









Pertussis (Whooping Cough) Investigation Guideline

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Attachments can be accessed through the Adobe Reader's navigation panel for attachments. Throughout this document attachment links are indicated by this symbol ; when the link is activated in Adobe Reader it will open the attachments navigation panel. The link may not work when using PDF readers other than Adobe.

Revision History:

Date	Replaced	Comments
01/2020	05/2019	Updated case definition. Modified recommendation on when to perform a follow-up interview for cough duration. Updated how to enter contacts into new EpiTrax version.
05/2019	05/2018	Updated “Case Management” (bullet 3) to agree with Isolation & Quarantine. Updated “Laboratory Analysis” adding specimen rejection criteria. Clarification of communicable period in “Disease Overview”. Removed exception for PEP “up to 6 weeks” in “Contact Management” (bullet 1) but added infants <1 year could receive treatment “up to 6 weeks” after onset in “Case Management”. Created Pertussis Notification letter for schools to replace use of CDC Guidance letter that was more suited for use in outbreaks.
05/2018	07/2013	Updated Notification sections and Isolation, Work and Daycare Restrictions sections and letters and fact sheet with updated regulations.
07/2013	03/2015	Revised format of table under “Contact Management” on page 12. Included notes on attachments  (Content Page).
03/2015	12/2013	Updated Case Definition to CDC 2014 definition and further refined “Suspect” case definition. Updated Disease Overview – Incubation Period, Period of Communicability, and Susceptibility sections and added Vaccination section. Updated Case Investigation with definition of symptoms and edits to incubation period. Updated Isolation and Restrictions section, Contact Management, and Special Situations – School and Childcare to agree with KDHE March 2015  recommendations on exclusion. Modified Data Management section and added hints on EpiTrax data entry throughout the document. Updated the fact sheet with KDHE March 2015 recommendations on exclusion.
12/2013	11/2012	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 <u>high-risk</u> contacts and households. Removal of references to the CDC’s Guidelines for the Control of Pertussis Outbreaks.
11/2012	07/2012	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.
07/2012	05/2012	Added reporting form. Fixed minor typographical errors.
05/2012	03/2010	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. (02/2012 Removed references to KS-EDSS)

Pertussis

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 2014)

Clinical Description for Public Health Surveillance:

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

- Paroxysms of coughing; OR
- Inspiratory whoop; OR
- Post-tussive vomiting; OR
- Apnea (with or without cyanosis)

Laboratory Criteria for Case Classification:

Confirmatory laboratory evidence:

- Isolation of *Bordetella pertussis* from clinical specimen
- Positive polymerase chain reaction (PCR) for *B. pertussis*

Epidemiologic Linkage

Contact with a laboratory-confirmed case of pertussis

Case Classification:

Confirmed:

Acute cough illness of any duration, with

- Isolation of *B. pertussis* from a clinical specimen **OR**
- PCR positive for *B. pertussis*

Probable:

- In the absence of a more likely diagnosis, illness meeting the clinical criteria,
OR
- Illness with cough of any duration, with
 - o At least one of the following signs or symptoms:
 - o Paroxysms of coughing; or
 - o Inspiratory whoop; or
 - o Post-tussive vomiting; or
 - o Apnea (with or without cyanosis)

AND

- o Contact with a laboratory confirmed case (epidemiologic linkage)

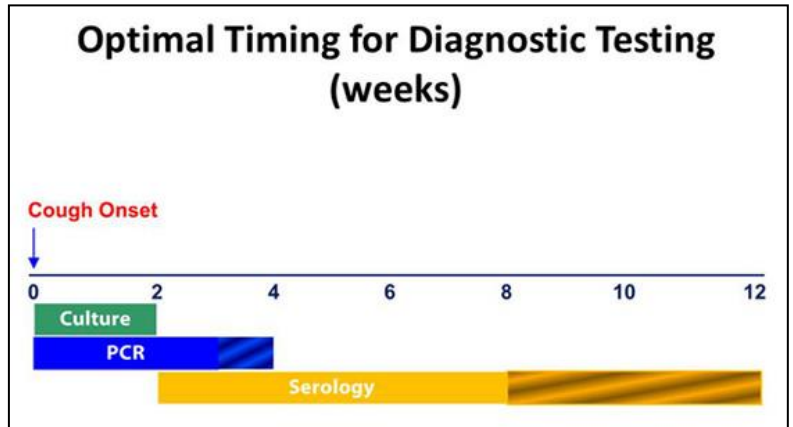
Suspect: (used for KDHE Data Management only)

