

Issue At A Glance:

Pandemics and US Preparedness

The coronavirus disease 2019 (COVID-19) pandemic caused by the SARS-CoV-2 virus highlighted the importance of adequate preparation and response needed to minimize the negative effects of such a pandemic. This brief covers the conditions under which pandemics may occur, monitoring of pandemics, and the state of pandemic preparedness in the US.

What is a Pandemic?

A pandemic is an outbreak of a disease that spreads over multiple countries or continents, affecting a large proportion of the population. In order for a disease to be a pandemic, it must be infectious or contagious. Notable pandemics include the Black Death that occurred from 1331 to 1353 and is estimated to have killed between 75 to 200 million people worldwide due to an infection by a bacterium called *Yersinia pestis*; the 1918 flu (also known as the Spanish flu) pandemic that occurred between 1918 and 1919 and killed an estimated 17 to 50 million people due to an infection by the H1N1 influenza A virus; and most recently, the coronavirus disease 2019 (COVID-19) that started in December 2019 and has killed over 1 million people worldwide to date due to an infection by the SARS-CoV-2 virus.¹

Pandemics are dangerous and destructive since they can cause high morbidity (illness), mortality (death), and economic losses. Preparing for them requires thoughtful planning, careful coordination, and adequate resource allocation. This issue brief provides an overview of the conditions that make a pandemic likely and monitoring of pandemics in the US. Additionally, it highlights some of the lessons learned from the COVID-19 pandemic which can be used to help prepare for future pandemics in the US.

Relevant Terminology²

- **Endemic:** a disease that naturally occurs in a particular geographic location or population
- **Outbreak:** a rapid increase in the number of endemic cases to levels that are greater than anticipated
- **Epidemic:** an outbreak of disease that affects a large number of people in a region over a specific period of time
- **Pandemic:** an outbreak of disease that spreads over multiple countries or continents, affecting a large proportion of the population

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Why do Pandemics Occur?

According to the *National Academies Press*, certain conditions increase the likelihood of an outbreak turning into a pandemic:

Novelty of pathogen: When a new pathogen arises, everyone is potentially at risk as humans may have almost no immunity to the new pathogen. Moreover, no vaccines or treatments likely exist for the new pathogen.³

Multiple modes of transmission: Infectious pathogens can be transmitted between humans either directly or indirectly, and multiple modes of transmission may affect the number of people exposed. Direct methods include person-to-person contact where an infected person touches or exchanges bodily fluids with an uninfected person. It can also occur through the spread of droplets such as when an infected person coughs or sneezes in close proximity to another individual. Indirect methods include airborne transmission (where the virus lasts in the air for a period of time), contact with contaminated surfaces, consumption of contaminated food and water, or transmission from an animal/insect bite or scratch.⁴

Population density and travel: As the world increasingly urbanizes, the likelihood of a pathogen being transmitted to multiple people grows far higher. Moreover, international travel can quickly expose a large number of people from different countries to a pathogen through an infected person.³

How is a Pandemic Tracked, Assessed, and Managed?

The US Centers for Disease Control and Prevention (CDC) uses the Pandemic Severity Assessment Framework (PSAF) to understand the potential for an outbreak to become a pandemic. The PSAF uses transmissibility and clinical severity to determine the potential severity of a pandemic. Transmissibility includes measures such as school/workplace absenteeism, population immunity, and the number of cases within at-risk populations in communities, workplaces, and schools. Clinical severity includes multiple measures such as case fatality rate (proportion of deaths compared to the total number of infections), case hospitalization ratios (ratio of hospitalizations related to the infection compared to hospitalizations for other reasons) and the ratio of deaths to hospitalizations. The US government actively tracks novel pathogen outbreaks domestically and internationally.⁵ When a pandemic occurs, it must be contained and mitigated. Containment involves identifying and isolating infected individuals to stop the spread of the pathogen to the rest of the population. Mitigation strategies reduce transmission through large-scale prevention efforts such as hand hygiene, use of facemasks, sanitization of surfaces, and social distancing.⁶

Which US Agencies are Responsible for Preparedness?

