

This year, it's the Zika virus. But what about next year?

28 July 2016, by Shelby Lyon, Milwaukee Journal Sentinel

Epidemics start in mundane ways. A child might play with a pet. An air-conditioning unit might break down. A pool of water might collect in an empty flowerpot. Any one of those actions is all it takes for a virus to find a host and infect its first case.

From there, the virus can spread exponentially - across cities, regions, countries. Millions of people might be exposed from that single event, and thousands might die.

This year, the Western Hemisphere is reeling from an outbreak of the mosquito-borne Zika virus, which has been linked to unusually small heads and brain damage in newborns.

It prompted the World Health Organization to advise Brazilians to consider delaying pregnancy. And it is overshadowing the Summer Olympics set to start in Rio de Janeiro next month.

On July 8, the first death in the continental United States from the virus was confirmed.

But Zika is just the latest of many.

Since 1980, the global number of viral outbreaks per year has more than tripled. In the last three years alone, [health officials](#) have confirmed outbreaks of dengue, chikungunya, measles, enterovirus, Middle East respiratory syndrome (MERS) coronavirus, and Ebola - and those are just the ones that have reached the United States.

Then there are the viruses that haven't emerged yet. The World Health Organization has listed Nipah, a virus similar to the fictional subject of the movie "Contagion"; the MERS and SARS coronaviruses; and several hemorrhagic fevers, including Ebola, as the viruses most likely to cause a major epidemic in the near future.

But predicting potential outbreaks is challenging because so many factors are involved.

"How do you figure out what's coming next?" said David O'Connor, professor at UW-Madison and chair of the Global Infectious Disease Division at the Wisconsin National Primate Research Center. "That's the million-dollar question."

What we do know is that epidemics can affect virtually anyone.

—

The goal of a virus is to infect a host, replicate, and spread to a new host.

Transmission is more efficient when a sick person is active, meaning it's actually better for the survival of a pathogen if you don't die.

The biggest threat is when a virus that normally infects animals jumps to humans. There are two problems: The virus wasn't designed to live in humans, and humans don't have protective immunity to it.

Ebola from bats, MERS from camels, and avian flu from birds - all of them had a higher mortality rate, at least at first. Zika was first seen in monkeys.

Part of the reason it has spread so quickly, O'Connor said, is because it jumped into a population that had not been exposed.

In general, once the number of susceptible people in a population decreases, an epidemic begins to fade.

This leads to a cycle in which viruses emerge or move into a new region, spread quickly, then run out of vulnerable hosts and disappear.

As long as the source or reservoir for the virus is still around, there's always a risk that the disease could return.

Population density also plays a role. With 2.8 billion more humans on Earth in 2015 than in 1980, population density has increased from 78 people per square mile of land to 127 people per square mile.

The level of urbanization in Africa alone has soared from 15 percent to 40 percent over the last 50 years.

When towns or villages become overcrowded, people move into less habitable areas such as flood plains or marshes, and clear forests for farmland.

Viruses that were once carried by animals or mosquitoes in the unmolested interiors of jungles for millennia, suddenly encounter an entire population of vulnerable hosts.

"This intensified contact between animals and humans facilitates spillover and opens pathways for transmission," said Sarah Paige, executive director for the Ebola Survivors Corps, an organization that provides support for Ebola victims and equips survivors to help communities respond to future outbreaks.

At the same time, the entire world has been linked by air travel. Commercial airlines fly an estimated 3 billion people a year, according to a 2014 report.

Each passenger is transported in a confined space and released into a terminal with connections touching every city on the globe.

An airborne virus from just one sick passenger could cover continents in a matter of hours.

Events such as natural disasters, political unrest and mass gatherings like the Olympics also can drive new interactions between humans while disrupting medical care.

For example, outbreaks of polio, measles and hepatitis A have appeared in Syria as the civil war there drags on.

In a connected world, diseases can leak over borders and into transportation hubs.

According to Paige, humanitarian efforts that provide basic resources like disease prevention information, sanitation, bed nets and clean water are necessary to stop outbreaks before they start. "It's important for people to reflect on the impacts of epidemics throughout the world - seeing Zika and Ebola affecting people and communities in a real way."

—

The fear associated with outbreaks has the power to hurt entire communities. During the SARS outbreak in 2003, Asians were taunted in the streets of Toronto. In 2015, Senegalese boys in a New York schoolyard were beaten to chants of "Ebola!"

"In the U.S., things like Zika and Ebola make us very xenophobic. We want to close borders and push people away - anyone not 'us,'" Paige explained. "We have a hard time realizing that people are suffering with real diseases and medical needs."

Fear also has the power to exacerbate outbreaks.

Charlatans feed on the hysteria to peddle false cures. Runs on basic medication and food can create new emergencies. Strain on local economies can lead to riots that layer violence on top of suffering.

"The next time something pops up," Paige said, "learn about it from a trusted source like the CDC or health department websites - not social media."

Understanding how a disease is transmitted can reduce that feeling of helplessness."

For mosquito-borne viruses, simple actions like making sure there aren't pools of stagnant water around and wearing DEET outdoors can prevent infection.

And as simple as it sounds, hand washing with soap and water remains the No. 1 tip to avoid spreading a disease.

—

Many viruses have lingered for decades, even centuries, before emerging as major medical crises.

The Zika virus can be traced back at least to 1947; Chikungunya - which hit Puerto Rico and reached Florida two years ago - was first described in 1955. The earliest likely case of Dengue fever dates to 265 A.D.

But some emerge seemingly out of nowhere.

In 2003, the Global Public Health Intelligence Network, which scours the internet for any clues of the start of an outbreak, was searching for avian flu in China when it detected a spate of individuals suffering from an unidentified respiratory disease. That disease was SARS.

The network collected the data that provided the World Health Organization with specific and up-to-date information that suggested where the disease might spread.

Subsequent contact tracing, the process of identifying anyone who might have been exposed by an infected person, allowed officials to identify susceptible individuals and quarantine them before they could infect others.

This immediate response was able to put a stop to the highly contagious epidemic within 100 days.

Surveillance systems like this prepare health officials for potential cases and establish a timeline for outbreaks. Additionally, advances in data analysis capabilities now allow better modeling of disease progression.

And it seems to be working. In that same period since 1980, when the number of outbreaks tripled, the per-capita infection rate during an outbreak actually plummeted.

In other words, even as the world gets more crowded and the [outbreaks](#) more prevalent, fewer people are infected with each new epidemic.

©2016 Milwaukee Journal Sentinel

Distributed by Tribune Content Agency, LLC.

APA citation: This year, it's the Zika virus. But what about next year? (2016, July 28) retrieved 26

September 2021 from <https://medicalxpress.com/news/2016-07-year-zika-virus.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.