Scan the code for further information about the Smithsonian’s exhibition

naturalhistory.si.edu/exhibits/outbreak

Scan the code for further information about OIE activities

www.oie.int

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This major exhibition is an important component in the Smithsonian National Museum of Natural History’s Outbreak Initiative, developed in collaboration with the OIE and other global partners to raise awareness of the human, animal, and environmental factors that contribute to infectious disease epidemics.

In a globalised and connected world, with ever-increasing growth in travel and trade, infectious agents move freely between borders and continents, potentially impacting human and animal health, and economies.

The OIE is a key resource for the dissemination of information about the current global animal disease situation, enabling countries throughout the world to take necessary preventive action. Immediate or periodic reports also include information about animal diseases that are transmissible to humans, and about any intentional introduction of pathogens. Real-time data is disseminated mainly through the OIE’s World Animal Health Information System Interface (WAHIS Interface).

The Outbreak: Epidemics in a Connected World exhibition is composed of 15 graphic panels that are freely available to reproduce on demand. These graphics can be customised to a local context, enabling any interested stakeholder to mount the exhibition locally. The Outbreak exhibition is divided into four themes:

1. Outbreak origins. Visitors learn how diseases are transmitted from animals to humans, and how environmental factors contribute to disease spread.
2. Stopping the spread. This highlights factors that can decrease the risk of disease outbreaks.
3. Detection, response and containment. An introduction to the variety and interaction of those working in many different fields of activity to identify and control the spread of potentially dangerous diseases.
4. Disease profiles. Visitors can learn about the occurrence, ways of spreading, treatment and prevention of important zoonoses such as Ebola, tuberculosis and influenza.
Human health is connected to animal and environmental health. As our population grows, we interact with animals and the environment in new ways that can cause disease outbreaks and epidemics.

Around the world, people are working together to stop outbreaks—sometimes before they even start.

Bangladesh is the most densely populated country in the world, with growing human and livestock populations and intensifying agriculture.

The decline in forested areas means more wildlife species share environments and food resources with people. This, coupled with poor sanitation and limited healthcare access, makes Bangladesh a prime spot for emerging zoonotic pathogens.

Building Cooperation

Bangladesh introduced a One Health Strategic Framework in 2012. This policy promotes cooperative surveillance of emerging zoonotic diseases, research sharing, and coordinated preparation for and response to outbreaks among human health, livestock health, and wildlife agencies.

One Health Against Rabies

The One Health approach has been highly successful in Bangladesh’s efforts to control rabies—a particular problem for rural residents. Mass vaccination for dogs is coupled with free treatment for infected patients at health centers in all of the country’s 64 districts.

The results are clear: a steady decline in rabies cases since 2010. Bangladesh aims to eliminate rabies within its borders by 2020.
Keeping an outbreak from becoming an epidemic requires cooperation and coordination from individual communities to international partnerships.

The World Health Organization (WHO), the World Organisation for Animal Health (OIE), and the Food and Agriculture Organization of the United Nations (FAO) lead the charge in intergovernmental coordination. But every country has a role to play.

Lessons Learned
Past outbreaks have taught us what works:
- Involve communities in disease education and surveillance.
- Equip local laboratories to detect and report infectious diseases.
- Budget money to deal with outbreaks locally and globally.
- Create networks that share information on infectious diseases and outbreaks.
- Make emergency plans to redirect trained people and supplies to outbreak areas.

An Epidemic Success Story
When a person infected with Ebola virus in Liberia traveled to Lagos, Nigeria (pop. 17 million) in 2014, officials in Lagos mobilized a rapid emergency response.

They quickly trained Nigerian health workers to treat Ebola patients safely. They redirected resources toward contact tracing. And they used social media to disseminate accurate information to citizens.

In the end, only 20 people in Nigeria became infected, and 12 of them survived.

Most viruses that infect humans are zoonotic; they originate in other animals.

When people began to farm and domesticate animals around 11,000 years ago, our risk of exposure to zoonotic diseases increased.

How can pathogens spread from animals to humans?
- Pathogens evolve, helping them to adapt to humans.
- People move into once-wild places, increasing contact with pathogen-carrying animals.
- Insects, such as mosquitos, can carry pathogens into villages and cities as seasons and climate change.
- People without clean water and food, waste disposal, and medical care have higher risks of infections.

Not all viruses, bacteria, and fungi are bad for you.
Many don’t cause disease, and others are necessary for good health and normal body functions.
WHERE DO ZOONOTIC DISEASES COME FROM?

Some animal species—especially bats, rodents, and non-human primates—carry pathogens that can also infect humans. These reservoir hosts may spread pathogens even if they do not show disease symptoms.

Animals that transmit pathogens between hosts—such as mosquitoes—are called vectors.

