

Health security's blind spot

The severity of this year's influenza virus is a reminder of the daunting task facing the global health community as it struggles to prevent infectious diseases from sparking deadly epidemics. Today, yellow fever and cholera continue to spread in Africa, while Brazil is in the midst of a major yellow fever outbreak. It was only recently that Zika virus and Ebola virus epidemics were in the headlines. The world needs to harness every resource and tool in the battle to catch outbreaks before they catch us. Prevention is always the first line of defense, and nations must maintain vigilant surveillance—and yet, effective and affordable, quick and definitive diagnostics are absent in the countries where they are most needed. This represents one of our most serious global health security blind spots.

During the 2014 Ebola epidemic in West Africa, the first cases were initially misdiagnosed as cholera, and then later as Lassa fever on the basis of clinical symptoms. It took nearly 3 months before blood samples sent to Europe finally identified the disease as Ebola, during which time it was allowed to spread. Similarly, in Nigeria, a lack of rapid diagnostics is making it difficult to get ahead of the current yellow fever outbreak with targeted vaccination. Throughout 2016 and the first 8 months of 2017, Nigerian laboratories were unable to carry out tests on almost all suspected cases of yellow fever, owing to a shortage of chemicals needed for those diagnostics. When these reagents eventually became available last fall, yellow fever had spread to multiple states. As of last month, there were more than 350 suspected yellow fever cases over 16 states and 45 deaths. The world's poorest countries simply cannot equip and maintain their limited laboratory facilities.

But the problem is not just how well-stocked laboratories are, it's also about how quickly and reliably they can respond. For yellow fever, whenever lab tests are positive or inconclusive in Africa, samples are sent to a Regional

Reference Laboratory for confirmation. For the whole of Africa there is just one such facility in Dakar, Senegal. Even under the best conditions, these lab tests are expensive and take at least a month. What's more, about 40% of samples found to be positive by Nigerian national laboratories have tested negative in Senegal, creating uncertainty about the reliability of the test. The United States Centers for Disease Control and Prevention (CDC) has historically played a major role in helping countries

expand disease surveillance and modernize laboratories, particularly for new viruses and drug-resistant bacteria. But now it is feared that the CDC may scale back its global health security work in 39 developing countries. This prospect highlights the need for low-income countries to create a sustainable program for their disease surveillance.

Ultimately, to achieve sustainable global epidemic preparedness, we need to stimulate the development of cutting-edge diagnostic technologies—both for laboratories and for use in the field in remote locations—and make them available and affordable in low-income countries. One approach is to provide incentives to industry by creating markets that may have seemed impossible. At Gavi, the Vaccine Alliance, we

have been doing this by working with industry to harness innovative refrigeration technologies to modernize vaccine cold chains in poor countries. The global health community could look at how partnerships with industry can be applied to innovative diagnostic technologies. Early detection through reliable, available, and efficient testing is essential to stopping outbreaks before they spread. With many diseases presenting similar first symptoms, it's all too easy to get a diagnosis wrong and potentially miss an outbreak. And given the ease and speed at which pathogens can now travel in the modern urban-dense global village, any delay in diagnosis will inevitably and increasingly be measured in lives lost.

—Seth Berkley



“Early detection through...testing is essential to stopping outbreaks before they spread.”



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Science

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Science **359** (6380), 1075.
DOI: 10.1126/science.aat4714

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