

Letters

Study authors don't consider waning SARS-CoV-2 immunity after vaccination in their model

Fisman and colleagues¹ present an oversimplification of a complex epidemiological, social and bioethical issue. The authors make strong ethical and political claims based on their findings, which feed existing social polarization.

The authors use a compartmental susceptible, infectious or recovered (SIR) model to compute the infection burden in vaccinated and unvaccinated population subgroups and assess the contribution of the unvaccinated group to the cumulative rate of infection among the vaccinated. The study's main conclusion — that mixing with unvaccinated people increases the risk of infection among the vaccinated — is predetermined by the authors' choice of model and parameters. By ignoring waning immunity (from both vaccination and previous infection), the authors have constructed a model in which herd immunity always occurs, leaving some residual proportion of the population uninfected indefinitely. In this hypothetical scenario, it is a foregone conclusion that if 1 group with high baseline immunity is mixed with another group of lower baseline immunity, then a greater proportion of the high-immunity group will become infected before herd

immunity is achieved, compared with if they had not mixed. The model² contains 2 crucial parameters: “vaccine efficacy” and “baseline immunity in unvaccinated.” If these are set to any combination where the latter is higher, then the findings are reversed; the vaccinated increase risk for the unvaccinated. Obviously, both conclusions are similarly flawed. In the context of observed waning of vaccine efficacy against infection,³ even the authors acknowledge that “it is unlikely that SARS-CoV-2 will be eliminated.” The authors discuss the theoretical risk that unvaccinated people pose to vaccinated people via their disproportionate demand for health care resources — something not considered in their model — without any acknowledgment of the vast difference in health care demands of, say, a healthy 18-year-old individual compared with an 80-year-old person with comorbidities. The potential for this work to foster social division and misplaced anger and blame is at odds with public health ethics.

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