WHY THE WORST OUTBREAK EVER IS A WARNING OF WHAT COULD COME NEXT

BY BRYAN WALSH AND ALEXANDRA SIFFERLIN
PROTECTIVE MEASURES
Dr. David Kuhar of the CDC wears the protective suiting needed to prevent Ebola infections at hospitals.
THE HEADQUARTERS OF THE CENTERS FOR DISEASE CONTROL AND PREVENTION IN ATLANTA IS BUZZING

BECAUSE OF A DISEASE THAT HAS NEVER KILLED A SINGLE PERSON ON U.S. SOIL. BUT THAT’S HOW NASTY EBOLA IS.

Staffers at the agency’s Emergency Operations Center (EOC)—as close as the infectious-disease world has to a Mission Control—relay data from the field, producing comprehensive maps of the progression of the disease, which is killing more than half the people it infects, as it rages through West Africa. The telephones never stop ringing, a testament to the fact that on Aug. 6 the EOC was put on Level 1 response for Ebola—the highest possible alert.

That means the daily 10 a.m. meetings now spill out of the primary conference room, where Centers for Disease Control and Prevention (CDC) officials and representatives from the State Department and the U.S. Agency for International Development (USAID) discuss how to handle the deadliest Ebola outbreak in history, one that has already infected more than 1,900 people and killed more than 1,050. It’s getting worse: on Aug. 8 the World Health Organization (WHO) classified the outbreak as a public-health emergency of international concern, only the third time the global body had made such a declaration since 2005. “If current trends continue, it won’t be long before there’s more cases associated with this one outbreak than all previous outbreaks of Ebola virus combined,” says Stephan Monroe, deputy director of the CDC’s National Center for Emerging and Zoonotic Infectious Diseases, who’s helping lead the Ebola response. “In order to fully resolve the outbreak, we’re clearly looking at months, not weeks, of effort.”

The magnitude of that challenge is apparent to Dr. Jefferson Sibley, who runs Phebe Hospital in central Liberia, one of the three West African nations, along with Sierra Leone and Guinea, at the heart of the outbreak. In mid-July, the hospital treated an Ebola patient who in turn infected five of Sibley’s nurses, an aide and one of his doctors. The patient later died of the disease—as did all of the nurses and the aide. (The doctor survived.) After the nurses were taken away to an isolation center in Monrovia, the Liberian capital, nearly 200 staff members at Phebe Hospital abandoned their posts, refusing to return until they received the equipment needed to protect them from a bug that is transmitted via close contact with blood and other contaminated body fluids.

At least 80 health workers have died of the disease so far in West Africa—far more than in any previous Ebola outbreak—and hospitals are closing even as the virus spreads. In Monrovia, bodies are rotting in the streets, and governments are putting into place cordon sanitaires—drawing lines around infected areas and refusing to let anyone leave. Sibley survived Liberia’s 14-year civil war, which killed more than 250,000 people, but believes Ebola is worse. “The good thing about the war was you heard the gun sounds, you could run and take cover, but Ebola is not like that,” says Sibley, standing outside his empty hospital. “You never know where it is coming from or who is bringing it to you.”

For all the chaos and suffering that the virus is causing in West Africa, Ebola is unlikely to pose a serious health threat to the U.S. or other developed nations. It’s simply too difficult to transmit, provided the infected are identified and isolated and health care workers are given proper protective equipment. That’s the case at Emory University Hospital near CDC headquarters in Atlanta, where doctors are caring for two American health workers who contracted Ebola in Liberia and were then airlifted to the U.S. “We have the resources in place to take care of those patients with the highest-level care possible,” says Dr. Aneesh Mehta, an assistant professor of medicine at Emory who is helping treat the American patients.

But there’s a reason the CDC is on red alert for a disease that mostly remains a threat to poor Africans. An uncontrolled outbreak anywhere, no matter how remote, can pose a real danger to the rest of the planet. “We live in a world where we are all connected by the air we breathe, the food we eat and by airplanes that can bring disease from anywhere to anywhere in a day,” says Dr. Tom Frieden, the CDC director. “That’s why it’s so important to strengthen global health security and work with countries all around the world so they can do a better job finding threats.” Barring a sudden change, Ebola won’t threaten the developed world, including the U.S. But there are lessons to be learned from this disease—lessons that could be lifesaving when the next virus hits.

