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Largest measles epidemic in North America in a decade--Quebec, Canada, 2011: contribution of susceptibility, serendipity, and superspreading events.

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Abstract

BACKGROUND: The largest measles epidemic in North America in the last decade, occurred in 2011 in Quebec, Canada, where rates of 1- and 2-dose vaccine coverage among children 3 years of age were 95%-97% and 90%, respectively, with 3%-5% unvaccinated.

METHODS: Case patients identified through passive surveillance and outbreak investigation were contacted to determine clinical course, vaccination status, and possible source of infection.

RESULTS: There were 21 measles importations and 725 cases. A superspreading event triggered by 1 importation resulted in sustained transmission and 678 cases. The overall incidence was 9.1 per 100,000; the highest incidence was in adolescents 12-17 years old (75.6 per 100,000), who comprised 56% of case patients. Among adolescents, 22% had received 2 vaccine doses. Outbreak investigation showed this proportion to have been an underestimate; active case finding identified 130% more cases among 2-dose recipients. Two-dose recipients had milder illness and a significantly lower risk of hospitalization than those who were unvaccinated or single-dose recipients.

CONCLUSIONS: A chance superspreading event revealed an overall level of immunity barely above the elimination threshold when unexpected vulnerability in 2-dose recipients was taken into account. Unvaccinated individuals remain the immunization priority, but a better understanding of susceptibility in 2-dose recipients is needed to define effective interventions if elimination is to be achieved.

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