

Outbreak of Varicella Associated with an Early Childcare Center — Shawnee County, March 2013



Background

On March 26, 2013 at 10:20 a.m., a parent notified the the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) of varicella in an infant who attended an early childcare center in Shawnee County. The nine-month-old patient presented to a physician on March 11, 2013 with several red papules but no fever. The infant was not diagnosed with varicella and was allowed to attend daycare on March 11 and 12. After developing a more generalized maculo-papular rash covering all areas of the body, the non-pyretic infant was diagnosed with varicella by a second physician the afternoon of March 12, 2013. No notification was sent to KDHE at that time. A second case of varicella was reported by a third physician on March 26, 2013 at 12:20 p.m. This nine-month-old patient also attended the childcare center's infant room, with onset of a rash on March 24, 2013. Over the course of the week following March 26th, two additional infant cases were identified associated to the childcare center's infant room. One of the infant cases was a resident of Douglas County. Lawrence-Douglas County Health Department (LDCHD) and Shawnee County Health Agency (SCHA) were notified of all cases and carried out actions to prevent the further spread of disease.

The center's infant room cared for six infants under the age of one year. None of the infants had previous history of varicella disease or vaccine; all of the infants were considered susceptible contacts of the initial case. All childcare workers assigned to the room had previous history of varicella disease.

On April 16, 2013 at 2:15 p.m., the LDCHD notified the KDHE of another varicella case associated to the early childcare center in Shawnee County. This fifth case was a three-year-old sibling of an infant case; the sibling was also enrolled in the early childcare center. SCHA was notified and actions were taken to coordinate additional control measures within the early childcare center.

Methods

A case was defined as any individual with a diffuse maculo-papulovesicular rash onset between March 11, 2013 and May 24, 2013 who was diagnosed with varicella by a physician or nurse. A susceptible contact was defined as an individual who was exposed to a case of varicella and could not demonstrate immunity toward the disease either by vaccination or previous history of disease as documented by a licensed healthcare provider. Immediately after each case was reported, SCHA and LDCHD worked to identify susceptible contacts by reviewing immunity information for children and staff in each affected room to identify susceptible contacts, and implement prevention and control measures. Susceptible household contacts were also identified.

In accordance with Kansas Administrative Regulation (K.A.R.) 28-1-6, each varicella case was excluded from the center for six days after rash onset or until the rash lesions were crusted. K.A.R. 28-1-6 also states that susceptible contacts are to be either vaccinated within 24 hours after the case was reported to KDHE or excluded from a childcare center for 21 days after the onset of the last reported illness in the childcare center. For preschool-aged children, the American Committee of Immunization Practices does not recommend initial vaccination against varicella until 12 months. Because of the age of the susceptible contacts, the delay in the initial report, and the center's ability to cohort the exposed susceptible infants away from other children, SCHA instructed the director that all exposed infants could be cohorted together for 21 days after the onset of the last case at the daycare. No new admissions were to be admitted to the infant room during the time the exposed infants were cohorted. Letters were sent to notify parents that varicella cases had been identified at the center,

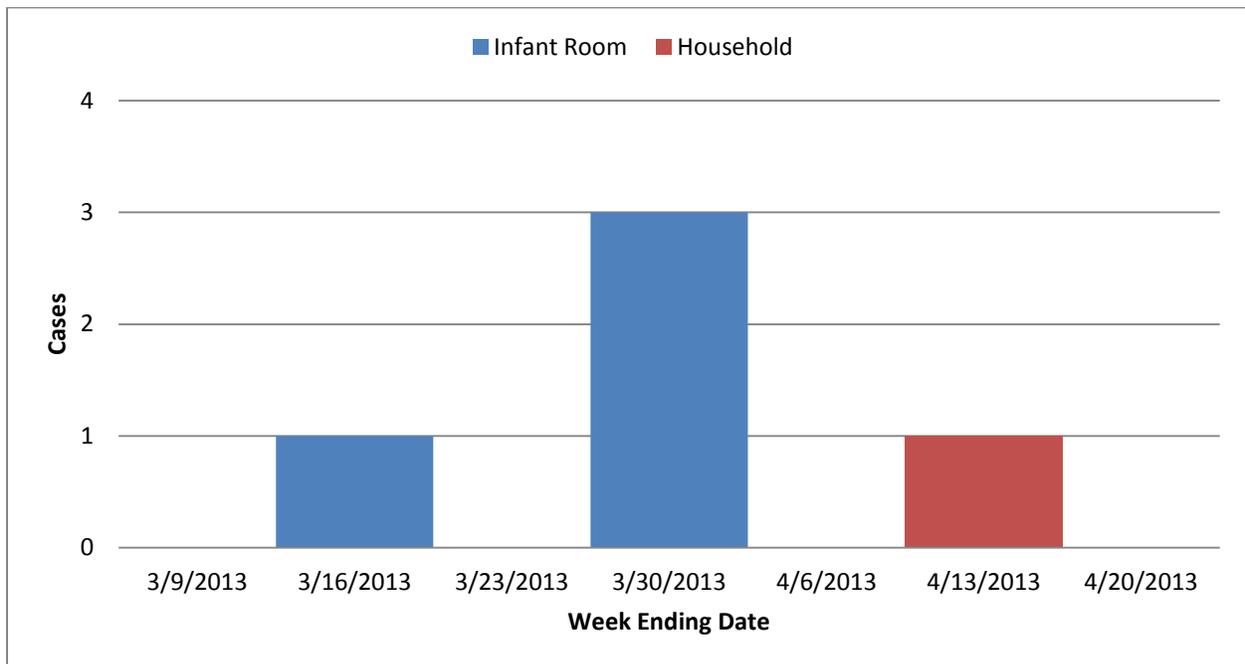
directing them to contact their primary care provider or SCHA if their child developed varicella symptoms.