Pandemic preparedness in the US involves three main agencies overseen by the National Security Council (NSC) established in 1947: the US Agency for International Development, the CDC, and the US Department of Defense. These agencies are primarily responsible for global health security efforts that involve building surveillance, laboratories, and other capacities. Other agencies involved in research efforts and diplomacy include the Department of Health and Human Services, the National Institutes of Health, the Food and Drug Administration, the Department of State, and the Department of Agriculture.⁷



In 2016, former President Obama created the Directorate of Global Health Security and Biodefense in preparation of a future pandemic after the Ebola outbreak in 2014. The office was essentially disbanded in May 2018 by the Trump Administration.⁸ In addition, the PREDICT program through the USAID that was responsible for tracking early stage viruses and diseases around the world was defunded by the current administration.⁹ Recently, however, an emergency allocation was granted to temporarily continue the

work. In 2019, the Trump Administration issued a strategy for the US government to speed up prevention, detection, and response to infectious diseases in targeted countries in a report called the *Global Health Security Strategy*. The report heavily emphasized global security efforts over a domestic response strategy.⁷

What are Some Challenges to Preparedness in the US?

Funding: The primary challenge to pandemic preparedness is funding. Funding often spikes when an outbreak occurs and then wanes until the next outbreak. For instance, the average amount of funding for global health security was roughly \$450 million per year between 2005 and 2015. In 2015, the funding spiked to \$1.34 billion when the Ebola outbreak occurred and to \$552 million in 2016 when the Zika outbreak occurred.⁷ *Innovative payment methods and pandemic funds are required to build long-term healthcare infrastructure and to continue with surveillance and research within the US and abroad.*¹⁰

Global Involvement: An additional challenge involves US involvement in global health security. Without infrastructure to survey and detect diseases abroad, especially in countries with vulnerable public health systems, the US will not be able to rapidly adjust to outbreaks. Moreover, multiple diplomatic posts remain unfilled. *Strengthening diplomacy through competent and knowledgeable diplomats will help build trust and relationships with other nations.*¹¹

Lack of Domestic Strategy: Finally, the lack of a domestic strategy makes efficient decisions in times of crisis difficult. The COVID-19 pandemic uncovered the lack of preparedness of the US public health system for a pandemic with the shortage of personal protective and life-saving equipment, medical providers, and widespread testing. Moreover, millions of people lost their health insurance.³

What has Worked During the COVID-19 Pandemic?

The COVID-19 pandemic created opportunities to experiment with different measures to find effective methods for such situations:

- Healthcare systems utilized parks and hotels as overflow rooms, and cities quickly adapted to create heated structures to test and quarantine homeless individuals.
- New sterilization techniques for personal protective equipment were implemented and new methods for placing patients on a limited number of ventilators were discovered.
- The federal government provided paid sick leave.
- Healthcare systems switched to telehealth services to provide nonemergency care, and payment models adapted to reimburse providers and allow them to provide care across state lines.
- Restrictions on the use of methadone and buprenorphine for opioid addiction were lifted and prison/jail overcrowding was addressed through the release of nonviolent offenders.¹⁰

What Should the US do Moving Forward?

A crucial component of pandemic preparation is a multilateral approach to vaccine development. An equitable strategy for deployment is necessary since such disasters disproportionately burden low-income and minority communities.¹² The economic burden resulting from lost wages may create pressures to ease some of the mitigation efforts that are being implemented. Government leaders must use sound strategies rooted in science to make the best decisions for the future of our country. Finally, while it is difficult to prepare for the next pandemic, especially in the wake of the current one, it is crucial to understand that another pandemic can occur at any time. The US must begin creating the infrastructure as soon as possible in the following ways:

- Development of an integrated planning approach that builds on the lessons of past epidemics and pandemics
- Establishment of a robust public health workforce to be deployed in acute situations
- Creation of an innovative funding stream to finance healthcare institutions during a crisis
- Formation of a stockpile of resources such as personal protective equipment for frontline workers, face masks, ventilators, and syringes as well as a strategy to halt exportation of medical supplies during a crisis¹³
- Development of a pandemic risk communication strategy to ensure effective communication from trusted public health leaders during a pandemic
- Establishment of a national plan with guidance for state and local governments
- Continued investments in global health security and the World Health Organization

Finally, the United States *must* address universal health coverage to ensure that people do not lose access to care during catastrophes and invest in developing a strong healthcare workforce to tackle the healthcare workforce shortage. Investing in public health is investing our nation's security, health, and well-being.

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LOMA LINDA UNIVERSITY
HEALTH

Institute for Health Policy and Leadership

11209 Anderson Street
Loma Linda, CA 92354
Phone: 909-558-7022
Fax: 909-558-5638
www.IHPL.llu.edu

Questions?

Please contact the Institute for Health
Policy & Leadership (ihpl@llu.edu).