

Community-Wide Pertussis Outbreak – Ford County, May-September 2011



Background

On June 10, 2011, the Kansas Department of Health and Environment (KDHE) Infectious Disease and Epidemiologic Response (IDER) team was notified of a nine-year-old male who tested positive for *Bordetella pertussis* by polymerase chain reaction (PCR). At 11:00 AM that day, Ford County Health Department (FCHD) was notified of this case. FCHD reviewed the case on the day of notification, but contact with the parent of the case did not occur until the afternoon of Monday, June 13. Further investigation and surveillance identified additional cases; all cases were associated to Dodge City, Kansas. Potential transmission settings included households, a summer day camp, and healthcare and manufacturing work settings. Near the end of the outbreak, an elementary school became a potential concern. No additional cases were identified after September 6.

An analysis of Ford County surveillance data for the previous five years revealed two cases reported in 2009 and three in 2010. The 2011 increase in cases met the definition of a community-wide pertussis outbreak with the number of reported cases higher than what is expected based on previous reports for Ford County.

Dodge City is the county seat of Ford County which is located in Southwest Kansas. With a population of 27,340 persons, 51.5% are male and 57.5% Hispanic. Of races reported alone or in combination, 75% are white, 3.1% black, and 2.8% Asian. Those under the age of five represent 10.3% of the population, with 68.2% of the population over the age of 18. 8.9% of the population is over the age of 65 years. (Source: U.S. Census Bureau, 2010 Census¹). Dodge

¹ U.S. Census Bureau. American Fact Finder. Accessed on line at: <http://factfinder2.census.gov/>

City has eight elementary schools, two intermediate schools, one middle school and one high school. The largest elementary school has a student population of 744 with pre-kindergarten through 4th grade. (Source: Kansas Department of Education, 2010-2011²) This was the only school with a reported case associated to the outbreak. Ford County is served by one acute care hospital that is accredited for 99 beds. According to Kansas Kindergarten Immunization Coverage Survey for the 2010-2011 school year, 93% of the children entering Ford County schools have received the recommended doses of pertussis containing vaccine³.

Methods

Confirmed cases were 1) those with a cough illness of any duration that were culture positive for pertussis or 2) those meeting the clinical criteria of a cough illness lasting ≥ 2 weeks with paroxysms of coughing, an inspiratory “whoop”, or post-tussive vomiting who tested positive for pertussis by PCR or who were epidemiologically linked to a PCR or culture positive case. Those cases meeting the clinical criteria but without a culture or PCR positive for pertussis or a link to a PCR or culture positive case were classified as probable cases. Suspect cases were those that did not meet the clinical criteria or did not have clinical information available but were PCR positive or had serology indicating a possible acute pertussis infection.

Using the Kansas Pertussis Supplemental Form, the local health department interviewed the cases or a parent or guardian by phone. Immunization data was retrieved from the Kansas Immunization Registry or the patient’s medical records. All data was entered into the Kansas Electronic Disease Surveillance System.

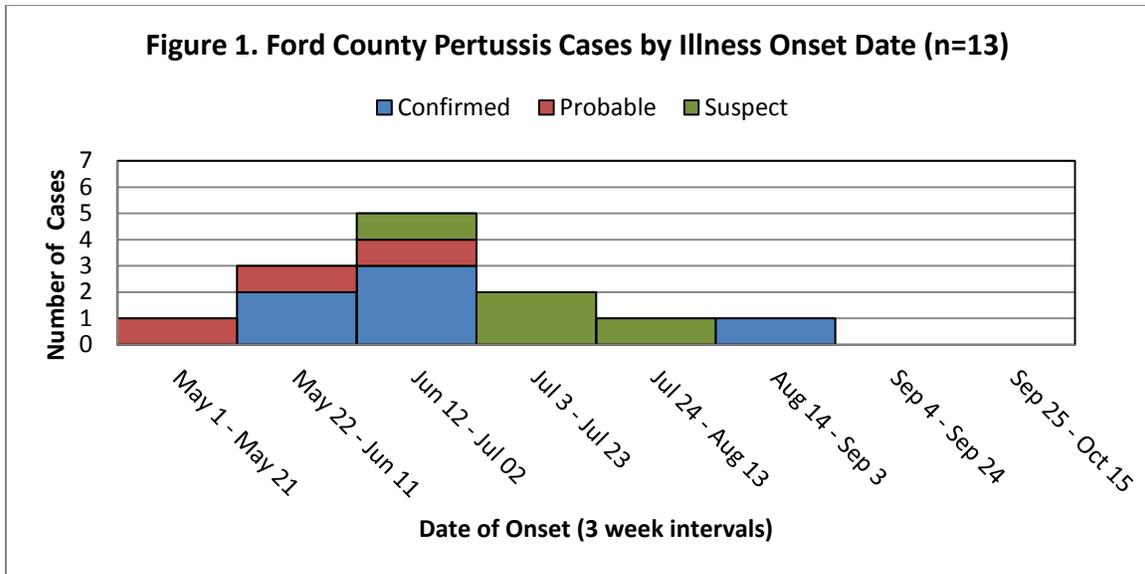
The local health department coordinated with the infection control nurse at the hospital and a school nurse at a local elementary school to investigate setting-related exposures. Another local health department completed follow-up with one case that, while exposed in Ford County, resided in Gray County.

