

How can Africa prevent the next haemorrhagic fever crisis? Invest in research and development

August 6 2018, by Dr. Jenniffer Mabuka



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In 2014, West Africa encountered its [worst recorded outbreak](#) of Ebola with over 11,000 reported deaths. The memory of this crisis hadn't faded yet when Ebola reared its ugly head again this month in the Democratic Republic of Congo (DRC), showing up for the first time in one of the country's urban areas. Unfortunately for the African continent, Ebola isn't the only fatal disease it needs to fight.

As of June 2018, Nigeria [reported](#) 1,999 cases of Lassa fever, which has resulted in 109 confirmed deaths. The [outbreak](#) is not limited to Nigeria; to the west, Liberia [has reported](#) 112 cases this year, with a high case fatality rate of 72%. That is more than all Lassa fever reported deaths in 2016 and 2017 combined—it is now the worst recorded Lassa fever outbreak in history.

Lassa fever is caused by Lassa virus, which originates in rats and transfers to humans through food and other household items contaminated with urine or feces. In rare cases, it can be transferred from person to person. It has a long incubation period with generic early symptoms—general weakness, headaches, fever, and muscle pain—making diagnosis difficult and allowing the virus to spread unnoticed. Despite having been first described half a century ago, we don't yet have specific Lassa virus drugs or a vaccine.

While both Ebola and Lassa fever are haemorrhagic fevers of great public health importance, the latter is rarely discussed, maybe because it is confined to West Africa. This is despite the World Health Organization (WHO) having identified it as a likely cause of a future epidemic.

Beyond these two, the African equatorial belt is home to several other hemorrhagic fevers like Yellow fever, Marburg virus, Crimean-Congo hemorrhagic disease and Rift Valley fever (which is reported to be the probable cause of five recent deaths in Kenya).

For decades, public health efforts on the continent have focused on solving one health challenge at a time – an approach that misses the bigger picture. As a hotspot for emerging and reemerging diseases, Africa needs to develop a research base and scientific environment that will help accurately detect, document and monitor a range of pathogens to help prevent—or at least better address—outbreaks.

Humans and disease-causing organisms, including Ebola and Lassa virus, are in a constant evolutionary arms race, one that moves very quickly in favour of the virus. A thorough base of research would result in tools that will speed up detection and containment of future outbreaks, generate the knowledge base to help predict future outbreaks of known origins, and help accelerate the development of diagnostics, efficacious drugs and vaccines.

Take for example the benefits accrued from research and innovations resulting from the Ebola outbreak in 2014. The rVSV-ZEBOV vaccine, which was developed towards the end of the West African epidemic in 2016, was available for use in the recent outbreak in DRC. The vaccine, which [provides protection](#) within 10 days of administration, was used to protect healthcare workers and also for preventing spread by using the ring-fenced vaccination approach. Diagnostic kits developed during the West African outbreak were also used to identify cases rapidly, paving the way for relevant authorities to act accordingly. The DRC outbreak, which claimed 33 lives before it was contained, would probably have been worse were it not for these innovations, a rapid international response and a coordinated approach on the ground led by the DRC government. After all, it was the [country's 9th outbreak](#) since Ebola was first discovered there in 1976.

The ability to track the evolution of diseases is instrumental in helping us predict the danger of future known (and unknown) viral outbreaks. But this will only be possible if we have the relevant infrastructure in place,

as well as skilled people to work with it. For instance, viruses such as Lassa and Ebola which cause haemorrhagic fevers can only be handled in biosafety level 4 laboratories (BSL-4), the highest level of biocontainment. Sadly, in 2015 there were only two BSL-4 labs throughout Africa's 54 countries – [compared](#) to 13 in the USA alone. To make matters worse, the lab in Gabon isn't currently functioning and the South African one is thousands of miles away from Nigeria, where Lassa fever is concentrated. Investing in the right lab space will empower the continent to be able to take lead in researching these pathogens for the benefit of likely future outbreaks.

Biological samples obtained during outbreaks should be considered and handled as a treasure, as they hold the key to crucial knowledge. Once samples have been collected and processed, they need to be properly stored to maintain their quality for future research use. Beyond that, the use of poor and unregulated storage facilities increases the risk that such high pathogenic biological material could fall into the wrong hands – raising biosafety and biosecurity concerns. Consequently, across the continent we need to construct and equip safe storage facilities to support subsequent research endeavours. In addition, data and biospecimen sharing guidelines that meet global standards but also consider the cultural diversity displayed across the continent should be developed and rapidly implemented.

The continent is yet to exploit the benefits of genetics and genomics research. Currently, most diagnostic tools are based on the genetic sequence of the pathogen. Indeed, the Xpert Ebola test that was deployed in DRC is based on this concept. Beyond diagnostics, there's need to monitor the host-pathogen genomics interactions to inform future research and innovations. This kind of research however, generates massive and diverse data sets, which require skilled human capacity to clean it, analyze it and interpret it for maximum benefit. As a result, Africa also needs to invest in bioinformatics centers with the right

infrastructure and expertise for data storage, analysis and interpretation.

But all these activities call for heavy financial investments and it's time that the continent took ownership. African governments must increase funding toward research and development around [haemorrhagic fevers](#). Local funding will be instrumental in supporting training of a vibrant scientific community and promoting local development of appropriate, accessible and affordable healthcare products. To cover immediate needs, stockpiling current available tools will help mitigate spread when outbreaks do happen.

Equatorial Africa remains the hotbed for emerging and re-emerging diseases—the outbreaks of the last few years are a good reminder. It is paramount that Africa invests in understanding the interplay between disease-causing organisms, organism carriers and humans to facilitate designing of diagnostic tools and drugs, hasten vaccine research and be better prepared to stop future outbreaks. Having witnessed the impact of new relevant tools in the DRC Ebola outbreak in which a potential disaster has been evaded, this is a reminder that increased investments in research and development should be a priority for the African governments.

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