- A case, not meeting the confirmed or probable case classifications, with a clinical syndrome that has no other apparent cause and is compatible with a potential pertussis infection based on symptoms and risk, including:
 - o Close contact with a confirmed or probable pertussis case and developing within the incubation period for pertussis a cough of any duration but without paroxysms, whoop, post-tussive vomiting, or apnea.
 - o No known close contact with a confirmed or pertussis case, but the medical provider suspects pertussis because one of the following signs or symptoms present in any duration:
 - Paroxysmal cough,
 - Cough with inspiratory whoop, or
 - Cough associated with apnea

LABORATORY ANALYSIS

The State Public Health Laboratory (KHEL) is equipped to test for *B. pertussis* for public health investigation purposes, but only after approval. Patients must be symptomatic; no asymptomatic contacts will be tested. Testing is done through a [Respiratory Panel PCR](#) at KHEL.

- For testing to occur at KHEL: requests must be approved by KDHE-BEPHI through the disease reporting hotline at 1-877-427-7317
 - Shipment to KHEL: [Category B Cold Specimen VTM](#) shipper
 - Specimen: Nasopharyngeal swab
 - Collection materials:
 - Nasopharyngeal swab collection system that consists of a flexible wire shaft and a swab that is made from Dacron material
 - Viral Transport Medium (VTM) or other M4 Universal Transport Medium (UTM).
 - **Reasons specimen will be rejected:**
 - **No KDHE-BEPHI approval.**
 - **Specimen not received on ice packs.**
 - **Specimen received more than 3 days post collection.**
 - **Specimen not submitted in the correct media or swab type.**
- 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 during 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) It 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) Parapertussis is sometimes identified during a pertussis investigation. Refer to [Parapertussis Infection Identified During Pertussis Investigation](#).

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.

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 ([Figure 2](#)).

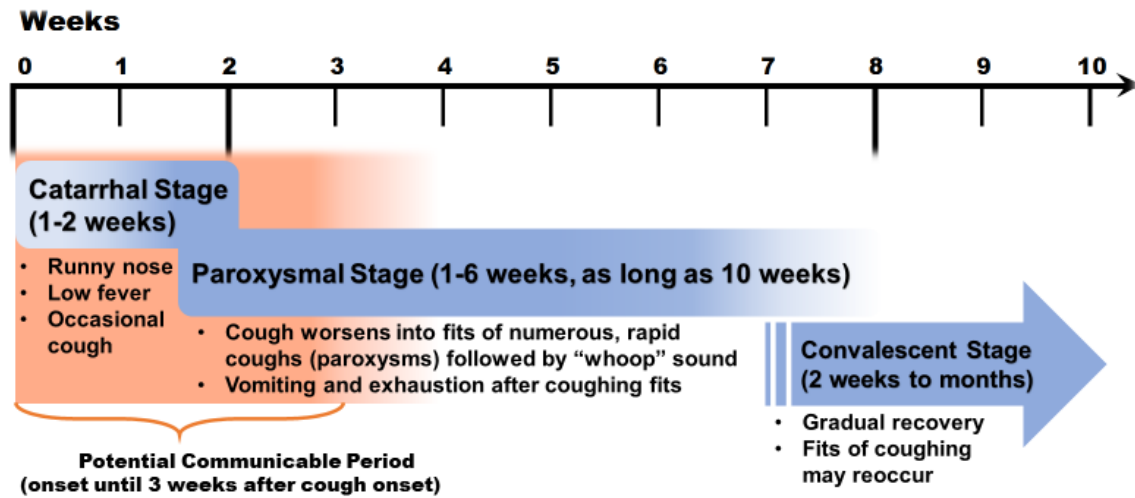
- 1) Catarrhal stage characterized by the insidious onset of coryza (runny nose), sneezing, low-grade or no fever, and a mild, occasional cough, like the common cold. The cough gradually becomes more severe. The catarrhal stage usually lasts 7-10 days in length; but ranges from 4-21 days.
- 2) Paroxysmal 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 paroxysms. 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 like 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.

Figure 2: Typical pertussis disease progression in susceptible case-patient



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:

Commonly 7-10 days, with a range of 4-21 days. (Source: [The Pink Book, 2012](#))

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 cough.

- For control purposes, the communicability is considered from the onset of any respiratory symptoms until 3 weeks after onset of cough in untreated cases. When treated with appropriate antibiotics during the communicable period of the illness, patients are considered no longer contagious after completion of the antibiotic treatment.

