Pertussis
(Whooping Cough)
Investigation Guideline

CONTENT:

Investigation Protocol:

- Investigation Guideline
  12/2013
- Parapertussiss Case Investigation Guideline
  11/2012
- Rapid Assessment Worksheet / Contact Listing
  03/2010

Supporting Materials found in attachments:

- KDHE Pertussis Supplemental Form
  07/2012
- Pertussis Case Report Form (for medical provider reporting)
  12/2013
- Pertussis Investigation Algorithm
  12/2013
- Fact Sheet
  12/2013
- Pertussis Guidance Letter
  06/2013

Revision History:

<table>
<thead>
<tr>
<th>Date</th>
<th>Replaced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/2013</td>
<td>11/2012</td>
<td>Laboratory: requesting testing at state lab. Modifications to Contact Investigation, Contact Management, and Managing Special Situations to align with CDC recommendations to administer chemoprophylaxis to high-risk contacts and households. Removal of references to the CDC’s Guidelines for the Control of Pertussis Outbreaks.</td>
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<tr>
<td>11/2012</td>
<td>07/2012</td>
<td>Additional definitions for investigational purposes, updated laboratory section, clarification on exclusions and use of chemoprophylaxis, addition of parapertussis guidance and tools to use when incidence is high in a county.</td>
</tr>
<tr>
<td>07/2012</td>
<td>05/2012</td>
<td>Added reporting form. Fixed minor typographical errors.</td>
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<tr>
<td>05/2012</td>
<td>03/2010</td>
<td>Addition of notification section. Fixed typographical error in “Case Management.” Revisions in “Contact Management”, “Isolation… Restrictions” and “School/Childcare Settings” to agree with ACIP guidance on the use of Tdap for those over 7 years and added a VAERS statement. Edited incubation period in “Disease Overview”. Edited fact sheet.</td>
</tr>
<tr>
<td>02/2012</td>
<td>-</td>
<td>Removed references to KS-EDSS.</td>
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</table>
CASE DEFINITION (CDC 1997)

Clinical Description for Public Health Surveillance:
- A cough illness lasting ≥ 2 weeks with one of the following: paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting, without other apparent cause (as reported by a health professional).

Laboratory Criteria for Case Classification:
- Isolation of Bordetella pertussis from clinical specimen.
- Positive polymerase chain reaction (PCR) for B. pertussis.

Case Classification:
- Confirmed:
  - A case that is culture positive and in which an acute cough illness of any duration is present; or
  - A case that meets the clinical case definition and is confirmed by positive PCR; or
  - A case that meets the clinical case definition and is epidemiologically linked directly to a case confirmed by either culture or PCR.
- Probable:
  - Meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to a laboratory-confirmed case.
- Suspect: (used for investigation purposes only)
  - A case, not meeting the confirmed or probable case classifications, who has a clinical syndrome compatible with pertussis without other apparent cause such as: cough of >7 days, paroxysmal cough of any duration, cough with inspiratory whoop, cough associated with apnea in an infant, or cough in a close contact of a pertussis case.

Additional definitions for investigation purposes:
- Paroxysmal cough: Sudden uncontrollable “fits” or spells of coughing where one cough follows the next without a break for breath.
- Post-tussive emesis: Vomiting following paroxysms of cough.
- Whoop: High-pitched noise heard when breathing in after a coughing spasm.
- Apnea: Transient cessation of respiration occurring spontaneously or after a coughing spasm. Apnea is generally associated with cyanosis or syncope and might be accompanied by slowing of the heartbeat (bradycardia). Apnea is a common pertussis symptom in infants and might be the only presenting sign; apnea is rarely associated with pertussis in older children or adults.
- Cyanosis: Paleness or blueness of the skin, most noticeable on the lips and tongue, occurring after coughing paroxysms and apnea.
- Positive x-ray for pneumonia: Evidence of acute pneumonia on chest x-ray.
- Acute encephalopathy: Acute illness of the brain manifested by a decreased level of consciousness (excluding transient drowsiness after a seizure) occurring with or without seizures. Patients are almost always hospitalized and most undergo extensive diagnostic evaluations.
LABORATORY ANALYSIS
The State Public Health Laboratory (KHEL) is equipped to test for B. Pertussis for public health investigation purposes, but only after approval for patients with signs and symptoms consistent with pertussis: an acute illness characterized by prolonged cough and with paroxysms, whoop, or post-tussive vomiting. No asymptomatic contacts will be tested.

- For testing to occur at KHEL: requests must be approved through the disease reporting hotline at 1-877-427-7317
- Shipment: KHEL pertussis mailer is used for shipment to KHEL.
- Specimen: Nasopharyngeal swab or aspirate collected pernasally.
- Collection materials:
  - A commercially obtained bacterial nasopharyngeal swab collection system that consists of a flexible wire shaft and a swab that is made from Dacron material (not calcium alginate), or
  - A suction catheter with mucous trap and vacuum pump or a syringe with tubing that includes an in-line filter for collecting nasal aspirates.

