

COVID-19 has left the world less prepared for an influenza pandemic



Prior to 2020, most pandemic preparedness efforts centered on influenza. Some countries, such as Aotearoa (New Zealand)¹, were able to successfully adapt national pandemic influenza plans to the response to COVID-19, and global influenza surveillance systems were harnessed for SARS-CoV-2 (ref. 2). It is now critical that nations and the international community implement lessons learned from COVID-19 back into influenza preparedness³. This task is particularly urgent given both the emergence of a number of influenza spillover threats and exhausted and depleted public health systems globally.

There are currently several avian influenza virus subtypes, including H5N8, H5N6 and H7N9, that international and national health organizations are monitoring for potential human cases and onward transmission. Most recently, an H5N1 virus is causing particular concern, given the scale of avian spread – unabated globally for more than a year – and die-offs across migratory bird species, and cases in mammals, including mink and sea lions, in which mammal-to-mammal transmission either was indicated or could not be ruled out, respectively. In addition, single human cases have been reported, including in the United Kingdom in 2021, in the United States in 2022, and in Ecuador, China and Chile in 2023 (ref. 4). In February 2023, an 11-year-old girl in Cambodia was confirmed to have died from H5N1, but from a separate clade circulating before the current outbreak⁵. Since 2003, H5N1 has resulted in 873 cases and 458 deaths globally, as of 3 March 2023 (ref. 6). Although human-to-human transmission clusters have been limited and have occurred only because of extremely close contact, such as between a sick person and a caregiver, the World Health Organization (WHO) Director-General has advised that “we cannot assume that will remain the case and we must prepare for any change in the status quo.”⁷

Mammalian contact risk, the potential adaptation of avian influenza to human transmission and the variety of settings in which spillover may occur demand a One Health approach to both surveillance and mitigation.

Active case finding among humans at risk of exposure, via sentinel surveillance systems, is a prudent strategy for early detection of future human cases. Case detection must be coordinated with routine and surge surveillance of wild bird populations for better understanding of susceptible species and transmission dynamics. Coordinated national sentinel surveillance among veterinarians is needed. Past zoonotic outbreaks have shown that astute veterinarians, wildlife biologists and environmental health professionals are critical for the surveillance of wild birds and, with clinicians, for making linkages for early detection of human cases. The current H5N1 outbreak demonstrates that levels of funding and effort for avian influenza surveillance, reporting, research and response are insufficient to ward off advancing influenza infections in migratory birds or to translate surveillance data on birds into human health risk-assessment and preparedness action.

Countries are legally required to immediately notify the WHO of any “human influenza caused by a new subtype” as a potential public health emergency of international concern under the International Health Regulations (2005). However, the broad adoption of travel restrictions during COVID-19, and the potential risk that travel bans will be imposed after a notification, means that countries are currently disincentivized to rapidly report future outbreaks of pathogens of pandemic potential. Incomplete surveillance and delayed notification may result in wide transmission of a novel pathogen before the international community is alerted and global responses can be mounted⁸.

There are already well-established institutions and processes for pandemic influenza preparedness and response, including surveillance networks and legal instruments. The Global Influenza Surveillance and Response System (GISRS) plays a fundamental role in pandemic influenza preparedness, surveillance and response, including the global sharing of pathogen samples and conducting risk assessments. Half of the GISRS’s operating costs are covered through industry partnership contributions under the Pandemic

Influenza Preparedness Framework – a non-binding instrument supported by legally binding contracts with industry that aim to share diagnostics, vaccines and therapeutics during an influenza pandemic. Given the vaccine nationalism seen during COVID-19, and that pandemic treaty negotiations are still nascent, there is a risk that governments, particularly those in high-income countries, will use advance purchase agreements to secure national supply of scarce vaccine resources during a future influenza pandemic.

Countries and international bodies must adjust the risk calculus for potential pandemic influenza, because of the persisting technical, legal, financial and political consequences of COVID-19. The increasing risks posed by an influenza pandemic also increase the obligation of governments to undertake preparedness activities. This includes immediately revising existing pandemic influenza plans to incorporate the impacts of COVID-19, including public receptiveness to non-pharmaceutical measures; the potential for misinformation and disinformation; limitations to public health legal authorities; and impediments to antivirals and vaccines and other medical supply chains. At the population level, governments may want to consider how to incorporate additional and more systematic human influenza testing into existing COVID-19 infrastructure, or redeployment as it is wound down. At the international level, the quadripartite (comprising the WHO; the World Organisation for Animal Health; the Food and Agriculture Organization of the United Nations; and United Nations Environment Programme) should capitalize on their One Health Joint Action Plan (2022–2026) and consider linking technical interdisciplinary networks such as the Network of Expertise on Animal Influenza (of the World Organisation for Animal Health–Food and Agriculture Organization of the United Nations) and the GISRS to better understand and track risks from emerging avian influenza viruses. Finally, the ongoing pandemic treaty negotiations and International Health Regulations amendments should be informed by these risks, with the urgency in reforming international

governance balanced against appropriately considered and detailed obligations that address the thorny issue of disincentivized reporting. A truly One Health approach to pandemic preparedness will be broader than a focus only on wild animals, and will also include surveillance and standards for poultry and livestock, and procedures for shared notifications⁹.

The COVID-19 pandemic has led to depleted and weakened health systems¹⁰. An estimated 180,000 healthcare workers lost their lives during the pandemic, and some estimates show that at least one in five have left the field and about 31% intend to leave the health workforce within the next 2–3 years as a result of the pandemic. Public health has seen an unprecedented attrition of national, state and local public health officers and epidemiologists. In addition, century-long legal precedents and once-well-established powers that enable

leaders and agencies to implement control measures have been rolled back by legislators or limited by courts. The ongoing COVID-19 pandemic has paradoxically left the world probably even less prepared for stopping the next outbreak from becoming a pandemic. The world is in a precarious public health position that warrants weighing potential pandemic risks more seriously. The next pandemic may not be influenza, but the risk calculus for such a pandemic must be prepared now.

Alexandra L. Phelan¹✉, **Erin M. Sorrell**¹,
Claire J. Standley^{2,3}, **Crystal Watson**¹,
Lauren Sauer⁴ & **Caitlin M. Rivers**¹

¹Johns Hopkins Center for Health Security, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA. ²Center for Global Health Science & Security, Georgetown University, Washington, DC, USA. ³Heidelberg Institute of Global Health,

University of Heidelberg, Heidelberg, Germany. ⁴University of Nebraska Medical Center, Omaha, NE, USA.

✉e-mail: aphelan4@jhu.edu

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References

1. Kvalsvig, A. et al. *J. R. Soc. N. Z.* **51**, S143–S166 (2021).
2. Hammond, A. et al. *China CDC Wkly.* **3**, 937–940 (2021).
3. Dzau, V. et al. *Lancet Microbe* **4**, E203–E205 (2023).
4. University of Nebraska Medical Center Global Center for Health Security. <https://go.nature.com/3ZYd5Mn> (accessed 13 April 2023).
5. WHO. <https://go.nature.com/41iqzDQ> (2023).
6. WHO. <https://go.nature.com/3ZV4w50> (2023).
7. WHO. <https://go.nature.com/41g07uh> (2023).
8. Meier, B. M. et al. *Bull. World Health Organ.* **100**, 178–178A (2022).
9. Carlson, C. J. et al. *Lancet* **400**, 462–468 (2022).
10. Haldane, V. et al. *Nat. Med.* **27**, 964–980 (2021).

Competing interests

A.L.P. has consulted for the WHO on international law matters, including influenza.