G. Susceptibility and Resistance:

- Susceptibility of non-immunized individuals is universal.
- The highest incidence of pertussis is in children aged less than 5 years (especially infants).
- Effective infant vaccination programs result in a shift has toward infection in adolescents.
- Cases occur in previously immunized adolescents and adults because of waning immunity.
- One attack usually confers prolonged immunity, although subsequent attacks (some of which may be attributable to *B. parapertussis*) can occur.
- Neither infection nor immunization provide lifelong immunity.
- Milder and missed atypical cases occur in all age groups.
- Incidence, morbidity and mortality are higher in females than males.
- Secondary attack rates of up to 90% have been observed in non-immune

household contacts.

- Although antibodies cross the placenta, transplacental immunity in infants has not been demonstrated.

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 during 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](#).

I. Vaccination:

Immunization is the most rational approach to pertussis control. Immunization protects against severe disease but begins to wane after about 5 years. Acellular pertussis vaccines are now utilized in the United States and consist of a primary series (DTaP) of four doses at age two months, four months, six months, and 15-18 months, with a booster dose at school entry (4-6 years). Administration of a **single** dose of an adolescent and adult formulation (Tdap) is also recommended for those 11-18 years of age (preferable at 11-12 years of age), for children 7-10 years of age who are not fully vaccinated against pertussis, and for adults 19 years of age and older who did not get Tdap as an adolescent. Expectant mothers should receive Tdap during each pregnancy, preferably at 27 through 36 weeks. Tdap can be given no matter when Td was last received.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Suspected cases of pertussis shall be reported within 24 hours, except if the reporting period ends on a weekend or state-approved holiday, the report shall be made by 5:00 p.m. on the next business day after the 24-hour period:

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)



**Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)
Phone: 1-877-427-7317 Fax: 1-877-427-7318**

Further responsibilities of state and local health departments to the CDC:

As a nationally notifiable condition, pertussis cases require a ROUTINELY NOTIFIABLE report to the Center of Disease Control and Prevention (CDC).

1. ROUTINE 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 14 days of receiving a notification of a report.

INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all confirmed, probable and suspected cases to the KDHE-BEPHI.
 - Start the [Case Investigation](#) within 1 day of receiving a notification
 - Complete the case investigation within 14 days of receiving notification.
- 2) Contact medical provider to collect additional information and confirm diagnosis using the current case definition.
 - If laboratory testing reveals that a suspected case of pertussis is positive for parapertussis, refer to the [parapertussis section](#) for guidance.
 - Collect all information requested in [Step 1](#)) of case investigation.
 - Ensure that the patient is aware of his/her diagnosis.
- 3) Complete the [case investigation](#) to identify potential source of infection.
- 4) Conduct [contact investigation](#) to locate additional cases and/or contacts.
 - Identify primary contacts within 24 hours of notification.
- 5) Identify whether the source of infection is major public health concern,
 - Patient 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.
- 6) Initiate [control and prevention measures](#) to prevent spread of disease.
- 7) [Record](#) data, collected during the investigation, in the KS EpiTrax system under the data's associated [\[tab\]](#) in the case morbidity report (CMR). Identify whether the source of infection is major public health concern,
- 8) As appropriate, use the [notification letter\(s\)](#)  and the disease [fact sheet](#) .

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

- 1) Review the following definitions to prepare for the case investigations:
 - **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 fit.
 - **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; 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.
 - **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.
- 2) Contact the medical provider who ordered testing of the case or is attending to the case and obtain the following information.

<ul style="list-style-type: none"> Verify that the patient is aware of the diagnosis. 	<p><i>Stress importance of public health interviewing the patient.</i></p>
<ul style="list-style-type: none"> Request pertussis immunization history or information why the case is not immunized or fully immunized. 	<p><i>If not available, obtain information through another credible source.</i> [Investigation-Vaccination History]</p>
<ul style="list-style-type: none"> Request pertinent clinical information, including onset date of cough, symptoms, complications, hospitalizations, any additional laboratory testing not reported, and patient outcome. 	<p><i>Symptoms to note: cough duration, paroxysms, inspiratory whoop, post-tussive emesis, apnea, and cyanosis.</i> [Investigation-Symptoms]</p>
<ul style="list-style-type: none"> Verify appropriate treatment and testing has occurred. 	<p><i>Refer to Treatment Section and/or Case Management for guidance.</i> [Clinical]</p>
<ul style="list-style-type: none"> Determine what exclusion recommendations were made. 	<p><i>Refer to Isolation and Restriction Section for guidance.</i></p>
<ul style="list-style-type: none"> Ask about high-risk contacts/settings. 	<p><i>Refer to High-risk Contacts definition in Contact Investigation.</i></p>
<ul style="list-style-type: none"> Determine whether household/high risk contacts received chemoprophylaxis. 	<p><i>Refer to Contact Management Section.</i></p>
<ul style="list-style-type: none"> Finally, verify the patient demographic and contact information. 	<p><i>Birth date, gender, race /ethnicity, address, phone numbers</i> [Demographic]</p>