- Timing of collection:
  - For culture: within 2 weeks of cough onset
  - For PCR: within 3 weeks of cough onset, but it may provide accurate results for up to 4 weeks of cough in infants or unvaccinated persons.
- Serology: Not recommended for surveillance purposes.
  - Useful for diagnosis in those without recent vaccination who present late in the course of their illness
  - Not standardized and not used for confirmation of surveillance cases.
  - Reported serological results are investigated in the same manner as negative PCR results, with the collection of onset and symptoms.
  - IgM and IgA results can indicate current infection or recent immunization.
  - IgG results can indicate recent or past infection or past immunization.

Notes:
1) Testing is not helpful to test contacts without respiratory symptoms.
2) Negative PCR results do not rule out the possibility of pertussis. Refer to Managing Special Situations - Determining … Non-laboratory Confirmed cases
3) Culture confirmation for at least one suspected case of pertussis is recommended when there is suspicion of a pertussis outbreak.

For additional information concerning collection or sample transport:
- Call (785) 296-1620 or refer to www.kdheks.gov/labs/lab_ref_guide.htm.
EPIDEMIOLOGY

Pertussis is endemic worldwide, with peaks occurring every 2-5 years. It is highly infectious, with secondary attack rates of 70-100% among unimmunized contacts. In the U.S., incidence of pertussis is highest in infants younger than 6 months of age, followed by people 10 –14 years of age. The increasing incidence in adults and adolescents, who serve as a source of infection for infants and under-immunized children, may be the result of waning immunity. Pregnant women with pertussis near term and other household contacts with pertussis are a source of pertussis for newborn infants. Protection after the last vaccination of DTaP wanes and is absent 12 years after the last dose which is usually given at kindergarten entry. Two acellular pertussis-containing vaccines were first licensed for adolescents and adults in 2005 (Tdap).

DISEASE OVERVIEW

A. Agent:
**Bordetella pertussis**, a small, aerobic Gram-negative rod.

B. Clinical Description:
Pertussis is an acute bacterial disease affecting the respiratory tract. The clinical course of the illness is divided into three stages.
1) **Catarrhal stage** characterized by the insidious onset of coryza (runny nose), sneezing, low-grade or no fever, and a mild, occasional cough, similar to the common cold. The cough gradually becomes more severe.
2) **Paroxysmal stage** beginning 1-2 weeks after onset; stage at which pertussis is usually suspected and diagnosed. The difficulty in expelling thick mucus from the tracheo-bronchial tree results in bursts, or paroxysms, of numerous, rapid coughs. A paroxysm may be followed by a long inspiratory effort with whoop. Infants < 6 months of age may not have the strength to whoop, but they do have paroxysms. During an attack, the patient may become cyanotic. Children and young infants appear very ill and distressed. Vomiting and exhaustion commonly follow the episode. Attacks occur more frequently at night, with an average of 15 attacks per 24 hours. During the first 1 or 2 weeks attacks increase in frequency, remain at the same level for 2 to 3 weeks, and then decrease. The paroxysmal stage lasts 1 to 6 weeks, but may persist for up to 10 weeks.
3) **Convalescent stage** is a gradual recovery. Paroxysmal coughing lessens and disappears in 2 to 3 weeks. Non-paroxysmal cough can continue for 6 weeks or longer. Viral respiratory infection can cause paroxysms to reoccur.

A milder disease with a persistent (>7 day) cough that is similar to other upper respiratory infections is seen in adolescents, adults, and children partially protected by the vaccine. The inspiratory whoop is uncommon in these cases.

C. Reservoirs: Humans. Adolescents and adults are an important reservoir for *B. pertussis* and are often the source of infection for infants

D. Mode(s) of Transmission:
Transmission most commonly occurs by the respiratory route through contact with respiratory droplets, or by contact with airborne droplets of respiratory secretions, which generally travel 3 feet or less when an infected person talks, cough or sneezes. Indirect spread through contaminated objects occurs rarely.
E. Incubation Period:
Average 9-10 days with a range of 6-20 days.

F. Period of Communicability:
Highly communicable in the early catarrhal stage and at the beginning of the paroxysmal cough stage (first 2 weeks). Communicability gradually decreases and becomes negligible about 3 weeks after the onset of paroxysmal cough. For control purposes, the communicability is considered from the onset of the respiratory symptoms up to 3 weeks after onset of typical paroxysms in untreated cases. Those cases treated with an antibiotic are considered no longer contagious after 5 days of appropriate treatment.

G. Susceptibility and Resistance:
Primarily a disease of childhood yet susceptibility in non-immunized populations is universal. Cases occur in previously immunized adolescents and adults because of waning immunity and can be a source of infection for young children. Neither infection nor immunization provides lifelong immunity.

H. Treatment:
Antibiotic treatment with a macrolide (erythromycin, clarithromycin or azithromycin) will eradicate *B. pertussis* from the nasopharynx of infected persons (symptomatic or asymptomatic). Antibiotics administered early in the course of illness can reduce the duration and severity of symptoms and the period of communicability. Refer to the CDC’s guidelines for [Recommended Antimicrobial Agents for Treatment and Postexposure Prophylaxis of Pertussis](https://www.cdc.gov/pertussis/guidelines/index.html).

