Substantial proportion of US measles cases intentionally unvaccinated

March 15 2016

An analysis of numerous studies and reports finds that unvaccinated or undervaccinated individuals comprised substantial proportions of cases in measles and some pertussis outbreaks, and vaccine refusal was associated with an elevated risk for measles and pertussis, including among fully vaccinated individuals, according to a study appearing in the March 15 issue of *JAMA*.

Recent outbreaks of vaccine-preventable diseases in the United States have prompted clinicians, public health officials and the public to pay greater attention to the growing phenomenon of vaccine refusal and hesitancy. Improved understanding of the association between vaccine refusal and the epidemiology of these diseases is needed. Saad B. Omer, M.B.B.S., M.P.H., Ph.D., of Emory University, Atlanta, and colleagues examined the association between vaccine delay, refusal, or exemption and the epidemiology of measles and pertussis, two vaccine-preventable diseases with recent U.S. outbreaks. The authors searched the medical literature for reports of U.S. measles outbreaks that have occurred since measles was declared eliminated in the United States (after January 1, 2000), endemic and epidemic pertussis since the lowest point in U.S. pertussis incidence (after January 1, 1977), and for studies that assessed disease risk in the context of vaccine delay or exemption.

The researchers identified 18 published measles studies, which described 1,416 measles cases (individual age range, 2 weeks-84 years; 178 cases younger than 12 months) and more than half (57 percent) had no history of measles vaccination. Of the 970 measles cases with detailed

vaccination data, 574 cases were unvaccinated despite being vaccine eligible and 71 percent of these had nonmedical exemptions (e.g., for religious or philosophical reasons, as opposed to medical contraindications; 42 percent of total).

Among 32 reports of pertussis outbreaks, which included 10,609 individuals for whom vaccination status was reported (age range, 10 days-87 years), the 5 largest statewide epidemics had substantial proportions (range, 24 percent-45 percent) of unvaccinated or undervaccinated individuals. However, several pertussis outbreaks also occurred in highly vaccinated populations, indicating waning immunity. Nine reports (describing 12 outbreaks) provided detailed vaccination data on unimmunized cases; among 8 of these outbreaks, from 59 percent through 93 percent of unvaccinated individuals were intentionally unvaccinated.

"This review has broad implications for vaccine practice and policy. For instance, fundamental to the strength and legitimacy of justifications to override parental decisions to refuse a vaccine for their child is a clear demonstration that the risks and harms to the child of remaining unimmunized are substantial. Similarly, central to any justification to restrict individual freedom by mandating vaccines to prevent harm to others is an understanding of the nature and magnitude of these risks and harms. However, the risks of vaccine refusal remain imperfectly defined, and the association between vaccine refusal and vaccine-preventable diseases may be both population- and disease-specific," the authors write.

"Without a centralized infrastructure focused on the goal of maximizing community immunity, high-reliability vaccine coverage remains challenging in the United States," writes Matthew M. Davis, M.D., M.A.P.P., of the University of Michigan, Ann Arbor, in an accompanying editorial.

"Nonetheless, if vaccines are developed for emerging diseases that threaten the U.S. population—such as Zika, Ebola, or human immunodeficiency virus—the public will likely expect the currently complex and heterogeneous vaccination system in the United States to function as a seamless organization. The U.S. population wants vaccination to be safe, effective and available in a timely manner, and for immunization to be durable. Current challenges with measles and pertussis outbreaks provide an opportunity to develop and evaluate approaches to achieve unprecedented levels of vaccination coverage, limit waning immunity, and minimize vaccine-preventable disease for children and adults alike."

More information: *JAMA*, DOI: 10.1001/jama.2016.1353
JAMA, DOI: 10.1001/jama.2016.1529