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population immunity in the simplest way possible: by assuming that previously infected people were immune, vaccination was randomly distributed, and immunity did not wane. Tellingly, this metric did not inversely correlate with community transmission (ie, the time-varying reproductive number), showing that such a simple approach no longer provides an appropriate measure of population immunity. A more reliable measure would account for waning, boosting from multiple exposures, non-random vaccine uptake, different immune response across age groups, and cross-variant immunity.

As such, one could argue that the proportion of the population ever infected is no longer a meaningful metric of population immunity. However, the same data streams to infer cumulative incidence can be used to address more pressing epidemiological questions, such as how severe are new variants? To what extent do the population's historical infections—in terms of timing and variants—protect against infection and severe disease of new variants? Relatedly, how do layers of vaccine-induced and virus-induced immunity combine to confer protection to the population? Perhaps most importantly at this moment in the pandemic, we need to identify the sub-populations that remain susceptible to severe disease and death. Serosurveys combined with morbidity and mortality surveillance and detailed monitoring of vaccine

coverage are essential to identify the groups lacking immunity from vaccination or previous infection.<sup>5-7</sup> Integrating data enables the kinds of insights offered by COVID-19 Cumulative Infection Collaborators to inform the next phase of the pandemic response, and we should sustain this effort.

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## Gender equality and COVID-19: act now before it is too late



2 years into the COVID-19 pandemic, it is clear that gender differences exist, and that women, men, and gender minorities are differentially impacted by the pandemic.<sup>1</sup> Emmanuela Gakidou and colleagues' Article<sup>2</sup> in *The Lancet* provides additional data to reinforce this fact. Much of the research on the impacts of COVID-19 (outside of those whose work focuses on sex and gender differences) has focused on the direct health-related impacts of COVID-19, such as the fact that more men have been hospitalised and died from COVID-19-attributable causes than women.<sup>3</sup> Still, sex and gender disaggregated data are not routinely captured and reported because of a lack of knowledge, resources, or political will.<sup>4</sup> In their comprehensive review, Gakidou and colleagues searched for

administrative and survey data that was disaggregated by sex or gender across publicly available datasets with information from 193 countries and found that there were major gaps in available data.

Using mixed effects regression, Gaussian process regression, and bootstrapping to synthesise all data sources, as well as mixed effects logistic regression to explore gender gaps globally and by region, they analysed several indirect and secondary indicators related to health and other domains of wellbeing (eg, vaccine hesitancy, health-care services, economic and work-related concerns, education, and safety) to explore how men and women were differentially affected by COVID-19.<sup>2</sup> Unsurprisingly, across most of these indicators, women were disproportionately

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negatively impacted compared to men. In relation to employment, for example, in September, 2021, women were more likely than men to report loss of employment (26.0% vs 20.4%).<sup>2</sup> In relation to education, women and girls were 1.21 times more likely to report dropping out of school compared with men and boys. Women were also more likely than men to report that they perceived gender-based violence had increased during the pandemic (53.7% vs 43.8%).

The authors' findings clearly show that gender inequities exist at the global level across several key social and economic issues. However, they also show that important regional, national, and local level variations and disparities exist. With respect to employment loss, for example, the largest gender gaps were seen in north Africa and the Middle East (ratio of women to men: 1.52), and Latin America and the Caribbean (ratio of women to men: 1.38); while the highest rates of income loss were reported in sub-Saharan Africa.<sup>2</sup> With respect to education, the largest gender gaps were seen in central Europe, eastern Europe, and central Asia (ratio of women to men: 4.10) and south Asia (ratio of women to men: 1.48). And with respect to gender-based violence, the highest rates of perceived increases were reported by women in Latin America and the Caribbean (61%), followed by high-income countries (59.9%) and sub-Saharan Africa (56.7%). Overall, sub-Saharan Africa had the most pronounced differences compared with global data, while high-income countries had the

smallest negative effects of COVID-19 across the reported indicators.<sup>2</sup>

