Title

One Health Policy Brief: Urgent Action Needed to Strengthen Pandemic Prevention & Response Capacity for H5N1 Avian Influenza & Other Emerging Infectious Diseases

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***ONE HEALTH POLICY BRIEF*:**

Urgent Action Needed to Strengthen Pandemic Prevention & Response Capacity for H5N1 Avian Influenza & Other Emerging Infectious Diseases

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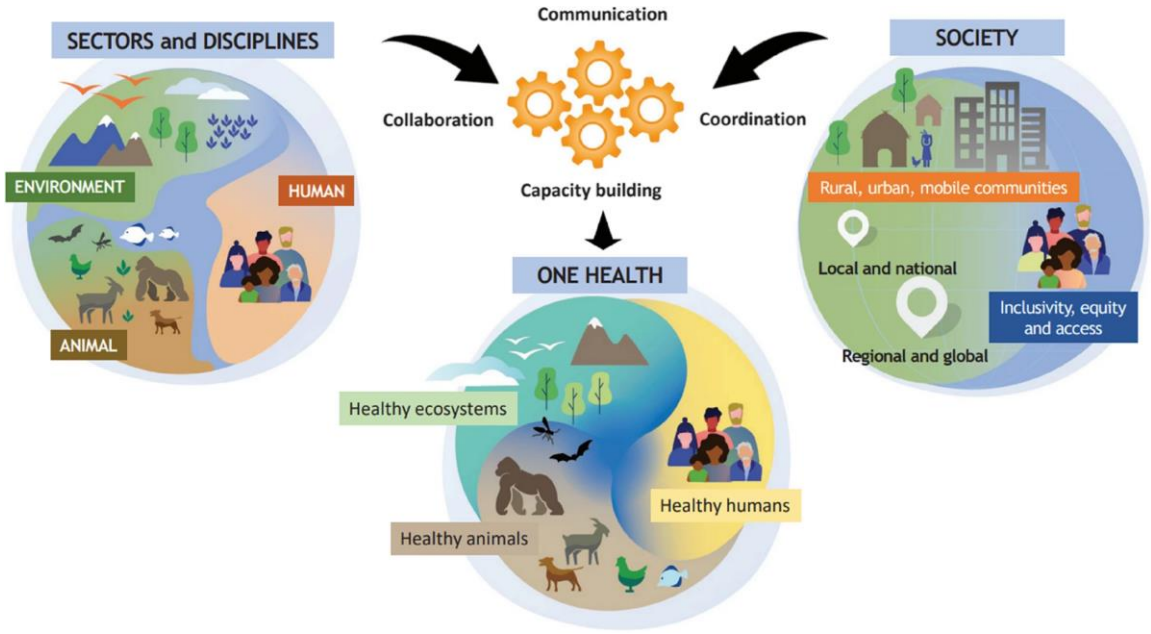
Summary

Disease outbreaks and pandemics cause tremendous illness, mortality, and economic harm. A highly pathogenic avian influenza (HPAI) H5N1 virus has spread around the globe in the last four years and, like other influenzas, has the potential to cause a pandemic much worse than COVID-19. Emerging infectious diseases (EID) pose an imminent threat to global health and economic order. Experts are calling for the urgent enactment of new policies to integrate agency action to prevent, prepare for, and identify emerging health threats and to provide funding to prevent and effectively respond to a potential pandemic using a One Health approach.[1] This approach should be used to proactively coordinate and guide comprehensive disease outbreak prevention and preparedness, surveillance for early EID detection in people and animals, robust disease response and vaccination capacity, and ongoing education and communications strategies at the state, national, and global levels.

What is One Health?

An integrated, unifying approach that mobilizes multiple sectors, disciplines, and communities at varying levels of society to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants, and the environment (including ecosystems) are closely linked and interdependent.[1]



[1] Mettenleiter TC, *et al*. 2023. *One Health Outlook*. 5:18.

Background

The COVID-19 pandemic revealed many of the nation's vulnerabilities around pandemic preparedness, prevention, and response. As of 2024, over 1.1 million deaths in the US and 7 million deaths globally have been attributed to COVID-19. Had proper vaccination, disease surveillance, testing, diagnostics, and other response efforts been in place at the beginning of the pandemic, the death toll would be at least 50% lower than its current levels.[2,3] Furthermore, COVID-19 caused an estimated $14 trillion in damages to the US economy,[4] suggesting that pandemic preparedness, prevention, and response efforts can help mitigate the negative economic impacts of health threats in addition to minimizing mortality.

