



VIEWPOINT

Vaccine apartheid: This is not the way to end the pandemicVanessa S Lanzotti,¹ Yonca Bulut,² Danilo Buonsenso  ^{3,4,5} and Sebastian Gonzalez-Dambrauskas ^{6,7}

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There are many reasons why the international community as a whole should advocate for COVID-19 vaccine equity: global economic recession, uncontrolled outbreaks with higher risk of virus variants and persistent unsafe travelling in an era of now vaccine-preventable cause of death. This inequity is an avoidable threat to global health. Funding agencies, policy makers, drug companies and NGOs among others have the moral duty to end this vaccine apartheid and to make vaccine equity a reality. In this viewpoint, we discuss how inequalities in vaccination access affect a proper control of the pandemic, highlighting specific consequences on child health.

No one is safe, until everyone is safe

(Dr Tedros Adhanom Ghebreyesus, Director General of the WHO)

Imagine if ‘The pandemic has ended. Mobility restrictions, social distancing and uncomfortable masking are not required anymore. Your social life has turned back to normal for you and your family. You are kissing and hugging your loved ones. Your kids are thriving and you feel safer. Your wounds have started to heal after the COVID-19 horror story and those days are now only distant, unpleasant memories’. If you live in a high-income country (HIC), this hypothetical scenario will probably soon be your reality. Although regions within some HICs are experiencing surges with the highly contagious SARS-CoV-2 delta variant, hospitalisations and deaths are at lower levels compared with previous waves. This has been possible, thanks to relatively COVID-19 vaccines. Now, routine activities and tourism are normalising to pre-pandemic levels and almost all severe cases and deaths occurring in patients who were not vaccinated.

Vaccines are now the safest and fastest way to make the scenario of normal life possible. Unfortunately, most of humanity is blind to this reality as a vaccine apartheid is unfolding. If this vaccine apartheid does not end soon, it is likely that poorer countries will be left behind once again losing thousands of vaccine-preventable lives, further undermining global recovery and leading to more virulent virus variants to appear.

Apartheid is an Afrikaans word meaning ‘separateness’ or ‘the state of being apart’, which describes the system of institutionalised racial segregation that existed in South Africa

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and South West Africa. The ‘state of being apart from vaccine programmes’ for low- and middle-income countries (LMICs) and not having actual meaningful solutions strongly resemble the situation in South Africa during the 20th century. Despite most of the phase-3 trials for COVID-19 vaccines having been completed in LMIC, these countries have only received a very small percentage of the vaccines they helped develop by participating in clinical trials and providing test subjects.

As of 18 August 2021, 31.7% of the world population has received at least one dose of a COVID-19 vaccine and 23.7% is fully vaccinated. About 4.76 billion doses have been administered globally and 37.24 million are now administered each day. However, only 1.3% of people in low-income countries have received at least one dose.^{1,2} There was an effective global coalition to develop the vaccines but not to deliver it.³ LMICs were actively involved in vaccine production and trials, but did not receive adequate doses.

The World Health Organization (WHO) promoted social media campaigns with #vaccineequity hashtags to bring light to the ongoing tragedies without effective response. A more realistic approach was first offered by the COVAX programme, which is one of the three pillars of the Access to COVID-19 Tools (ACT). Many programmes tried to bring governments, global health organisations, manufacturers, scientists, the private sector, civil society and philanthropy together in order to provide innovative and equitable access to COVID-19 diagnostics, treatments and vaccines. So far, they have failed. After a slow start, COVAX achieved important results in shipping; as of 17 August, 206 million COVID-19 vaccines are delivered to 138 countries. However, although this may seem good news, it is still nothing compared with coverage in rich countries. As of 18 August 2021, the COVAX could only immunise 4.3% of Africa (only 2.1% fully immunised), 50% of South America (25% fully immunised) and 31% of India (8.3% fully vaccinated).⁴ These figures are in contrast with an impressive 70 and 59% for the UK and USA, respectively.

How did we get here? We should look at global free-market strategies to uncover some answers. To further exacerbate these inequalities, it is now public knowledge that vaccine manufacturers charged different prices to different countries.⁴ Some African nations paid more than twice per dose than their European counterparts pay and now is public that some vaccines produced in Africa are being exported to Europe.⁵

The extraordinary, rapid development of many highly effective vaccines has never occurred before in the history of science and might become one of the greatest achievements in human health. It might shape the human fight against future pandemics to come. The USA made an important move towards alleviating vaccine inequality by supporting the waiver of intellectual property protections as an extraordinary measure during the current crisis. However, with no infrastructure to support vaccines manufacturing, how will this practically help the current situation in LMICs remains uncertain. For the time being, profiteering from vaccine inequity is still the norm and companies and most rich nations are not committed to aid poorer countries.