**NOTIFICATION TO PUBLIC HEALTH AUTHORITIES**

Pertussis shall be designated as infectious or contagious in their nature, and all cases or suspected cases shall be reported within 4 hours by phone to KDHE:

1. Health care providers and hospitals: report to the local public health jurisdiction or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)
4. KDHE-BEPHI contacts the local public health jurisdiction by phone within one hour of receiving a pertussis report

Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)
24/7 Phone: 1-877-427-7317

**Further responsibilities of state and local health departments to the CDC:**
As a nationally notifiable condition, pertussis cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).
1. STANDARD reporting requires KDHE-BEPHI to file an electronic report for cases within the next reporting cycle.
   • KDHE-BEPHI will file electronic reports weekly with CDC.
2. Local public health jurisdiction will report information as requested in the Kansas electronic surveillance system, as soon as possible, ensuring that the electronic form is completed within 7 days of receiving a notification of a report.
INVESTIGATOR RESPONSIBILITIES

Note: Investigate as soon as possible; control measures must be initiated ≤ 24 hours of initial report.

1) Use current case definition, to confirm diagnosis with the medical provider.
   • If laboratory testing reveals that a suspected case of pertussis is positive for parapertussis, refer to the parapertussis section for guidance.
2) Conduct case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases and/or contacts.
4) Identify whether the source of infection is major public health concern,
   • Case exposed infant(s) or those in contact with infant(s), including pregnant women, health care workers, and child care workers.
   • Under-immunized population within the community.
5) Initiate control and prevention measures to prevent spread of disease.
6) Report all confirmed, probable and suspect cases to the KDHE at 1-877-427-7317 within 4 hours of the initial report.
7) Complete and report all information requested in EpiTrax.
8) As appropriate, use the notification letter(s) and the disease fact sheet to notify the case, contacts and other individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1) Contact the medical provider who ordered testing of the case or is attending to the case and obtain the following information.

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Verify that the patient is aware of the diagnosis.</td>
<td>Stress importance of public health interviewing the patient.</td>
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<tr>
<td>Request pertussis immunization history or information why the case is not immunized or fully immunized.</td>
<td>If not available, obtain information through another credible source.</td>
</tr>
<tr>
<td>Request pertinent clinical information, including onset date of cough, symptoms, complications, hospitalizations, any additional laboratory testing not reported, and patient outcome.</td>
<td>Symptoms to note: cough duration, paroxysms, inspiratory whoop, post-tussive emesis, apnea, and cyanosis</td>
</tr>
<tr>
<td>Verify appropriate treatment and testing has occurred.</td>
<td>Refer to Treatment Section and/or Case Management for guidance.</td>
</tr>
<tr>
<td>Determine what exclusion recommendations were made.</td>
<td>Refer to Isolation and Restriction Section for guidance.</td>
</tr>
<tr>
<td>Ask about high-risk contacts/settings.</td>
<td>Refer to High-risk Contacts definition in Contact Investigation.</td>
</tr>
<tr>
<td>Determine whether household/high risk contacts received chemoprophylaxis.</td>
<td>Refer to Contact Management Section.</td>
</tr>
<tr>
<td>Finally, verify the patient demographic and contact information.</td>
<td>Birth date, gender, race /ethnicity, address, phone numbers</td>
</tr>
</tbody>
</table>

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2) Interview the case to determine source, risk factors and transmission settings:
   • Verify the clinical symptoms and onset date.
   • Focus on incubation period 6-20 days prior to cough onset.
     − Examine exposure to others with extended cough illness.
       o Obtain dates of exposure,
       o Name and the date of birth of possible sources,
       o The possible source’s relationship to case,
       o Transmission setting, if applicable (i.e., household, school)
   • Focus on communicable period, collect information from case for the Contact Investigation. (See below).
   • Schedule a time for a follow-up interview.
     − If the case is still coughing at the time of initial interview, it is important to complete a follow-up interview 14 days after cough onset to determine the duration of cough.
   • See Case Management for additional instructions.

3) Investigate epi-links among cases (clusters, household, co-workers, etc). If the case had contact with person(s) who have/had pertussis, determine if the other “cases” have been reported to the state:
   • Search EpiTrax for the possible “case”. If found, record the previously reported record number in the current case notes.
   • Highly suspected cases, that have not previously been reported should be investigated as a suspect case and reported to KDHE.
   • For suspected outbreaks or possible undetected community transmission refer to Managing Special Situations section.

Contact Investigation

1) Identify and record all of the case’s occupations and activities while infectious, especially involvement with infants or other high risk individuals.
   • Pertussis Infectious Period: From onset date of cough until 21 days after onset or, if treated, 5 days after appropriate antibiotic therapy.
   • Exposure is defined as:
     − Direct face-to-face contact for a period (not defined) with coughing case,
     − Shared confined space in close proximity for a prolonged period of time, such as >1 hour, with a symptomatic, coughing case-patient; or
     − Direct contact with respiratory, oral, or nasal secretions from a symptomatic case (e.g., an explosive cough or sneeze in the face, sharing food, sharing eating utensils during a meal, kissing, mouth-to-mouth resuscitation, or performing a full medical exam including examination of the nose and throat).
   • Close contact: those potentially exposed to a pertussis case, during the infectious period, in a manner that would allow pertussis to be transmitted
   • High risk contacts: those close contacts at risk for developing severe disease or those who may expose persons at high risk for severe disease.
     − Infants < 1 year old
     − Pregnant women in the 3rd trimester of pregnancy
     − All persons with pre-existing health conditions that may be exacerbated
by a pertussis infection (for example, but not limited to immunocompromised persons and patients with moderate to severe medically treated asthma).
- Contacts who themselves have close contact with either infants under 12 months, pregnant women, or individuals with pre-existing health conditions at risk of severe illness or complications.
- All contacts in high risk settings that include infants aged <12 months or women in the third trimester of pregnancy.