Human pathogens can infect other animals, too.

**Bats are effective at spreading pathogens. Why?**

- Bats live together in large groups, sharing viruses among them.
- Bats seem to carry viruses without getting very sick. We’re still learning how.
- Bats fly long distances, taking viruses to new populations.
- Bats live everywhere people do.

**Why not just kill all the bats?**

We need bats. Bats are vitally important for maintaining healthy forests and crops by eating insect pests and dispersing pollen and seeds.

Bats are not to blame. We get exposed to bat pathogens when our own activities, such as deforestation, bring us closer to them.

FIGHTING FEAR

People affected by infectious diseases can face stigma: extreme public disapproval and negative beliefs associated with the disease and how it is transmitted.

These beliefs are used to justify unfair and hostile behavior toward victims and survivors—and those who care for them.

Rumors, fear, and misinformation about an infectious disease can help it spread.

**Teaching Truth**

Effective public information campaigns—including outreach by community health workers—can help fight fear and stigma against patients and their families by combating common misconceptions about a disease.

**Stopping Stigma**

Stigma affects everyone. Individuals may delay testing or treatment. Children may stop attending school. Entire groups of people may be rejected from their communities or blamed for the disease itself.

Community-based programs that provide direct support and care to affected people, and information to those not infected, can help reduce stigma and its effects.

Scan the code and discover the OIE information regarding the EBOSURSY Project:

[Scan Code]

www.oie.int/EBOSURSYen

Scan the code and discover the OIE information regarding Communications tools for Veterinary Services:

[Scan Code]

www.oie.int/communication-handbook
Microbes can develop resistance to the drugs used to eliminate them. This antimicrobial resistance (AMR) can, for example, occur when farmers overuse antimicrobial medicines in livestock, when doctors prescribe the wrong drugs, or when patients use them improperly.

A Global Challenge

AMR reduces the options we have to fight infectious diseases. When medicines are ineffective, infections persist in the body and increase the risk of spread to others. For some pathogens, our options are running out.

For people AND animals, antibiotics and antiviral drugs should be used only when and as prescribed.

Different Tools: Bacteria vs. Viruses

Antibiotics are drugs that kill bacteria or slow their growth. They do not work against viral infections like colds and flu.

Antivirals are drugs that can treat people who have already been infected by a virus. They can also limit illness, if treatment starts early after infection.

Both viruses and bacteria can develop resistance to drugs.

Pathogens can “spill over” into humans when we are exposed to infected animals. Once pathogens infect humans, they can travel anywhere humans go.

When multiple people are infected, the spillover becomes a disease outbreak.

If an outbreak is not stopped, it can become an epidemic. An epidemic that spreads globally is called a pandemic.

Where Did Pandemic HIV Come From?

Molecular dating suggests that HIV spilled over into humans around 1850 in central Africa—perhaps when a chimpanzee carrying a closely related virus was butchered for meat.

Over the next several decades, people who were infected but unaware passed along the disease.

HIV

Transmission - Person-to-person via bodily fluids
- Sexual transmission common

Incidences - Worldwide

Recent epidemics - Ongoing, 36.2 million HIV cases as of 2018

Treatment & prevention - Antiretroviral (ARV) drugs can control virus and help prevent transmission

Scan the code and discover the OIE information regarding Antimicrobial Resistance:

www.oie.int/antimicrobial-resistance

Scan the code and discover the OIE information regarding the Biological Threat Reduction Strategy:

www.oie.int/www.oie.int/biothreat-reduction
**You can stop the spread**

Pathogens can spread through the **air**, in **water**, and by **human or animal bodily fluids**.

Some pathogens spread more easily than others. Common **behaviors** can help the spread. Simple **changes** can stop it.

**Animals and Outbreaks**

- Pathogens can spread when humans have contact with the blood, urine, feces, or saliva of wild animals.
- Don’t touch living or dead wild animals. If you do, wash your hands thoroughly afterward or use hand sanitizer.

Insect bites or mosquito bites can spread pathogens when they suck blood from an infected animal or person and then bite an uninfected person.

- Wear insect repellent and protective clothing in high-risk areas.

**Take action:**
- Wash your hands often.
- Get vaccinated when possible.
- Stay home and don’t travel when you are sick.
- Protect yourself from insect bites.
- Use antimicrobial medicine only when and as prescribed.
- Disinfect your kitchen and bathroom.
- Practice safe sex.
- Get information from your public health department.
- Spread the word: #Outbreak

**Vaccination equals prevention**

Vaccines keep viruses from taking hold in the body, instead of treating a disease after it strikes.

Vaccinating yourself, your family, and your animals is a simple and vital step in keeping your community healthy.