Moreover, planned strategies in HICs further complicate current and future scenarios for vaccine access in LMICs. First, almost all western countries started vaccinating children older than 12 years of age and major agencies including the CDC declared that approvals for children aged 5–11 years are expected soon. These decisions were not without controversy surrounding mass child vaccination under emergency use authorisations.^{6,7} Although there is recent evidence of a higher transmissibility of the delta variant and increase in paediatric cases registered world-wide,⁸ an increasingly recognised role of children in

transmission⁹ and concerns of long COVID in children^{10–13} require that immunisation strategies consider the pros and cons of vaccinating younger people, this should be done in the context of a global perspective. Should a health-care professional in LMIC be immunised after a healthy adolescent with very low risk of complications from SARS-CoV-2 infection? To fuel this moral outrage of vaccine nationalism, some HICs, including Israel and the USA, have already decided booster vaccinations. Although this approach might be based on the evidence of improved immune response in some fragile populations (like the immunocompromised),¹⁴ this is still not supported by robust clinical evidence showing an improvement of meaningful clinical outcomes in previously healthy vaccinated adults. Again, this approach of a third dose for fragile adults in HICs instead of giving a first dose to riskier adults in LMICs lacks global perspective.

While vaccine distribution is almost non-existent in many LMICs, it is in these countries where the most vulnerable children are born and live. We, as paediatricians, are extremely concerned about the vaccine crisis. Mounting evidence throughout the first year of the pandemic showed that children and adolescents remain at very low risk of COVID-19 mortality. This was particularly true across rich countries where it is estimated that less than 0.19 deaths per 100 000 people younger than 19 years occurred, comprising 0.54% of the total mortality from all causes.¹⁵ During the beginning of the pandemic, children have been less likely to develop symptomatic disease, their disease course was mostly mild and they were relatively spared from hospitalisation.^{16,17} Importantly, low or incomplete vaccine coverage in most of the world-wide population is not only an ethical

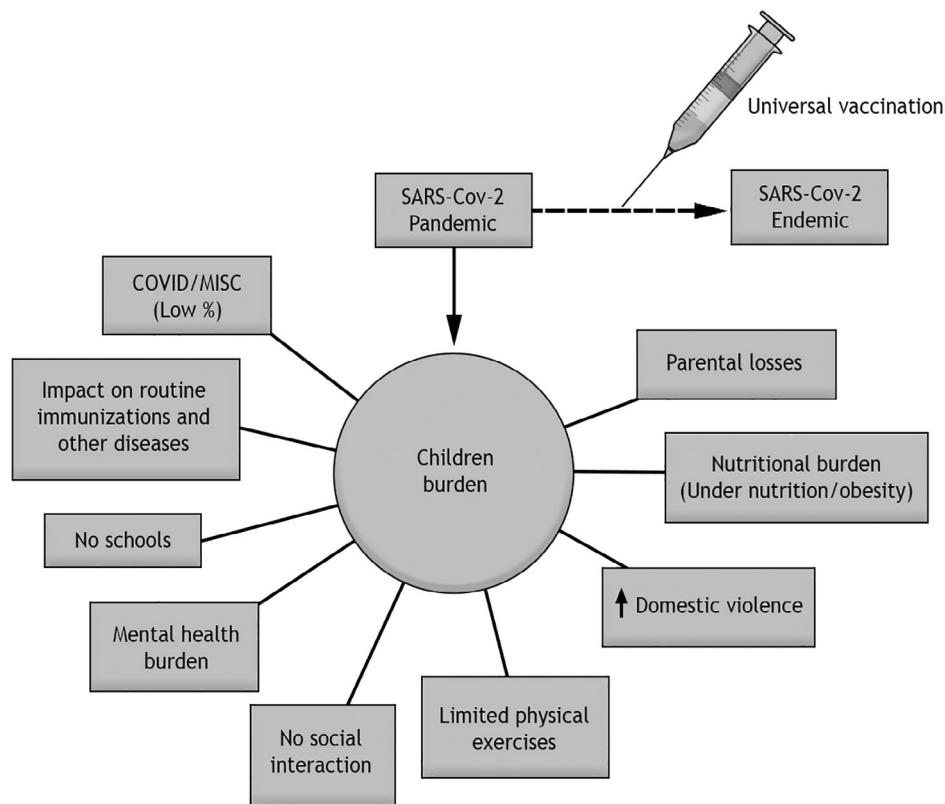


Fig 1 Indirect consequences of inequalities in vaccine access on child's health.

