Exhibition

Understanding, preventing, and stopping epidemics

Public health was born from crises. Before the influenza pandemic of 1918, many diseases were seen as something that mostly affected the poor, to be blamed on those who had not pulled themselves out of poverty. The 1918 influenza pandemic is estimated to have killed up to 50 million people, infecting rich and poor alike. Viruses were just beginning to be recognised, and doctors had no vaccines, no antivirals, no antibiotics. The pandemic revealed that disease is a population-wide issue, not simply an individual burden. This shift in thinking helped to create the impetus for governments to take a leading role in promoting and protecting health.

Outbreak: Epidemics in a Connected World, at the US Smithsonian Institute's National Museum of Natural History in Washington, DC, brings the 1918 influenza pandemic back to life, along with many of the other major global public health threats of the past century. The exhibition explores the ecology of epidemics and what it takes to prevent, detect, and respond to outbreaks.

From Nipah virus to HIV and severe acute respiratory syndrome (SARS), the exhibition explains, through visual and interactive displays, how viruses can spread from animals to people and why the diseases they cause can be so severe. *Outbreak* explores three phases: the origins of zoonotic diseases, which cause three-quarters of all emerging infections in humans worldwide; the role of humans in spreading these animal-borne diseases; and the response to these disease outbreaks, displaying our failures as well as successes, particularly on the global detection and response to the pandemic of disease caused by HIV. Clever use of digital interactive games, visual aids, and displays of artifacts of disease outbreaks, including a mock-up of an Ebola treatment ward, immerse the audience not only in the science but also in the human reality of outbreaks.

Even before the 1918 influenza pandemic, infectious disease outbreaks drove change at a global scale. The cholera epidemics that ravaged Europe in the 19th century were a catalyst to establishment of the early iterations of what are now known as the International Health Regulations (IHR). The first of the International Sanitary Conferences, held in Paris, France, in 1851, was attended by 12 countries and focused on the introduction of quarantine measures to prevent economic loss and control the spread of cholera. The subsequent conferences that ran until 1938 grew to include almost 50 countries and set the groundwork for the establishment of WHO.

> **"...*Outbreak* provides a platform to reach an unprecedented number of people with key messages about epidemics and how we can work together to prevent, detect, and respond to the risks."**

Public health sometimes appears, sadly, to rely on epidemics to drive progress—with critical reviews of the need to do better after every major outbreak, including HIV, SARS, and Ebola virus disease. In 2016, the Review Committee on the Role of the International Health Regulations (2005) in the Ebola Outbreak and Response identified the need to achieve country-level IHR capacity to improve global preparedness. The Committee also advocated for the external assessment of these capacities using an assessment tool known as the Joint External Evaluation (JEE). Since then, more than 75 countries have undergone a voluntary self-assessment with the JEE, identifying thousands of life-threatening gaps in preparedness that need to be addressed urgently if we are to be better prepared for the next public health crises. Past infectious disease crises have helped spread the understanding that outbreaks are a global issue, exacerbated by increasing population movement, urbanisation, and lack of preparedness. Just as the 1918 pandemic helped catalyse recognition of the need for governments to protect all people, recent epidemics have accelerated the recognition that if any

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Outbreak: Epidemics in a Connected World
Smithsonian's National Museum of Natural History, Washington, DC, USA, until 2021
https://naturalhistory.si.edu/exhibits/outbreak/

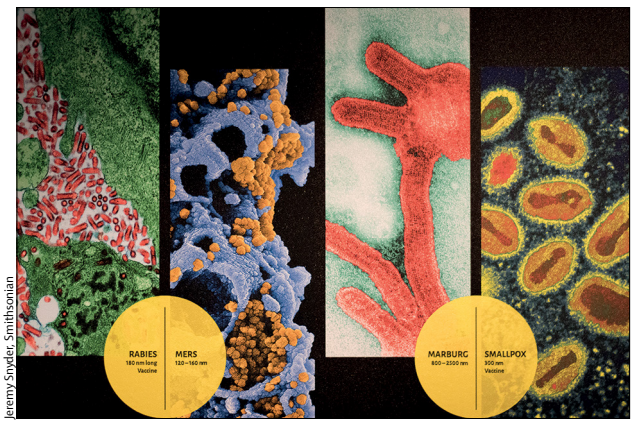
For the **International Health Regulations** see http://www.who.int/topics/international_health_regulations/en/

For the **Review Committee on the Role of the International Health Regulations (2005) in the Ebola Outbreak and Response** see http://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_21-en.pdf?ua=1

For the **Joint External Evaluation** see http://www.who.int/ihr/procedures/mission-reports/en/

US National Library of Medicine

Influenza victims during World War 1



Jeremy Snyder, Smithsonian

country is unable to find, stop, and prevent an epidemic, the entire world may be at risk.

