Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Prioritising immunisation across the life course

We read with interest the paper by Kate Causey and colleagues,[1] the first detailed quantification of the substantial disruptions to routine childhood immunisations throughout the COVID-19 pandemic. Their findings corroborate the comprehensive report published by WHO and UNICEF of official vaccination figures globally: primary infant diphtheria, tetanus, and pertussis vaccine coverage declined to 83% in 2020, the lowest rate of the decade, resulting in 3·7 million more children under-vaccinated compared with 2019; and up to 17 million children, mainly living in settings that are affected by conflicts, under-served, deprived, or remote, probably did not receive even a single dose of this vaccine, exacerbating existing inequities in vaccine access.[2]

In addition to shortfalls in childhood vaccination delivery, we are deeply concerned about the ongoing collateral effect of the COVID-19 pandemic on maternal services, particularly immunisation programmes. Vaccines recommended in pregnancy against pertussis, tetanus, or influenza, or all, are established tools to protect not only pregnant women, but also infants during the vulnerable postnatal period.[3] Although country-specific data are emerging that show that maternal vaccine uptake declined in 2020,[4] to date, no similar global estimates of COVID-19-related disruptions to these services have been published.

The IMmunising PRegnant women and INfants neTwork (IMPRINT), a global, interdisciplinary collaboration of key stakeholders in maternal and infant vaccinology, captured the grassroots experiences of changes to vaccine delivery among our network members by an initial online survey in April, 2020.[5] We reported issues from 18 countries across five continents related to service access (eg, logistical barriers) and provision (eg, staff shortages), as well as user concerns over attending appointments.[5] 1 year on, in May, 2021, we repeated this survey, and it is evident that routine maternal and infant vaccination programmes are yet to fully recover, despite the local or national measures, or both, implemented to mitigate disruption. Key barriers that were reported are parental anxiety about the spread of COVID-19 infection when attending routine vaccination appointments and uncertainty around access to these services.

As restrictions are lifted and in the wake of a year of declining vaccine coverage, there is now an increasing risk not only of ongoing COVID-19 transmission, but also of other vaccine-preventable diseases affecting pregnant women and infants. Following on from the study by Causey and colleagues,[1] we therefore urgently call for specific data and the robust quantification of COVID-19-related disruptions to maternal immunisation coverage and the subsequent effect on maternal and infant health outcomes. Efficiency and safety of maternity services need to be prioritised, with clearer communication to women on potential risks as well as any specific safety measures implemented.[6] Pregnant women are also at risk of severe outcomes from COVID-19.[7] Promoting and delivering COVID-19 immunisation itself in pregnancy, already recommended in many countries, not only confers protection[8] but might be one effective strategy to mitigate the current interruptions to antenatal vaccination programmes.[3]

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Authors' reply

Anja Saso and colleagues rightly emphasise the importance of quantifying pandemic-related effects on maternal immunisation, with the IMmunising PRegnant women and INfants neTwork highlighting the multifaceted disruptions in 2020 and incomplete recovery to date among 18 countries.[1] Our study, which modelled the effects of COVID-19 on routine childhood immunisation in 2020,[2] focused on one part of the life course where vaccination can improve health and wellbeing. But the ambition

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of the Immunization Agenda 2030[3] is broader: a world where everyone benefits from vaccines at every age.

Immunisation during pregnancy protects both women and newborn babies against several infectious diseases,[4] including tetanus, pertussis, and influenza.[5] Robust maternal immunisation programmes also serve as key platforms for introducing new and future vaccines (eg, COVID-19, respiratory syncytial virus, and group B *Streptococcus*).[5] Yet differences in access to and inequities in these programmes long predate the COVID-19 pandemic. Formal maternal immunisation policies and guidelines, which "underpin the quality and scope of health services",[4] have been fairly limited among lower income countries for some vaccines (eg, pertussis[5] and influenza[6]), and there are serious data challenges for comprehensively monitoring vaccination across the life course. Aside from maternal tetanus immunisation, multi-country health surveys rarely collect information on the vaccines received beyond childhood, and global syntheses of reported administrative data often do not have detailed coverage estimates for older age groups. As underscored by Saso and colleagues, the absence of timely, granular data poses large obstacles to understanding acute and long-term gaps in immunisation services beyond childhood vaccination.

Improving vaccination across the life course, from infancy to old age, is a strategic priority of the Immunization Agenda 2030.[3] Increasing the reach of maternal immunisation services contributes to these aims, and formally including more vaccines—namely, pertussis, influenza, and now COVID-19, among others—through such programmes will benefit many. However, fully implementing a life course approach will require expanding vaccine policy and administration in most countries. For instance, universal influenza and diptheria, tetanus, and pertussis booster vaccinations could additionally protect individuals not reached through maternal immunisation or routine childhood programmes (eg, men and older adults).[3] In parallel, data systems that effectively track vaccination status and needs over the lifespan are necessary for monitoring progress and promoting equitable access.

The COVID-19 pandemic has substantially affected immunisation services for all populations. The global roll-out of COVID-19 vaccines, which includes age groups often missed by traditional immunisation platforms, offers an opportunity to rethink how, and to whom, vaccines are delivered. Leveraging the lessons learned and successful strategies used during the pandemic could not only augment child and maternal immunisation services but also pave the way for a future in which "everyone, everywhere, at every age fully benefits from vaccines for good health and well-being".[3]

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High-dose budesonide for early COVID-19

The importance of effective community-based treatments for COVID-19 cannot be overstated. We applaud Ly-Mee Yu and colleagues[1] for addressing this issue in the PRINCIPLE trial and would like to share some comments.

The study included participants onset of COVID-19 within 14 days; however, those closer to 14 days since illness onset might be approaching spontaneous resolution, which could confound effectiveness and expose patients to unnecessary inhaled corticosteroids. We are concerned that the subjective self-reporting of obesity might be biased and wonder if any criteria were placed for participants to classify themselves as obese. Likewise, symptom severity was self-reported from no problem to major problem.[1] Was this subjective scale controlled for, particularly in quantifiable variables like fever.

It is important to understand the illness severity of the study population, such as how many participants were symptomatic versus asymptomatic at enrolment, how many were compliant with treatment versus non-adherent, and if there were any outcome differences among them. We are curious if time from enrolment to treatment initiation differed among participants. The Article's Table 1 includes 833 participants from the inhaled budesonide group and 1126 participants from the usual care group, respectively, which does not coincide with the 787 and 1069 included for primary analysis.[1]

Finally, the study faced limitations such as the predominantly white population (92%), which does not represent the high-risk community,