

The race is on to find ways to prevent and cure the Ebola virus - a disease that has killed more than 10,000 people in Sierra Leone, Guinea and Liberia, BBC 27th March 2015

There are no proven treatments for Ebola or vaccines to prevent individuals becoming infected. However, progress is now being made on an unprecedented scale. Trials, which would normally take years and decades, are being fast-tracked on a timescale of weeks and months. Vaccines train the immune systems of healthy people to fight off any future infection.

Three potential immunisations are frontrunners, having been rushed from promising animal studies into human trials. The plan is for the different vaccines to be tested in several separate trials across the three worst affected countries in the next few months.

Trials in Liberia started in February 2015. They have three separate parts. Scientists hope to recruit 10,000 people to be given the GSK vaccine, 10,000 to receive the Merck jab and a further 10,000 to get a dummy, placebo vaccine.

So far the GSK and Merck vaccines have been deemed safe in some 600 volunteers. Further testing is underway to see whether the immunizations actually offer protection against the disease. It is also being trialled in a separate study in Guinea. Here it is being given to anyone who has recently come into contact with an infected person.

Johnson and Johnson announced the start of their vaccine trial at the beginning of 2015. This uses a different approach still - two separate jabs will be given in the hope the second one boosts the effectiveness of the first. Vaccine company Novavax has recently announced the start of an Australian trial designed to investigate another potential immunization on healthy human volunteers.

Some experts now say, with Ebola cases going down in Sierra Leone, Guinea and Liberia, it will be harder still to prove whether a vaccine actually works. And researchers will have to rely on thousands of volunteers to test these as yet experimental jabs. In some communities, they will face mistrust.

There are also practical issues to take into account - some of the immunisations need to be kept at minus 80C in hot countries with limited access to electricity. But if all these obstacles are overcome and a vaccine is found to work, there is hope a jab could be more widely available towards the end of 2015.

Questions will then be asked about who gets the vaccine first.

Ethical quandary

Drugs trials are even more ethically controversial than vaccine trials in the midst of this outbreak.

Should normal randomised clinical trials take place? It allows doctors to know for certain whether a drug is effective, but it means withholding a potentially life-saving treatment during a deadly outbreak. One option being used is to compare survival in the same centres before and after drugs were used.

A different approach is to harness one survivor's immune system to help another who is sick. The body produces Ebola-fighting antibodies in response to the virus. So the idea is to purify the blood, extract the antibodies and give those to sick patients.