

Will the New Ring Vaccination Stop the Spread of Ebola?

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The World Health Organization (WHO) and news reports are describing the deployment of a new experimental vaccine for Ebola in the Democratic Republic of the Congo (DRC). Originally 4,000 doses were sent to the country, and while the number is growing to 8,000 or more, there are still not enough to widely inoculate the city of Mbandaka with a population of over a million. Reports describe how the vaccine will be used in a “ring vaccination” technique. In ring vaccination, those who are most likely to be infected receive the vaccine. Currently this is being done by inoculating the known contacts of the sick and the contacts of the contacts, as well as healthcare workers. Prior experiments suggest that the vaccine can prevent the disease in those individuals.

If the effect of the vaccine is as hoped, those individuals who are infected among the known contacts will be spared from the horrendous disease—an incredible advance that will save lives and prevent suffering.

There are challenges. The vaccine has to be stored at -60°C and its experimental status means the side effects are poorly understood and informed consent is required of each individual.

There remains a key unanswered question: Will the vaccine stop the disease from spreading? In standard contact tracing, the known contacts are generally isolated from having further contacts and therefore don’t infect other individuals. Thus, this approach to ring vaccination doesn’t prevent new infections more than isolation already would have.

An exception to this rule are the healthcare workers who are at risk of being infected due to their contact with the sick. Stopping them from becoming infected

might reduce the spread of the disease.

Unless the effectiveness of isolation is poor or healthcare workers have a high rate of infection, ring vaccination is not much better than standard contact tracing for the purpose of stopping disease transmission. The rapid growth of the Ebola outbreak in West Africa urban centers implies that standard contact tracing couldn’t stop the outbreak there.

A better approach uses other methods to identify who is at risk of infection. One way to do this is to monitor people by door-to-door neighborhood screening using forehead thermometers, and in public places like markets, restaurants, busses and taxis, to see who has fever. Those who have fever may have one of many viral illnesses, including Ebola. Giving them the vaccine would stop the disease from spreading. The trick is to reduce the contagion among “unknown” contacts rather than among the known contacts to improve upon standard contact tracing.

Other methods that identify professions, such as merchants, who have high levels of contact with other people for inoculation can help too. More than one strategy can help.

Another advantage of the current vaccination efforts is to further test the vaccine so that it can be used more widely in the population when more doses are available.

What we should not do is rely upon ring vaccination among known contacts to stop the disease in a city where there are so many cases that contact tracing wouldn’t work. Whether this is the case in the current outbreak in DRC is not known.