2) Prepare a contact listing for each possible transmission setting (i.e., location) and record close contacts in each setting.
   - Collect information on each contact’s immunization status and on any symptoms of coughing.
   - Collect information on the contact’s occupation.
   - Note any school or daycare attendance. (Include facility name and location.)
   - Note any high risk contact, when able.

3) Follow-up coughing contacts as suspect cases. A contact meeting the clinical case definition may be considered a confirmed or probable case.

4) Institute control measures for school or day-care contacts as indicated under Isolation, Work and Daycare Restrictions.

5) Follow-up with household and close contacts (especially high risk contacts) as recommended under Contact Management.

Isolation, Work and Daycare Restrictions

**K.A.R. 28-1-6 for Pertussis (whooping cough):**

- Each infected person shall remain in respiratory isolation for three weeks if untreated, or for five days following initiation of antibiotic therapy.
- Each susceptible person in a school, child care facility, or family day care home shall be vaccinated within 24 hours of notification to the secretary or shall complete a five-day course of antibiotic therapy.
- Each susceptible person who does not receive the vaccination shall be excluded from the school, child care facility, or family day care home until 21 days after the onset of the last reported illness in the school, child care facility, or family day care home.

1) An infected person is considered to be any symptomatic person that is highly suspected of having pertussis.
2) Exclude all infected persons from daycare and school until the completion of five days of antibiotics or 3 weeks after cough onset, whichever comes first.
3) Susceptible persons are those who are highly likely to experience disease if exposed. This would include those lacking evidence of any immunizations.
4) Exclude all susceptible persons who do not receive the vaccination as instructed by K.A.R. 28-1-6.
5) Recommendations can be made for healthcare settings; refer to Managing special situations.

**Note:** While susceptible persons are most likely to become symptomatic on
day 6 till day 20 after exposure to an infectious case, susceptible persons are excluded from a child care or school for the full 21 days after the onset of the last reported illness in the facility to prevent the transmission within that setting.

**Case Management**

1) Determine if further testing is needed: if cultures or PCR tests have not been done, testing may be needed for symptomatic, highly suspected cases if results are necessary for response decisions or confirming an outbreak.

2) Assure proper antibiotic treatment is started as soon as pertussis is suspected.
   - Initiating treatment >3 weeks after cough onset has limited benefit to the patient or contacts. However, treatment is recommended up to six weeks after cough onset in late pregnancy.
   - Macrolide antibiotics that may be prescribed by physician:
     - 5-day course of azithromycin
     - 7-day course of clarithromycin
     - 14-day course of erythromycin
   - Alternative agent: 14-day course of trimethoprim-sulfamethoxazole

3) Initiate voluntary isolation, treatment, and control measures, as needed; if necessary, reference the [Kansas Community Containment Toolbox](#) for templates concerning isolation measures.
   - Cases should refrain from contact outside of the household for the first 5 days of a full course antibiotic therapy or for 21 days from cough onset for those who did not receive therapy.
   - Case isolation inside a household is not usually feasible but care should be taken to protect unimmunized infants or those at risk for complications.

4) Conduct a follow-up as needed to assure compliance with control measures, including work, school or daycare restrictions.

5) Conduct a follow-up interview to determine duration of cough and the number of days antibiotics were taken.

**Contact Management**

* If suspicion of pertussis in source patient is low, the recommendation of prophylaxis can be delayed until more evidence is gathered. See [Managing Special Situations](#).

The steps to accomplish for each contact are determined by the type of contact as defined by immunizations and risk. Use this table to determine what (steps) to accomplish, refer to indicated bullets (#) for guidance.

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>High Risk / Household</th>
<th>Non-High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-immunized</td>
<td>Recommend Chemoprophylaxis (1)</td>
<td>Recommend Vaccine (2,3)</td>
</tr>
<tr>
<td></td>
<td>Recommend Vaccine (2,3)</td>
<td>Provide Education (4)</td>
</tr>
<tr>
<td></td>
<td>Provide Education (4)</td>
<td>Monitor 21 days (5)</td>
</tr>
<tr>
<td></td>
<td>Monitor 21 days (5)</td>
<td></td>
</tr>
<tr>
<td>Up-to-date on vaccines</td>
<td>Recommend Chemoprophylaxis (1)</td>
<td>Provide Education (4)</td>
</tr>
<tr>
<td></td>
<td>Provide Education (4)</td>
<td>Monitor 21 days (5)</td>
</tr>
<tr>
<td></td>
<td>Monitor 21 days (5)</td>
<td></td>
</tr>
</tbody>
</table>
1) All **household** and **high risk** contacts should be given chemoprophylaxis regardless of age or immunization status.
   - Must be within 3 weeks of exposure to infectious case to be of any benefit.
   - Exceptions: chemoprophylaxis should be considered for high-risk contacts (e.g., infants) up to 6 weeks after exposure.

