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Letter to Editor (Pages: 19646-19649)

# A Concern That Persists After the Pandemic: The Importance of Getting a Booster Dose of the COVID-19 Vaccine for Children

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***Abstract***

Although the acute phase of the pandemic has subsided, coronavirus disease 2019 (COVID-19) continues to circulate, with new variants emerging periodically. Children, initially thought to be less susceptible to severe outcomes, are not immune to the virus's effects. Data from the Centers for Disease Control and Prevention (CDC) indicates that pediatric hospitalizations due to COVID-19 have occurred across all age groups, particularly during variant-driven surges. Moreover, long COVID—persistent symptoms following infection—has been documented in children, affecting their quality of life and development .Parents are encouraged to consult pediatricians to determine the appropriate schedule for their child, considering factors like prior infection, health status, and local transmission rates. Ensuring high booster uptake among children has far-reaching implications. Schools remain safe environments when vaccination rates are high, reducing absenteeism and supporting educational outcomes. Additionally, protecting children contributes to global efforts to control COVID-19, preventing the emergence of new variants that could prolong the pandemic. Governments and health organizations must prioritize equitable access to boosters, particularly in low-resource settings where vaccine distribution remains a challenge. Community outreach, mobile vaccination clinics, and school-based programs can enhance uptake and address disparities.

***Key Words:*** Booster Dose , COVID-19 Vaccine , Children.

* Please cite this article as: Abdollahi R, Bagherzadi A. A Concern That Persists After the Pandemic: The Importance of Getting a Booster Dose of the COVID-19 Vaccine for Children. J Ped Perspect 2025; 13 (9):19646-19649. **DOI: 10.22038/jpp.2025.91001.5595**

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## DEAR EDITOR

The coronavirus disease 2019 (COVID-19) pandemic has reshaped global health perspectives, highlighting the critical role of vaccines in protecting vulnerable populations. While initial vaccination campaigns focused on adults, children have since become a priority as new variants and waning immunity underscore the need for booster doses.

Although the acute phase of the pandemic has subsided, COVID-19 continues to circulate, with new variants emerging periodically. Children, initially thought to be less susceptible to severe outcomes, are not immune to the virus's effects. Data from the Centers for Disease Control and Prevention (CDC) indicates that pediatric hospitalizations due to COVID-19 have occurred across all age groups, particularly during variant-driven surges. Moreover, long COVID—persistent symptoms following infection—has been documented in children, affecting their quality of life and development (1).

The virus's ability to mutate necessitates ongoing vigilance. Variants like Omicron and its subvariants have shown increased transmissibility, even among vaccinated individuals. For children, who often interact in high-contact environments like schools and daycare centers, the risk of exposure remains significant. Booster doses are designed to enhance immunity, providing targeted protection against these evolving strains (2). Booster doses are additional vaccine shots administered after the primary series to restore and strengthen immunity. For children, boosters are particularly important for several reasons, considering both antibody and cellular immunity, which are critical components of the immune response to COVID-19 vaccines.

1. **Waning Immunity Over Time:** Studies have shown that immunity from the initial COVID-19 vaccine series, encompassing both antibody and cellular responses, diminishes over months, particularly against new variants. A 2023 study published in The Lancet found that vaccine effectiveness against infection in children aged 5–11 dropped significantly six months post-vaccination. Booster doses help restore antibody levels and enhance cellular immunity, improving protection against both infection and severe outcomes. Additionally, serum gammaglobulin levels, which reflect humoral immunity, are an important metric in evaluating post-vaccination immune status, though responses vary across individuals, with some showing stronger antibody responses and others more robust cellular immunity.
2. **Protection Against Severe Outcomes:** While children are less likely to develop severe COVID-19 compared to adults, complications such as Multisystem Inflammatory Syndrome in Children (MIS-C) remain a concern. The CDC reported over 9,000 cases of MIS-C in the U.S. by 2024, with a notable proportion occurring in unvaccinated or under-vaccinated children. Boosters reduce the risk of such complications by bolstering both arms of the immune system, though further research is needed to fully understand the long-term effects of different vaccine types on these outcomes.
3. **Reducing Transmission in Communities:** Children play a significant role in community transmission due to their social interactions. Vaccinated children with booster doses, benefiting from enhanced antibody and cellular

immunity, are less likely to spread the virus to vulnerable populations, such as unvaccinated peers, elderly relatives, or immunocompromised individuals. Interestingly, low and frequent exposures to the virus in the post-pandemic era may act as a natural booster in some individuals, potentially reinforcing immune responses, though this effect is not a substitute for vaccination and requires further investigation (3).

