



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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

- 8 Dhingra N, Jha P, Sharma VP, et al. Adult and child malaria mortality in India: a nationally representative mortality survey. *Lancet* 2010; **376**: 1768–74.
- 9 Spayne J, Hesketh T. Estimate of global human papillomavirus vaccination coverage: analysis of country-level indicators. *BMJ Open* 2021; **11**: e052016.
- 10 Ostropelets A, Shoener Dunham L, Johnson KD, Liu J. Pneumococcal vaccination coverage among adults newly diagnosed with underlying medical conditions and regional variation in the US. *Vaccine* 2022; **40**: 4856–63.
- 11 Takeda. Takeda's QDENGGA® (dengue tetravalent vaccine [live, attenuated]) approved in Indonesia for use regardless of prior dengue exposure. Aug 22, 2022. <https://www.takeda.com/newsroom/newsreleases/2022/takedas-qdenga-dengue-tetravalent-vaccine-live-attenuated-approved-in-indonesia-for-use-regardless-of-prior-dengue-exposure/> (accessed Oct 18, 2022).
- 12 US Food and Drug Administration. FDA approves add-on therapy to lower cholesterol among certain high-risk adults. Dec 22, 2021. <https://www.fda.gov/drugs/news-events-human-drugs/fda-approves-add-therapy-lower-cholesterol-among-certain-high-risk-adults> (accessed Oct 18, 2022).
- 13 Huang SA, Taubel J, Fiore G, et al. Abstract 14387: dose-related reductions in blood pressure with a RNA interference (RNAi) therapeutic targeting angiotensinogen in hypertensive patients: interim results from a first-in-human phase 1 study of ALN-AGT01. *Circulation* 2020; **142** (suppl 3): A14387-A.
- 14 US Food and Drug Administration. FDA approves first injectable treatment for HIV pre-exposure prevention. Dec 20, 2021. <https://www.fda.gov/news-events/press-announcements/fda-approves-first-injectable-treatment-hiv-pre-exposure-prevention> (accessed Oct 18, 2022).
- 15 National Council for Mental Wellbeing. Guide to long-acting medications for clinicians and organizations. 2022. https://www.thenationalcouncil.org/wp-content/uploads/2021/12/2022.02.02_NC_Updated-Guide-To-LAMs.pdf (accessed Oct 18, 2022).
- 16 Airfinity. COVID-19 vaccine production 2021. https://www.ifpma.org/wp-content/uploads/2021/03/Airfinity_global_summit_master_final.pdf (accessed Oct 18, 2022).
- 17 UNICEF. COVID-19 Market Dashboard. 2022. <https://www.unicef.org/supply/covid-19-market-dashboard> (accessed Oct 18, 2022).
- 18 Institute for Health Metrics and Evaluation. Financing global health. Flows of development assistance for health. 2022. <https://vizhub.healthdata.org/fgh/> (accessed Oct 18, 2022).
- 19 PATH. Digital Square. Electronic immunization registries in low- and middle-income countries. 2021. https://static1.squarespace.com/static/59bc3457ccc5c5890fe7cadd/t/60aee1bfd163646306fb924c/1622073794356/Digital+Square+EIR+Landscape_Final.pdf (accessed Oct 18, 2022).
- 20 Dagan N, Barda N, Kepten E, et al. BNT162b2 mRNA COVID-19 vaccine in a nationwide mass vaccination setting. *N Engl J Med* 2021; **384**: 1412–23.
- 21 Lopez Bernal J, Andrews N, Gower C, et al. Effectiveness of the Pfizer-BioNTech and Oxford-AstraZeneca vaccines on COVID-19 related symptoms, hospital admissions, and mortality in older adults in England: test negative case-control study. *BMJ* 2021; **373**: n1088.
- 22 Alkafir A, Berry T, Britto D, et al. A global opportunity to combat preventable disease: how to use COVID-19 infrastructure to transform public health worldwide. Tony Blair Institute for Global Change. January, 2022. <https://institute.global/sites/default/files/2022-01/GHSC%2C%20A%20Global%20Opportunity%20to%20Combat%20Preventable%20Disease%2C%20January%202022.pdf> (accessed Oct 18, 2022).
- 23 Agus D, Bell J, Blair T. One shot to prevent disease and prepare for future pandemics. Global Health Security Consortium. October, 2022. <https://institute.global/sites/default/files/2022-10/GHSC%2C%20Introducing%20One%20Shot%20to%20Prevent%20Disease%20and%20Prepare%20for%20Future%20Pandemics%2C%20October%202022%20FINAL.pdf> (accessed Oct 25, 2022).



