

## Recorded but not revealed: exploring the relationship between sex and gender, country income level, and COVID-19

In 2020 we witnessed a seeming exponential spread of information about COVID-19. From understanding the pathogen to understanding its effect on populations, we have a wealth of evidence for decision making in pandemic control. Nonetheless, there remain some fundamental areas of investigation and response for which evidence remains oddly and inconsistently absent. The role of sex and gender in understanding the testing-to-outcome pathway of the pandemic is one such area.

Identifying the contribution of sex and gender to SARS-CoV-2 infection yields important evidence on both biological mechanisms that underlie differences in illness outcomes,<sup>1</sup> and social and structural dynamics that influence individuals' risk and vulnerability depending on their position in the gender hierarchy in any country or community.<sup>2</sup> Such information can help identify sites for tailored individual-level and population-level health interventions that are more responsive to sex and gender and potentially more effective. The minimum starting point for analysing the contribution of sex and gender to the COVID-19 pandemic, and identifying opportunities for reducing health inequities, requires data that is sex-disaggregated, which can be analysed to understand and explain gendered inequalities.<sup>3</sup>

In March 2020, we established a system (the COVID-19 sex-disaggregated data tracker) for systematically tracking nationally reported sex-disaggregated data on testing, cases, hospitalisations, admissions to intensive care, and recorded deaths.<sup>4</sup> We collected data

every 2 weeks from official, publicly available government sources, and currently track 187 countries, representing more than 99% of recorded global deaths and cases.

The WHO COVID-19 monitoring and evaluation framework provides guidance to countries on systems indicators to monitor preparedness, response, and situations. The framework recommends collection and reporting of sex-disaggregated data on testing, cases, deaths, hospitalisation, case fatality rates, and case rates in health workers.<sup>5</sup> However, globally in 2020, we found that around four in ten cases and three in ten deaths were reported with no mention of whether the individuals were male or female. The availability of sex-disaggregated data varied according to the income status of the country, with a lower proportion of cases and deaths disaggregated by sex in low-income countries compared with high-income countries (appendix p 1).

Across all WHO-recommended indicators, we have seen fewer countries reporting sex-disaggregated data in January 2021 than ever before (appendix p 2). These findings indicate that reporting of sex-disaggregated data is not just a question of resource capacity or an absence of data availability, but of a failure to consistently analyse and report on existing data.

Our database offers a unique insight into the ongoing effect of the epidemic on males and females around the world. Of note, no country appears to explicitly provide COVID-19 data on non-binary or transgender populations, although some data are available at the subnational level (eg, in India). Analysis of sex-disaggregated data has identified trends in inequalities between and within countries (eg, differences between males and females along the testing-to-outcome pathway). At the global level, females are more likely to get tested (57% of those tested are female), equally likely

to be diagnosed with COVID-19 (50% of cases), less likely to be hospitalised (48% of hospitalisations), less likely to be admitted to an intensive care unit (31% of admissions), and less likely to die (43% of deaths) compared with males (appendix p 3). Such evidence, and the patterns elucidated, provide the basis for both action and future investigation of the roles of sex and gender. The higher rates of admission to hospital and to intensive care in men might reflect underlying biological vulnerabilities (sex) or higher rates of comorbidities leading to more severe disease (sex and gender),<sup>6</sup> but might also reflect women's gender-driven inequalities in accessing services and effective, intensive, and costly interventions within the health system. Such findings have previously been reported in the case of health-care pathways across a range of conditions, including cardiovascular disease.<sup>7</sup> When health services are associated with out-of-pocket payments (ie, the individual or the family is responsible for payment) the absence of autonomy and financial resources many women face can act as a barrier to their access to and use of health services—possibly also including their access to interventions in intensive care units.<sup>8</sup>

The national-level sex-disaggregated data in our database also provide evidence of variations along the testing-to-outcome pathway when analysed by country income level. The male to female ratio in uptake of testing, proportion of confirmed cases, hospitalisations, and deaths varied by country income level (appendix p 4). The ratio of deaths in males to females is 1.21:1 in high-income countries, but 2.8:1 in low-income countries.

Correspondence between Global Health 50/50 and Public Health England goes some way to explain the absence of consistent and comprehensive sex-disaggregated data on COVID-19 in at least one country. When asked to clarify why England does not appear to



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See Online for appendix

consistently report sex-disaggregated data (particularly for deaths), the official wrote "For most of the data sex is certainly recorded but as it does not appear to be an important risk factor for COVID [sic] the dashboard does not have a focus on analysis by sex." (Global Health 50/50, personal communications). We disagree with this statement, and believe that this represents a missed opportunity to better understand and act to reduce one of the most profound health inequities across all societies. Along with age, the recording of sex is ubiquitous within health and vital registration systems, but much of the health community repeatedly fails to appreciate the importance of monitoring sex differences and analysing and addressing the possible gendered dimensions of inequalities and inequities. The health community is not alone: Open Data Watch reports an absence of sex-disaggregated data across a range of sectors globally, including 65 countries that report no sex-disaggregated data on crime, justice, or prison populations.<sup>9</sup>

As we move towards the global distribution of COVID-19 vaccines, we believe that this moment must serve as a wake-up call for the importance of recording sex-disaggregated data accompanied by gender analysis. Monitoring the coverage of the vaccine by sex will be a vital component of ensuring equity and promoting equality. It could lead to more effective vaccine programmes. For example, a population-based survey in the USA found higher rates of COVID-19 vaccine scepticism in females compared with males.<sup>10</sup> Will vaccine scepticism lead to lower uptake rates in women? We will not know unless we acknowledge that the purpose of sex-disaggregated data is not only to record it, but also to reveal it publicly, analyse it (including from a gender perspective) and, crucially, act on it.

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\*Sarah Hawkes, Sonja Tanaka, Athena Pantazis, Abhishek Gautam, Sylvia Kiwuwa-Muyingo, Kent Buse, Anna Purdie  
s.hawkes@ucl.ac.uk

Institute for Global Health, University College London, London WC1N 1EH, UK (SH, AP); Global Health 50/50 (SH, ST, AP, KB, AP); International Center for Research on Women, New Delhi, India (AG); Data Measurement and Evaluation unit, African Population and Health Research Centre, Nairobi, Kenya (SK-M); Healthier Societies Programme, The George Institute for Global Health, University of New South Wales, Sydney, NSW, Australia (KB)

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