Graph showing pertussis incidence by age group in Massachusetts, 2012-2019](image-url)
People of all ages need WHOOPING COUGH VACCINES

DTaP
- for young children
  - 2, 4, and 6 months
  - 15 through 18 months
  - 4 through 6 years

Tdap
- for preteens
  - 11 through 12 years

Tdap
- for pregnant women
  - During the 27-36th week of each pregnancy

Tdap
- for adults
  - Anytime for those who have never received it

www.cdc.gov/whoopingcough
Testing for Pertussis
PERTUSSIS TESTING

- Acceptable diagnostic tests include:
  - Culture at MA SPHL or any commercial lab
  - PCR from any commercial lab – Quickest and most frequently used!
  - Serology performed at MA State Public Health Lab (MA SPHL)
    - (Serologies from commercial labs are not acceptable due to inability to interpret results.)

<table>
<thead>
<tr>
<th>DURATION OF COUGH</th>
<th>CHILDREN (&lt;11 yrs)</th>
<th>ADULTS (≥ 11 yrs)</th>
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<tbody>
<tr>
<td>&lt; 14 DAYS</td>
<td>NP Swab(s)</td>
<td>NP Swab(s)</td>
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<tr>
<td></td>
<td>(for Culture &amp; PCR Testing)</td>
<td>(for Culture &amp; PCR Testing)</td>
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<tr>
<td>14-28 DAYS</td>
<td>Serology* at MA SPHL</td>
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<td>&amp; Consider NP Swab(s)</td>
<td>Serology* at MA SPHL</td>
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<td>(for Culture &amp; PCR Testing)</td>
<td>&amp; Consider NP Swab(s) (for Culture &amp; PCR Testing)</td>
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<tr>
<td>29-56 DAYS</td>
<td>Serology* at MA SPHL</td>
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Pertussis Testing

Optimal Timing in Weeks for Diagnostic Testing

Cough Onset

- Culture
- PCR
- Serology
NP Swabs for Pertussis

**CULTURE:** Isolating actual live *B. pertussis* and other Bordetella species and growing them out.

**Turnaround Time:** 3-12 days

May be negative if too far out or if patient already took antibiotics and organism is challenging to grow.

**PCR:** Detects *B. pertussis* DNA

**Turnaround Time:** Typically 1 day

Improved in specificity and sensitivity since initial use. Useful in a patient with a cough illness.
Serology for Pertussis

**SEROLOGY:** Serologic, single serum testing for the presence of IgG antibody to pertussis toxin.

**Turnaround Time:** 2 to 14 days.

Only valid if performed through the MA State Public Health Laboratory.

Must not have a pertussis containing vaccine in last 3 years.
Pertussis Control Measures
Controlling Pertussis – Main Points

- Broad-based use of post-exposure prophylaxis (PEP) is not recommended.
- The focus is on early identification and treatment of high suspect cases.
- The focus of PEP is on those close contacts at high risk of severe disease, and those who could transmit to others who are at high risk of severe disease.
Infectious Period

- Pertussis Infectious Period: 1 week before cough onset, through 3 weeks after cough onset. (Total 4 weeks!)
- If Antibiotics Used: Infectious through 5 days of antibiotics.

<table>
<thead>
<tr>
<th>Cough Onset</th>
<th>No Tx</th>
<th>- 1 Week</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
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<table>
<thead>
<tr>
<th>Cough Onset</th>
<th>With Tx</th>
<th>- 1 Week</th>
<th>Week 1</th>
<th>Not Infectious</th>
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LBOHs

- Investigating the Case
  - Ensure appropriate treatment
  - Help determine if the case needs to be excluded from work or school and for how long
  - Complete data collection in MAVEN
    - Ensure Demographic Question Package is completed for key variables (race, ethnicity, etc.)
- Identifying “close contacts”
  - Make recommendations for immunization, treatment, and/or exclusion from work/school as needed.

MDPH Epidemiologists can help with any of these and supplying template letters as needed.

617-983-6800
Control Measures

- Confirmed Cases of Pertussis Require Control Measures.
- If a suspect case is not lab confirmed, there are no formal control measures from public health
  - Although medical providers may use clinical judgement for household contacts, etc.
Making Control Recommendations

1. Ensure that case is confirmed (PCR positive with a cough) before making official recommendations.
   • (Need to call provider to get symptoms and clinical information.)

2. Identify infectious period based on cough onset date
   • (One week before, three weeks after, or until five days of appropriate antibiotic therapy have been completed, whichever comes first.)

3. Identify close contacts for referral (evaluation, testing, treatment/prophylaxis)
   • Who are close contacts for pertussis?
Making Control Recommendations

3. Identify close contacts for referral (evaluation, testing, treatment/prophylaxis)
   • Prioritize close contacts at **high risk of complications** (infants, pregnant women, immunocompromised)
   • Prioritize close contacts who have a **high risk of transmitting pertussis to infants, pregnant women, immunocompromised** ("transmission risk")

4. Exclude (test & treat) symptomatic close contacts if coughing <21 days.

5. Assess immunization history and recommend vaccination if appropriate (for case and contacts).

Symptomatic Cases & Contacts = Treatment
Asymptomatic Contacts = Prophylaxis
Making Control Recommendations

Who are close contacts for pertussis?

1. **Household contacts**
   - Includes caregivers who come to the house regularly, friends/relatives who visit often, overnight guests, and intimate contacts of the case

2. **Face-to-face contact**
   - Close face-to-face contact (within three feet), regardless of duration (sports teams, bus buddies, lunch buddies, best friends, etc.)