- 3) Interview the case to determine source, risk factors and transmission settings:
- Verify clinical symptoms and onset date of respiratory symptoms and cough.
 - Focus on incubation period 4-21 days prior to symptom onset.
 - Examine exposure to others with extended cough illness.
 - Obtain dates of exposure,
 - Name and the date of birth of possible sources,
 - The possible source's relationship to case,
 - Transmission setting, if applicable (i.e., household, school)
 - Record occupations, group living, daycare associations, and any Exposure(s) (where illness could have been transmitted) under [Investigation] tab.
 - Focus on communicable period, collect information from case for the [Contact Investigation](#). (See below).
 - Determining duration of cough and schedule a follow-up interview:
 - If a coughing case does not meet the confirmed or probable case criteria and is only missing the duration of cough to be considered a probable case, schedule and complete a follow-up interview 14 day after cough onset to determine the duration of cough.
 - If the case is laboratory confirmed, will not meet clinical criteria even with cough duration, or has been coughing longer than 14 days or is no longer coughing at the time of the initial interview, a follow-up interview may not be

necessary; record the current duration of the cough on the [\[Investigation-Symptoms\]](#) tab.

- See [Case Management](#) for additional instructions.
- 4) Investigate epi-links among cases (clusters, household, co-workers, etc).
- If the patient had contact with person(s) who have/had pertussis, determine if the other “cases” have been reported to the state:
 - Search the state electronic surveillance for the possible case.
 - If found, record the previously reported record number “Link to an orphan contact...” field on the [\[Contact\]](#) tab and ‘[Save and Continue](#)’.
 - Suspected pertussis in persons that have not previously been reported should be investigated as a potential case and [reported](#) to KDHE-BEPHI if evidence is collected that supports the [case definition](#).
 - ‘Add’ the patient’s contact who exhibited pertussis-like illness on the [\[Contact\]](#) tab of the CMR and save.
 - After the contact is saved, click ‘[Options](#)’ and ‘[Edit Event](#)’ beside the contact on the listing to enter any further details on the contact.
 - To upgrade the symptomatic contact to a case: click ‘[Options](#)’ and ‘[Edit](#)’ beside the contact on the listing. With the [Edit Contact Event](#) open, select ‘[Options](#)’ and ‘[Promote](#)’ in the upper left corner; update, as needed.
 - For suspected [outbreaks](#) refer to Managing Special Situations section.
 - For suspected [outbreaks](#) or possible undetected [community transmission](#) refer to Managing Special Situations section.

Contact Investigation

- 1) Review the patient’s occupation and activities collected during the [Case Investigation](#) and recorded on [\[Investigation\]](#) and [\[Notes\]](#) tabs.
- 2) Continue to interview patient / family to identify activities during the [Pertussis Infectious Period](#): from onset date of cough until 21 days after onset or, if treated, the days prior to completion of appropriate antibiotic treatment.
- 3) Assess for close contacts based potential risk of exposure by type of contact, date/time of contact (first and last exposures), and duration of exposure.
 - [Exposure](#) is defined as:
 - Direct face-to-face contact for a period (not defined) with coughing case,
 - Sharing a close, confined space (proximity) for a prolonged period, 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 or 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 patient, 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 < 1year 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.
- 4) 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. (Refer to [Contact Management](#) for monitoring and management of coughing contacts.)
 - Collect information on the contact's occupation.
 - Note any school or daycare attendance. (Include facility name and location.)
 - Note any high-risk contact information that is available.
- 5) Institute control measures for school or day-care contacts as indicated under [Isolation, Work and Daycare Restrictions](#).
- 6) 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):

Control of Cases

- For each person hospitalized with a case, droplet precautions shall be followed until completion of appropriate antimicrobial therapy or, if appropriate antimicrobial therapy is not followed, for 21 days following onset of paroxysmal cough, post-tussive vomiting, or inspiratory whoop.
- Each person with a case shall remain in home isolation until completion of appropriate antimicrobial therapy or 21 days following onset of paroxysmal cough, post-tussive vomiting, or inspiratory whoop if appropriate antimicrobial therapy is not followed.

