

# Outbreak of Varicella in a Community with a Low Vaccination Rate — Pottawatomie County, April 2013 - August 2013



## **Background**

On April 10, 2013, the Pottawatomie County Health Department notified the Kansas Department of Health and Environment (KDHE) of six cases of varicella within one household. Upon further investigation, additional cases were identified and were epidemiologically linked to a church that the household attended. After additional cases were identified, the local health department, along with KDHE, began an outbreak investigation to identify additional cases, exposed individuals, and to implement prevention and control measures.

## **Methods**

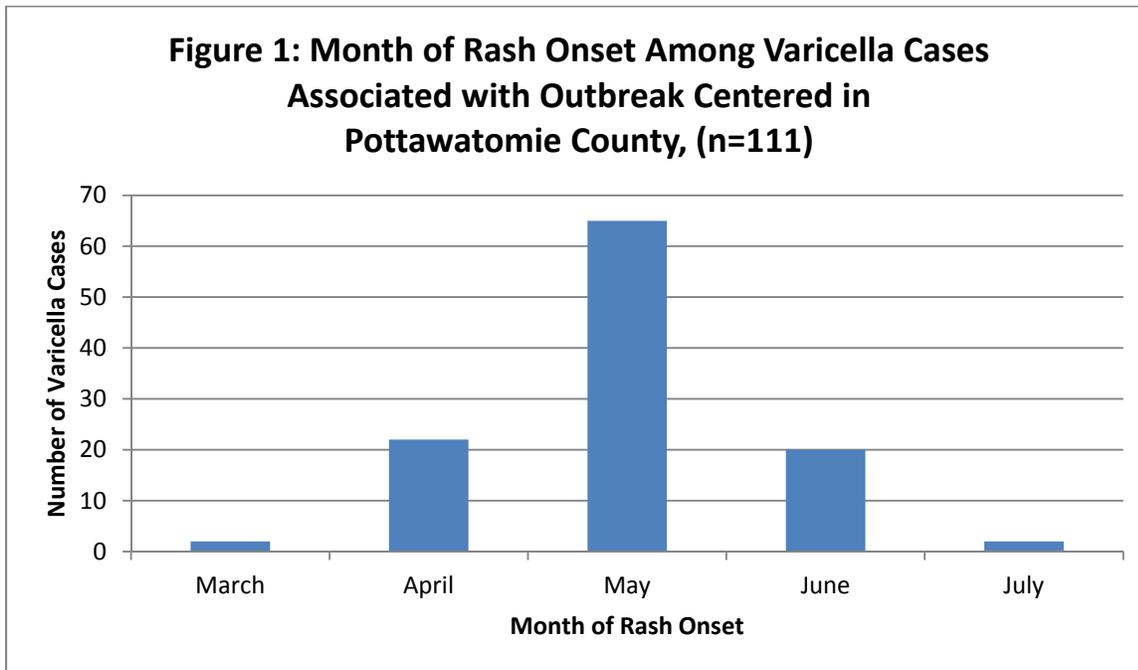
A case was defined as any individual with a diffuse macular, papulovesicular rash onset between April 10, 2013 and August 29, 2013 who was diagnosed with varicella by a physician or nurse and who was epidemiologically linked to another case from the Pottawatomie County community. A susceptible contact 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.

In accordance to Kansas Administrative Regulation (K.A.R.) 28-1-6, each case of varicella was excluded from school for six days after rash onset or until the rash lesions were crusted over and susceptible contacts were either vaccinated within 24 hours of notification to KDHE or excluded for 21 days after the onset of the last reported illness. The Advisory Committee for Immunization Practices recommends initial vaccination against varicella for children aged 12-18 months and a second dose at 4-6 years. According to K.A.R. 28-1-20, all individuals that attend a school or childcare setting operated by a school in Kansas are required to be vaccinated against specific diseases. For varicella, two doses of vaccine are required for children in kindergarten through grade four and grades seven through nine. One dose of varicella vaccine is required for children in grades five and six and 10 through 12.

Reported cases of varicella were interviewed to assess onset date, transmission setting, severity of rash, and vaccination status. The vaccination status of exposed individuals was also assessed.

## **Results**

During this outbreak, 111 cases were identified. The first cases identified had a rash onset in March. Rash onset dates ranged from March 26, 2013 to July 18, 2013 with the majority of the cases occurring in May. The outbreak was declared over 42 days after the last reported date of disease onset (Figure 1).



Ages ranged from less than one year to 15 years of age with a median of 5 years. 61 cases were male (55%). Two cases were hospitalized. Cases resided in four Kansas counties. A majority of the cases resided in Pottawatomie county but other cases were identified in adjacent counties. (Table 1).