The Lancet Commission on 21st-Century Global Health Threats



Yusuf Chino/Getty Images

Published Online
 December 15, 2022
[https://doi.org/10.1016/S0140-6736\(22\)02576-4](https://doi.org/10.1016/S0140-6736(22)02576-4)

The world has lived through an extraordinary global health threat, the COVID-19 pandemic, leading to nearly 20 million deaths, staggering economic losses, a generational decline in human capital, and the first decline in global life expectancy since 1950 (the first year when UN estimates were published).^{1–4} Another major threat, climate change, now has broad scientific, political, and social recognition.^{5–7} The spectre of nuclear confrontation has re-emerged as a serious threat during the ongoing Russian invasion of Ukraine. The three Cs—COVID-19, climate change, and conflict—highlight that the steady global health progress of the past 70 years will not necessarily continue in the next 70 years. But there are many other threats beyond the three Cs that threaten to undermine future global health progress, including rising antimicrobial resistance, increasing obesity, inverted population pyramids, eroding sexual and reproductive rights for women, food insecurity, and fraying multilateralism. How global health advances or retreats will depend crucially on the multiplicity of these threats and how they intersect.

The global community and many nations have launched commissions, task forces, and panels to

draw lessons from the COVID-19 pandemic.^{7–12} The Pan-European Commission on Health and Sustainable Development⁸ explored the post-pandemic world for Europe and made far-reaching recommendations based on a One Health lens. The Independent Panel for Pandemic Preparedness and Response¹¹ and the G20 High Level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response¹² called for the creation of new institutions and financing mechanisms to prepare the world for new pandemics and other threats. Multiple commissions, task forces, and panels have addressed climate change, including two *Lancet* Commissions, and the Intergovernmental Panel on Climate Change produces regular multistakeholder assessments.^{7,8,13,14} These global convenings have been mirrored by multiple national reviews.^{15–17} Although there are high-profile initiatives for pandemics and climate change, other threats have received less widespread attention or have been debated largely in academic subdisciplines.

Governments, international organisations, and local communities will need to manage multiple threats at the same time. Many of these threats interact and lead

to complex health, economic, social, and geopolitical consequences. Climate change, population growth, and political fragility may coincide leading to large-scale migration. Food systems can be designed to improve health, reduce poverty, and slow climate change, or the reverse. Specific and cross-cutting technologies and policies are needed to reduce the risk of emerging threats or to decrease the harms from threats as they unfold. The most important strategies for risk and harm reduction are unlikely to emerge if each threat is examined in isolation from the others.

We have established the *Lancet* Commission on 21st-Century Global Health Threats to examine the broad set of threats facing the world over the rest of the century. This long perspective is needed since threats such as climate change, food systems, antimicrobial resistance, or inverted population pyramids require many decades for actions to alter future trajectories. The Sustainable Development Goal focus on 2030 is an important motivator for immediate policy action, but a longer-term perspective is needed to fully assess and respond to emerging threats.

This Commission's work will be informed by diverse expertise. The Commission members are drawn from many distinct groups: current and former heads of state, intergovernmental organisation leaders, leaders of public health institutions, global health funders, global health thought leaders, and civil society and youth organisations. The Commission represents a diverse group with gender parity and regional balance so that many perspectives are brought to bear on finding cross-cutting tools and solutions for future threats. The Commission will meet over the next 2 years to assess the evidence produced by various working groups and will release its analysis and recommendations by the end of 2024.

Beyond the Commission members, the Commission also seeks input from diverse individuals and institutions in every region of the world. We recognise that solutions for multiple threats facing communities require sound scientific analyses combined with understanding of local values, preferences, priorities, and perspectives. We make an open call for input to this Commission through the Commission's website and encourage evidence that can help us all find potential cross-cutting solutions for global health threats. We now have the analytic capabilities to harness the power

of data from across multiple fields, galvanise global expertise with diverse perspectives, and identify for the world some of the most important priorities for the long term. The *Lancet* Commission on 21st-Century Global Health Threats will act as an independent voice to call attention to these priorities.

