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EBOLA VACCINE TESTED DURING EPIDEMIC SAVES LIVES IN CONGO

Relevant for: Developmental Issues | Topic: Health & Sanitation and related issues

Prevention: A woman getting vaccinated in Conakry, Guinea, on March 10, 2015, during the first clinical trials of Merck's vaccine. | Photo Credit: CELLOU BINANI

The 2014–2015 Ebola epidemic mainly in the three western African countries of Guinea, Liberia and Sierra Leone has been the most deadly one since the virus became known in 1976. It caused disease in 28,616 people and killed 11,310 others. But what stands out as a remarkable scientific and public health achievement has been the conduct of a large clinical trial in Guinea to test the efficacy of an Ebola vaccine in the midst of the epidemic.

The phase-3 clinical trial involving thousands of volunteers tested the efficacy of Merck's vaccine (VSV-EBOV) to protect vaccinated individuals from getting infected with Ebola virus.

The phase-1 and phase-2 clinical trials involving fewer volunteers were carried out in Europe and Africa in 2014-2015 and consequently used in Guinea in 2015 during vaccination campaigns even when it was being tested in the phase-3 trial.

During the trial, the vaccine was administered to 2,119 individuals who had come in contact with a person infected with or died due to Ebola virus and 2,041 people who had come in contact with the primary contacts (known as contacts of contacts). In July 2015, an interim analysis revealed that the vaccine had 100% efficacy. The final results of the trial, too, showed the same result. The duration of protection is not known, though a few studies suggest protection up to one year.

So when Ebola struck the Democratic Republic of Congo on August 1, 2018, the decision to use Merck's vaccine, which has not been licensed in any country for clinical use, was taken without much thought as it was the only vaccine that been tested in phase-3 trials. Also, the World Health Organization's Strategic Advisory Group of Experts on Immunization (SAGE) had in March 2017, recommended that in the absence of a licensed vaccine for Ebola, the investigational vaccine could be used during an outbreak caused by the Zaire strain of the virus.

The vaccine was developed by the Public Health Agency of Canada and licensed to NewLink Genetics. In November 2014, Merck entered into a licensing agreement with NewLink Genetics to research, develop, manufacture and distribute the vaccine.

The vaccine was administered to nearly 29,000 health-care workers and about 94,000 primary contacts and contacts of contacts in Congo under "compassionate use". The vaccination began a week after the outbreak was officially declared.

Putting to rest the debate on the extent of efficacy during the phase-3 trial, the WHO noted that the preliminary data suggest that the vaccine used during the current outbreaks in Congo was 97.5% efficacious in preventing Ebola infection.

Of the 94,000 people who were vaccinated during the current outbreaks, only 71 developed the disease. Of the 71, only 15 developed symptoms 10 or more days after vaccination. The majority — 57 individuals — displayed symptoms within nine days of vaccination, before the vaccine could fully protect them. It had become clear during the trials that the vaccine needed 10

days to fully protect vaccinated individuals.

There were only nine deaths among the 57 people who developed the disease before the vaccine could be fully protective. In comparison, no deaths were reported among people who developed the disease more than 10 days post vaccination.

More importantly, 54 of the 71 Ebola cases were in high-risk contacts, and only two cases were among the contacts of contacts, thus underlining the effectiveness of the ring vaccination strategy in preventing the spread of the disease. In the ring vaccination strategy, the spread of the virus is curtailed by creating protective rings by vaccinating people based on the risk of infection. The first ring of protection is created by vaccinating everyone who has come in contact with infected persons or their bodies, or has lived in the same house. The second ring — contacts of contacts — comprises neighbours and family members of all contacts.

As a result of delay in detecting and isolating cases and tracing the contacts, the virus continues to spread, and about 80 new cases are reported each week, the WHO said on July 17. The hotspots have been shifting and new cases are being reported from areas that were previously cleared. In May 2019, SAGE cautioned that virus transmission continues to occur in areas where there is difficulty in implementing ring vaccination and that new cases are being reported among unknown contacts.

In order to cut the transmission chain, SAGE recommended the inclusion of a third ring of contacts to be vaccinated. Currently available evidence does not support mass immunisation of the population.

There are indications that the epidemic is not going to end anytime soon, and the number of people who need to be vaccinated is bound increase. To avoid any diversion of critical human resources and being in the thick of an epidemic, the Congo health minister has ruled out a clinical trial using Johnson & Johnson’s experimental vaccine. This would mean that more Merck vaccines would be needed to end this epidemic. Though Merck intends to double the supply by 2020, vaccine supplies are currently insufficient. The only way to stretch supplies of the vaccine to meet the ever-increasing demand is to use smaller doses.

In May 2019, SAGE recommended that the currently administered dose (1 ml) can be halved to match the dose tested in phase-3 trial in Guinea to protect health-care workers, contacts and contacts of contacts. People in the third ring could be given one-fifth the current dose. Instead of 10, it would take 28 days for the vaccine to confer protection when one-fifth of the current dose is used. But it would provide a “reasonable risk-benefit trade-off for protection,” SAGE noted.

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