

1076. Assessment of the Status of Measles Elimination in the United States, 2001-2013

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Background. Although measles was declared eliminated in the U.S. in 2000, importations from remaining endemic areas in the world continue to occur, and lead to outbreaks in pockets of unvaccinated. Due to an apparent increase in the number of cases and outbreaks in recent years, and concerns of increasing vaccine hesitancy, we evaluated transmission from imported cases to assess measles elimination status in the U.S.

Methods. Measles elimination was assessed by evaluation of the effective reproduction number R , the average number of secondary cases that result from an importation; elimination is indicated by maintenance of $R < 1$. Four previously described methods for estimating R were applied to national surveillance data reported to the CDC from 2001-2013. Method 1 estimates R as $1-P$, where P is the proportion of all cases that are imported. Methods 2 and 3 estimate R by fitting a model of the spread of

infection, based on a branching process, to data on the observed sizes and generations of outbreaks, respectively. An outbreak was defined as 1 or more cases. Method 4 estimates R from the observed epidemic curves of the largest outbreaks, using a likelihood-based estimation approach. Inverse-variance-weighting was applied to year-specific R estimates to analyze trends overtime.

Results. During 2001-2013, a total of 1153 confirmed measles cases were reported, of which 447 were importations. These constituted 525 outbreaks, ranging in size from 1 to 58 cases; 145 had >1 case. Median outbreak duration was 15 days (range 1-89 days). Across all study years, R was <1 with all 4 methods: 0.62 (95% CI: 0.54-0.72) using method 1, 0.52 (95% CI: 0.39-0.64) using method 2, 0.66 (95% CI: 0.62-0.71) using method 3, and 0.63 (95% CI: 0.60-0.66) using method 4. A statistically significant trend in annual R estimates overtime was not identified (p -value > 0.2).

Conclusion. Our estimates of R demonstrate that elimination of endemic measles transmission is maintained in the U.S. The congruence in results using different methods augments the validity of the estimates and provides a framework for continued monitoring of elimination. Sustained high vaccination coverage and prompt outbreak response strategies have proven successful in halting prolonged transmission of measles in the U.S.

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