Control of Contacts

- Each susceptible contact working in an adult care home, correctional facility, or health care facility and attending or working in a school, child care facility, or adult day care shall be monitored for 21 days following the last exposure to an infectious case.
- Each susceptible contact who develops symptoms compatible with pertussis shall be considered as having a case of pertussis and shall be kept in isolation until requirements for control of cases are met or until pertussis is no longer suspected.

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 public health 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 patients >1 year of age. However, treatment for infants <1 year of age and pregnant women (especially near term) is recommended up to six weeks after cough onset.
 - 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 isolation, treatment, and control measures, as needed.
 - Cases should refrain from contact outside of the household until completion of a full course of appropriate 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.
 - Hospitalized patients should be placed on droplet precautions as described in [K.A.R. 28-1-6](#).
- 4) Conduct a follow-up as needed to assure compliance with control measures, including [work, school or daycare restrictions](#).
- 5) Only if needed, conduct a follow-up interview to determine if cough duration was >14 days 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.

Contact Type	Immunization Status	
	Under-immunized	Up-to-date on vaccines
High Risk / Household	Recommend Chemoprophylaxis ⁽¹⁾ Recommend Vaccine ^(2,3) Provide Education ⁽⁴⁾ Monitor 21 days ⁽⁵⁾	Recommend Chemoprophylaxis ⁽¹⁾ Provide Education ⁽⁴⁾ Monitor 21 days ⁽⁵⁾
Non-High Risk	Recommend Vaccine ^(2,3) Provide Education ⁽⁴⁾ Monitor 21 days ⁽⁵⁾	Provide Education ⁽⁴⁾ Monitor 21 days ⁽⁵⁾

- 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.
 - Note: The use of chemoprophylaxis in a closed setting may be appropriate when the number of identified cases is small and a community-wide outbreak is not ongoing; however, when continued transmission of pertussis is evident, multiple rounds of antibiotics would not be recommended. Rather than repeating a course of antibiotics, contacts should be monitored for onset of signs and symptoms of pertussis for 21 days after last 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, \geq 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.
 - o 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>
- 4) Provide education, as described in the [Education](#) section.
- 5) Arrange for monitoring of close contacts for respiratory symptoms for 21 days after last exposure.
 - All symptomatic (coughing) contacts should be evaluated as potential cases.
 - If evidence indicates the contact has developed symptoms compatible with pertussis and there are no other apparent causes for the symptoms, the contact and should be considered a suspect case.
 - Report and manage as pertussis case and refer for medical care.
(On the [Contact] Tab of the CMR, click 'Show' beside the contact on the listing. When View Contact Event opens in show mode, select 'Promote to CMR'.)
 - A contact that has been promoted to a suspect case and later meets the [clinical case definition](#), or is laboratory confirmed, may be considered a confirmed or probable case, depending on the situation.
 - A contact that has been promoted to a suspect case and is later determined not to have pertussis will be closed as “not a case” and all restrictions can be lifted.
- 6) Maintain [records](#) on all close contacts: symptoms screening, immunization histories, prophylaxis recommended/completed, exclusions, and the disposition of the contact after 21 days of active surveillance, including any missing or gone explanations (MOGE). *[Contact-'Edit Contact']*
 - Use the contact listing to record and report outcomes (maintain listings for 21 days after last exposure).
- 7) Report the following to help summarize the contact management efforts:
 - Number of recommendations for chemoprophylaxis made to household and

high-risk contacts. (This number should equal the total number of household and high-risk contacts listed by name on the “Contacts” tab.)

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 with appropriate specimens taken and treatment considered for those with compatible signs or symptoms of pertussis.

MANAGING SPECIAL SITUATIONS

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


- If testing was done, but there was a negative result:
 1. When was the specimen collected? (*Collection within a week of onset and before antibiotic treatment results in fewer false negatives results.*)
 2. *How sensitive is the testing methodology?*
 - ✓ If the specimen was collected early in the 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.
- Testing was not done or is unreliable (possible false-negative):
 1. *Are there any classical symptoms of pertussis, such as paroxysms, even without the 14-day cough duration?*
 2. *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 low risk. Delay making recommendation for antibiotic treatment of contacts until reliable laboratory testing is available, or an epi-link is established to support the possibility of pertussis in the setting.
 - ✓ Cases that do have classical symptoms of pertussis especially if epi-linked are a higher risk, it may be prudent to recommend antibiotic treatment of high-risk contacts even without testing results.

