Notes from the Field

Varicella Outbreak Associated with Riding on a School Bus — Muskegon County, Michigan, 2015

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On December 3, 2015, Public Health–Muskegon County (PHMC) in Michigan was notified by a local kindergarten–grade 2 school that a student aged 8 years (the index patient) had been sent home because of a rash suspected to be varicella (chickenpox); the rash had not been observed the previous day. Investigation by PHMC revealed that the student was one of five siblings in household A, none of whom had a history of having received any immunizations. During the preceding month the index patient's two older siblings (aged 12 years and 25 years) and two younger siblings (twins, aged 4 years) had been excluded from other schools in this rural district because of rashes that also were suspected to be varicella. Investigators also learned that a parent in household A had received a physician diagnosis of herpes zoster (shingles) nearly 7 weeks earlier, on October 20, after having been evaluated for a painful, unilateral trunk rash that had begun 3 days earlier, and for which acyclovir was prescribed. PHMC could not confirm whether any advice regarding prevention of possible transmission of varicella zoster virus to susceptible contacts was provided. The other children in household A had rash onsets on November 3, November 18 (two children), and November 22. The index patient rode a school bus and was the first student on and the last off each day; none of the index patient's four siblings attended the same school or rode on the same school bus as the index patient. Public health investigators subsequently linked three more cases in children to sharing the same school bus as the index patient.

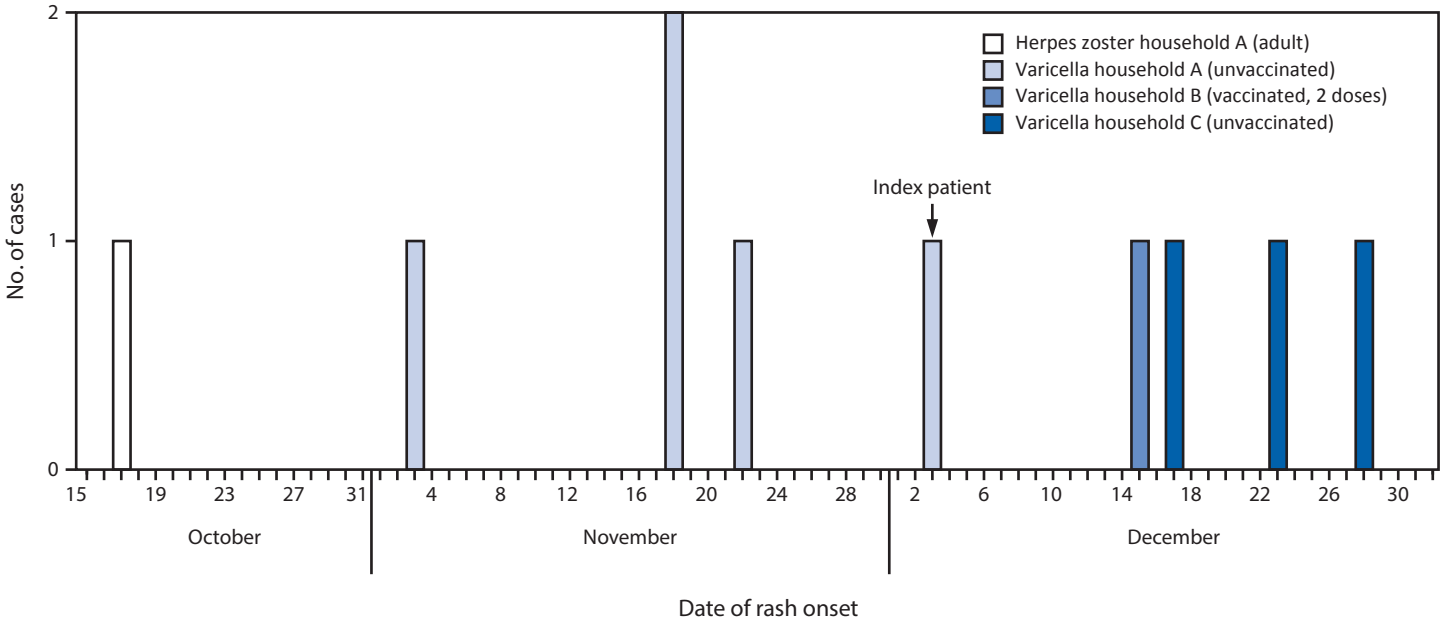
Three children from two additional households (household B and household C) who routinely rode the same school bus as the index patient also received diagnoses of varicella. The first case was diagnosed in a fully immunized student aged 7 years who resided in household B, and had rash onset on December 15 (Figure). That diagnosis was subsequently confirmed from a cutaneous lesion swab by polymerase chain reaction (PCR). This student rode on the same bus as the index patient for approximately 40 minutes in each direction each day. The next two cases occurred in siblings from household C, aged 7 years and 5 years, who had rash onset on December 17 and December 23, respectively. On December 28, a rash suspected to represent varicella was noted in a younger sibling (aged 17 months) of the two patients from household C. None of the three children in household C had been vaccinated against varicella. The diagnosis in the second sibling (aged 5 years) was also confirmed by PCR testing from a cutaneous lesion swab. None of the four children in households B and C were related to or interacted socially with members of household A; nor did the child in household B share any classes, lunchrooms, or recess with children in household C. It is not known whether the three students from households B and C sat next to or otherwise interacted with the index patient during the bus ride. No other cases of varicella had been reported in that school district during that school year. The reported coverage with at least 1 dose of varicella vaccine in the school was 96% and for coverage with 2 doses was 95%.* The overall coverage rate with all required immunizations for the school was 95%; 2% of children had waivers, and immunizations for 3% of children were incomplete.

This outbreak of varicella appears to have begun with an adult case of herpes zoster and resulted in nine cases of varicella in children residing in three households. The timeline of rash onsets is consistent with the 10–21 day incubation period for varicella (Figure). With continued 2-dose childhood varicella vaccination and declining incidence of varicella among children (*1*), transmission of varicella initiated by adults with herpes zoster might become increasingly more likely (*2*). This investigation also strongly suggests that transmission of varicella to children residing in households B and C occurred while riding the same school bus as the index patient. Varicella transmission on school buses is plausible and was implicated previously as a risk factor for transmission in a large varicella outbreak reported in China (*3*). Public health investigators who see similar findings might consider the close proximity of students in a relatively small, enclosed space, such as a school bus, as a risk factor for airborne transmission of diseases such as varicella.

This investigation underscores the importance of maintaining high 2-dose varicella immunization levels to reduce risk for disease transmission. The high immunization rates achieved in this school likely limited the scope of the varicella outbreak. Two doses of varicella vaccine are routinely recommended for children at age 12–15 months and age 4–6 years (*4*). In addition, contacts of patients with varicella or herpes zoster should immediately be evaluated for evidence of varicella immunity to determine need for postexposure varicella vaccination. Early vaccination of exposed susceptible persons can prevent disease and transmission.

*Michigan IP100 Report, February 2016 Reporting Period, 6124008057. Michigan schools and licensed childcare centers are required to report Immunization Program (IP) compliance on students aged ≤18 years to their local health department (https://www.mcir.org/school-childcare/reporting-immunization-program-status-to-the-health-department/).

FIGURE. Dates of varicella (chickenpox) rash onset among children in outbreak,* and date of diagnosis of herpes zoster (shingles) in the initiating parent in household A — Michigan, October–December, 2015



* The patient with rash onset December 28 was aged 17 months and did not attend school.

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References

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