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paid when interpreting findings from this study. First, seroprevalence data, which is important for estimation of IFR, was absent in most locations in Asia, Australia, and South America. This situation was more obvious for age-stratified seroprevalence data. Although several models were constructed to obtain age-standardised IFRs, the effect of incompleteness of data on seroprevalence and mortality across countries and territories on model constructions might not be avoided. Second, the clinical predictors selected and effect sizes for these clinical predictors used as priors for modelling age-standardised IFRs were all based on data from the USA. Whether the model performance for other countries and territories, especially low-income countries, can be affected is not known.

Although IFR after the prevaccination era is not sufficiently delineated for now, the fight against COVID-19 still continues. The emergence of the SARS-CoV-2 variant, omicron (B.1.1.529), has raised global concern and led to resurgence of COVID-19 waves in many countries. For now, vaccination is the most important intervention to reduce resurgence and transmission of COVID-19 epidemics and lower the number of new fatalities.^{6,7} Other promising SARS-CoV-2 antivirals are extending pandemic control to pharmaceutical intervention. With more promising weapons to fight against COVID-19, whether

IFR will continue to reduce after the prevaccination era needs to be answered by future studies. As the COVID-19 pandemic continues, society has to be prepared for and adapt to the potential for living with SARS-CoV-2 in the coming years.

We declare no competing interests.

Xiaoying Gu, *Bin Cao
caobin_ben@163.com

Department of Pulmonary and Critical Care Medicine, Centre of Respiratory Medicine, National Clinical Research Center for Respiratory Diseases (XG, BC) and Institute of Clinical Medical Sciences (XG), China-Japan Friendship Hospital, Beijing 100029, China; National Centre for Respiratory Medicine, Beijing, China (XG, BC); Institute of Respiratory Medicine, Chinese Academy of Medical Sciences, Beijing, China (XG, BC); Department of Respiratory Medicine, Capital Medical University, Beijing, China (BC); Tsinghua University-Peking University Joint Centre for Life Sciences, Beijing, China (BC)

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Advancing accurate metrics for future pandemic preparedness

As we enter the 28th month of the ongoing devastating COVID-19 pandemic, the reality remains that WHO and the world's public health systems were unprepared, with COVID-19 causing more than 494 million cases and more than 6 million deaths worldwide as of April 5, 2022. A phenomenal amount of data has been generated in various formats across continents, which, if analysed methodically, could inform future pandemic preparedness, improve management, and enhance public health interventions and operational capacities. However, research studies so far have focused on geographically restricted cohorts or incomplete national surveillance data that are not reflective of the global picture. In *The Lancet*, the COVID-19 National Preparedness Collaborators¹ have substantially decreased this gap by

publishing the largest, most comprehensive exploratory analyses to date of estimates of daily infection and fatality rates, and contextual factors associated with COVID-19 preparedness.

A strength of the study is the large dataset covering the period Jan 1, 2020, to Sept 30, 2021, from 177 countries and territories and 181 subnational locations. For associations with both incidence and mortality, the authors analysed measures of pandemic preparedness, including 12 indicators of preparedness and response, seven indicators of health-system capacity, and ten other demographic, social, and political conditions. Furthermore, using a unique study design the authors controlled for demographic, biological, economic, and environmental variables associated with COVID-19



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For worldwide COVID-19 data see <https://covid19.who.int/>



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outcomes, including age, seasonality, population density, income, and health risks to identify contextual factors subject to policy control. They also adjusted inputs for under-reporting of COVID-19 outcomes, and use of population data estimates generated by the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD).

There were several limitations of the study clearly delineated by the authors. Although they controlled for several key confounders, they did not cover all confounders. The estimates they report might have been affected by the varied data sources such as population and expert opinion surveys, government statistics, and modelled estimates. Furthermore, the study design was not intended to show causal relationships. However, the key findings of the study are relevant for public health systems, health-care workers, and policy makers worldwide.

First, there were large variations in differences in SARS-CoV-2 infection and mortality rates across countries and continents, even among countries within close geographical proximity. Contrary to what is assumed, low-income countries and lower-middle-income countries that rank low on public health preparedness and access to health care had lower infection rates and deaths compared with high-income countries such as the USA and France. This supports findings of an analysis of 26 countries reporting their first COVID-19 cases imported from China where the Global Health Security index and Joint External Evaluation score for health preparedness did not correlate with the countries' COVID-19 detection response

time and mortality outcome.² Additional research is now needed to better understand within and between countries, and between continents, the variability in COVID-19 outcomes, including data on the SARS-CoV-2 omicron variant (B.1.1.529).