B. Community Settings:

Pertussis in infants <1 year is evidence of undetected disease in the community. When incidence of pertussis is higher than 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:

- Initiate active surveillance for pertussis by contacting medical community (i.e. physicians, health care workers, laboratories) weekly.
- Issue pertussis alerts to health care providers with education on pertussis, the need to protect contacts and importance of protecting infants.
 1. Continue to issue periodic updates of the situation, as needed.
 2. Provide the [supplemental case report form](#) for physicians to encourage reporting.
- Employ media and other means to educate the public, particularly parents of very young children and infants <6 months old.
- Consider consultation with KDHE-BEPHI on the appropriateness and logistics of accelerated vaccination schedules for children in the community.

C. Outbreak Investigation:

- Outbreak definition: ≥ 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.
- Notify KDHE immediately, 1-877-427-7317.
- Active case finding will be an important part of any investigation.
- Data will be reported and maintained through Kansas EpiTrax.
- Recommendations will be made based on the most current guidance.
- During periods of high incidence, triaging pertussis reports may be necessary.
 1. Indication of a [high-risk contact](#)/setting will increase the priority of a report.
 2. Investigations should **always** be performed for:
 - Culture- or PCR-positive cases
 - Epi-linked cases that meet the clinical case definition
 - Infants < 1 year of age regardless of symptom presentation
 3. 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 but no testing was performed or there was 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 investigation occurs or not.)
 4. A [supplemental case report form](#) can be given to medical providers for reporting during periods of high incidence.
 5. A [flowchart](#)  is provided in attachments to assist local health departments with triage of cases during periods of high incidence.

D. 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 high risk (e.g., hospitalized neonates and pregnant women in third trimester or post-partum).
 - Other HCPs could receive post-exposure antimicrobial prophylaxis but monitoring daily for 21 days after pertussis exposure is an acceptable alternative. The HCPs being monitored should be excluded from work and treated at first sign or symptom of illness that may indicate 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.

E. Pregnancy:

- CDC recommends that pregnant women receive the Tdap vaccine during each pregnancy. It is best to administer Tdap during 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 any time in late pregnancy provided it is received within 3 weeks of cough onset.
- 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.

F. School and Child Care Settings:

- Coordinate activities with school nurse and/or administration.
- 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 or divided class rooms, 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, including settings with frequent changing of classes:** Consider contacts based on extent of exposure; the presence/absence of coughing persons in the group; whether any other pertussis has been reported in the 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 ≥ 2 confirmed cases in a classroom, team or other group,** 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).
- 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.
 - Manage contacts as described under [Isolation, Work and Daycare Restrictions](#) and [Contact Management](#).
- Maintain log of symptomatic cases, treatment and testing referrals, and exclusions.

1. Record the recommendations made in the EpiTrax system.
 2. Follow-up to see outcomes of referrals and exclusions.
- Notify parents of contacts and susceptible children. The [Pertussis Notification 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.
 - Report any respiratory illness occurring within 3 weeks and to seek medical care for diagnosis and appropriate treatment.
 - 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 of any duration after being in close contact with a coughing pertussis case, for medical evaluation.
 - Reference K.A.R. 28-1-20 for immunization requirements for the current school year; on-line at: www.kdheks.gov/immunize/schoolInfo.htm

G. Parapertussis Infection Identified During Pertussis Investigation

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 treatment for parapertussis is the same as for 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.

