

Should children get COVID vaccines? What the science says

At a time when much of the world is still struggling to access COVID-19 vaccines, the question of whether to vaccinate children can feel like a privilege. On 19 July, vaccine advisers in the United Kingdom recommended delaying vaccines for most young people under 16, citing the very low rates of serious disease in this age group. But several countries, including the United States and Israel, have forged ahead, and others are hoping to follow suit when supplies allow. *Nature* looks at where the evidence stands on children and COVID-19 vaccines.

Is it necessary?

SARS-CoV-2 is much less likely to cause serious illness in children than it is in adults. But some children do still become very ill, and the spectre of long COVID — a constellation of sometimes debilitating symptoms that can linger for months after even a mild bout of COVID-19 — is enough for many paediatricians to urge vaccination as quickly as possible. “I spent the pandemic taking care of kids in a children’s hospital,” says Adam Ratner, a paediatric infectious-disease specialist at New York University. “We saw not as many as in the adult side, but plenty of children who were quite ill.”

Vaccine advisers in the United Kingdom, however, have recommended that only adolescents who are clinically vulnerable, or who live with vulnerable adults, should be vaccinated for the time being. Severe illness, death and even long COVID are rare among healthy adolescents and children (see page 639), and soon, nearly all vulnerable adults will have received two vaccine doses, University of Bristol paediatrician Adam Finn told reporters at a media briefing.

But in some countries, little is yet known about how COVID-19 affects children. Some official tallies of hospitalizations and deaths due to COVID-19 in sub-Saharan Africa, for example, do not break down the cases by age. As a result, paediatricians don’t know which deaths were in children and young people, and how outcomes of COVID-19 might be affected by conditions such as malnutrition, or concurrent tuberculosis or HIV infection. “We are feeling in the dark,” says Nadia Sam-Agudu, a paediatrician with the University of Maryland School of



A student in Bogor, Indonesia, receives a Sinovac jab in a COVID-19 vaccination campaign.

Medicine in Baltimore who works in Nigeria.

In addition, some paediatricians are concerned about what will happen to children who are co-infected with SARS-CoV-2 and other common viruses that have been kept at bay by social distancing, says Danilo Buonsenso, a paediatrician at the Gemelli University Hospital in Rome. “We don’t know yet what will be the burden of co-infections in children when we have a massive circulation of routine viruses and COVID,” he says.

Is vaccinating children safe?

A handful of vaccines have been tested in young people over the age of 12, including messenger RNA vaccines made by Moderna and Pfizer–BioNTech, and two Chinese vaccines made by Sinovac and Sinopharm. And several countries, including the United States, Israel and China, are now offering vaccines to this age group. Other studies are expected to report results in young people over the age of 12 soon, including studies on the Zydus Cadila vaccine and the Covaxin inactivated coronavirus vaccine, both made in India.

Thus far, the vaccines seem to be safe in adolescents (B. Han *et al. Lancet Infect. Dis.* <https://doi.org/gn93>; 2021), and some

companies have moved on to carrying out clinical trials in children as young as six months old. In the United States, vaccines for those under 12 might be available later this year, says paediatrician Andrea Shane at Emory University in Atlanta, Georgia.

A potential link between the Pfizer vaccine and heart inflammation — conditions called myocarditis and pericarditis — has emerged since Israel and the United States began vaccinating young people. However, researchers have yet to establish that the vaccine caused the inflammation. Most of those affected have recovered, and the data suggest that the risk of these conditions is “extremely low”, says paediatrician David Pace at the University of Malta in Msida — about 67 cases per million second doses in adolescent males aged 12–17, and 9 cases per million in adolescent females in the same age group.

How will vaccinating children and young people affect the pandemic?

Malta has one of the highest vaccination rates in the world, and is now vaccinating adolescents over the age of 12. There, the decision to vaccinate young people was shaped, among other factors, by the

ADRIANA ADIE/NURPHOTO/GETTY

close-knit family structures in a country where adolescents tend to have frequent contact with their grandparents and often travel abroad for school.

Data show that children, and particularly adolescents, can play a significant part in coronavirus transmission, says Catherine Bennett, an epidemiologist at Deakin University in Melbourne, Australia. And concerns about transmission by children and adolescents are growing as new coronavirus variants emerge. It's possible that more-transmissible variants will develop a way to push through whatever it is in a young person's immune response that makes them more resistant to infection, says Bennett, making it all the more important that they are vaccinated.

Hopes of achieving herd immunity quickly through immunization have waned, so countries need to do the best that they can to keep transmission low, she adds: "You only need one poorly vaccinated population to generate global variants."

Is vaccinating children fair?

Chile, another country with a high COVID-19 vaccination rate, is also rolling out vaccines to those aged 12 and older.

