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COVID-19 vaccination protects children and adolescents

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By February 2022, European and US agencies recommended use of the BNT162b2 mRNA COVID-19 vaccine (Pfizer–BioNTech) as a primary two-dose series in children aged 5–11 years and as a booster dose in adolescents aged 12–15 years.[1–2] Since then, some real-world BNT162b2 vaccine effectiveness data among children and adolescents have generally showed moderate protection against symptomatic infection,[3–6] with better protection against COVID-19-associated serious outcomes (emergency department visits and hospitalisations),[6–9] especially in the weeks immediately after vaccination.

However, how well two doses of BNT162b2 protected children or a booster dose protected adolescents from symptomatic and asymptomatic SARS-CoV-2 infections against the omicron variant (B.1.1.529) has not been clear. In *The Lancet Infectious Diseases*, Ofra Amir and colleagues[10] report that children, in Israel aged 5–10 years who received two doses (of BNT162b2) and adolescents aged 12–15 years who received a booster dose had a substantially reduced rate of confirmed SARS-CoV-2 infections during a period of omicron predominance in the weeks following BNT162b2 vaccination.[10]

In an observational study of almost 200 000 children and adolescents using a comprehensive Israeli Ministry of Health database, Amir and colleagues estimated rates of confirmed SARS-CoV-2 infection according to BNT162b2 vaccination status in children aged 5–10 years and adolescents aged 12–15 years during a 2-week (Dec 26, 2021, to Jan 8, 2022), omicron-dominant period in Israel.[10] When comparing children 14–35 days after receiving a second BNT162b2 dose with same-aged children 3–7 days after receiving the first BNT162b2 dose, rates of infection after two vaccine doses were more than two times lower. Similarly, rates of SARS-CoV-2 infection among adolescents 14–60 days after receiving a booster dose were more than three times lower than in those 3–7 days after receiving a booster dose. Secondary analyses among individually matched vaccinated and unvaccinated children and adolescents also found lower rates of SARS-CoV-2 infection after vaccination.[10]

Interestingly, the authors note that unvaccinated children and adolescents had lower rates of testing in the period before the start of the study than did those in the vaccinated groups, suggesting that rates of infection in the unvaccinated cohorts might have been underestimated. Although this observation was not fully explained by the authors, differential testing rates might have reflected variations in health-care seeking behaviour between the groups. Further, vaccine uptake was low in the study population, which could lead to selection biases in the unvaccinated group comparisons. Exploring differences between those vaccinated and unvaccinated in future assessments of COVID-19 vaccine performance in children and adolescents will be important. Overall, the authors' use of recently vaccinated children and adolescents as controls in the primary analyses to reduce potential biases between those vaccinated and unvaccinated, together with the consistency of results across different analytical methods, should reassure readers that BNT162b2 vaccination protected children and adolescents from confirmed SARS-CoV-2 infection.

Published estimates of vaccine effectiveness among 5–11-year-olds range from 29% to 60% against symptomatic infection,[3–5] which are laudable but notably lower than the 90·7% seen in the initial clinical trial.[1] Since the clinical trials were done before omicron predominance, such differences between the efficacy and real-world effectiveness estimates highlight the importance of continued COVID-19 vaccine assessment and development as SARS-CoV-2 lineages continue to evolve. However, work showing increased protection of BNT162b2 against more severe outcomes, such as hospitalisation, in children and adolescents[6–9] remains an important reason to strongly encourage vaccine uptake in these populations.

Studies have shown that a BNT162b2 booster dose among adolescents increases protection against infection.[3,10] In May, 2022, the USA recommended a booster dose for 5–11-year-olds.[11] Whether a booster dose among children aged 5–11 years similarly increases protection against SARS-CoV-2 infection is not yet known, but we are hopeful that a booster will also benefit this younger population.

Growing literature paints a consistent picture that COVID-19 vaccination provides short-term protection for children and adolescents against SARS-CoV-2 infection during the omicron-predominant era, but the

extent to which BNT162b2 vaccine protection persists beyond the 35 days after the second dose in children and 60 days after the booster dose in adolescents observed in Amir and colleagues' study is not clear. Monitoring the duration of COVID-19 vaccine protection will be a public health priority, especially as waning protection after two BNT162b2 doses has been observed in other paediatric studies.[3,6,8]

Consistent with findings from the USA[3,4] and England,[5] Amir and colleagues found substantially lower rates of confirmed SARS-CoV-2 infection among vaccinated children and among boosted adolescents compared with unvaccinated children and adolescents. We are encouraged by these results, which further emphasise the benefit of vaccinating children and adolescents with all recommended vaccine doses.

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