

## **Ebola vaccines, therapies, and diagnostics Questions and Answers**

As of 04 December 2014

This Q&A provides answers to questions about clinical trials and evaluations of potential vaccines and therapies for Ebola virus disease. Additional questions and answers about the epidemiology of the disease, as well as infection prevention and control, treatment, and recommendations for travel, can be found at: <http://who.int/csr/disease/ebola/faq-ebola/en/>

### **Is there a vaccine to protect against Ebola virus disease?**

At this time, there are no vaccines to protect against EVD licensed for use in humans.

On 8 August 2014, WHO convened an Emergency Committee on the Ebola outbreak in West Africa. The Committee concluded that the outbreak constituted a Public Health Emergency of International Concern (PHEIC). Since then, evaluation of the most advanced Ebola vaccine candidates has been accelerated.

Link to: Statement on the first meeting of the IHR Emergency Committee on the 2014 Ebola outbreak in West Africa <http://who.int/mediacentre/news/statements/2014/ebola-20140808/en/>

### **Which vaccines are being tested?**

The two vaccine candidates currently being tested in humans are the cAd3-ZEBOV vaccine, being developed by GlaxoSmithKline, in collaboration with the United States National Institute of Allergy and Infectious Diseases, and the rVSV-ZEBOV vaccine, being developed by NewLink Genetics and Merck Vaccines USA, in collaboration with the Public Health Agency of Canada. Both vaccines have shown to be safe and efficacious in animals.

Phase I clinical trials (to test for safety and for dose selection) are underway for both vaccines. Trial participants are healthy adults in countries with no (or very few) cases of Ebola virus disease. For the cAd3-ZEBOV vaccine, trials began in the United Kingdom and the United States of America in September and in Mali and Switzerland in October. For the rVSV-ZEBOV vaccine, trials began in the United States of America in October and in Gabon, Germany, and Switzerland in November. Trials in Canada and Kenya are also due to begin shortly.

Phase II clinical trials of the cAd3-ZEBOV vaccine are expected to take place in several countries with no or few cases of EVD in West Africa in January 2015. The Phase II trials will test for safety and capacity to induce an immune response in larger numbers and in broader populations, including the elderly, children, and persons living with HIV.

### **When will these vaccines be available?**

For the candidate vaccines, wide-scale introduction in affected countries will depend on the results of the clinical trials and review by regulatory authorities of vaccine safety and efficacy. Data from all trials is being gathered and analysed as rapidly as possible. Results from a trial in the United States of America using the cAd3-ZEBOV vaccine were published in late November. No safety concerns were identified. Immune responses of trial participants appeared to be in the range reported from preclinical trials involving nonhuman primates. It is anticipated that data from all Phase I trials will be available by the end of December 2014.



WHO is working with manufacturers and regulatory bodies to ensure that any vaccines shown to be safe and efficacious in trials can be made available to those who need them as soon as possible, without compromising quality and safety. Work is also ongoing to ensure that a sufficient number of vaccines is available.

Phase III clinical trials are planned to start in early 2015 in the three countries most affected by Ebola. The objectives of these trials will be to assess whether the vaccines protect against EVD and to further document safety.

**What other treatments and therapies are available or being evaluated?**

Transfusion of convalescent whole blood and plasma has been prioritized for use as an investigational therapy. Convalescent whole blood donated by EVD recovered patients is currently being administered in some Ebola treatment centres. In the affected countries, limited numbers of doses of convalescent plasma are expected to become available in the near future. Trials in Guinea and Liberia are anticipated to begin shortly. Assessments of national capacities for ensuring the safety of blood products outside of clinical trial settings and plans for recovery and strengthening of national blood transfusion services in the affected countries are being developed in the coming weeks.

Of the pre-existing medicines that have been considered for re-purposing to treat Ebola, many have demonstrated efficacy against Ebola virus in test tubes (in vitro), however very few of these demonstrate any activity in monkeys infected with EVD. Two antivirals were identified as having promise – favipiravir and brincidofovir – and will be entering clinical trials shortly.

Of the novel products, some have shown initial promise in monkey models and a few have been administered to a small number of Ebola patients on a compassionate basis. However, these cases are too few to permit any conclusion regarding safety and efficacy. As these products are still in the development phase and manufacturing them takes a long time, it would not be possible to scale up use of these therapies within a short timeframe.

WHO is working with all relevant stakeholders on each of the potential therapies and vaccines to continue to accelerate identification, verification, development, and, if safety and efficacy are found, deployment.

Link to: Statement on the WHO Consultation on potential Ebola therapies and vaccines  
<http://who.int/mediacentre/news/statements/2014/ebola-therapies-consultation/en/>

Link to: WHO Meeting on the Scientific and Technical Advisory Committee on Experimental Ebola Interventions – Briefing Note  
[http://who.int/medicines/ebola-treatment/scientific\\_tech\\_meeting/en/](http://who.int/medicines/ebola-treatment/scientific_tech_meeting/en/)

**Who will receive the vaccines and treatments when they become available?**

Clear criteria are needed on how the first treatments and vaccine doses will be allocated. Approaches to prioritization of vaccines and treatments are being developed to identify strategies that will contribute the most to control of the epidemic.

Final decisions on introduction are made by ministries of health. While target populations for mass vaccination are being discussed, experts agree that front-line workers should be among the first to be offered the vaccine.

**What are the ethical considerations for use of unregistered interventions?**

On 11 August 2014, WHO convened an Ethics Panel to consider and assess the ethical implications of the potential use of unregistered interventions. The panel reached consensus that in the particular circumstances of this outbreak, and provided certain conditions are met, it is ethical to offer unproven interventions for which the safety and efficacy have not yet been demonstrated in humans as potential treatment or prevention. Key conditions relate to the evidence and ethical basis for the assessment of each intervention. There should be a strong scientific basis for the hypothesis that the intervention will be effective against EVD in humans: the unregistered interventions to be offered should have been demonstrated to be safe and efficacious in relevant animal models, and in particular, in non-human primates. In addition, use of such interventions should be based on the best possible assessment of risk and benefit from the information available at a given time.

Ethical criteria must guide the provision of such interventions and should include: transparency about all aspects of care; informed consent; freedom of choice; confidentiality; respect for the person; preservation of dignity; and involvement of the community. The panel advised that there is a moral obligation to collect and share all data generated, including from treatments provided for compassionate use. In addition, several areas were identified that need more analysis and discussion:

- ethical ways to gather data while striving to provide optimal care under the prevailing circumstances;
- ethical criteria to prioritize the use of unregistered experimental therapies and vaccines; and
- ethical criteria for achieving fair distribution of therapies and vaccines in communities and among countries.

Link to: Ethical considerations for use of unregistered interventions for Ebola virus disease: Report of an advisory panel to WHO <http://who.int/csr/resources/publications/ebola/ethical-considerations/en/>