issue, but also a clear risk for the development of viral variants capable of escaping vaccines which can, in turn, also negatively impact health systems in HIC too. Although only 112 children deaths were reported during the first 6 months of the pandemic in the USA,¹⁸ if more contagious and virulent variants continue to arise, these figures in HICs are likely to change, disproportionately affecting unvaccinated populations like children. In addition, preliminary, although still not peer-reviewed, data suggest increasing cases among the paediatric population, which seem reflected in an increase of paediatric hospitalisations as well, although the overall outcomes seem unchanged.⁸ In any case, although surges of COVID-19 cases may not have direct severe clinical impact on child health, the lower availability of hospital resources, including intensive care facilities, may be threatened with the resurgence of common respiratory viruses, including respiratory syncytial virus.¹⁹ Importantly, while HICs will eventually find solutions and resources in case of increased stress on paediatric health resources, this might not be the reality in LMICs, where disease burden has been largely ignored and outcomes might be worse.²⁰ For instance, a recent systematic review collected data from 216 countries found that 9 out of 10 paediatric COVID-19 deaths occurred in LMIC, where deaths per million children were twice as high compared to HIC and case fatality rate more than 20 times higher.²¹ Moreover, the study found striking differences for paediatric intensive care unit (ICU) admissions, with 18.80/1 000 000 children in HICs and 1.48 in LMICs. A recent large study of paediatric ICU admissions found that mortality in LMICs was much higher than HICs, reaching 15% in children younger than 2 years who are unlikely to be vaccinated soon, if ever.²² Although this higher mortality could be related to the lack of human and technological resources, it is important to point out that most of the children living in LMICs are surrounded by unvaccinated individuals. In this environment, vaccines become essential for disease control and improve children's survival.

Vaccine apartheid will pose a newer threat to children's wellbeing who have already been harmed by the pandemic through its indirect consequences (Fig. 1). Prolonged school closures not only led to reduction of social interactions and widened the educational disparities, but also led to food insecurities and safety concerns for children from fragile social backgrounds.²³ Children in LMIC will suffer more from disruptions of immunisation services described during the pandemic.^{24,25} A recently published report from the WHO and UNICEF highlighted that the COVID-19 pandemic and associated disruptions have strained health systems in 2020, resulting in 22.7 million children missing out on vaccination, 3.7 million more than in 2019 and the highest number since 2009. Moreover, the number of children receiving no vaccines through the routine immunisation programme – 'zero-dose children' – increased from 13.6 to 17.1 million.²⁶ Tragically, a growing number of children from vulnerable families might be at particular risk of becoming orphans due to COVID-19. In the USA, at least 43 000 children have lost a parent and black children were disproportionately affected.²⁷ It would be expected that these consequences will be even more pronounced in LMIC, where chronic shortages of health-care infrastructure (such as vital oxygen supplies) including ICU beds will contribute significantly to morbidity and mortality of children and their families.²⁸ It becomes clear that the only way out of this

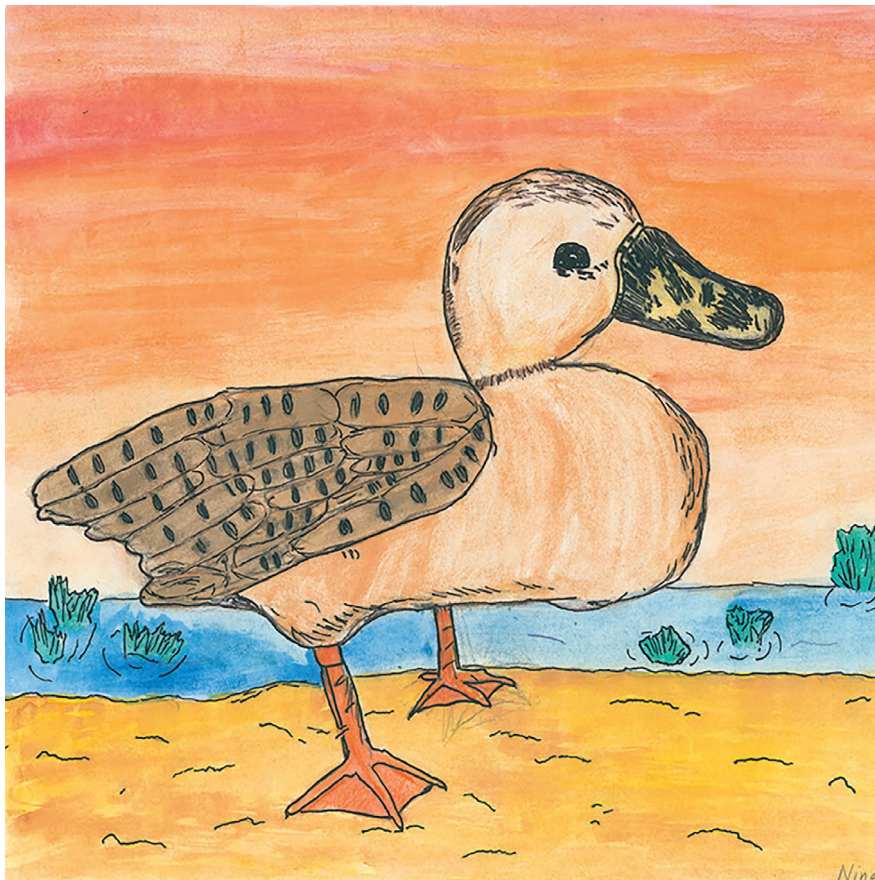
catastrophic situation is to ensure equitable adult vaccination in LMICs, and indirectly protect all family members, including children.