Lesson No. 1: Mind the Animals

Preliminary research indicates that Patient Zero for the outbreak was likely a 2-year-old child who died of Ebola in December near Gueckedou, Guinea, a town close to the borders of Sierra Leone and Liberia. But that’s not where the outbreak began. Like most recently emerged pathogens—such as bird flu and SARS—Ebola is a zoonotic disease, meaning it originated in animals before spreading to human beings. It’s not known which
MOBILIZING THE DEFENSE

On Aug. 6, the CDC put its Emergency Operations Center in Atlanta—the closest thing the world has to a medical Mission Control—on its highest alert. CDC staffers track cases of the disease and direct the agency’s on-the-ground offensive against the virus.

The surge
Over the next few weeks, the CDC will send 50 disease specialists, including epidemiologists, data managers and health educators, into the West African hot zone.

Contact tracing
CDC disease specialists will locate people who may have come into contact with someone infected with Ebola, checking for further infections in an effort to bring an end to the current outbreak.

Best practices
Staffers will work to help health workers and local leaders understand how the disease spreads and how to protect themselves in the event of an outbreak.

species was the original host, but scientists believe that a likely candidate would be one or more species of fruit bat, which can carry the Ebola virus without showing signs of illness. Bush meat—wildlife like bats or apes found in the jungle—is a major source of protein in parts of rural Africa, and it’s possible for viruses like Ebola to infect human beings if an infected animal is butchered and eaten. That first animal-to-human transmission can mark the start of an outbreak.

Such spillover events are rare, but they seem to be more common as deforestation and development bring humans and animals closer together. “The incidence of those spillover events is increasing,” says Raina Plowright, a research associate at the Center for Infectious Disease Dynamics at Penn State University. “That needs to be looked at as a source of new pathogens.”

In the past, the only warning of a spillover event was a cluster of sick human beings—and by then it was often too late to stop an outbreak. Scientists believe HIV—which originated in chimps—had been circulating in humans for decades in Central Africa before IV drug use, changing sexual mores and widespread international air travel allowed it to go global in the early 1980s. SARS, which began in horseshoe bats in southern China, had already jumped to human beings and spread across international borders by the time it was identified by doctors in the spring of 2003.

Now a new generation of scientists is trying to pinpoint and even prevent spillover events before they occur. USAID’s Emerging Pandemic Threats (EPT) program supports a network of researchers who police the borders between animal health and human health in viral hot spots like West and Central Africa and Southeast Asia. By maintaining close watch on the viruses circulating in wildlife and educating people about practices that can expose them to the viruses, EPT may help give the world early warning of events like this year’s Ebola outbreak.

It’s far from a foolproof system. Researchers have identified at most 1% of the viruses in animals, and it can be incredibly challenging to boost diagnostic capabilities in some of the poorest nations in the world—which happen to be the same places where spillover events unfold.

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That's especially true of desperately poor countries like Liberia or Sierra Leone, where health care systems were barely adequate even before Ebola. “We were not prepared to really fight this battle in terms of the material, the training, the people, the expertise,” Liberian President Ellen Johnson Sirleaf told Liberian health workers on Aug. 10. The CDC is now sending dozens of staffers to West Africa, and on Aug. 4 the World Bank pledged up to $200 million to help support the global response, but for too long, under-resourced aid groups like Doctors Without Borders were the only international forces on the ground fighting the outbreak. Fear of the disease among local populations has made control that much more difficult, with some people hiding sick relatives and even attacking medical personnel. “There is such unevenness in terms of capability and capacity that every country on the planet is more vulnerable,” says Gayle Smith, senior director at the National Security Council. “We can't afford for health-security reasons for there to be big holes in the net.”

