

this decade. IA2030 envisions a world where everyone, everywhere, at every age, fully benefits from vaccines to improve health and wellbeing. The IA2030 has equity at its foundation, and one of its core principles is being data-guided.¹² Heightening focus on the production and use of quality data, starting with health workers, and creating a strong data-use culture from the local to the global level, can not only help improve the quality of the coverage estimates but ultimately also help identify and reach people who are due for vaccination, including those in displaced and marginalised populations who are not being fully vaccinated in a timely fashion. We agree with the conclusions of the GBD Collaborators that strengthening vaccine data and monitoring systems is crucial to achieve the vision of IA2030, and join in their call to do so, to live in a world where everyone, everywhere can fully benefit from vaccines.

We are all WHO employees, in the division of Immunizations, Vaccines & Biologicals. MG-D and MCD-H are involved in the analysis and publication of WUENIC. The views expressed in this Comment are those of the authors and do not necessarily represent the official position of WHO.

Copyright © 2021 World Health Organization. Published by Elsevier Ltd. All rights reserved.

M Carolina Danovaro-Holliday, *Katrina Kretsinger, Marta Gacic-Dobo
kretsingerk@who.int

Immunizations, Vaccines & Biologicals, World Health Organization, Geneva 1211, Switzerland

1 The Lancet. 2021: the beginning of a new era of immunisations? *Lancet* 2021; **397**: 1519.

- 2 GBD 2020, Release 1, Vaccine Coverage Collaborators. Measuring routine childhood vaccination coverage in 204 countries and territories, 1980–2019: a systematic analysis for the Global Burden of Disease Study 2020, Release 1. *Lancet* 2021; published online July 12. [https://doi.org/10.1016/S0140-6736\(21\)00984-3](https://doi.org/10.1016/S0140-6736(21)00984-3).
- 3 WHO. WHO/UNICEF estimates of national immunization coverage. 2021. <https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/global-monitoring/immunization-coverage/who-unicef-estimates-of-national-immunization-coverage> (accessed May 7, 2021).
- 4 Burton A, Monasch R, Lautenbach B, et al. WHO and UNICEF estimates of national infant immunization coverage: methods and processes. *Bull World Health Organ* 2009; **87**: 535–41.
- 5 Burton A, Kowalski R, Gacic-Dobo M, Karimov R, Brown D. A formal representation of the WHO and UNICEF estimates of national immunization coverage: a computational logic approach. *PLoS One* 2012; **7**: e47806.
- 6 WHO. Immunization and Vaccine-related Implementation Research Advisory Committee (IVIR-AC). Session 3: The WHO/UNICEF Estimates of National Immunization Coverage (WUENIC 2.0). *Wkly Epidemiol Rec* 2020; **95**: 609–28.
- 7 Scobie HM, Edelstein M, Nicol E, et al. SAGE Working Group on Immunization and Surveillance Data Quality and Use. Improving the quality and use of immunization and surveillance data: summary report of the Working Group of the Strategic Advisory Group of Experts on Immunization. *Vaccine* 2020; **38**: 7183–97.
- 8 WHO. Meeting of the strategic advisory group of experts on immunization, November 2011 — conclusions and recommendations. *Wkly Epidemiol Rec* 2012; **87**: 1–16.
- 9 Cutts FT, Claquin P, Danovaro-Holliday MC, Rhoda DA. Monitoring vaccination coverage: defining the role of surveys. *Vaccine* 2016; **34**: 4103–09.
- 10 Cutts FT, Claquin P, Danovaro-Holliday MC, Rhoda DA. Reply to comments on monitoring vaccination coverage: defining the role of surveys. *Vaccine* 2016; **34**: 6112–13.
- 11 PAHO, PATH. Immunization data: evidence for action. A realist review of what works to improve data use for immunization, evidence from low- and middle-income countries. 2019. https://path.azureedge.net/media/documents/PATH_IDEA_WhitePaper_R6_pages_0JQAQOBp.pdf (accessed May 7, 2021).
- 12 WHO. Immunization Agenda 2030: a global strategy to leave no one behind. April 1, 2020. <https://www.who.int/teams/immunization-vaccines-and-biologicals/strategies/ia2030> (accessed May 7, 2021).

