

Managing the risks of vaccine hesitancy and refusals

In *The Lancet Infectious Diseases*, John Glasser and colleagues¹ report the results of a spatially-stratified model to better understand the dynamics of disease outbreaks and the link with vaccine hesitancy and refusal. Using data for 39 132 children starting elementary school in San Diego County, CA, USA, in 2008 (2% of whom had a personal-belief exception to vaccines), the authors show the effect of heterogeneity on the reproduction numbers for measles, mumps, and rubella. Although the mean population immunities for measles, mumps, and rubella were similar to the population-immunity thresholds, modelling for non-random mixing (unvaccinated children tend to preferentially mix with other unvaccinated children) and heterogeneity caused the basic reproductive numbers to increase by 70%, meaning that an introduced infectious person could cause an outbreak. For measles, the realised reproduction number was 3.39, meaning that one introduced infectious person would cause three or more secondary infections. Their model suggests that one of the most effective strategies to minimise risks of diseases outbreaks was to vaccinate all children with a personal-belief exception, which would lower the realised reproduction number to 1.11. This intervention had a similar effect to raising immunity by 50% in all schools classified as having low immunity (realised reproduction number 1.02).

In most countries, vaccination is widely accepted with nearly all children receiving all recommended vaccines.² However, as shown by the 2015 measles outbreaks in the USA and Canada, national estimates of vaccination coverage can hide clusters of under-vaccinated individuals, leading to increased transmission of vaccine-preventable diseases.³

Sadly, putting Glasser and colleagues' recommended approach into practice remains easier said than done. Despite being recognised as one of the greatest public health tools against infectious diseases, vaccination is perceived by a growing number of individuals as risky. Acceptance of recommended vaccines in a timely fashion is challenged by many issues, including complacency when the risks associated with vaccine-preventable diseases have dropped due to high rates of immunisation; declining trust in government, science, and institutions; barriers to access vaccination

services; and the negative influence of so-called vaccine controversies in the media, especially the wider diffusion of vaccine-critical messages on the internet and social media. In most countries only a very small proportion of the population hold strong anti-vaccination convictions (so-called vaccine deniers). However, up to a third of people might have doubts and uncertainties that can lead them to refuse some vaccines but agree to others, delay vaccination, or follow the recommended schedule but with reluctance.⁴

Vaccine hesitancy, defined as delay in acceptance or refusal of vaccines despite availability of vaccination services, is now recognised as a complex and rapidly changing global problem that requires monitoring and action.⁵ Addressing the concerns of the people who are vaccine-hesitant is a key public health challenge because the success of vaccination programs relies on high uptake by all.

In the midst of the 2014–15 measles outbreak, there were calls for a “gloves off” approach to address the issue of vaccine hesitancy and refusal.⁶ Some experts called for stronger policies to enforce mandatory immunisation, some physicians excluded from practice families refusing vaccines, and some parents publicly said that their immunocompromised children were endangered by “irresponsible” parents who refused to vaccinate their healthy children. The debate around vaccination in the media became harsh, judgemental, and polarised. Although this polarisation can make vaccine advocates feel positive, studies have shown that approaches that too strongly advocate vaccination run the risk of backfiring among the vaccine hesitant.^{6,7}

Furthermore, the rationalist public health approach to public resistance to adoption of recommended health behaviours of providing additional information (ie, educate the target group) can also fail. This approach presumes that with adequate knowledge people will accept vaccination given that the benefits for disease prevention clearly outweigh potential risks of serious adverse events. However, the evidence shows that most educational interventions have no effect on reducing vaccine hesitancy or refusal.⁸ Even worse, educational interventions to correct “misinformation” about vaccines can actually augment negative attitudes in many who are vaccine-hesitant.⁷



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Vaccination decisions are complex. Facts alone are not convincing and knowledge is only one of many determinants that influence acceptance. A very different approach is needed. Unfortunately, there is no strong evidence for a single best strategy to address vaccine hesitancy and refusal in practice. Understanding the root causes of vaccine hesitancy and refusal in individuals and in subgroups of the population is essential to develop effective tailored strategies to fit each context.⁹ Vaccine acceptance among the hesitant can then be improved by targeting emotional, cognitive, and social distortions or biases affecting judgement.¹⁰ The crucial role of health-care providers in enhancing vaccine acceptance among people who are vaccine hesitant or refuse vaccinations must also be emphasised.¹¹ Health-care workers who believe vaccines are important for their own health and are fully immunised are much more likely to have patients that are fully immunised.¹²

Building vaccine acceptance in individuals and populations and resiliency in the face of the anti-vaccine lobby takes time. Transparent communications and tailored interventions can help to build trust in the effectiveness and safety of vaccines, in the system that delivers them, and in the motivations of the policy makers who decide which vaccines are needed when and where. This method takes commitment, but the tailored multipronged approach is the only way to maintain vaccination programme successes in the long run.¹³

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