Lesson No. 3: Strengthen Homeland Defense

The Ebola outbreak may have killed more than 1,000 Africans and counting, but it wasn’t until those two U.S. aid workers were infected that the disease grabbed the attention of Americans. Dr. Kent Brantly and Nancy Writebol were treating Ebola patients at a Liberian hospital run by the Christian groups Samaritan’s Purse and SIM when they both contracted the deadly disease. News that the two would be airlifted to Atlanta for treatment caused criticism from some who worried they would spread Ebola in the U.S. It’s an understandable fear, if only because Ebola can kill in such a grisly fashion: some victims hemorrhage so heavily they end up effectively bleeding to death. But there is virtually no chance that the disease will spread in the U.S. Emory’s isolation unit was more than ready to take the Ebola patients, who are being treated by doctors and nurses wearing full-body protective suits. “This is what we’ve been preparing for for 12 years,” says Dr. Bruce Ribner, an infectious-disease specialist at Emory who is leading the care of the Ebola patients. “This is what we’re here for.”

Most of the hospitals in the U.S.—and throughout much of the developed world—would be capable of handling a few patients suspected to have the disease. With Ebola, the U.S. had ample warning and was dealing with just a few cases of a known disease that doesn’t spread easily.
That might not be the case next time. In April, an American health care worker contracted Middle Eastern Respiratory Syndrome (MERS)—another new disease that spilled over from animals—in Saudi Arabia before flying back to Indiana via London and Chicago. His infection wasn’t detected when he entered the U.S. and didn’t become known until after he turned up at an Indiana hospital with respiratory symptoms. The man didn’t infect anyone—MERS doesn’t seem to be very transmissible—but he could have exposed countless people to the disease. “We were just lucky,” says Michael Osterholm, director of the University of Minnesota’s Center for Infectious Disease Research and Policy. In outbreaks, days and hours matter. The faster public-health officials can detect new infections, the faster they can trace contacts with sick people and stop further spread. That can be the difference between an outbreak and a pandemic.

Lesson No. 4: Get Ready to Surge

There’s no vaccine for Ebola and no cure. All doctors can do is provide what’s known as supportive therapy, maintaining oxygen, blood pressure and hydration. And then there’s hope—and prayer.

But that may be changing. The two American Ebola patients have been treated with an experimental drug called ZMapp, developed by an 11-year-old San Diego company, Mapp Biopharmaceutical. While there’s no laboratory evidence of ZMapp’s effectiveness, the drug seems to have helped the American patients, who have said in statements that they are improving. (The drug was also obtained for a 75-year-old Spanish priest who contracted Ebola in Liberia, though he died in Madrid on Aug. 12.) That has prompted Ebola-affected African countries to demand the drug. Even though ZMapp hasn’t been fully tested yet, on Aug. 12 WHO endorsed the use of such untested drugs to combat Ebola—a measure of how desperate doctors fighting the outbreak have become.

But while Mapp Biopharmaceutical has shipped some doses of the drug to a West African country—believed to be Liberia—the company says supplies of ZMapp are now “exhausted.” There are potential vaccines as well, but those have languished in the pipeline because of a lack of demand and what was until now a slow approval process. “People like me and others who have worked for years in vaccines and countermeasures are frustrated,” says Thomas Geisbert, a professor of microbiology and immunology at the University of Texas Medical Branch at Galveston. “But on the other hand, we don’t want to take a step that isn’t well thought through and ruin the whole approach in the future.”

In the event of an unchecked and dangerous pandemic, we may have no other choice—and even then we may not be ready. The vaccines made to respond to the H1N1 flu in 2009 weren’t manufactured in time to head off the pandemic, though the doses that were made were rapidly distributed. Those logistical challenges would still need to be overcome should a new pandemic emerge. While improvements have been made—the CDC’s Frieden touts a “more resilient system” since H1N1—the U.S. health care industry still lacks surge capacity that would enable it to withstand a sudden wave of seriously ill people. “If we had another flu pandemic tomorrow, one that hit people harder, you’d see a major deterioration of capacity throughout the health care system,” says Osterholm. And that’s the final lesson of Ebola. In an interconnected world, even the strongest medical systems are weaker than they seem.

—WITH REPORTING BY CLAIR MACDOUGALL/MONROVIA, ALICE PARK/NEW YORK AND MICHAEL SCHERER/WASHINGTON

LIBERIA A military policeman holds his rifle with gloves to avoid possible contact with the virus during the burial of Ebola victims; over 320 people have died in Liberia so far