In the initial phases of the COVID-19 pandemic, the US made major investments to boost vaccine development and production capacity. Those investments have waned, and vaccine research, development, and production capacity have declined. Waiting to ramp up vaccine capacity until after a viral disease is spreading human-to-human will result in unnecessary loss of life. For example, if faced today with a pandemic like the 1918 influenza pandemic, an estimated 33 million people will die globally in the first six months, with an additional 1 million deaths for every month that vaccine production and administration is delayed.[5]

Public education and communication are essential to pandemic preparedness, prevention, and response. The US death rate during COVID-19 was among the highest in the developed world due to extreme resistance to preventive measures, such as masking, getting vaccinated, testing, and isolating.[2,6] A major effort is needed in public education and communication so that critical numbers of people will be informed about preventive measures, will support early interventions, and will follow other public health measures to protect themselves and their communities against disease outbreaks.

Lessons from COVID-19 can inform preparedness, prevention, and response strategies for emerging health threats, such as HPAI H5N1.

The US is positioned to use lessons from COVID-19 to inform preparedness, prevention, and response strategies for other emerging health threats, including HPAI H5N1. A similar virus has been known for decades. In the 2000s, an earlier version of HPAI H5N1 spread from Asia and Africa to the Middle East and Europe.[7] The virus infected over 800 people globally, with a mortality rate over 50%.[8] By comparison, COVID-19 killed about 1 out of 1,000 infected people, or 0.1%.[9] Despite global concern for H5N1, the US was not prepared. There was no comprehensive surveillance program in place across the range of animals likely to host the virus that was known to be able to infect humans, nor were plans in place for early detection and isolation of infected individuals in the US. To prevent tens of millions of deaths worldwide and avoid economic catastrophe, we must implement new policies and funding to enable a One Health approach,[1] spanning wildlife, livestock, domestic animals, and humans.

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[2] Jia KM, et al. 2023. *Eur J Epidemiol.* 38(11):1125-1128.
[3] Wang X, et al. 2022. *Proc Natl Acad Sci USA* 119(34):e2200652119.
[4] Walmsley T, et al. 2023. Econ Model. 120:106147.
[5] Gates B. 2018. *N Engl J Med.* 378(22):2057-2060.
[6] Embrett M, et al. 2022. *BMC Public Health.* 22(1):750.
[7] US CDC. 2024. 2000-2009 Avian influenza timeline.
[8] Tram JS. 2002. *Vaccine.* 20: S77-S81.
[9] Ahmad FB, et al. 2023. *MWWR Morb Mortal Wkly Rep.* 72(18):493-496.

The Current H5N1 Threat

The global community is now under threat from a new highly pathogenic H5N1 virus that can spread rapidly around the world and transmit across a wide range of animals, including mammal to mammal transmission. Over the last four years, the virus has successfully spread among wildlife, domestic animals, including poultry and livestock, and even to humans (see Timeline).[10-13] Surveilling this disease requires a One Health approach with global testing and monitoring programs that consider the transmission linkages between wildlife, domestic animals, humans, and the environment.

Since 2022, key national and international groups have sponsored expert consultations, workshops, and reports that cover lessons learned from previous H5N1 outbreaks and the COVID-19 pandemic. These efforts, which include a World Bank Group report,[14] a National Academies of Science workshop,[15] and a UC Davis Grand Challenges Pandemic Preparedness Roadmap convening,[16] all emphasize the value of a One Health approach to better prepare for and respond to emerging disease outbreaks.

Highly Pathogenic Avian Influenza (HPAI) H5N1 Current Timeline[10,11]

2020

Gene-swapping between poultry and wild bird viruses leads to emergence of HPAI H5N1.

2021

The virus is first detected in mammals in Europe, including on farms and in one human.

2022

Wild birds & poultry in Asia, Africa, Europe, and North America are infected.

Numerous mammal species in the US are infected.

2023

The virus is detected in marine mammals and wild birds in South America & Antarctica and a polar bear in the Arctic.

Mammal-to-mammal transmission of the virus is detected.

2024

Cattle on US dairy farms test positive for HPAI H5N1; viral fragments are detected in milk (March).