2) Recommend pertussis vaccine to all under-immunized contacts:
   - Child, >2 months, unimmunized or < 3 doses of DTP/DTaP, initiate or continue according to the recommended schedule.
   - Child, ≥12 months of age, with 3 doses of DTaP/DTP, a fourth dose of DTaP can be given ≥6 months after the third dose
   - Child, 4-6 years of age, with 4 doses of DTaP/ DTP but received the fourth dose before the 4th birthday, should be given a fifth dose of DTaP.
   - Child, 7-10 Years of age who did not receive a 4th dose after age 4 years, should be given Tdap
   - Person, >10 years of age who has not had Tdap, consider a single dose of an age appropriate formulation of Tdap.
     - There is no current recommended minimum interval between Td and Tdap.

3) Report any adverse event that occurs after the administration of a vaccine to Vaccine Adverse Events Reporting System at [http://vaers.hhs.gov/index](http://vaers.hhs.gov/index)

4) Provide education, as described in the **Education** section.

5) Arrange monitoring of close contacts for respiratory symptoms for 21 days after cough onset of the last confirmed or suspected case.
   - Symptomatic (coughing) contact: Considered a suspect case; investigate and report to the state; initiate any work, school, or daycare restrictions. A contact meeting the clinical case definition is considered a confirmed case.

6) Follow-up of contacts that have been excluded from daycare, school, or work is indicated to determine compliance of control measures.

7) Report each household, high-risk, and under-immunized contact under the “Contacts” tab in EpiTrax. Refer to **Data Management** for more guidance.

8) Report the following to help summarize the contact management efforts:
   - Number of contacts excluded as required by **K.A.R. 28-1-6**
   - Number of recommendations for chemoprophylaxis made to household and high risk contacts (The number should correspond to the household and high risk contacts listed by name on the “Contacts” tab.)

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**Education**

1) Provide education that includes basic information about the disease:
   - Incubation period (when to expect illness to appear after exposure)
   - Symptoms of disease
   - Precautions to take if symptoms develop

2) Provide information on ways to treat and prevent transmission of illness.
   - Benefits of vaccination
   - Proper antibiotic usage

3) Instruct cases on the necessary isolation.
4) Instruct cases and contacts to be aware of the high risk that infection poses to certain individuals, especially to infants under 6 months of age.

5) Counsel contacts to watch for signs or symptoms of pertussis occurring within 21 days of exposure; should symptoms develop:
   • The local health department should be notified and
   • Medical care should be sought promptly with appropriate specimens taken and treatment considered for those with any of the signs or symptoms compatible with pertussis.

MANAGING SPECIAL SITUATIONS

1) Determining the need for treatment of close contacts of a suspected but non-laboratory confirmed cases

1) If testing was done, but there was a negative result:
   • When was the specimen collected? (Collection within a week of onset and before antibiotic treatment results in fewer false negatives results.)
   • How sensitive is the testing methodology?
   • If the specimen was collected early in the course of illness, prior to antibiotic treatment, and was performed with a highly sensitive test, the results are most likely a true negative and antibiotic treatment of contacts would not be recommended.

2) Testing was not done or is unreliable (possible false-negative):
   • Are there any classical symptoms of pertussis, such as paroxysms, even without the 14 day cough duration?
   • Is it a sporadic case or is there a link to a confirmed case of pertussis?
   • Cases that do not have any of the classical symptoms of pertussis and are not linked to other cases are considered low risk. Treatment can be delayed until reliable laboratory testing is available or an epi-link is established to support the possibility of pertussis in the setting.

2) Community Settings:

Pertussis in infants aged <1 year is a sentinel event of undetected disease in the community.

When incidence of pertussis is higher then expected in a community based on previous reports in a non-epidemic period and/or when no specific settings of transmission can be identified, consider the following:

1) Initiate active surveillance for pertussis by contacting medical community (i.e. physicians, health care workers, laboratories) weekly.

2) Issue pertussis alerts to health care providers with education on pertussis, the need to protect contacts and importance of protecting infants. Continue to issue periodic updates of the situation, as needed.
   • Provide the supplemental case report form for physicians.

3) Employ media and other means to educate the public, particularly parents of very young children and infants <6 months old.

4) Consider consultation with KDHE-BEPHI on the appropriateness and logistics of accelerated vaccination schedules for children in the community.
3) **Outbreak Investigation:**

1) **Outbreak definition:** if ≥ 2 cases are clustered in time (e.g., cases occurring within 42 days of each other) and space (e.g., in one building) where transmission is suspected to have occurred in that setting.

2) Notify KDHE immediately, 1-877-427-7317.

3) Active case finding will be an important part of any investigation.

4) Data will be reported and maintained through Kansas EpiTrax.

