

Fighting epidemics with food

October 10 2014, by Simin Nikbin Meydani

The deadly outbreak of Ebola in West Africa continues to spread, despite heroic efforts on the part of health-care workers. The death rate—estimated at 70 percent of cases—is staggering. Those patients who contract the disease and survive, however, seem to have something in common. Their bodies are able to stand up to the virus's first attack with a robust immune response, followed by a measured inflammatory response. This keeps the virus from rapidly reproducing and causing lethal damage to key organs.

As I read news stories about the outbreak, I can't help but ask what role nutrition could play in helping stem the spread and mortality of the disease and perhaps deterring future outbreaks. We have known for many years that having a healthy immune system goes hand in hand with good nutrition. Adequate nutrition plays a key role in ensuring a robust and early immune response as well as a disciplined [inflammatory response](#).

Nutrients are needed for the normal function of the [immune response](#), whether it is to increase the number of cells capable of fighting the virus, produce antibodies and other key mediators such as cytokines or kill the invading pathogens. Proper nutrition is also important in keeping inflammation under control. Producing inflammatory molecules is part of the normal process of defending the body against viral infections, yet heightened and continued inflammation as is seen with Ebola can result in extensive cellular damage with dire consequences.

More recently we have learned that the nutrition status of a host can

affect a virus directly: when mice that were deficient in selenium or vitamin E were infected with a non-virulent type of the coxsackie B3 virus, the virus was shown to mutate to a virulent type.

It seems telling that many of the emerging infections have originated from the regions of the world with high prevalence of malnutrition. Malnutrition is the primary cause of immunodeficiency worldwide, and West Africa is no exception. The area has long struggled with [food](#) crisis brought on by seasonal food shortages and high prices. A 2012 Liberia report found that 36 percent of the population was malnourished.

With this in mind, I wonder how continued food scarcity will impact future outbreaks. If a vaccine were to be developed, how effective would it be in a malnourished person with impaired ability to produce antibodies and appropriate cell-mediated responses?

Yet the [nutrition](#) situation only seems to be getting grimmer. In the three hardest-hit countries, food harvests have been endangered due to labor shortages, and food prices are rising since the outbreak. The U.N. World Food Program and the Food and Agriculture Organization (FAO) have approved an emergency program to deliver 65,000 tons of food to 1.3 million people over a three-month period, but road closures because of quarantines often prevent access to the drops. One local leader in Sierra Leone told the New York Times, "Our fear now is that closing these roads risks having more people die of malnutrition and even starvation than by Ebola."

At first glance, the Ebola outbreak is a medical crisis, but at its core, it is also a nutritional one. While the barriers to better nourishing the global population have never been more complex, we have even more reason to strive to do so. Not only would it alleviate the perennial hunger that persists in regions around the world, it may deter other disasters like Ebola from happening again and again.

Provided by Tufts University

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