

Chickenpox outbreak in a highly vaccinated school population

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Abstract

Objective: We investigated a chickenpox outbreak that started in an Oregon elementary school in October 2001, after public schools began phasing in a varicella vaccination requirement for enrollment. We sought to determine the rate of varicella vaccination and effectiveness and risk factors for breakthrough disease.

Methods: A chickenpox case was defined as an acute maculopapulovesicular rash without other explanation occurring from October 30, 2001 through January 27, 2002 in a student without a prior history of chickenpox. We reviewed varicella vaccination records and history of prior chickenpox, and we calculated vaccine effectiveness. We evaluated the effects of age, gender, age at vaccination, and time since vaccination on risk of breakthrough disease (ie, chickenpox occurring >42 days after vaccination).

Results: Of 422 students, 218 (52%) had no prior chickenpox. Of these, 211 (97%) had been vaccinated before the outbreak. Twenty-one cases occurred in 9 of 16 classrooms. In these 9 classrooms, 18 of 152 (12%) vaccinated students developed chickenpox, compared with 3 of 7 (43%) unvaccinated students. Vaccine effectiveness was 72% (95% confidence interval: 3%-87%). Students vaccinated >5 years before the outbreak were 6.7 times (95% confidence interval: 2.2-22.9) as likely to develop breakthrough disease as those vaccinated \leq 5 years before the outbreak (15 of 65 [23%] vs 3 of 87 [3%]).

Conclusions: A chickenpox outbreak occurred in a school in which 97% of students without a prior history of chickenpox were vaccinated. Students vaccinated >5 years before the outbreak were at risk for breakthrough disease. Booster vaccination may deserve additional consideration.