Results

Sixteen potential cases were investigated. Of these, six were confirmed, three were probable, four were suspect, and three were not cases. The median age of cases was 21 years with a range from one month to 68 years. Race, ethnicity, and gender were available for all cases. Twelve cases were white and one, Asian. 69% of the cases were male, and 46.2% were Hispanic. The first case reported an onset date of May 1, 2011, and the final case reported an onset date of August 16, 2011 (Figure 1).

² Kansas Department of Education. Kansas K-12 Reports. Accessed on line at: <http://svapp15586.ksde.org/k12/>

³ Kansas Department of Health and Environment. KINDERGARTEN IMMUNIZATION COVERAGE SURVEY, School Year 2010-2011. Accessed online at: http://www.kdheks.gov/immunize/kindergarten_coverage.htm



Three cases had missing clinical information and uncompleted interviews; of these, all were white and two were Hispanic. Two cases were hospitalized—one for radiologically diagnosed pneumonia and one because of pregnancy-related complications. All cases reported a cough, and nine of the ten cases for whom complete clinical information was obtained reported paroxysms (Table 1).

Table 1: Clinical Information for Cases (n=13)

<i>Symptoms</i>	<i># with Symptoms (%)</i>
Cough	13/13 (100%)
Paroxysms	9/10 (90%)
Whoop	3/10 (30%)
Post-tussive Vomiting	6/10 (60%)
Apnea	6/10 (60%)

Two cases were respiratory therapists that were exposed in a hospital setting while collecting nasopharyngeal specimens. Another case was an adult exposed during a visit to a household of a symptomatic 9-year-old case. The median incubation period for these cases was 12 days with a range of 10 to 13 days. Additional epidemiological links could not be found among the remaining nine cases.

Vaccination history was obtained for nine cases. Four cases had five doses of pertussis containing vaccine and three cases had four, three, or one dose. The case with three doses was the only child who had not received the recommended doses of pertussis-containing vaccine based on age and the Advisory Committee on Immunization Practices (ACIP) recommendations. Those with five doses of pertussis containing vaccine had a median of 4.2 years between onset of symptoms and their last dose of vaccine, with a range of 2.3 to 17.8 years. Those reporting

no doses of vaccine or for whom vaccination status was not available had a median age of 43.5 years (range 24-68 years).

Cases were reported to the health department within a median of 15 days after the onset of symptoms (range 8-51 days) and a median of 5 days after laboratory collection of specimens (range 0-7 days). Of the 16 potential cases, only 43.8% were reported when pertussis was first suspected.

Conclusions

FCHD responded to cases by providing treatment and prevention recommendations to the families of the ill children and adults and to close contacts of those individuals.

The hospital infection control evaluated exposures within the hospital. It was discovered that while those employees within the Obstetrics (OB/GYN) unit were routinely vaccinated with the tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) vaccine, other hospital employees were not included in this program. It was recommended that the policy be examined considering the CDC's recommendation that all healthcare personnel who have direct patient contact should have a single dose of pertussis-containing vaccine⁴.

The school nurse of the affected elementary school examined the immunization records of all classmates of cases, and confirmed that all classroom contacts had previously received the recommended five doses of pertussis-containing vaccine required for attending Kansas schools. Letters went home in English and Spanish to make parents aware of pertussis at the school and to contact their medical provider or the local health department if their child developed pertussis-like symptoms. No further cases were identified within the school.

During the course of this outbreak, the time available for local investigation was limited by primary investigator's responsibilities to the immunization program within the local health department. For certain cases, the limited time for follow-up had to be coordinated with the availability of the office interpreter. As a result, certain information was incomplete or missing from this response, including the number of contacts that needed referral or were referred for medical evaluation and/or post-exposure prophylaxis treatment. Another weakness of this response was the delay in reporting by medical providers. In Kansas, state regulations require health care providers to immediately report suspected pertussis cases to public health; but, for 56% of the cases, this did not occur. Public health was not aware of these cases until several days after the physician tested the cases, when the laboratory did report them. Also, during this

⁴ Centers for Disease Control and Prevention. Immunization of Health-Care Workers: recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC). MMWR 1997;46(No. RR-18):1-42.

response, no specimens were collected for culture confirmation, as CDC recommends for outbreaks of pertussis.

An important lesson learned as part of this investigation was that those providing direct patient care must also be evaluated as possible close contacts of pertussis cases. Because these health care workers have the potential to become infected and expose high risk individuals, they should be protected before exposure to pertussis and evaluated after any potential exposure. Strengths of this investigation included the local health department's coordination with the hospital infection control and school nurse. This cooperation was instrumental in preventing further spread of disease.

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