The 2014–16 outbreak of Ebola virus disease revealed other shortcomings. Much like the doctors in the 1918 influenza pandemic, medical teams in west Africa during this epidemic initially had no rapid diagnostics, no effective treatment, and no vaccine. Cases spread across borders, reminding everyone how quickly modern travel has changed the dynamic of outbreaks. Weaknesses in disease surveillance systems and community engagement highlighted the need to strengthen core public health capacities at the local level, and the fear and stigma generated by the outbreak tested geopolitics and had far-reaching economic impacts.

There has been progress since then. The establishment of the Coalition for Epidemic Preparedness Innovations, improvement of the WHO Health Emergencies Programme, substantial improvements in the WHO Regional Office for Africa, and enthusiastic uptake of the JEE by countries are just a few examples of how public health has used the crises as an opportunity. Much of this progress is evident in the ongoing Ebola outbreak in the Democratic Republic of the Congo (DRC). The response to this Ebola outbreak includes the first use of Ebola vaccine in an active outbreak. Although this is important progress in the battle against Ebola, it is vital that gaps identified in country JEEs (eg, sustained capacity to activate and manage an emergency operations centre, deliver appropriate and timely risk communications, and ensure laboratory quality) are not only addressed to meet the immediate needs of the current response but that the funding and attention also contribute to building long-term capacity to find, stop, and prevent future outbreaks.

As the memory of a disease outbreak wanes, there is an obligation to ensure that the gaps identified are filled beyond the scope of one disease. The responsibility to support countries that have identified gaps needs to be front and centre of the political, technical, and financial agenda for years to come. This will require more than talking, writing reports, and highlighting gaps from afar. Civil society along with health and public health leaders and workers must engage populations and politicians to explain the risks, solutions, and potential catastrophic outcomes. As *Outbreak* highlights so clearly, this engagement must be done not in the peak of an outbreak through a lens of fear but through ongoing education and engagement. The exhibit does not shy away from the reality that new outbreaks will occur, highlighting recent examples of Zika virus and Middle East respiratory syndrome coronavirus, and also shows the reality of the science required to detect new infectious agents, develop vaccines, prevent the spread, and respond to outbreaks.

The world today has an unprecedented need, responsibility, and opportunity to close the life-threatening gaps found in dozens of countries. The need arises because, as *Outbreak* shows, we are all connected by the air we breathe, food we eat, and travel we take. The exhibition underlines issues of responsibility, because preventable outbreaks are a stark reminder of our failure to protect human life. It also examines unprecedented opportunities, because we now have rigorous information on the gaps that need to be filled around the world. This agenda is the focus of a new website, *PreventEpidemics.org*, from our organisation Resolve to Save Lives; it illustrates gaps and points users to critical step-by-step actions countries, donors, activists, and local and global organisations can take to fill key gaps. To make the world safer, it is particularly important to step up functionality in disease tracking, laboratory testing, training and deploying public health staff, and rapid response.

As Bill Foege, a former Director of the US Centers for Disease Control and Prevention, often notes: "Public health is at its best when we see and help others see the faces and the lives behind the numbers." *Outbreak* succeeds in putting a human face on disease statistics, allowing viewers to reflect on personal memories and photographs from disease survivors and front-line health-care workers. There is even a scrapbook memorialising Ryan White, compiled by his mother, Jeanne White-Ginder. Ryan was the Indiana teenager who died from AIDS in 1990, a month before his high school graduation, and for whom the largest federally funded programme in the USA for people living with HIV/AIDS is named.

The Smithsonian has an estimated 6 million visits a year from across the globe. The 3-year run of *Outbreak* provides a platform to reach an unprecedented number of people with key messages about epidemics and how we can work together to prevent, detect, and respond to the risks. The Smithsonian has designed the exhibition in modular form that can be used for pop-up exhibits across the globe to spread the key message to countries around the world that none of us is safe until we are all better prepared. *Outbreak* shows in graphic detail that epidemics are not only a problem in poorer countries but that they can also happen anywhere and everywhere. It is imperative that we work together to make a safer world for everyone.

For the **Coalition for Epidemic Preparedness Innovations** see http://cepi.net/

For the **Prevent Epidemics website** see http://www.preventepidemics.org

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