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# Which Country Is Best Prepared for the Zombie Apocalypse?

BY REID STANDISH

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It starts with strange reports of a mysterious flu. Then come rumblings online that the dead are coming back to life. Soon the government is forced to react, likely with force. Next come the panic, the quarantines, and the eventual breakdown of global trade networks as cities and countries try to protect themselves — but it's likely too late. The world as we know it is no more.

The zombie apocalypse has begun.

This scenario has become the backbone of a booming genre of science fiction exploring the fall of civilization through a disease that reanimates the dead into mindless killing machines. Starting **Sunday night** on AMC, *Fear the Walking Dead*, the spinoff companion series to the network's **wildly successful** *The Walking Dead*, will be playing this out on a weekly basis. But where the original series explored the morality of struggling to survive in a post-apocalyptic world, its prequel focuses on the start of the zombie plague and follows along as civilization collapses across Los Angeles, the United States, and, ultimately, the wider world. The show itself might be limited to Southern California, but political and economic effects of a pandemic are international — and come with plenty of real-world examples, from Liberia to China.

But which cities and countries would withstand a hypothetical apocalypse? Could a decisive Vladimir Putin or Kim Jong Un take the drastic actions necessary to save their citizens? Is the Eurasian steppe the safest place to hide from the roaming hordes of the undead? And could governments worldwide realistically agree to funnel their resources in the name of the greater good?

To get a better sense of how the breakdown of international order would likely unfold, **Foreign Policy** spoke with researchers who have used the zombie apocalypse as an intellectual exercise to game out models about the spread of disease and its implications, from the local to the global levels.

“The most important thing to note is that we get all our resources through the same mechanisms that a disease can spread,” said **Robert Smith?** (yes, the question mark is part of his legal name), associate professor at the University of Ottawa’s Department of Mathematics and Statistics and author of the book *Mathematical Modelling of Zombies*. “That type of interconnection means that the zombie plague would have spread across the globe by the time anyone realized what it was, and the world economy would essentially need to be shut down to stop its spread,” Smith? said.

Recent history is filled with examples of diseases going global fast. At the end of World War I, and before the advent of commercial aviation, returning soldiers tracked the **Spanish flu** across Europe. Fast-forward nearly a century later to 2003, when the SARS virus spread from **Hong Kong to Toronto** in a matter of hours. Likewise, after only a few weeks in the summer of 2014, Ebola had been tracked from rural West Africa to Texas — sowing **economic destruction** along the way. Even now, Saudi Arabia is grappling with **containing the MERS virus** before devout Muslims flock to the country for the hajj next month. “If the zombie plague were real, it would be just a matter of days before you had a pandemic,” Smith? said.

In the **model** that Smith? presents, the scale of the zombie disease would be catastrophic, crippling infrastructure and supply chains and leaving governments in the quagmire of how to contain the infection and handle their increasingly anxious populations. The simplest and most effective response would be an aggressive quarantine, closing off countries and cities from one another, controlling the media, and severely restricting the lives of citizens.

“Eventually the public good would trump individual rights. People would most likely resist a quarantine. Then what? Would a government have to use force on its own population? It could be the only way to contain the spread of the disease,” Smith? said.

But the type of resolute action needed could be in short supply in democracies, where political cooperation is needed to make decisions — an especially worrisome notion for the United States, where dysfunction has crippled Congress for the past eight years, if not longer. This could give authoritarian countries, with few decision-making obstacles and limited reservations about using force to keep order, a major advantage as the zombie plague grew. But were global trade to shut down, everything from food to medicine to raw materials would begin to be in short supply. And as the tide shifted, zombies wouldn't be the only threat to survival.

“It's not always the zombies that would kill you,” Smith said. “It's dirty water, poor nutrition, and sometimes other people. Moreover, a shortage of food would likely lead to revolts. The breakdown of order is just as much a killer as the zombies.”

With governments of all shades teetering on collapse — or already there — iron-willed survivors might look to move elsewhere to increase their chances of survival. But where would the migrants of the zombie apocalypse go? Northern Canada? Mongolia? Russia?

In Max Brooks's seminal *World War Z* (the novel, not the inferior Brad Pitt movie), the relatively isolated and self-reliant Cuba emerges as a rare island of stability, while Iceland — a mainstay of commercial air travel and easy to enter — becomes overwhelmed with hordes of zombies. “The durability of a country to zombies would depend a lot on the size of the population and the strength of its infrastructure,” said Matt Bierbaum, a doctorate student at Cornell University's Department of Physics.