**Table 1: Outbreak-Associated Cases by County of Residence**

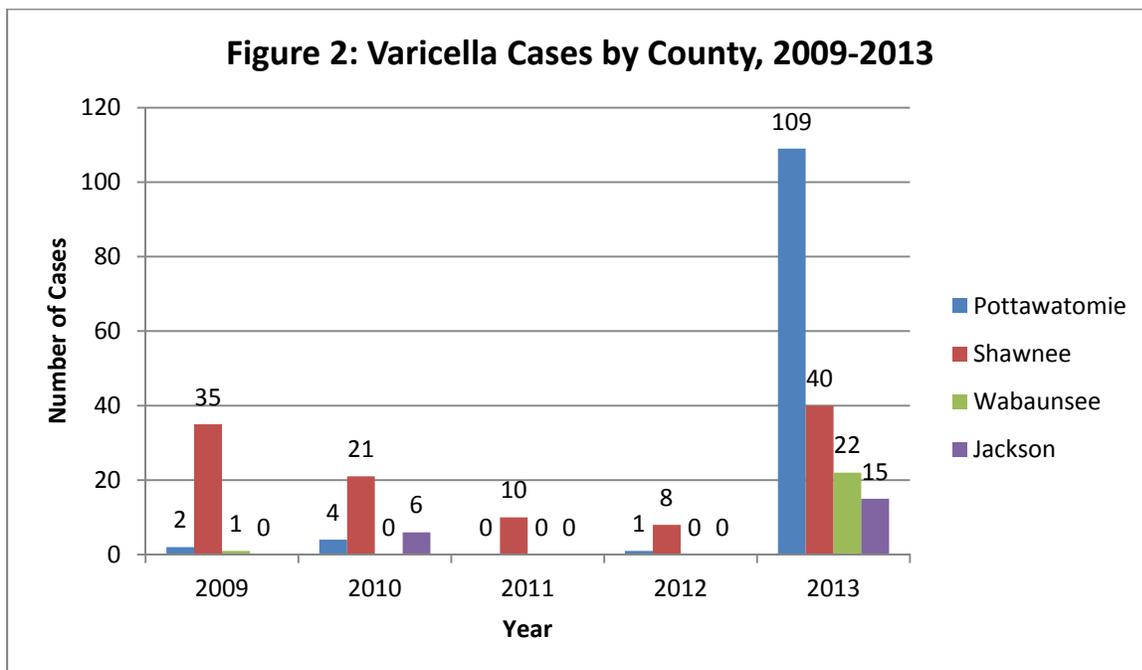
County	Number of Cases	Percentage
Pottawatomie	73	66%
Wabaunsee	22	20%
Shawnee	11	10%
Jackson	5	5%

Of the 111 cases identified, 103 (93%) were unvaccinated or had unknown vaccination status. The majority of the cases were unvaccinated due to the parents' refusal to vaccinate, or the parents' claiming an exemption for to religious reasons (Table 2).

**Table 2: Reported Reason for not Receiving Varicella Vaccine, (n=101)**

Reported Reason	Number of Cases	Percentage
Parents refused vaccine or claimed religious exemption	91	88%
Too young to be vaccinated	7	7%
History of varicella disease	3	3%

Compared to recent years, the four affected counties experienced a higher number of varicella cases. Pottawatomie County showed the largest rise in cases during 2013 (Figure 2). Pottawatomie's neighboring counties of Shawnee, Wabaunsee, and Jackson also showed an increase in cases. The increase in these neighboring counties may be coincidental; alternatively, some of the varicella cases may have been linked to the outbreak, but the link was not discovered during the investigation.



## **Conclusions**

During the course of the outbreak, one hundred and eleven cases of varicella were identified in four counties, primarily among school-aged children. The majority of cases were unvaccinated due to parental refusal or a claim of religious exemption. Extensive case investigations revealed numerous susceptible contacts among the largely unvaccinated community. Since the outbreak investigation ended on July 18, 2013 (after 42 days — two incubation periods — had elapsed without a reported case), five additional cases have been reported in Pottawatomie County.

The varicella vaccine is a safe, effective way to prevent the disease. 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.<sup>2</sup> A second dose of varicella vaccine boosts immunity and reduces breakthrough disease in children. Studies of vaccine used after exposure indicate that varicella vaccine is 70% to 100% effective in preventing illness or modifying the severity of illness if used within three days, and possibly up to five days.

This was one of the largest varicella outbreaks KDHE has investigated. It is important to note the actual number of infected individuals was likely higher than the number of reported cases. Parents may not have sought care for infected children with mild symptoms, or may have avoided a physician diagnosis to prevent exclusion from school. The outbreak was difficult to control as most parents in this community are unwilling to vaccinate their children. KDHE has investigated other vaccine preventable disease outbreaks associated with this community, including a 2009 pertussis outbreak with 35 reported cases.

<sup>1</sup>Centers for Disease Control and Prevention. "Chickenpox (Varicella)", Accessed on October 21, 2013 at: [www.cdc.gov/chickenpox/about/overview.html](http://www.cdc.gov/chickenpox/about/overview.html).

<sup>2</sup>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.

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