After the notification of the three-year old case, SCHA verified that all exposed contacts had at least one dose of varicella vaccine or documentation of previous history of disease. No early booster doses were recommended by the SCHA health officer as no transmission outside of the center’s infant room had yet been documented — transmission likely occurred at the case’s home.

Results

Five attendees met the varicella case definition. Rash onset dates ranged from March 11, 2013 to April 13, 2013 (Figure 1).

Figure 1: Week of Rash Onset Among Varicella Cases Associated to Shawnee County Early Childcare Center, as Defined by Transmission Setting (n=5)



Ages ranged from 7 months to 3 years of age, with a median age of 9 months. Three cases were male (60%). Five susceptible contacts were identified. All were associated to the infant room and were too young to receive vaccine. Of these

contacts, three developed disease (60%) within the incubation period of exposure to the initial case. No cases or susceptible contacts were identified among the staff members. Incubation period was calculated for four cases. The incubation period ranged from 13 to 18 days, with a median of 15.5 days.

Of the cases, only three reported fever (60%). The youngest infant and the three-year-old case, who had received one varicella vaccine dose two years prior, experienced only minor rashes of less than 50 lesions. All other cases, who were infants greater than 9 months of age, experienced moderate rashes of 249-500 lesions. There were no complications or hospitalizations among the cases.

Conclusion

Five cases of varicella were identified among the center's enrollees. After extensive investigation, five susceptible contacts were identified; all were too young to receive varicella vaccine after exposure. The susceptible contacts were cohorted together for 21 days after the onset of the last case at the daycare to limit further disease transmission.

Varicella is highly contagious and spreads easily to individuals that have neither been vaccinated against varicella nor had the disease. It can be transmitted through coughing, sneezing, and/or having direct contact with or breathing in particles from the lesions. A person with varicella can spread the disease to others 1 to 2 days before they develop a rash until all vesicles form scabs. A susceptible person who is exposed to varicella may develop symptoms 10 to 21 days after exposure.

Varicella vaccine is a safe effective way to prevent the disease.¹ Studies have shown that a single dose of varicella vaccine is 85% effective at preventing disease and that any varicella vaccine is 100% effective at preventing severe disease.² A second dose of varicella vaccine will boost immunity and reduces breakthrough

¹ CDC. "Chickenpox (Varicella)", Accessed on May 23, 2013 at: www.cdc.gov/chickenpox/about/overview.html.

² Seward JF, Marin M, Vasquez M. Varicella vaccine effectiveness in the United States vaccination program; a review. *J Infect Dis (Suppl)*. 2008 Mar 1;197 Suppl 2:S82-9. Review.

disease in children. Studies of vaccine use in a variety of settings indicate that varicella vaccine is 70% to 100% effective in preventing illness or modifying the severity of illness if used within 3 days, and possibly up to 5 days, after exposure.

³ In this outbreak, the vaccinated case had only 25 lesions reported. The seven-month old case also had less than 50 lesions; this infant most likely was still partially protected by waning maternal antibodies altering the course of illness.⁴

According to K.A.R. 28-1-20, all individuals attending childcare facilities in Kansas are required to be vaccinated against certain diseases, including varicella.

Children with documentation of disease history by a licensed health care provider are not required to be vaccinated. For preschool-aged children, the American Committee of Immunization Practices recommends initial vaccination against varicella for all healthy children aged 12-18 months. A second dose is recommended at 4-6 years of age before the child enters pre-kindergarten, kindergarten, or first grade. The second dose may be administered at an earlier age provided that the interval between the first and second dose is >3 months.⁵

In this outbreak the SCHA health officer made the appropriate decision not to recommend an early booster dose of vaccine to the three-year-old population at the center before transmission outside of the infant room was identified. No further cases were identified in the three-year-old room even after exposure to the three-year-old case.

K.A.R. 28-1-6 is a regulation in place to prevent the spread of disease from an infectious case and to susceptible contacts. Varicella cases are excluded until six days after rash onset or until the rash lesions are crusted. Susceptible contacts must be protected from future exposure to the disease and/or after exposure they could also become a source of disease to others. K.A.R. 28-1-6 requires that susceptible contacts be either vaccinated within 24 hours after the case was

³ CDC. Epidemiology and Prevention of Vaccine-Preventable Disease (Pink Book): Chapt. 21 Varicella. May 2012.

⁴Pinquier D, Lécuyer A, Levy C, Gagneur A, Pradat P, Soubeyrand B, Grimprel E; Pediatricians Working Group. Inverse correlation between varicella severity and level of anti-Varicella Zoster Virus maternal antibodies in infants below one year of age. *Hum Vaccin*. 2011 May;7 (5):534-8. Epub 2011 May 1. Accessed May 23, 2013 at <http://www.landesbioscience.com/journals/vaccines/article/14820/>

⁵ CDC. Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2007;56(No. RR-4).

reported to KDHE or excluded from a childcare center for 21 days after the onset of the last reported illness in the childcare center. In this outbreak, infants were cohorted rather than excluded. The parents of the infants were notified of the risk of varicella, and actions were taken to limit the possibility of further exposures inside and outside of the infant room. In this instance, while primary cases did result from the initial exposure, no secondary transmission was identified among the susceptible contacts that were cohorted.

This outbreak may have been prevented if the first case had not been misdiagnosed, or if the diagnosing physician had reported the first case to KDHE. With the exception of the first case, all other cases were identified, reported, and investigated in a timely manner. The childcare center's high vaccination rate among eligible attendees and their quick response with SCHA and LDCHD likely prevented the continued transmission of varicella within the center.

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