But Miguel O'Ryan, a former member of two advisory committees to the government there who has pushed for aggressive vaccination campaigns, now finds himself wondering whether it's time to slow down. "Other countries, even our neighbours, are struggling very hard to get enough vaccines for their high-risk groups," says O'Ryan, who is a paediatric infectious-disease specialist at the University of Chile in Santiago.

In May, World Health Organization chief Tedros Adhanom Ghebreyesus said that wealthier countries that are vaccinating children are doing so at the expense of health-care workers and high-risk groups in other countries. But advocates for vaccinating children and young adults argue that it need not be a case of one or the other. Sam-Agudu points out that some wealthy countries bought more than enough doses to fully vaccinate their populations, and that sending vaccines abroad "should not preclude vaccinating children in higher-income countries".

By Heidi Ledford

DEATHS FROM COVID 'INCREDIBLY RARE' AMONG CHILDREN

Studies find that overall risk of death or severe disease from COVID-19 is very low in kids.

By Heidi Ledford

A comprehensive analysis of hospital admissions and reported deaths across England suggests that COVID-19 carries a lower risk of dying or requiring intensive care among children and young people than was previously thought.

COVID-19 caused 25 deaths in that age group between March 2020 and February 2021, researchers reported in a series of preprints published on medRxiv¹⁻³. About half of those deaths were in individuals with an underlying disability with high health-care needs, such as tube feeding or assistance with breathing.

The studies did not evaluate rates of less severe illness or debilitating 'long COVID' symptoms that can linger months after the acute phase of the infection has past. "The low rate of severe acute disease is important news, but this does not have to mean that COVID does not matter to children," says paediatrician Danilo Buonsenso at the Gemelli University Hospital in Rome. "Please, let's keep attention – as much as is feasible – on immunization."

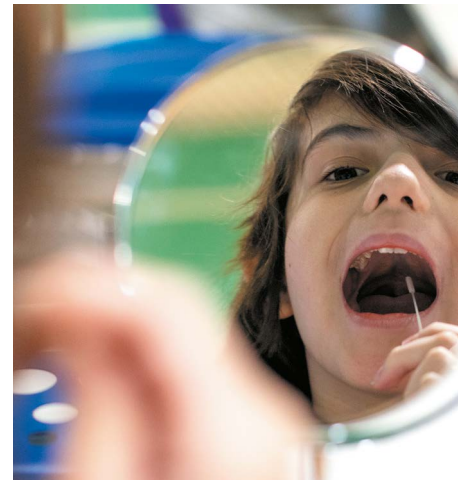
In one of the preprints, the researchers trawled for published accounts of COVID-19 among children and young people, and ultimately analysed data from 57 studies and 19 countries³. They then picked apart risk factors for severe disease and death from the data.

Study findings

Some conditions – including obesity and cardiac or neurological conditions – were associated with a higher risk of death or intensive-care treatment, the researchers found. But the absolute increase in risk was very small, study author Rachel Harwood, a paediatric surgical registrar at Alder Hey Children's Hospital in Liverpool, UK, said at a media briefing.

For the other two preprints, the researchers focused on England, where they found that of 6,338 hospital admissions for COVID-19, 259 children and young people required treatment in intensive-care units.

Black children were more likely than their white counterparts to require intensive care, both for COVID-19 and for paediatric multi-system inflammatory syndrome, a rare syndrome associated with coronavirus infection. But overall, the need for intensive care was "incredibly rare" among these patients, says



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A child performs a lateral-flow COVID test.

study author Joseph Ward at the University College London Great Ormond Street Institute of Child Health.

Of 3,105 deaths from all causes among the 12 million or so people under 18 in England between March 2020 and February 2021, 25 were attributable to COVID-19 – a rate of about 2 for every million people in this age range. None had asthma or type-1 diabetes, the authors note, and about half had conditions that put them at a higher risk than healthy children of dying from any cause.

In some cases, efforts to shield children thought to be vulnerable to severe complications from COVID-19 might have "caused more stress and anxiety for families than benefit", says Elizabeth Whittaker, an infectious-disease specialist at Imperial College London.

The work does not tackle the spectre of long COVID, but other studies suggest that it does occur in children – including in those who had mild initial symptoms or were asymptomatic – but less frequently than in adults.

Buonsenso still hopes that schools will embrace measures such as masks and improved ventilation, and that parents will focus on immunization – for either their children, where possible, or themselves.

1. Ward, J. L. et al. Preprint at medRxiv <https://doi.org/10.1101/2021.07.01.21259785> (2021).
2. Smith, C. et al. Preprint at medRxiv <https://doi.org/10.1101/2021.07.07.21259779> (2021).
3. Harwood, R. et al. Preprint at medRxiv <https://doi.org/10.1101/2021.06.30.21259763> (2021).