Second, the level of trust in governments, interpersonal trust, and less government corruption were directly proportional to fewer infections and higher vaccination rates in high-income and middle-income countries. The findings indicate that if societies had had trust in governments, the world would have experienced 13% fewer infections. For social trust—ie, trust in other people around individuals—the effect would be even larger, with 40% fewer infections globally. For future pandemic preparedness, the level of trust a government earns will be crucial to mount more effective responses and increase public confidence in infection control recommendations. Improving trust will require minimising corruption and effective risk communication and community engagement strategies during public health crises, especially in settings with historically low levels of government and interpersonal trust.³⁻⁵ Since the success of these strategies is intimately tied to addressing fundamental social and economic inequalities in society, long-term political commitments to addressing these inequalities appear essential.

Third, GBD researchers have brought to light important knowledge gaps due to varying quality and quantity of data from across the world. There is a dire need for a universal approach to uniformly collect more comprehensive, quality, and accurate data to guide development of reliable metrics for health systems and national pandemic preparedness and response. Other research, political, and scientific groups have published analyses of the effects of the COVID-19 pandemic on health systems and lessons learnt and have their own recommendations for future pandemic preparedness.⁵⁻¹⁰

In an era of decolonising global health,¹¹ the IHME GBD collaboration has over the years shown visionary leadership in being more inclusive of global participation of researchers and stakeholders for collation and analyses of health metrics. An opportunity arises for IHME to take global leadership of transferring skills, technology, and expertise, and help build capacity at source for collecting data uniformly and analyses of health metrics on surveillance, monitoring, and evaluation. These areas are intrinsically political and

For more on GBD see <https://www.healthdata.org/gbd/about>

resource issues must be addressed by both funders and researchers of health metrics enterprises. Furthermore, studies using actual and real-time data at source are required to make appropriate updated models, which will require changing from established knowledge and dogma of previous infectious disease epidemics, and a mindset change from WHO and other global public health bodies.

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**Francine Ntoumi, Alimuddin Zumla*
 fntoumi@fcr-mongo.com

Fondation Congolaise pour la Recherche Médicale, Brazzaville, Congo (FN); Institute for Tropical Medicine, University of Tübingen, Tübingen, Germany (FN); Division of Infection and Immunity, Center for Clinical Microbiology, University College London, London, UK (AZ); National Institute for Health Research Biomedical Research Centre, UCL Hospitals NHS Foundation Trust, London, UK (AZ)

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Financing the future of WHO

WHO has anchored the global health architecture since its founding in 1948, and it is impossible to imagine another institution filling the void if the international community were to let it atrophy. While also confronting and guiding the response to COVID-19, WHO is engaged in the most consequential reforms since its founding, including negotiating a global pandemic agreement and revising the International Health Regulations. Underpinning all these reforms is the need for robust and sustainable financing.

WHO's resources have consistently lagged behind its constitutional mandate. There is a deep misalignment between what governments and the public expect WHO to do and what the organisation is resourced to do. WHO is challenged by low levels of political will to increase its financing, strained government treasuries, and a battle over control of priorities.¹ These tensions were clear when the Working Group on Sustainable Financing, chartered by WHO's Executive Board, did

not reach consensus by the January, 2022 deadline.¹ WHO's Executive Board has now charged the Working Group on Sustainable Financing with identifying a viable plan before the World Health Assembly in May, 2022.²

There is no time to lose. WHO's resourcing strategy must match its mission with assured financial support from member states buttressed by proven, innovative financing methods. By defining its priorities, delivering on them, and being transparent and accountable, WHO can more boldly pursue its public health mission.

WHO's revenue model has always been politically contentious with its first budget slashed by 23%, thus "preventing us from being an operating agency to any extent".³ In 2022, WHO is expected to support a world health agenda with a budget less than that of a major research hospital or mid-sized subnational health agency.

The constitution of WHO gives the organisation flexibility to receive voluntary contributions from state



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