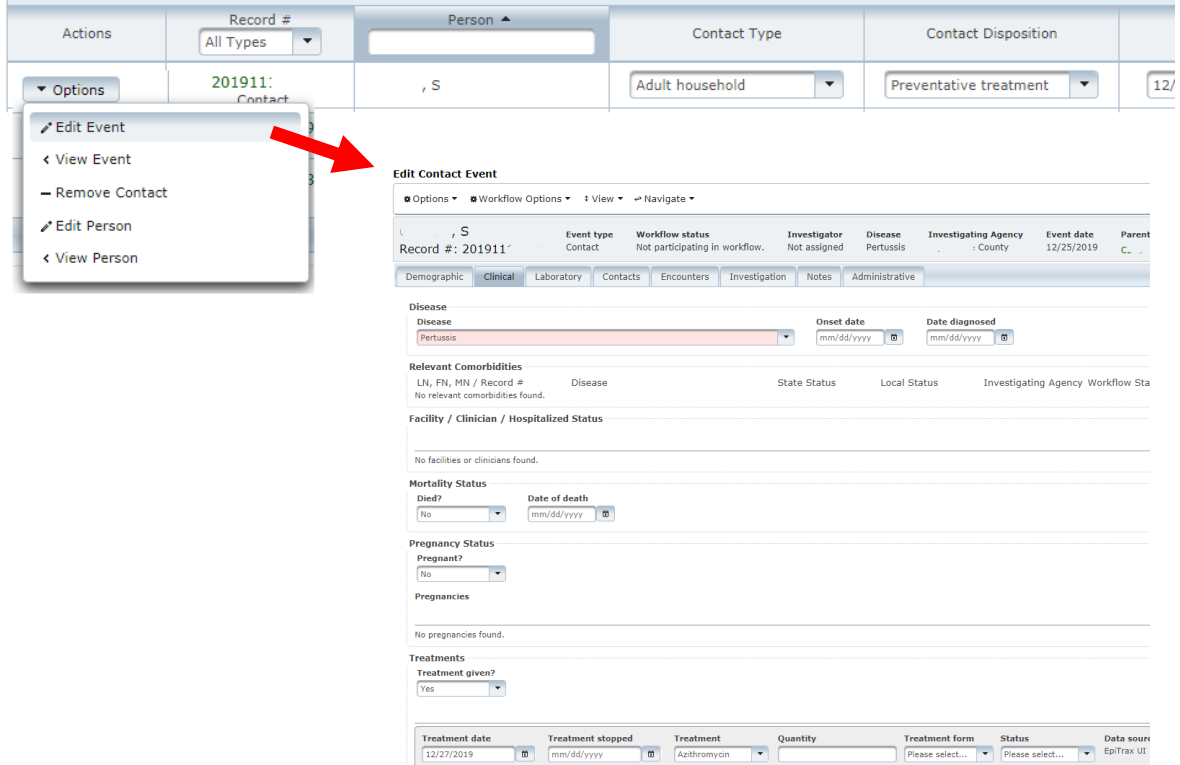
DATA MANAGEMENT AND REPORTING TO THE KDHE

- A. Accept the case assigned to the LHD and record the date the LHD investigation was started on the [\[Administrative\]](#) tab.
- B. Organize and collect data.
 - Forms provided to assist the investigator include:

Forms and Worksheets for Reporting and Investigation	
Form Name	Purpose
Pertussis Rapid Assessment Worksheet	Used by local investigator as a one-page collection tool of essential data. Its use is not required.
Pertussis Contact Listing	Used by the local investigator to record and manage contacts of a case.
Supplemental Pertussis Case Report Form	Used by medical providers to report suspected cases of pertussis to local health department. Must be used in conjunction with the Kansas Notifiable Disease Form .
KDHE Pertussis Form	Used by local investigator to collect data that will be reported in the Kansas EpiTrax System.

- Investigators can collect and enter all required information directly into EpiTrax [\[Investigation\]](#), [\[Clinical\]](#), [\[Demographics\]](#), [\[Contact\]](#) tabs without using the paper forms.
 - During outbreak investigations, refer to guidance from a KDHE epidemiologist for appropriate collection tools.
- C. Report data collected during the investigation via EpiTrax.
- Verify that all data requested in [Step 1](#) has been recorded on an appropriate EpiTrax [\[tab\]](#), or that actions are completed for a case lost to follow-up as outlined below.
 - Some data that cannot be reported on an EpiTrax [\[tab\]](#) may need to be recorded in [\[Notes\]](#) or scanned and attached to the record.

- To enter information on contacts on their separate Contact Form:
 - Add and save the contact on the case's (parent patient's) **[Contact]** tab.
 - After the contact is saved, click **'Options'** and **'Edit Event'** beside the contact on the listing to enter any further details on the contact.