Here, we paraphrase the WHO's Secretary General Tedros Adhanom Ghebreyesus: 'I believe the world faces a catastrophic moral failure in equal access to the tools to combat the pandemic'. This apartheid of a now vaccine-preventable disease would remain in the memory of generations as a macabre precedent of this syndemic. The disastrous situation of India during March–May 2021 is a perfect example of what awaits us if we fail to change the course of the story and it is beyond moral discussions. It is an enormous mistake to believe that vaccine apartheid is a problem confined to LMIC. If inequalities persist and are neglected, the pandemic will not go away any time soon. It could cost trillions of dollars to world economies if access to COVID-19 vaccines endure.²⁹ There are many reasons why the international community as a whole should advocate for vaccine equity: global recession, uncontrolled outbreaks with higher risk of deadly virus variants and persistent unsafe travelling which are all avoidable threats to global health.³⁰ Funding agencies, policy makers, drug companies and NGOs among others have the moral duty to end this vaccine apartheid and to make vaccine equity a reality. It is heart breaking to observe children suffer directly and indirectly due to a vaccine-preventable disease. Our children deserve better and we are all in this together.

References

- Burki TK. Challenges in the rollout of COVID-19 vaccines worldwide. *Lancet Respir. Med.* 2021; **9**: e42–3.
- Available from: <https://ourworldindata.org/covid-vaccinations>
- Choo EK. COVID-19 fault lines. *Lancet* 2020; **395**: 1333.
- Dyer O. Covid-19: Countries are learning what others paid for vaccines. *BMJ* 2021; **372**: n281.
- Available from: <https://www.nytimes.com/2021/08/16/business/johnson-johnson-vaccine-africa-exported-europe.html>
- Obaro S. COVID-19 herd immunity by immunisation: Are children in the herd? *Lancet Infect. Dis.* 2021; **21**: 758–9.
- Available from: <https://blogs.bmj.com/bmj/2021/05/07/covid-vaccines-for-children-should-not-get-emergency-use-authorization/> [accessed 11 May 2021].
- Available from: <https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-state-level-data-report/>
- Paul LA, Daneman N, Schwartz KL *et al.* Association of age and pediatric household transmission of SARS-CoV-2 infection. *JAMA Pediatr.* 2021; e212770. <https://doi.org/10.1001/jamapediatrics.2021.2770> [Epub ahead of print].
- Buonsenso D, Di Giuda D, Sigfrid L *et al.* Evidence of lung perfusion defects and ongoing inflammation in an adolescent with post-acute sequelae of SARS-CoV-2 infection. *Lancet Child Adolesc. Health.* 2021; **5**: 677–80. [https://doi.org/10.1016/S2352-4642\(21\)00196-6](https://doi.org/10.1016/S2352-4642(21)00196-6) [Epub ahead of print].
- Osmanov IM, Spiridonova E, Bobkova P *et al.*; Sechenov StopCOVID Research Team. Risk factors for long covid in previously hospitalised children using the ISARIC Global follow-up protocol: A prospective cohort study. *Eur. Respir. J.* 2021; **1**: 2101341.
- Buonsenso D, Munblit D, De Rose C *et al.* Preliminary evidence on long COVID in children. *Acta Paediatr.* 2021; **110**: 2208–11.
- Molteni E, Sudre CH, Canas LS *et al.* Illness duration and symptom profile in symptomatic UK school-aged children tested for SARS-CoV-