5) Recommendations will be made based on the most current guidance.

6) During periods of high incidence, it may be necessary to triage reports of pertussis.

   - An indication of a **high-risk contact**/setting will increase the priority of a report.
   - Investigations should **always** be performed even if resources are extremely limited for:
     - Culture- or PCR-positive cases
     - Epi-linked cases that meet the clinical case definition
     - Infants < 1 year of age regardless of symptom presentation
   - Investigations should be performed as resources allow during the outbreak: (in order of importance):
     - Cases that meet the clinical case definition but have no epi-link or lab confirmation ('probable' cases)
     - Cases with classic symptoms (paroxysmal cough, post-tussive vomiting, or whooping) and < 2 week cough duration with no testing or a negative test
     - Cases with an epi-link that do not yet meet the clinical case definition (symptomatic contacts of a case) (Reports should be entered in EpiTrax or faxed to KDHE whether further investigated or not.)
   - A **supplemental case report form** can be given to medical providers for reporting during periods of high incidence.
   - A **flowchart** is provided in attachments to assist local health departments with triage of cases during periods of high incidence.
4) **Health Care Setting:**

- Consult with the facilities infection control practitioner to identify contacts that need to receive a medical evaluation as soon as possible.
  - Health care provider (HCP) contacts are people exposed to a patient with pertussis who did not take proper infection-control precautions.
- Post-exposure antimicrobial prophylaxis is recommended for all HCPs (even if immunized with Tdap) who have unprotected exposure to pertussis and are likely to expose a patient at risk of severe pertussis (e.g., hospitalized neonates and pregnant women).
  - Other HCPs should either receive post-exposure antimicrobial prophylaxis or be monitored daily for 21 days after pertussis exposure and treated at the onset of signs and symptoms of pertussis.
  - Other people (patients, caregivers) defined as pertussis contacts in a health care setting should be given chemoprophylaxis and immunization as recommended in [Contact Management](#).
- Symptomatic contacts should be tested, treated and/or excluded from work as described in “[Isolation, Work and Daycare Restrictions.](#)”.
- HCPs with symptoms of pertussis (or HCPs with a cough illness within 21 days of exposure to pertussis) should be excluded from work for at least the first 5 days of the recommended course of antimicrobial therapy.
  - HCPs with symptoms of pertussis who cannot take, or who object to, antimicrobial therapy should be excluded from work for 21 days from onset of cough. Use of a respiratory mask is not sufficient protection.
- All contacts should be under surveillance for symptoms for 21 days since their last known exposure.
- During community outbreaks of pertussis, restriction of visitors from newborn and infant units and ward/hospital specific restrictions of visitors with respiratory symptoms (consistent with pertussis) may be needed.

5) **Pregnancy:**

- CDC recommends that pregnant women receive the Tdap vaccine during each pregnancy. The best time to receive the immunization is the 27th through 36th week.
- Pertussis early in pregnancy does not pose substantial risk to mother or fetus, but infants born to mother infected with pertussis at delivery are at high risk for acquiring severe infection.
- Antimicrobial treatment should be initiated as soon as pertussis is suspected in a pregnant woman, regardless of trimester. Treatment is recommended at anytime ≤ 6 weeks after cough onset in late pregnancy.
- Mothers with pertussis should be placed on droplet precautions during hospitalization for delivery until completing 5 days of antibiotic therapy.
- It is not necessary to isolate the baby from the mother if both are receiving antibiotic therapy. Breast feeding is encouraged in these situations.
- Measurement of antibody levels in cord blood is not recommended.
6) School and Child Care Settings:
   1) Coordinate activities with school nurse and/or administration.
   2) Identify close contacts to evaluate/observe for cough and high risk contacts needing chemoprophylaxis. Refer to Contact Management for specific guidance on vaccination and chemoprophylaxis.
   - **Child care centers**: With extensive contact between children, consider entire class (or entire center if the child care center is not divided into classes). With minimum interaction between children, consider only individual(s) or groups with significant exposure.
   - **Home child care setting**: Consider all children, the child-care provider and members of his/her family who have had contact with case.
   - **Schools**: Consider patterns of interaction that increase amount of exposure time among groups. Close contacts are those among the groups with significant, potential exposures.
     - **Elementary school or middle school**: without frequent changing of classes or high-risk settings with ill or developmentally delayed children, consider the entire classroom, staff, aides and volunteers when examining patterns of interaction. Investigate after school activities and core groups of close friends for extent of exposure.
     - **Other school settings**: Consider contacts based on extent of exposure; the presence/absence of coughing persons in the group; whether any other pertussis has been reported in area; and whether high-risk individuals or unvaccinated young children are present. Consider students who work closely together, students sitting next to case in school or extra-curricular activities, bus seatmates, carpool contacts, core group of close friends, and social or work contacts.
     - **Extra-curricular activity groups**: Teammates are usually considered potential contacts but it depends on the type of activity. Other extra-curricular groups are examined based on criteria mentioned above in other school settings.
       - For classrooms, teams and other groups in which there are > 2 confirmed cases, it may be appropriate to expand the definition of a close contact (i.e. entire classroom, team or group who would not have been considered with only one confirmed case).