Disruptions to childhood immunisation due to the COVID-19 pandemic



In *The Lancet*, Kate Causey and colleagues¹ report their estimates of the disruptions to routine childhood immunisation coverage for the third-dose diphtheria-tetanus-pertussis (DTP3) vaccine and first-dose measles-containing vaccine (MCV1) at the global, regional, and national levels due to the COVID-19 pandemic. These modelled estimates are of importance to national immunisation programmes for planning and implementing catch-up vaccination services to close the immunity gaps and prevent vaccine-preventable disease outbreaks.² The urgent need for catch-up vaccination efforts is conspicuous for most contagious childhood diseases, including measles and pertussis.³

Although the direct health effects of the COVID-19 pandemic have been devastating, the indirect effects on health-care systems and services have been colossal globally. These indirect effects include the disruption to childhood immunisation services in at least 85 countries during 2020, which has affected around 80 million children younger than 1 year of age.^{4,5} WHO issued interim guidance in March, 2020, on immunisation activities during the COVID-19 pandemic, which recommended continuation of routine immunisation services and a temporary suspension of mass vaccination campaigns.⁶ The programmatic guidance on continuing routine

Published Online
July 15, 2021
[https://doi.org/10.1016/S0140-6736\(21\)01418-5](https://doi.org/10.1016/S0140-6736(21)01418-5)
See [Articles](#) page 522



Marko Guber/Getty Images

immunisation services was also supported by a benefit–risk analysis that inferred that the health benefits of sustaining routine immunisation services far outweigh the excess risk of SARS-CoV-2 infections during the clinical visits.⁷ However, routine immunisation services were disrupted at higher levels than other essential health services during 2020.⁸

Causey and colleagues¹ provide, to our knowledge, the first modelled quantitative assessment of disruptions to routine immunisation services throughout 2020 at the global, regional (seven Global Burden of Disease super-regions), and national (204 countries and territories) levels. They did an evidence synthesis of mobility trends and monthly estimates of country-reported data and supplementary sources (the published literature, ministry of health websites, and media reports) on DTP3 and MCV1 dose administration. The authors inferred that the disruptions to childhood immunisation were relatively high during the early months of the COVID-19 pandemic, but recovered close to expected levels by the end of 2020. In comparison with pre-pandemic expected projections, the authors estimated that an additional 8.5 million (95% uncertainty interval 6.5–11.6) children missed DTP3 doses and an additional 8.9 million (5.7–13.7) children missed MCV1 doses during 2020. Furthermore, the authors estimated that, from January to December, 2020, 30.0 million (27.6–33.1) children missed DTP3 doses

and 27.2 million (23.4–32.5) children missed MCV1 doses. Globally, monthly disruptions were the highest in April, with 4.6 million (4.0–5.4) children missing DTP3 doses and 4.4 million (3.7–5.2) children missing MCV1 doses.

Causey and colleagues¹ used data from 94 countries and, to account for locations without monthly data on vaccination coverage, they used changes in mobility patterns as a proxy to estimate the disruptions to routine immunisation services. As empirical estimates of the disruptions to childhood immunisation become available for more locations, the study will need to be revisited to validate the methods and revise the estimates of DTP3 and MCV1 coverage to infer location-specific immunity gaps in need of catch-up vaccination efforts. The current estimates are not disaggregated by sex and ethnicity; estimates of the disruptions to immunisation by sex and ethnicity are important future requirements, as these will allow improved planning and targeting of catch-up vaccination services among disproportionately affected subpopulations. As multiple waves of the COVID-19 pandemic could have affected routine immunisation in 2021 and might continue to affect vaccination programmes beyond 2021, temporal expansions of the modelling estimates will also be valuable.

Vaccines save millions of lives each year and have been a cost-effective intervention to reduce disability and mortality, especially among children, while improving health equity across low-income, middle-income, and high-income countries.⁹ The Vaccine Impact Modelling Consortium has estimated that, since the inception of Gavi, the Vaccine Alliance in 2000, 37 million deaths have been averted by vaccination against ten select pathogens in 98 low-income and middle-income countries between 2000 and 2019, and an additional 32 million lives could be saved between 2020 and 2030.¹⁰ The disruptions to childhood immunisation due to the COVID-19 pandemic jeopardise the decades of efforts to enhance vaccine access and coverage, while compounding the existing global challenge of 20 million under-immunised children each year, of whom more than 13 million did not receive any vaccines during their first year of life even before the pandemic in 2018.¹¹

Although physical distancing measures due to the COVID-19 pandemic might have reduced the transmission of childhood infectious diseases, the risk of vaccine-preventable disease outbreaks among children will increase as COVID-19-related mitigation measures are lifted.¹² Therefore, we commend Causey and colleagues¹ for generating this timely evidence and these modelled estimates of disruptions to childhood immunisation as a result of the COVID-19 pandemic, which are important for inferring immunity gaps and epidemiological risk assessment of vaccine-preventable disease outbreaks among children in the future. We recommend national immunisation programmes to act upon this valuable evidence for planning and implementation of catch-up vaccination services to close the immunity gaps, to avoid reversing the substantial gains from childhood immunisation in reducing mortality and morbidity globally.

KA reports grants for vaccine impact modelling research from the Bill & Melinda Gates Foundation; Gavi, the Vaccine Alliance; UNICEF; and WHO, outside the area of work commented on here. VM reports grants for vaccine policy and economics research from the Bill & Melinda Gates Foundation; the US Centers for Disease Control and Prevention; the EU Framework Programme for Research & Innovation; EU Horizon 2020; the Federal Ministry of Health of Germany; Fleming Fund; Gavi, the Vaccine Alliance; Korea International Cooperation Agency; UK Foreign, Commonwealth and Development Office; the Wellcome Trust; and WHO, outside the area of work commented on here.