- Paper report forms do not need to be sent to KDHE after the information is recorded in EpiTrax. The forms should be handled as directed by local administrative practices.
- D.** If a case is lost to follow-up, after the appropriate attempts:
- Indicate 'lost to follow-up' on the **[Administration]** tab with the number of attempts to contact the case recorded.
 - Record at least the information that was collected from the medical records.
 - Record a reason for 'lost to follow-up' in **[Notes]**.
- E.** After the steps listed under [Case Investigation](#) have been completed, record the "Date LHD investigation completed" field located on the **[Administrative]** tab.
- Record the date even if the local investigator's [Case](#) or [Contact Management](#) for the contact is not "Complete".
- F.** Once the entire investigation is completed, the LHD investigator will click the "Complete" button on the **[Administrative]** tab. This will trigger an alert to the LHD Administrator, so they can review the case before sending to the state.
- The LHD Administrator will then "Approve" or "Reject" the CMR.
 - Once a case is "Approved" by the LHD Administrator, BEPHI staff will review the case to ensure completion before closing the case.

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. Red Book: Report of the Committee on Infectious Disease, 29th Edition. Illinois, Academy of Pediatrics, 2014.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, Washington, DC, American Public Health Association, 2010.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: wwwn.cdc.gov/nndss/
- D. **Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders www.kdheks.gov/cphp/operating_guides.htm
- E. **Kansas Regulations/Statutes Related to Infectious Disease:** 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.
- 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>
- H. **Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: www.cdc.gov/vaccines/pubs/pinkbook/index.html
- I. **Manual for the Surveillance of Vaccine-Preventable Diseases:** Available at: www.cdc.gov/vaccines/pubs/surv-manual/index.html .
- J. **Additional Information (CDC):** www.cdc.gov/health/default.htm

ATTACHMENTS

To view attachments in the electronic version:

1. Go to <View>; <Show/Hide>; <Navigation Pane>; <Attachments> – OR – Click on the “Paper Clip”  icon at the left.
 - a. If the icon or attachments are not visible in your browser. Save the document and reopen with Adobe.
2. Double click on the document to open.



Supplemental Pertussis Case Report Form

<http://www.kdheks.gov/epi/download/pertussisoutbreakform.pdf>

Pertussis cases or suspected cases are reportable by telephone (877-427-7317) to the Kansas Department of Health and Environment (KDHE) within 4 hours of diagnosis (per Kansas Administrative Regulation 28-1-2). Public health's role is to assure appropriate treatment, prophylaxis, and exclusion in order to prevent the spread of pertussis to high-risk persons. The primary goal is to prevent disease and deaths due to pertussis in infants.

To report a suspected pertussis case to Public Health, please provide the following information **in addition to** completing the standard Kansas Notifiable Disease Form (available at http://www.kdheks.gov/epi/download/KANSAS_NOTIFIABLE_DISEASE_FORM.pdf), and **fax both to 877-427-7318**:

Last Name _____ First Name _____

Clinical Symptoms

Cough Onset Date ___/___/___ Cough duration ___days Cough >= 2 weeks? Yes No

Paroxysmal cough? Yes No Date paroxysms started? ___/___/___

Inspiratory whoop? Yes No Post-tussive emesis? Yes No

Apnea (infants)? Yes No Cyanosis? Yes No

Does the case have contact with any high risk* persons? Yes No

Is the case in daycare or school? Yes No

Pertussis vaccination history available? Yes No

If yes, please circle type and enter dates of all pertussis-containing vaccines:

DTP/DTaP/Tdap ___/___/___ DTP/DTaP/Tdap ___/___/___ DTP/DTaP/Tdap ___/___/___

DTP/DTaP/Tdap ___/___/___ DTP/DTaP/Tdap ___/___/___ DTP/DTaP/Tdap ___/___/___

If unimmunized, why?

Religious exemption Medical contraindication Previous disease
Parental refusal Age <7 months Unknown

Antibiotic treatment Yes No

Date prescribed? ___/___/___

Antibiotic name _____ Duration _____

Was chemoprophylaxis given to household contacts and **high-risk*** close contacts? Yes No

***High-risk close contacts of a pertussis case are defined as:**

- **Infants < 1 year old**
- **Pregnant women, particularly in the 3rd trimester of pregnancy**
- **Persons with pre-existing health conditions that may be exacerbated by a pertussis infection**
- **Anyone who may expose infants < 1 year old, pregnant women, or individuals with pre-existing conditions who are at risk of severe illness or complications**
- **All contacts working in high risk settings that include infants aged <12 months or women in the third trimester of pregnancy.**

(e.g., members of a household with infants or pregnant women, child care workers who take care of infants <1 year old, health care workers with face-to-face contact with infants <1 year old or pregnant women, childbirth educators)