3) Create listing(s) of contacts organized by group setting. Evaluate extent of exposure for each group. For close contacts perform the following:
   - Evaluate each for acute cough illness and assess immunization status.
   - Refer symptomatic contacts to health care providers for evaluation and treatment.
   - The Pertussis Guidance Letter is used to refer asymptomatic high risk contacts for chemoprophylaxis.
   - Exclude as described under Isolation, Work and Daycare Restrictions.

4) Maintain the log of who had symptoms and was referred for treatment and/or testing and/or who required exclusion.
• Record the recommendations made in the EpiTrax system.
• Follow-up to see outcomes of referrals and exclusions.

5) Notify parents of contacts and/or susceptible children within 24 hours of receipt of the case report. The Pertussis Guidance Letter can be used for this notification. The notice advises the parents to:
• Verify their child’s immunization status and bring it up to date within 24 hours of receiving notification.
• Be informed of what will or needs to occur:
  o For high risk children: obtain chemoprophylaxis for child.
  o For symptomatic children considered to be suspect cases: must obtain and complete at least 5 days of appropriate antibiotic therapy before returning to school.
  o For susceptible children: the failure to comply with immunization requirements shall result in the child being excluded from school for 21 days after the onset of the last reported illness in the facility.
• Report any respiratory illness occurring within 3 weeks and to seek medical care for diagnosis and appropriate treatment.

6) Initiate active surveillance among close contacts and continue for at least 21 days following the cough onset of the last suspected or confirmed case.
• Notify day care operators to report to the health department any new respiratory illness occurring during the surveillance period. New admissions to the facility should be evaluated on a case-by-case basis according to risk of acquisition of pertussis (i.e., immunization status).
• Notify school nurse and/or other staff (teachers, coaches, instructors) to refer students with cough of >7 days, paroxysmal cough of any duration, cough with inspiratory whoop, or cough in a close contact of a pertussis case, for medical evaluation.

7) Reference K.A.R. 28-1-20 for immunization requirements for the current school year; on-line at: www.kdheks.gov/immunize/schoolInfo.htm
DATA MANAGEMENT AND REPORTING TO THE KDHE

A. Organize and collect data.

B. Report data via the state electronic surveillance system.
   - Especially data that collected during the investigation that helps to confirm or classify a case. (For epi-linked cases, please include the Record Number of the related case.)

<table>
<thead>
<tr>
<th>Forms and Worksheets for Reporting and Investigation</th>
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</thead>
<tbody>
<tr>
<td><strong>Form Name</strong></td>
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<tr>
<td>Pertussis Rapid Assessment Worksheet</td>
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<tr>
<td>Pertussis Contact Listing</td>
</tr>
<tr>
<td>Supplemental Pertussis Case Reporting Form</td>
</tr>
<tr>
<td>KDHE Pertussis Reporting Form</td>
</tr>
</tbody>
</table>

- EpiTrax entering information on contacts – Pertussis contact form:
  After the contact is created and saved on a case’s (parent patient’s) Contact tab, the form is accessed by selecting “Edit contact” and navigating to the “Investigation tab” of the contact. Fill out as much information as possible for the contact event.
ADDITIONAL INFORMATION / REFERENCES


C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: [www.cdc.gov/osels/ph_surveillance/nndss/casedef/case_definitions.htm](http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/case_definitions.htm)

D. **Quarantine and Isolation:** Kansas Community Containment Isolation/Quarantine Toolbox Section III, Guidelines and Sample Legal Orders [www.kdheks.gov/cphp/operating_guides.htm](http://www.kdheks.gov/cphp/operating_guides.htm)

E. **Kansas Regulations/Statutes Related to Infectious Disease:** [www.kdheks.gov/epi/regulations.htm](http://www.kdheks.gov/epi/regulations.htm)

F. **Recommended Antimicrobial Agents** for the Treatment and Postexposure Prophylaxis of Pertussis. 2005 CDC Guidelines. MMWR December 9, 2005 / 54(RR14); 1-16. Available at: [www.cdc.gov/mmwr/preview/mmwrhtml/rr5414a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5414a1.htm).

G. **Additional Recommendations for Use of Tetanus Toxoid, Reduced-Content Diphtheria Toxoid, and Acellular Pertussis Vaccine (Tdap).** COMMITTEE ON INFECTIOUS DISEASES. *Pediatrics*; originally published online September 26, 2011. Available online at: [http://pediatrics.aappublications.org/content/early/2011/09/21/peds.2011-1752](http://pediatrics.aappublications.org/content/early/2011/09/21/peds.2011-1752)

H. **Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: [www.cdc.gov/vaccines/pubs/pinkbook/index.html](http://www.cdc.gov/vaccines/pubs/pinkbook/index.html)


J. **Additional Information (CDC):** [www.cdc.gov/health/default.htm](http://www.cdc.gov/health/default.htm)
PARAPERTUSSIS CASE INVESTIGATION AND CONTROL METHODS

*B. parapertussis* causes a pertussis-like illness that is generally milder than pertussis because the bacteria do not produce pertussis toxin. Co-infection of *B. pertussis* and *B. parapertussis* is not unusual.