4. **Supporting Safe Return to Normalcy:** Booster doses enable children to safely participate in school, extracurricular activities, and social events. By reducing the likelihood of outbreaks in educational settings, boosters help maintain consistent learning environments and minimize disruptions caused by illness. However, the variability in immune responses among children underscores the need for personalized approaches to booster recommendations, guided by clinical and laboratory data.

Despite the clear benefits, some parents remain hesitant about vaccinating their children with booster doses. Common concerns include side effects, the necessity of boosters for healthy children, and the perception that COVID-19 is no longer a threat. Addressing these concerns with evidence-based information is crucial.

- **Safety of Boosters:** Extensive clinical trials and real-world data confirm that COVID-19 vaccines, including boosters, are safe for children. Side effects, such as mild fever or arm soreness, are typically short-lived. Serious adverse events, like myocarditis, are exceedingly rare in children and are closely monitored by health authorities.
- **Necessity for Healthy Children:** Even healthy children can experience severe COVID-19 or long-term effects, such as long COVID. Boosters ensure robust protection, particularly as new variants emerge, though the variability in immune responses (antibody versus cellular) highlights the need for ongoing research to optimize booster strategies (4).
- **Ongoing Risk:** The persistence of COVID-19 in communities underscores the need for continued vigilance. Vaccination, including boosters, remains the most effective tool to mitigate risks, though the long-term effects of repeated boosters across different vaccine types are not yet fully elucidated and warrant more detailed clinical and laboratory investigations, including systematic reviews of existing studies.

Healthcare providers play a vital role in addressing these concerns through open communication, providing parents with data-driven insights, and addressing misinformation. As of September 2024, the CDC and World Health Organization (WHO) recommend booster doses for children aged 6 months and older, depending on the vaccine type and primary series completion. For example:

- **Pfizer-BioNTech:** Children aged 5–11 are eligible for a booster 5 months after their primary series, with updated formulations targeting recent variants.
- **Moderna :** Similar recommendations apply, with boosters tailored for children as young as 6 months.
- **Timing and Frequency:** Boosters are typically

recommended annually or as advised based on variant prevalence, epidemiological data, and individual immune response profiles (5).

Parents are encouraged to consult pediatricians to determine the appropriate schedule for their child, considering factors like prior infection, health status, local transmission rates, and individual immune response patterns, including antibody and cellular immunity metrics. Ensuring high booster uptake among children has far-reaching implications (6). Schools remain safe environments when vaccination rates are high, reducing absenteeism and supporting educational outcomes. Additionally, protecting children contributes to global efforts to control COVID-19, preventing the emergence of new variants that could prolong the pandemic.Governments and health organizations must prioritize equitable access to boosters, particularly in low-resource settings where vaccine distribution remains a challenge. Community outreach, mobile vaccination clinics, and school-based programs can enhance uptake and address disparities (3).

## CONCLUSION

The COVID-19 pandemic may no longer dominate headlines, but its impact persists, especially for vulnerable populations like children. Booster doses are a crucial tool in maintaining both antibody and cellular immunity, preventing severe outcomes, and reducing community transmission. However, the variability in immune responses and the potential booster-like effect of low-level virus exposure in the post-pandemic era undersource the need for further research to refine booster recommendations. Additionally, the long-term effects of repeated boosters across different vaccine types require more comprehensive clinical and laboratory investigations, including systematic reviews of existing studies. By prioritizing boosters for children and ensuring equitable access, we protect not only their health but also the well-being of society as a whole. Parents, healthcare providers, and policymakers must work together to ensure that every child has access to this vital layer of protection, fostering a safer and healthier future through evidence-based strategies.

## CONFLICT OF INTEREST

The author declares that he has no competing interests to disclose in relation to this paper.

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