

Using the Ebola Outbreak as an Opportunity to Educate on Vaccine Utility

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The first domestic death from Ebola in the United States occurred in Texas in October 2014. Family members who were potentially exposed to the infected individual were legally and involuntarily quarantined. Quarantine may not be a recent normal practice in the United States, but it was used extensively during the influenza pandemic in the early 20th century. However, health care ethics comes into play when we quarantine someone whose infection status is unknown versus active. To prevent the spread of a pathogen, one person may be held against his or her will and that person's freedom is terminated. Quarantine may be acceptable in the case of Ebola, as it is particularly virulent and there have been more and more potential cases in the United States (and elsewhere). As a result, the general population may understand how isolation and quarantine may help prevent the spread of Ebola. We must use this epidemic as an opportunity to educate the general population on ways to prevent the spread of other infectious diseases. Measles provides a good comparative case study for consideration. While it may not be a current priority in the media, measles is airborne, more infectious than Ebola, and has caused more deaths (100,000 per year) than Ebola. Though there is an approved effective measles vaccine, parents in 48 U.S. states are allowed to refuse to vaccinate their children for religious reasons, while 19 states allow exemptions for moral, philosophical, or personal beliefs. Vaccine exemptions in the United

States are at an all-time high, which poses a risk for populations susceptible to infectious diseases like measles. In 2013, the number of measles cases in the United States tripled, with an outstanding amount of resources (including dollars and work hours) dedicated to managing measles cases. With adequate measles vaccine uptake, this rise in cases could have been avoided, highlighting how vaccines in general are an important primary prevention tool.

The global Ebola epidemic is in need of such a tool, and scientists are working toward a solution. An Ebola vaccine is currently being tested, and if results demonstrate it is safe, well tolerated, and provokes a strong immune response, additional trials will later follow to examine vaccine efficacy. If approved, people at the highest risk of Ebola exposure globally, namely health care workers, can get vaccinated to help break the chain of transmission during care. Usually, the review time to approve a vaccine takes several years and requires substantial safety and immunogenicity data. With close to 5,000 Ebola-related deaths during the current epidemic that began in March 2014, there is a race to get an effective vaccine tested, approved, and out to those who need it as soon as possible. As a result, current Ebola vaccine safety trials are being fast-tracked, and planned efficacy trials will be conducted rapidly with a control group and real-time data analysis prior to offering the vaccine to all. The principles of justice and nonmaleficence may come into play here if the risks outweigh the benefits, but the World Health Organization ethics panel has given its approval to move forward with this plan for good reason. The overwhelmed health infrastructures in countries with an Ebola outbreak are in dire need of another tool to use against Ebola.

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There are additional outstanding questions with regard to any Ebola vaccine to be used during an epidemic. Let us imagine for a moment that the Ebola vaccine is found to be safe, 80 percent effective, and recommended for children, similar to other vaccines. Let us also imagine Ebola is endemic in the United States and the Ebola vaccine is required for all children. Since parents of school-aged children are allowed to refuse existing vaccines for their children due to religious or philosophical reasons, should the same allowance be given for Ebola? Is it a different scenario because of Ebola's high mortality rate? In general, we must decide if individual choice is more important than population health. In the wake of smallpox deaths in the United States, the U.S. Supreme Court case of *Jacobson v. Massachusetts* (1905) showed us that governments can institute policies

requiring vaccination to protect society at large. Perhaps the same would occur for an Ebola vaccine. With the recent events and information about Ebola in the news, the majority of parents might rush to vaccinate their children with a new Ebola vaccine. If this is true, we must utilize the Ebola epidemic as an opportunity to educate vaccine disbelievers and those refusing vaccine for religious or philosophical reasons about the benefits of other approved vaccines. We must utilize innovative tools including media, pop culture, and advocacy to engage this group about the benefits of vaccines now that we have their attention. Human life must be weighed against religious, moral, philosophical, and personal beliefs. Ebola is a powerful example of what happens when an infectious disease runs rampant without human immunity.