Measles Outbreak in a Highly Vaccinated Population, San Diego, 2008: Role of the Intentionally Undervaccinated

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KEY WORDS
measles vaccine, disease outbreaks, vaccine-preventable diseases, vaccine refusal, vaccination coverage

ABBREVIATIONS
CDC—Centers for Disease Control and Prevention
PBE—personal-beliefs exemption

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WHAT'S KNOWN ON THIS SUBJECT: In the relative absence of measles, public attention has increasingly focused on vaccine adverse events, raising concerns that vaccination refusal might decrease coverage to the point at which an imported case could reestablish ongoing viral transmission.

WHAT THIS STUDY ADDS: Despite high community vaccination coverage, measles outbreaks can occur among clusters of intentionally undervaccinated children, at major cost to public health agencies, medical systems, and families. Rising rates of intentional undervaccination can undermine measles elimination.

abstract

OBJECTIVE: In January 2008, an intentionally unvaccinated 7-year-old boy who was unknowingly infected with measles returned from Switzerland, resulting in the largest outbreak in San Diego, California, since 1991. We investigated the outbreak with the objective of understanding the effect of intentional undervaccination on measles transmission and its potential threat to measles elimination.

METHODS: We mapped vaccination-refusal rates according to school and school district, analyzed measles-transmission patterns, used discussion groups and network surveys to examine beliefs of parents who decline vaccination, and evaluated containment costs.

RESULTS: The importation resulted in 839 exposed persons, 11 additional cases (all in unvaccinated children), and the hospitalization of an infant too young to be vaccinated. Two-dose vaccination coverage of 95%, absence of vaccine failure, and a vigorous outbreak response halted spread beyond the third generation, at a net public-sector cost of $10 376 per case. Although 75% of the cases were of persons who were intentionally unvaccinated, 48 children too young to be vaccinated were quarantined, at an average family cost of $775 per child. Substantial rates of intentional undervaccination occurred in public charter and private schools, as well as public schools in upper-socioeconomic areas. Vaccine refusal clustered geographically and the overall rate seemed to be rising. In discussion groups and survey responses, the majority of parents who declined vaccination for their children were concerned with vaccine adverse events.

CONCLUSIONS: Despite high community vaccination coverage, measles outbreaks can occur among clusters of intentionally undervaccinated children, at major cost to public health agencies, medical systems, and families. Rising rates of intentional undervaccination can undermine measles elimination. *Pediatrics* 2010;125:747–755