Sporadic cow-to-human transmission of the virus on US dairy farms, with at least one case causing severe respiratory illness in humans (May).

Responding to the currently escalating incidents of HPAI H5N1 infecting mammals and spilling over to humans, UC Davis Grand Challenges and School of Veterinary Medicine partnered to host an Emergency Expert Consultation, “Combating H5N1 Influenza: Employing the One Health approach to prepare for, prevent, and respond to emerging health threats,” on May 16, 2024.[17] The policy recommendations listed below are based on the expert opinions and audience feedback that were shared during the consultation and target policy change at state and national levels to strengthen pandemic preparedness, prevention, and response capacity.

Urgent action is needed to prepare for and effectively respond to HPAI H5N1 and other emerging infectious disease outbreaks.

[10] US CDC. 2024. 2020-2024 Avian influenza timeline.
[11] Uhart M, et al. *In Review.* doi: 10.1101/2024.05.31.596774.
[12] Kareinen L, et al. 2023. *Euro Surveill.* 29(25):2400063.
[13] Restori KH, et al. 2024. *Nat Comm.* 15:4112.
[14] Berth FCJ, et al. 2022. World Bank Group. Report 177299.
[15] NASEM. 2022. Washington DC: The National Academies Press.
[16] Pandemic Preparedness Roadmap Expert Group. 2024. UC Davis Grand Challenges.
[17] UC Davis Grand Challenges. 2024. Combatting H5N1 influenza.

Policy Recommendations to Implement a One Health Approach to Strengthen Prevention and Response Capacity for EIDs

1. **Enact legislation to establish and fund state and national One Health Councils for Disease Outbreak Prevention and Response empowered to**: a) coordinate communication systems and informed decision-criteria across sectors, agencies, and levels of government; b) set guidelines to build up testing and diagnostic capacities and sustain high-throughput lab networks with surge capacity provided by universities and the private sector; and c) recommend strategies to effectively tap resources and capacities of public and private institutions to contribute to prevention, preparedness, and response activities.
2. **Enact policy to maintain and enhance a One Health disease outbreak surveillance and pandemic early warning system at the state and national levels** to monitor wildlife, livestock, fur farms, poultry, humans, and the environment. Early warning surveillance programs that work across sectors and that have an easy reporting system can alert clinicians, public and animal health sector officials, and other frontline workers.
3. **Create and maintain a "National Guard" of networked organizations with trained professionals and laboratories for public health emergencies.** Network support should include continued investment to maintain surveillance and high-throughput testing systems.
4. **Secure reliable long-term funding and investment** for One Health preparedness activities and technologies, including funding for vaccine technology, updating and stockpiling vaccines and biosecurity supplies, research, and health system capacity improvements. Sustained support will eliminate delays and gaps in preparedness caused by intermittent and short-term funding programs and investments.
5. **Set up cross-sectoral emergency funding mechanisms** that can be immediately deployed in an outbreak to support expanded One Health surveillance, testing, and response activities by all engaged organizations, especially community-based organizations.
6. **Establish policies and agreements for One Health coordination of data collection and real-time ethical data-sharing** across all sectors and state and federal agencies involved in prevention and response efforts.
7. **Establish education, risk communication, and community engagement programs** in schools and among vulnerable groups, such as agricultural workers, to better communicate and build trust in disease prevention and control activities, such as disease surveillance and vaccination programs. The programs will improve scientific and health literacy among the public and increase understanding around how information changes as situations evolve.
8. **Enact policy and funding to expand the One Health workforce** and offer training to effectively implement One Health strategies, work across disciplines, and effectively engage with communities. The policy and funding will support universities to expand public health, animal health, and One Health programs to train a diverse, culturally competent workforce.
9. **Augment policy to prevent the unwarranted culling of wildlife, especially threatened and endangered species,** or destruction of their habitat as a strategy for disease control. Decisions regarding wildlife should be evidence-based and made in consultation with disease surveillance networks and wildlife disease experts.
10. **Strengthen animal agriculture biosecurity through increased funding and cross-sector communications**, particularly on poultry, swine, wildlife, and dairy farms. Improved biosecurity can prevent outbreaks and increase the likelihood of isolating an outbreak event.
11. **Increase public investment in research** on all aspects of disease outbreaks, prevention strategies, vaccine development, and other tools to prevent and control disease outbreaks using One Health approaches.