3. **Direct contact**
   - Direct contact with respiratory, oral, or nasal secretions.
Post-Exposure Prophylaxis

LBOH will usually take the lead on:

• Recommending post-exposure prophylactic treatment for any staff who were unmasked at any point while attending to the patient.
  • Rx recommended regardless of Tdap vaccination status.
  • Symptomatic staff should be tested, treated and excluded from work/public settings until the 5th day after appropriate antibiotic treatment.
Post-Exposure Prophylaxis

- Recommending post exposure prophylactic treatment of household members and close contacts of case if appropriate.
MAVEN
How does something end up in MAVEN?
Follow-Up in MAVEN

1. Review and acknowledge event in Maven.
   1. How did this come into Maven? What do we already know about this event?
   2. Identify the testing provider office/contact info. This may involve some calling/backend work.
      1. HINTS: Look in the lab tab for ordering provider. Sometimes you will have to call a laboratory to get the ordering provider information.
Follow-Up in MAVEN

2. Call Provider Office to Collect Patient Information.
   - Why did the patient go into the doctor?

   A. Have them read you the visit notes. Were multiple visits involved in this diagnosis?

   B. Collect Clinical Information
      1. Cough dates & symptoms
      2. Treatment information
      3. Vaccine hx (Tdap and DTaPs) & dates

   C. Collect Demographic Information
      1. Race/Ethnicity
      2. Confirm contact information
      3. School/profession info
      4. Household Contacts (Siblings? Was family also treated?)
         1. Guardian name & number
3. **Discuss Control Measures with Provider Office.**

1. Remind providers to update Tdap status of office.
2. Attending providers (face to face contact with patient – so med assistants, doc, etc.) need Zpack if exposed without masks worn.
   1. Rx recommended even if up to date with Tdap.¹

...IF you can confirm the case at this point.

Update Notes in MAVEN.
Follow-Up in MAVEN

4. **Call Patient (or Guardian) – same questions.**
   - Why did the patient go into the doctor?
     - A. Have them describe their illness. Did they go to the doctor multiple times?
     - B. Collect Clinical Information
       1. Cough dates & symptoms
       2. Treatment information – when did they start Zpack?
     - C. Collect Demographic Information
       1. School/profession info
       2. Household Contacts (Siblings? Was family also treated?)
     - D. Relevant Contacts/Exposures?
       1. Teams? Best Friends? Schools? (with dates)
       2. Anyone else you know sick with similar symptoms?

Patient may have more/different info from provider office.
Follow-Up in MAVEN

5. **Discuss Exclusion Dates & Notifying Contacts with Patient/Guardian.**
   1. You can work in tandem with them to notify exposed contacts as applicable.
   2. Calculate Infectious Period with them and discuss how long they need to stay out of work/school if applicable.
   3. Develop a plan of action for household contacts.
      1. Asymptomatic contacts can just have a script called in without being seen.

**Update Notes & Question Fields in MAVEN.**
Major Steps in Pertussis Case Investigation and Follow-up

6. **Follow Up with School and/or additional Contacts as applicable.**
   - Pertussis Letters/Advisories Templates are available. Contact MDPH Epi for assistance.

7. **Update all notes and fields in investigation in MAVEN.**
   - HELPFUL TOOL: Use Pertussis Wizard as a quick check for data completion.

8. **Sign off in Admin Question Package once investigation is complete.**

Review Notes & Question Fields in MAVEN.
Things to Remember/
Common Issues
Common Issues with Pertussis

• Remember to both acknowledge and sign off in the admin question package.

• MDPH Epis assigned to each case can be found in the “Tasks” for reference/questions.
Common Issues with Pertussis

• **Serologies** from the State Public Health Lab are the only valid serologies.
  • Commercial lab results are not valid (will not show up in MAVEN).
  • State Public Health Lab Serologies must be drawn >3 years after a pertussis containing vaccine was administered.
    • Positive serologies after a recent Tdap may just reflect vaccination.
Common Issues with Pertussis

- **PCRs** can be falsely positive.
  - In outbreaks we recommend culture testing to confirm the outbreak.
- Pertussis Testing is NOT needed for contacts (or anyone) without symptoms.
  - Testing should only be done on patients with SYMPTOMS.
  - Even contacts that show up with a letter to the doctor need symptoms for testing.
    - Prophylactic treatment, however, may be appropriate.
Common Issues with Pertussis

- **Cough onset date helps determine:**
  - Is patient still infectious?
  - Should they be excluded?
  - Do they need antibiotics?
  - Were they infectious when different contacts were exposed?
Common Issues with Pertussis

- **Record Clinical Information:**
  1. Paroxysmal cough
  2. Post-tussive vomiting
  3. Inspiratory Whoop
  4. Apnea (with or without cyanosis)

Make sure to ask specifically about these symptoms and to note in Clinical Question Package.
Common Issues with Pertussis

- **Vaccine Question Package is Required**
  - All DTaP and Tdap should be entered with dates.
  - Oldest vaccine first, newest last.
  - Select **Add New** for each vaccine entry.
  - If “unknown” or not up to date, must give reason for inadequate doses.
Common Issues with Pertussis

- **Other Bordetella Species Exist:**
  - **Bordetella Pertussis** is our biggest concern and requires follow-up and control measures.
  - Other species occasionally identified. **No Control Measures needed.**
    - Holmsei
    - Bronchiseptica
    - Parapertussis (treatment of case usually recommended but no prophylaxis for close contacts)

- **Check the Lab Test in MAVEN with all pertussis events.**
Resources

- MDPH Division of Epidemiology and Immunization 617-983-6800
  - Questions/Guidance for follow-up.
  - Sample Letters/Alerts
  - Reporting

- MAVEN Issues- call the MAVEN Help Desk.

- Reference Materials
  - Surveillance Chapter (Pertussis) (New!)
  - LBOH Tip Sheet (coming soon!)
  - Summary of Reportable Diseases, Surveillance and Isolation/Quarantine Requirements
Questions?