

# New evidence of durable immune response to 3 experimental Ebola vaccines helps drive new wave of vaccine development

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In the midst of an increasingly volatile Ebola outbreak in the Democratic Republic of Congo, a new study presented today finds that the immune response generated by three experimental Ebola vaccines—[including one already deployed in the DRC](#)—persists for at least two and a half years. The study, presented at the Annual Meeting of the American Society of Tropical Medicine and Hygiene, could have implications far beyond the Ebola fight, said Katie Ewer, Ph.D., who conducted the study with colleague Matthew Snape, MD, at the University of Oxford's Jenner Institute and Oxford Vaccine Group, and Emma Thomson, Ph.D., at the University of Glasgow.

Ewer said the impact is so far-reaching because the urgent need for Ebola vaccines has helped generate funding and scientific insights that could help expedite vaccines against several other diseases with significant [outbreak](#) potential, including Lassa fever, Nipah virus disease, and Middle East Respiratory syndrome coronavirus (MERS-CoV).

"The Ebola [vaccine](#) work that intensified after the outbreak in West Africa has produced an explosion of vaccine development that could leave us much better prepared to fight other outbreaks of infectious diseases," Ewer said. "It has helped policy makers and funders understand the need. And that support has helped validate new vaccine platforms, including one that is adaptable for a number of viral

diseases."

The Oxford study examined duration of immunity by analyzing blood samples taken from healthy human volunteers who had received one of the three vaccine regimens more than two years earlier. The study was funded by an Innovate U.K. award from the U.K. Department of Health to Matthew Snape.

"These results will be invaluable when deciding which strategy to use to induce long-lasting protection, for example in healthcare workers in areas at ongoing risk of Ebola outbreaks," he said. "Another important question is whether the persistence of this immune response can be enhanced by giving a 'late-booster' dose of vaccine 3 to 4 years after the initial immunization, and we will be studying this in further work in the U.K. and Senegal in the coming year."

## **Durable Immunity: A Milestone for Ebola Vaccines**

Ewer said that, in general, the analysis of the experimental Ebola vaccines showed that all three "were still producing a strong antibody response to the disease two and a half years after immunization, which is really good news."

One of the vaccines, developed by Merck, is now being use in the DRC, and there was already preliminary evidence that its protection lasted for at least two years. While the protection from the vaccines might actually be much longer, this is the longest scientists have been able to track Ebola vaccine responses in humans.

Ewer said that "to protect health-care workers in the field in regions where we know there is a risk of new Ebola outbreaks, it's really important to generate persistent immune responses and this is now the most urgent need for an Ebola vaccine."

During the 2013-2016 Ebola outbreak in West Africa, healthcare workers did not have the option of vaccination, and that is one reason it was so hard to contain the spread of disease. Healthcare workers, who are critical to fighting the disease, were also the most likely to be exposed, and many died early in the outbreak after being infected by their patients.

## **Validating Vaccine Platform Adaptable to Other Epidemic Diseases**

Ewer said there was also evidence from the study that one of the vaccine platforms used for Ebola could be very adaptable to other diseases. She believes evidence that this platform can induce long-lasting protection in an experimental Ebola vaccine helps validate work already underway to build vaccines against other deadly viral diseases using the same platform.

For example, the Jenner Institute is now [working in a partnership with Janssen pharmaceuticals](#) to follow a similar approach to rapidly develop vaccines against three lethal diseases: Nipah virus disease, Lassa fever, and MERS-CoV. Nipah virus, which causes outbreaks of severe respiratory illness, [caused a major scare in India](#) this year. Lassa fever has some similarities with Ebola and [surprised health officials in Nigeria](#) this year with a sudden spike in infections. MERS-CoV has a particularly worrisome capacity to cause deadly respiratory [disease](#) outbreaks in hospitals.

Work to develop these vaccines is being funded by the Coalition for Epidemic Preparedness Innovations (CEPI). CEPI was established with funding from the governments of Norway, Japan, and Germany, along with the Bill & Melinda Gates Foundation and the Wellcome Trust, with the goal of using new approaches to vaccine development to [radically](#)

[shrink the time it takes to get a vaccine](#) against viral diseases ready for use in health emergencies. While the Ebola vaccine now being used in the DRC was 12 years in the making, other vaccines, like the meningitis vaccine, have taken decades to develop. CEPI leaders believe that, for many diseases, that time can be reduced to as little as eight months.

Ewer said identifying a common vaccine platform that can be useful for multiple diseases can play a big part in meeting this ambitious timetable.

The goal now, said Ewer, is to have more vaccines that can be quickly readied for at least limited use at the first sign of an outbreak—to quickly protect healthcare workers and contain the spread with a ring of immunized individuals, as well as protecting against future outbreaks.

Daniel Bausch, ASTMH Scientific Program Chair and a veteran of many Ebola outbreaks, said: "It's been a long time coming, but we'll hopefully soon see that vaccines and therapeutics will be routine tools to combat Ebola. We need adequate funding to ensure that these new technologies make their way to the populations most in need and that the process for rapid development expands to other priority diseases."

Provided by American Society of Tropical Medicine and Hygiene

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