DOES VACCINATING ADULTS STOP KIDS FROM SPREADING COVID TOO?

Mass vaccination drives are yielding mixed data on the extent to which adult vaccination protects children.

By Dyani Lewis

Unvaccinated children seem to be reaping the benefits of COVID-19 vaccination programmes in many parts of the world. Infection rates in children have fallen as adults get their shots. But experts disagree on whether this means that unvaccinated children are unlikely to become a 'reservoir' for infection — and a potential hotbed for the emergence of new variants.

The answer affects whether children in wealthy countries should be prioritized for vaccination — or whether their doses should go to poorer nations instead.

Compelling data on the impact of adult vaccination on children comes from the town of Serrana in Brazil's São Paulo state, where 98% of adults have been vaccinated. The town was the site of a unique experiment — dubbed Project S — to measure the real-world effectiveness of CoronaVac, developed by Sinovac, based in Beijing.

In some previous clinical trials, Sinovac's shot had been less successful at preventing symptomatic infections than had other vaccines, with efficacy rates as low as 50%.

But on 31 May, researchers at the Butantan Institute in São Paulo city detailed in a press conference a striking reduction in COVID-19 cases and deaths: symptomatic cases fell by 80% and deaths by 95%. Only 62% of Serrana's 45,000 residents are adults, yet a similar drop in symptomatic infections occurred in unvaccinated children, according to Ricardo Palacios, the epidemiologist who led the study.

Similar scenarios have played out in countries with high vaccination rates, such as Israel and the United States. In the latter, cases in children (generally those under the age of 18) fell by 84% between January and May. Just over half of the US population — predominantly adults — has received at least one vaccine dose.

"It just makes sense," says Monica Gandhi, an infectious-diseases physician at the University of California, San Francisco. Vaccinating adults protects others who are unvaccinated. "That is really what herd immunity means," she says.

Gandhi also points to evidence that children are less likely than adults to transmit the virus — another reason why they might not act as effective reservoirs for infection (K. McCartney *et al. Lancet Child Adolesc. Health* **4**, 807–816; 2020). The way in which the virus affects children is "just different", she says, probably because children's airways have fewer of the receptors that SARS-CoV-2 uses to gain entry into cells.

Children in São Paulo city hold kits including sanitizing products and face masks.

ANDRE PENNER/AP/SHUTTERSTOCK

In Israel, infection rates have plummeted in people over 16, from 559 cases per 100,000 in mid-January to just 1.5 per 100,000 today. Most schools reopened by March, yet rates in unvaccinated children also dived. This suggests that children are most often infected by adults, says Eric Haas, a paediatric infectious-diseases physician and epidemiologist at the Israel Ministry of Health in Jerusalem.

But not everyone reads the data in that way. Julian Tang, a virologist at the University of Leicester, UK, says that the speed of the roll-out in Israel might have contributed to it stamping out infections across all ages.

And early data from the United Kingdom — where the vaccination rate is 60% — paint a more complicated picture. By the end of May, cases in secondary-school kids had fallen from a high of around 600 per 100,000 in January to less than 100 per 100,000. In younger school kids, the numbers are now even lower.

But recent data also suggest that unvaccinated children might still be important spreaders of the virus. During May, almost 100 outbreaks — defined as two or more cases — occurred in schools in England. Yet that number represents only a "tiny proportion" of England's 25,000 schools, says Shamez Ladhani, a paediatric infectious-diseases physician with Public Health England.

But Tang says school transmission shouldn't be ignored. Britain's vaccine roll-out was slower than Israel's, he argues, and school reopenings coincided with the spread of B.1.617.2 — also known as the Delta variant. As a result, the virus might continue to circulate in kids. And the longer the pandemic continues, the greater the chance that new variants will emerge.

The extent to which unvaccinated children act as spreaders has implications for whether they should be vaccinated once adults have been — a question being hotly debated.

The US Food and Drug Administration approved the Pfizer jab for children aged 12–18 on 10 May, and 7 million have received at least one dose. Agencies in Japan, the European Union and elsewhere have done likewise.

But severe COVID-19 in children is rare: a May 2020 analysis across 26 countries estimated that just 0.14% of infected children develop dangerous inflammation (A. Hoang *et al. EClinicalMedicine* **24**, 100433; 2020). Other complications are also uncommon, says Ghandi.

Because of the lower risk, the World Health Organization argues that vaccinating children is not a high priority, given that global supplies are insufficient to immunize all adults.

But Tang sees vaccinating children as crucial to controlling the pandemic. It would remove them as a potential reservoir for asymptomatic infections and would guard against the emergence of new variants, he says.

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