**Vaccination Truths**

**Vaccines keep us safe.** They pose no health risks that compare to the diseases they prevent.

**Vaccines do not cause autism or “overload” children’s immune systems.** Vaccines do not cause serious, long-lasting side effects in the vast majority of cases.

**Community Immunity**

When most members of a population are immune to a pathogen, there is little opportunity for transmission. **Community immunity** protects people who cannot be vaccinated.

Community immunity ended smallpox, which killed many millions of people over thousands of years—until a global vaccination campaign eliminated it in 1980.

Scan the code and discover the OIE information regarding Rabies - Success Stories:

www.oie.int/rabies-success-stories

Scan the code and discover the OIE information regarding Rabies Vaccine Bank:

www.oie.int/videovaccinebank
Identifying Outbreak in the Field

People in one community have begun falling ill with similar symptoms. Their family members and caregivers are getting sick, too. Doctors suspect an outbreak—but how do they know which pathogen is the cause?

Fighting Zika in Real Time

In heavily affected, poorly equipped regions, it’s often difficult to obtain and analyze Zika virus samples quickly.

But using portable testing units, scientists fighting Zika in South and Central America can now analyze the virus in patient samples almost immediately after collecting them. Tracking the virus’s evolution and spread speeds outbreak response and treatment.

Epidemiologists collect information about behavior and exposures that might be connected to patients’ illnesses.

Veterinarians test samples from domestic and wild animals to help identify pathogens associated with human cases.

Laboratory work is essential for identifying and containing infectious disease outbreaks. Mobile labs allow health workers in remote areas to get results quickly.

Disease Files

ZIKA VIRUS

Transmission: • Aedes mosquitoes • Person-to-person via bodily fluids

Incidence: • Africa • Asia • The Americas • The Pacific

Recent epidemics: • South and Central Americas, 2019-present • Ties to neurological abnormalities in infants discovered in Brazil, 2015

Treatment & prevention: • Usually no treatment required • Focus is on prevention, particularly in pregnant women, by reducing mosquito populations and preventing bites

We Can Stop the Spread

Poverty, conflict, and limited access to health care make people more vulnerable to disease.

Reducing disease risks takes cooperation at the local, national, and global levels.

The Central Role of Community

People and animals transmit Ebola virus through wound, saliva, feces, semen, and blood, even after death.

Traditional practices of hunting primates for food and washing dead loved ones before burial contributed to Ebola outbreaks in Congo and West Africa.

But when community members adopted safe, culturally acceptable hunting and burial practices, they helped stop the outbreaks.

Disease Files

EBOLA VIRUS

Transmission: Person-to-person via bodily fluids

Found: Mainly African continent


Treatment & prevention: Supportive care, rehydration

Scan the code and discover the OIE information regarding Tackling Infectious Animal Disease Emergencies:

www.oie.int/disease-management

Scan the code and discover the OIE information regarding the EBOSURSY Project:

www.oie.int/EBOSURSY/en
**Keeping Track of Pathogens**

**Surveillance**—finding people or animals who are infected with a pathogen—is a vital step in stopping outbreaks early.

**Active surveillance** identifies people or domestic animals that show symptoms of infection, and tests for pathogens in water, animals, people, wildlife, and food sources.

**Passive surveillance** draws information from reports of infection filed by public health departments, doctors, veterinarians, and hospitals.

**Participation Matters**

New online tools compile data about disease symptoms and infections from people worldwide to create early warning systems for outbreaks.

You can participate using mobile applications and community projects.
- www.fluencyyou.org/outbreak
- www.endgdpandemics.org/community

**Controlling the Spread**

Contact tracing involves finding everyone exposed to an infected person and then isolating and treating those with symptoms.

Even one missed contact means the disease can continue to spread.

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**One Health Heroes**

**The Activist**

“I imagined families sharing stories as they cut and sewed the AIDS quilt. It could be therapy for a community paralyzed by grief and rage and powerlessness. It could reveal the humanity behind the statistics.”

—Cindy Jones, Founder of The NAMES Project AIDS Memorial Quilt

**The Health Worker**

“We always feared getting infected with Ebola and our neighbors stigmatized us. The most dangerous episodes experienced were delivering a baby from an Ebola-confirmed woman in the middle of the night shift.”

—Jackson Naimah, Physician Assistant, ELWA-3 Ebola Treatment Center

**The Local Official**

“To understand how infectious diseases impact my community, I collect and interpret data about what viruses are present, who has been exposed, and what groups are at risk. These data inform my strategy for preventing further transmission.”

—LeQuande Newton, Director of the District of Columbia’s Department of Health

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Scan the code and discover the OIE information regarding the World Animal Health Information System:

www.oie.int/wahis-system

Scan the code and discover the OIE information regarding the PVS Pathway:

www.oie.int/pvs-pathway