If laboratory testing reveals that a suspected case of pertussis is instead positive for parapertussis, the investigator should:

1. Determine if the case has an epi-link to a lab-confirmed case of pertussis.
   - If so, investigate the epi-linked case using the Standard Case Investigation steps outlined in the above Pertussis Investigation Guideline.

2. Determine if the case lives in a household with an infant aged <6 months, or has other contact with an infant aged <6 months.
   - All infants should receive antibiotic prophylaxis if they have been in contact with a person who has parapertussis.
   - Prophylactic treatment of household members should be strongly considered if there is an infant in the household.
   - Recommended antibiotic treatment for parapertussis is the same as pertussis.

**NOTE:** Patients with laboratory-confirmed symptomatic *B. parapertussis* infections do not need to be isolated or furloughed from school or work. However, persons with *B. parapertussis* infection should avoid contact with infants aged <6 months until they have received five days of appropriate antibiotic treatment. Prophylaxis for asymptomatic contacts (except in the case of household members when there is an infant aged <6 months in the same household) is not recommended.
Pertussis Rapid Assessment Form for the Local Investigator

(Please refer to the Disease investigation Guideline for additional guidance.)

<table>
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<tr>
<th>SYMPTOM(S)</th>
<th>Initial Interview Information</th>
<th>Final Interview Information</th>
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<tr>
<td>Date</td>
<td>Unk. No Yes Onset Date Duration (days) Still Coughing Duration (days)</td>
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<tr>
<td>Cough</td>
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<tr>
<td>Paroxysm</td>
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<td>Whoop</td>
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<tr>
<td>Post-tussive Vomiting</td>
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<tr>
<td>Apnea</td>
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**TREATMENT INFO**

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<td>2nd Antibiotic used</td>
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**LABORATORY TESTING**

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<th>Results</th>
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<td>Culture</td>
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<tr>
<td>PCR</td>
<td>Positive / Negative</td>
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<tr>
<td>Serology IgM</td>
<td>Positive / Negative</td>
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<tr>
<td>Serology IgG-Acute</td>
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<tr>
<td>Serology IgG-Convalescent</td>
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**COMPLICATIONS**

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<td>Seizures</td>
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<td>Encephalopathy</td>
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**DTaP/ Tdap History**

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<td>Dose 6</td>
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For a case <12 months – Age of Mother at birth: Weight of baby at birth:

**Clinical Case Definition:** A cough illness lasting at least 2 weeks with one of the following: paroxysms of coughing OR inspiratory “whoop,” OR post-tussive vomiting, and without other apparent cause (as reported by a health professional).

**Laboratory Criteria:** Isolation of *Bordetella pertussis* by culture OR positive PCR for *Bordetella pertussis*.

**Confirmed:**
1) A person with an acute cough illness of any duration who is culture positive OR
2) Clinical case definition is met and PCR is positive OR
3) Clinical case definition is met and case is epi-linked directly to a culture positive / PCR positive case.

**Probable:**
1) Clinical case definition is met AND
2) Not laboratory confirmed AND
3) No epidemiology link to a confirmed case.

**Suspect:**
1) PCR positive but does NOT meet the clinical definition.
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<th>Birthdate or Age</th>
<th>Gender</th>
<th>Location / Address / Phone</th>
<th>Occupation / School</th>
<th>Date First Exposure</th>
<th>Date Final Exposure</th>
<th>High Risk Contact</th>
<th>DTaP/Tdap up-to-date</th>
<th>Provider Information (For Medical Assessment Referrals)</th>
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<th>Antibiotic Prophylaxis</th>
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</table>
**Contact:** Definition can vary but generally refers to those with direct face-to-face contact for a period (not defined) with symptomatic case; who shared a confined space in close proximity for a prolonged period of time, such as >1 hour, with a symptomatic case; or direct contact with respiratory, oral, or nasal secretions from a symptomatic case (e.g., an explosive cough or sneeze in the face, sharing food, sharing eating utensils during a meal, kissing, mouth-to-mouth resuscitation, or performing a full medical exam including examination of the nose and throat).

**High Risk Contacts:** Infants aged <1 year; persons who have an immunodeficiency or underlying severe disease (i.e., chronic lung disease or cystic fibrosis); health care workers providing direct patient care; anyone working with neonatal or pediatric, labor and delivery or postpartum patients; or those taking care of infants or who could be soon caring for infants (i.e., pregnant females and family).

Refer to the *Pertussis Disease Investigation Guideline* for further information.

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<tr>
<th>#</th>
<th>Comments</th>
<th>Contact</th>
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<td>Infants aged &lt;1 year; persons who have an immunodeficiency or underlying severe disease (i.e., chronic lung disease or cystic fibrosis); health care workers providing direct patient care; anyone working with neonatal or pediatric, labor and delivery or postpartum patients; or those taking care of infants or who could be soon caring for infants (i.e., pregnant females and family).</td>
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Supporting Materials

Supporting Materials are available under attachments:

CLICK HERE TO VIEW ATTACHMENTS

Then double click on the document to open.

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Go to <View>; <Navigation Pane>; <Attachments>
– OR –
Click on the “Paper Clip” icon on the left.