*Kaja Abbas, Vittal Mogasale
kaja.abbas@lshtm.ac.uk

London School of Hygiene & Tropical Medicine, London, WC1E 7HT, UK (KA); International Vaccine Institute, Seoul, South Korea (VM)

1 Causey K, Fullman N, Sorensen RJD, et al. Estimating global and regional disruptions to routine childhood vaccine coverage during the COVID-19 pandemic in 2020: a modelling study. *Lancet* 2021; published online July 12. [https://doi.org/10.1016/S0140-6736\(21\)01337-4](https://doi.org/10.1016/S0140-6736(21)01337-4).

- 2 WHO. Leave no one behind: guidance for planning and implementing catch-up vaccination. April 1, 2021. <https://www.who.int/publications/i/item/leave-no-one-behind-guidance-for-planning-and-implementing-catch-up-vaccination> (accessed June 21, 2021).
- 3 Feldman AG, O'Leary ST, Isakov LD. The risk of resurgence in vaccine preventable infections due to COVID-related gaps in immunization. *Clin Infect Dis* 2021; published online Feb 13. <https://doi.org/10.1093/cid/ciab127>.
- 4 WHO. News release: at least 80 million children under one at risk of diseases such as diphtheria, measles and polio as COVID-19 disrupts routine vaccination efforts, warn Gavi, WHO and UNICEF. May 22, 2020. <https://www.who.int/news/item/22-05-2020-at-least-80-million-children-under-one-at-risk-of-diseases-such-as-diphtheria-measles-and-polio-as-covid-19-disrupts-routine-vaccination-efforts-warn-gavi-who-and-unicef> (accessed July 9, 2020).
- 5 UNICEF. Tracking the situation of children during COVID-19 — dashboard. May, 2021. <https://data.unicef.org/resources/rapid-situation-tracking-covid-19-socioeconomic-impacts-data-viz/> (accessed June 13, 2021).
- 6 WHO. Guiding principles for immunization activities during the COVID-19 pandemic: interim guidance. March 26, 2020. <https://apps.who.int/iris/handle/10665/331590> (accessed Oct 5, 2020).
- 7 Abbas K, Procter SR, van Zandvoort K, et al. Routine childhood immunisation during the COVID-19 pandemic in Africa: a benefit-risk analysis of health benefits versus excess risk of SARS-CoV-2 infection. *Lancet Glob Health* 2020; **8**: e1264–72.
- 8 WHO. Pulse survey on continuity of essential health services during the COVID-19 pandemic: interim report, 27 August 2020. https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1 (accessed Jan 14, 2021).
- 9 Piot P, Larson HJ, O'Brien KL, et al. Immunization: vital progress, unfinished agenda. *Nature* 2019; **575**: 119–29.
- 10 Li X, Mukandavire C, Cucunubá ZM, et al. Estimating the health impact of vaccination against ten pathogens in 98 low-income and middle-income countries from 2000 to 2030: a modelling study. *Lancet* 2021; **397**: 398–408.
- 11 UNICEF. Press release: over 13 million children did not receive any vaccines at all even before COVID-19 disrupted global immunization. April 24, 2020. <https://www.unicef.org/press-releases/over-13-million-children-did-not-receive-any-vaccines-all-even-covid-19-disrupted> (accessed June 14, 2021).
- 12 Mburu CN, Ojal J, Chebet R, et al. The importance of supplementary immunisation activities to prevent measles outbreaks during the COVID-19 pandemic in Kenya. *BMC Med* 2021; **19**: 35.

COVID-19: the turning point for gender equality

The impacts of the COVID-19 pandemic have gone far beyond the disease itself. In addition to the increasing number of COVID-19 deaths,¹ the pandemic has deepened social and economic inequalities.² These indirect impacts have been compounded by pervasive gender inequalities, with profound consequences, especially for women, girls, and people of diverse gender identities.² There has been an escalation in gender-based violence within households,³ increasing risk of child marriages and female genital mutilation,⁴ and an increased burden of unpaid care work,⁵ with impacts on mental

health.⁶ Communities of people affected by HIV are, again, at the crossroads of injustice and targeted discrimination.⁷ Measures to control the pandemic have reduced access to essential health and social welfare services, including sexual and reproductive health services, reduced employment and labour force participation, and decimated many household incomes.^{8–10} Here again, women have borne the brunt of marginalisation, particularly those working in the informal sector. Intersectionality analyses have highlighted the inextricable effects of poverty, racial discrimination, harmful gender norms, and limited



Published Online
July 16, 2021
[https://doi.org/10.1016/S0140-6736\(21\)01651-2](https://doi.org/10.1016/S0140-6736(21)01651-2)

This online publication has been corrected. The corrected version first appeared at [thelancet.com](https://www.thelancet.com) on August 5, 2021