These data reinforce what gender scholars have known and stated for years: that the ways in which gender power relations manifest as inequities are context specific. This is because what it means to be a man or a woman (and the implications for someone who does not fit into these categories), and the norms and expectations accorded to them, differ between contexts, as well as over time. These meanings also vary across other social identities, including race, age, disability, or sexual orientation.<sup>5,6</sup> It is therefore important that global analyses do not take the place of regional or national level analyses: if policy is going to effectively address gender inequities, we must understand the ways in which inequities manifest at every level, paying attention to and actively recognising the diverse variations and contexts. Any action and policy should not be replicated without local adaptations, and considerations of local contexts, resources, systems, demographics, and social-cultural dynamics and spaces should always be made.<sup>7</sup>

Gakidou and colleagues also point to several important limitations to their analysis which, in our opinion, should be taken as a call-to-action to other researchers and programme implementers. The mode of data collection used throughout the pandemic (ie, self-reported information through surveys distributed online and via apps) begs the question of who is being excluded or misrepresented. Limited demographic data, in addition to the overall sparsity of data, prevented Gakidou and colleagues from conducting important intersectional analyses to explore how different groups of men and women were affected. As they rightly state, the perpetual exclusion of sexual and gender minorities across all forms of data collection and analysis remains an important gap in our understanding of gender differences.

Social science and qualitative research are needed to understand and provide evidence to address the relative disadvantages flowing to those who are invisible and to uncover the root causes of inequities.<sup>8</sup> We need to understand not only where inequities exist and who they affect (ie, through sex and gender disaggregated data), but also why they exist (ie, through qualitative and quantitative gender analyses).<sup>8</sup> These analyses must be intersectional. Dialogue and partnership

between governments, researchers, organisations, and community leaders is also needed so that the actions proposed can be put into practice effectively.

Increasingly there is concern that the inequities exacerbated by the pandemic are only going to worsen, and that any progress towards gender equality made before the pandemic will be reversed. Hopefully these data will reinforce the need for decision makers to act before it is too late.

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## Early introduction of allergenic food for all infants



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The 2015 Learning Early About Peanut Allergy (LEAP) study triggered a paradigm shift in the field of food allergy prevention from an understanding that, in infants at high risk of developing a peanut allergy, prevention was best achieved by peanut avoidance to active early peanut consumption.<sup>1</sup> LEAP showed that in infants at high risk of peanut allergy aged 4-10 months with either severe eczema or egg allergy, or both, peanut consumption three times a week achieved an 81% reduction in the prevalence of peanut allergy at 5 years of age.<sup>1</sup> However, the majority of cases of peanut allergy occur in infants who are not at high risk. For example, an extrapolation of the LEAP study to the Irish population demonstrated that 4.8% of Irish infants fulfilled the LEAP enrolment criteria.<sup>2</sup> Implementing the LEAP intervention would prevent 29% of annual cases of peanut allergy, since 59% of cases occur in infants who are not at high risk.<sup>2</sup>

After the LEAP study, global guidelines for infant feeding changed, advocating early introduction, with some countries restricting such guidance to peanut alone and emphasising risk status<sup>3</sup> and others recommending a broader range of allergenic food introduction for all infants, irrespective of their individual risk status.<sup>4</sup> Concerns have been expressed on two fronts: first, the validity of changing feeding recommendations for the general infant population on the basis of the LEAP

study, which was done in infants at high risk of peanut allergy, and, second, commencing early introduction before 6 months of age breaches the current WHO recommendation of 6 months' exclusive breastfeeding,<sup>5</sup> considering that the mean age of enrolment for the LEAP study was 7.8 months.<sup>6</sup> However, food allergy can emerge before 6 months of age.<sup>7</sup>

Questions remain with regard to the evidence base for recommending early allergenic food introduction in all infants, irrespective of individual risk. In the Enquiring About Tolerance (EAT) study, six allergenic foods were introduced from 3 months of age and by age 3 years, a 20% reduction in food allergy to one or more of the six foods was observed, but this reduction was not statistically significant.<sup>8</sup> Per-protocol reductions in allergy to any food or to specific foods were statistically significant but subject to potential bias and to the low level of adherence achieved (34% for all food and 52% for peanut).<sup>8</sup>

Therefore, the study by Håvard Ove Skjerven and colleagues reported in *The Lancet* is a welcomed response to questions regarding the efficacy of early allergenic food introduction in the general population of infants.<sup>9</sup> This study, Preventing Atopic Dermatitis and ALLergies in Children (PreventADALL), was a large pragmatic trial of 2397 newborn infants recruited from the general