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## **Measles Vaccine Refusal and its Effects on Communities**

Vaccine refusal has become an increasingly prevalent phenomenon in developed countries such as the US and UK. In fact, measles vaccine is reported to be the most frequently refused vaccine by parents in the US, resulting in measles outbreaks various communities, including San Diego in 2008. We investigate the effects of measles vaccination refusal in terms of increased risk of an outbreak and the disease burden. By using an agent-based model built with C++, we simulated the impact of measles vaccine refusal in Allegheny County, Pennsylvania. By varying the levels of the overall vaccine coverage of the children whose parents are skeptical about vaccination, we investigated the risk of an outbreak, the age distribution of the infected individuals, as well as the probability of infection among the vaccinated ones who failed to develop immunity. We concluded that as the years of vaccination refusal increased, the percent risk of infection for the entire community was strongly dependent on the vaccine coverage and that parents and siblings of unvaccinated children were at great risk of infection during an outbreak of measles.