Last March, Bierbaum and his colleague Alex Alemi presented a map of the United States that simulates the spread of a zombie outbreak. The two researchers found that it would only take about 28 days for the United States to become overrun by the undead. The pair also found that while densely populated cities would fall, regions located between large metropolitan areas would face the biggest threat, as zombies from several major cities converged into the same zone. In this model, northern Pennsylvania would be the hardest hit, followed by California's San Joaquin Valley, where zombies from San Francisco and Los Angeles (the site of *Fear the Walking Dead*) would intersect.

“The best areas to ride out the zombie apocalypse aren’t necessarily the least densely populated,” Bierbaum said. “They’re the areas that have the greatest distance from all other population centers.”

Based off this model, highly populated South Asia and Southeast Asia and their **megacities** clustered close together would not last long. Neither would countries with bustling megalopolises, like Egypt, Iran, and Nigeria.

Russia, long vexed by its **dwindling population figures** and expansive Eurasian territory, could be at the greatest advantage. “Siberia and Russia’s Far East is probably your best shot,” Bierbaum concluded. But such factors could also only matter in the short to medium term, he said: “In the long term, everywhere would eventually be overrun.”

This, of course, is all hypothetical. Zombies are not real, and medical infrastructure has so far managed to keep modern disease outbreaks under control. But what zombies represent continues to dominate popular culture and seems to resonate with humanity’s collective fears. In a testament to these anxieties’ massive appeal, *Fear the Walking Dead* has already been picked up for a 15-episode second season. This means we’ll have plenty of more opportunities to vicariously ride out the end of the world.

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# As Saudi Arabia Grapples With MERS Outbreak, a Vaccine Is in Sight

BY THOMAS STACKPOLE

AUGUST 21, 2015 - 5:02 PM

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Just one month before the beginning of the hajj, the annual pilgrimage of more than 2 million Muslims to Mecca, an outbreak of Middle East respiratory syndrome (MERS) in Saudi Arabia's capital of Riyadh has sparked fears that the country could become the epicenter for a global health crisis. In the span of a week, Riyadh has seen more than 40 cases of the disease, 15 of them affecting health workers. Three people have died, and the outbreak has forced the **closure** of the emergency ward at King Abdulaziz Medical City, one of the country's largest medical facilities.

But amid fears that the annual arrival and departure of pilgrims could spread the virus around the globe, researchers at the University of Pennsylvania have made a breakthrough in the fight against MERS, which has **claimed over 480 lives** since it was discovered in 2012. A team led by David B. Weiner, Ph.D., **announced** Wednesday it has developed an experimental vaccine able to protect 100 percent of test cases in an animal study. As camels are thought to be a major source of transmission to humans, an animal vaccine could be a major step forward in preventing the disease.

A human vaccine, however, is likely further off. Trials for a human version are **expected** to start later this year, meaning that the discovery will likely be of little help to Saudi during the hajj, which starts this year on Sept. 20.

Fears that the hajj could facilitate the virus's global spread are amplified by its rapid transmission. During the outbreak in South Korea that began in May, one single case infected 181 others through "rapid human-to-human transmission ... with in-hospital transmission the most common route of infection," according to a **press release** from Weiner's team.

The arrival in Saudi Arabia of travellers from more than 180 countries — and the subsequent crush of disparate crowds towards Mecca — is one of the largest gatherings of people on Earth, and has in the past acted as a massive petri dish. A study conducted by the Saudi Ministry of Health, in concert with French researchers, **found** that one-fifth of pilgrims carried viruses at the beginning of the hajj — a figure that nearly doubled by the end of the annual pilgrimage.

Still, the international transmission of serious virus outbreaks via travellers have been contained before reaching the point of catastrophe. Fears of a global Ebola outbreak **last year**, like MERS the year before and SARS in 2009, **never emerged**.

Last year, the Saudi Ministry of Health **administered** doses of polio vaccines to more than 172,000 pilgrims and vaccinated another half-million against meningitis. It also deployed 22,000 medical workers to Mecca and Medina. This July, the health ministry announced that meningitis vaccination would be a mandatory requirement for obtaining a hajj visa.

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