NK is the Executive Director of the United Nations Population Fund. CJLM is the Director of the Institute for Health Metrics and Evaluation. We declare no competing interests.

*Natalia Kanem, *Christopher J L Murray, Richard Horton*
cjlm@uw.edu

United Nations Population Fund, New York, NY, USA (NJ); Institute for Health Metrics and Evaluation and Department of Health Metrics Sciences, School of Medicine, University of Washington, Seattle, WA 98195, USA (CJLM); *The Lancet*, London, UK

- 1 Bollyky TJ, Hullah EN, Barber RM, et al. Pandemic preparedness and COVID-19: an exploratory analysis of infection and fatality rates, and contextual factors associated with preparedness in 177 countries, from Jan 1, 2020, to Sept 30, 2021. *Lancet* 2022; **399**: 1489–512.
- 2 Verschuur J, Koks EE, Hall JW. Observed impacts of the COVID-19 pandemic on global trade. *Nature Human Behaviour* 2021; **5**: 305–07.
- 3 Wang H, Paulson KR, Pease SA, et al. Estimating excess mortality due to the COVID-19 pandemic: a systematic analysis of COVID-19-related mortality, 2020–21. *Lancet* 2022; **399**: 1513–36.
- 4 Heuveline P. Global and national declines in life expectancy: an end-of-2021 assessment. *Population Develop Rev* 2022; **48**: 31–50.
- 5 Lenton TM, Rockström J, Gaffney O, et al. Climate tipping points—too risky to bet against. *Nature* 2019; **575**: 592–95.
- 6 Cook J, Nuccitelli D, Green SA, et al. Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environ Res Letters* 2013; **8**: 024024.
- 7 Pörtner H-O, Roberts DC, Adams H, et al. Intergovernmental Panel on Climate Change. Climate change 2022: impacts, adaptation and vulnerability. IPCC Sixth Assessment Report 2022. <https://www.ipcc.ch/report/ar6/wg2/> (accessed Nov 7, 2022).
- 8 European Observatory on Health Systems and Policies. Drawing light from the pandemic: a new strategy for health and sustainable development. A review of evidence for the for the Pan-European Commission on Health and Sustainable Development. 2021. <https://eurohealthobservatory.who.int/publications/m/drawing-light-from-the-pandemic-a-new-strategy-for-health-and-sustainable-development> (accessed Nov 7, 2022).
- 9 Sachs JD, Karim SSA, Akinin L, et al. The *Lancet* Commission on lessons for the future from the COVID-19 pandemic. *Lancet* 2022; **400**: 1224–80.
- 10 The Task Force for Global Health. Coronavirus pandemic. 2022. <https://www.taskforce.org/coronavirus-pandemic/> (accessed Nov 7, 2022).
- 11 The Independent Panel for Pandemic Preparedness and Response. COVID-19: make it the last pandemic. 2021. <https://theindependentpanel.org/mainreport/> (accessed Nov 7, 2022).
- 12 Shanmugaratnam T, Summers L, Okonjo-Iweala N, et al. A global deal for our pandemic age. Report of the G20 High Level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response. 2021. <https://pandemic-financing.org/> (accessed Nov 7, 2022).
- 13 Costello A, Abbas M, Allen A, et al. Managing the health effects of climate change: *Lancet* and University College London Institute for Global Health Commission. *Lancet* 2009; **373**: 1693–733.
- 14 Watts N, Adger WN, Agnolucci P, et al. Health and climate change: policy responses to protect public health. *Lancet* 2015; **386**: 1861–914.
- 15 US Global Change Research Program. Fourth national climate assessment. Washington, DC: US Global Change Research Program, US Government Publishing Office, 2018.
- 16 German Environment Agency. Climate impact and risk assessment 2021 for Germany: summary. Dessau-Roßlau: Umweltbundesamt, 2022.
- 17 Committee of Chinese National Assessment Report on Climate Change. The Third China's National Assessment Report on Climate Change. Beijing: China Science Press, 2016 (in Chinese).

For the website of the *Lancet* Commission on 21st-Century Global Health Threats see <https://www.globalhealththreatscommission.org>