

# Spatial clustering of exemptions linked to measles outbreaks

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(HealthDay)—Spatial clustering of exemptions to measles vaccination

reduces protection from outbreaks, according to a study published online Dec. 6 in *Pediatrics*.

Ashley Gromis, Ph.D., and Ka-Yuet Liu, D.Phil., from the University of California in Los Angeles, modeled measles transmission in a hypothetical population of youth aged 0 to 17 years in California. Outbreak sizes were compared under the observed spatial clustering of exemptions in schools before and after the [policy change](#) eliminating nonmedical exemptions with counterfactual scenarios of no postpolicy change in medical exemptions, no clustering of exemptions, and lower levels of population immunization.

The researchers observed a significant reduction in both average and maximal [outbreak](#) sizes with the elimination of nonmedical exemptions; however, increases in medical exemptions resulted in more than twice as many infections relative to maintenance of [medical exemptions](#) at pre-policy change levels. Some initial protection against random introduction of measles infections was provided by spatial clustering of nonmedical exemptions; however, ultimately, this allowed outbreaks with thousands more infections compared with random distribution of exemptions. The large-scale outbreaks associated with exemption clusters were only reproduced with random distribution of exemptions when population vaccination was lowered by more than 6 percent.

"Vaccine programs and policies must recognize that population-wide [protection](#) against disease outbreaks depends not only on overall vaccination coverage but on locations of nonvaccination," the authors write.

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