2. *Lancet Child Adolesc. Health* 2021; **5**: 708–18. [https://doi.org/10.1016/S2352-4642\(21\)00198-X](https://doi.org/10.1016/S2352-4642(21)00198-X) [Epub ahead of print].
- 14 Hall VG, Ferreira VH, Ku T et al. Randomized trial of a third dose of mRNA-1273 vaccine in transplant recipients. *N. Engl. J. Med.* 2021; **385**: 1244–6.
- 15 Bhopal SS, Bagaria J, Olabi B, Bhopal R. Children and young people remain at low risk of COVID-19 mortality (Published erratum appears in *Lancet Child Adolesc. Health* 2021). *Lancet Child Adolesc. Health* 2021; **5**: e12–3.
- 16 Götzinger F, Santiago-García B, Noguera-Julián A et al.; ptbnet COVID-19 Study Group. COVID-19 in children and adolescents in Europe: A multinational, multicentre cohort study. *Lancet Child Adolesc. Health* 2020; **4**: 653–61.
- 17 Li B, Zhang S, Zhang R, Chen X, Wang Y, Zhu C. Epidemiological and clinical characteristics of COVID-19 in children: A systematic review and meta-analysis. *Front. Pediatr.* 2020; **8**: 591132.
- 18 McCormick DW, Richardson LC, Young PR et al.; Pediatric Mortality Investigation Team. Deaths in children and adolescents associated with COVID-19 and MIS-C in the United States. *Pediatrics* 2021; e2021052273. <https://doi.org/10.1542/peds.2021-052273> [Epub ahead of print].
- 19 Buonsenso D, Valentini P, Moscato U, Ricciardi W, Roland D. A pediatric strategy for the next phase of the SARS-CoV-2 pandemic. *Front. Pediatr.* 2020; **8**: 582798.
- 20 Antúnez-Montes OY, Escamilla MI, Figueroa-Urbe AF et al. COVID-19 and multisystem inflammatory syndrome in Latin American children: A multinational study. *Pediatr. Infect. Dis. J.* 2021; **40**: e1–6.
- 21 Kitano T, Kitano M, Krueger C et al. The differential impact of pediatric COVID-19 between high-income countries and low- and middle-income countries: A systematic review of fatality and ICU admission in children worldwide. *PLoS One* 2021; **16**: e0246326.
- 22 Pediatric critical COVID-19 and mortality in a multinational cohort. Critical Coronavirus and Kids Epidemiological (CAKE) Study (in peer review). <https://doi.org/10.1101/2021.08.20.21262122>
- 23 Buonsenso D, Roland D, De Rose C et al. Schools closures during the COVID-19 pandemic: A catastrophic global situation. *Pediatr. Infect. Dis. J.* 2021; **40**: e146–50.
- 24 Buonsenso D, Cinicola B, Kallon MN, Iodice F. Child healthcare and immunizations in sub-Saharan Africa during the COVID-19 pandemic. *Front. Pediatr.* 2020; **8**: 517.
- 25 Dinleyici EC, Borrow R, Safadi MAP, van Damme P, Munoz FM. Vaccines and routine immunization strategies during the COVID-19 pandemic. *Hum. Vaccin. Immunother.* 2021; **17**: 400–7.
- 26 Available from: https://cdn.who.int/media/docs/default-source/immunization/wuenic-progress-and-challenges-15-july-2021.pdf?sfvrsn=b5eb9141_5&download=true
- 27 Kidman R, Margolis R, Smith-Greenaway E, Verdery AM. Estimates and projections of COVID-19 and parental death in the US. *JAMA Pediatr.* 2021; **175**: 745–6.
- 28 Buonsenso D, Cinicola B, Raffaelli F, Sollena P, Iodice F. Social consequences of COVID19 in a low resource setting in Sierra Leone, West Africa. *Int. J. Infect. Dis.* 2020; **97**: 23–6.
- 29 Available from: <https://iccwbo.org/publication/the-economic-case-for-global-vaccinations/> [accessed 11 May 2021].
- 30 Available from: <https://naturemicrobiologycommunity.nature.com/posts/10-reasons-why-everyoneshould-advocate-for-covid-19-vaccine-equity> [accessed 11 May 2021].



Bird Adaptation by Nina O'Keeffe (age 9) from Operation Art 2021