Infectious Diseases and the DoD

Introduction
The Department of Defense maintains a global footprint, with military personnel stationed in nearly 150 countries. Many of these countries contain endemic diseases not commonly found in the United States. From time-to-time, outbreaks occur when the number of disease cases exceeds typical levels, and sometimes these diseases can spread to other regions not commonly prone to these pathogens. These diseases could potentially have negative impacts on the health and fighting power of military personnel, which is why vaccinations are given when available during pre-deployment physicals and why good public health and hygiene principles are reinforced among military personnel at all times. Recently, the United States deployed forces to combat disease in developing nations, because the U.S. military has appropriate personnel and resources with rapid deployment capability to any location in the world. The DoD tracks infectious diseases of importance since pandemics can easily become a national security issue. Although there are thousands of different types of infections worldwide, three of recent note stand out as being the most relevant to the DoD.

Zika
Since its May 2015 outbreak in Brazil, the Zika Virus has spread to much of South America, parts of North America and Papua New Guinea. Primarily transmitted via mosquito; however, it is possible for the virus to be transmitted through person-to-person contact via maternal to fetal transmission during childbirth, sexual intercourse and blood transfusions. It presents a major hazard to pregnant women, causing serious birth defects, such as microcephaly, in newborns. The Centers for Disease Control and Prevention also linked Zika infection with an increased likelihood of developing Guillain-Barre Syndrome, a disorder of the nervous system, which causes the immune system to damage nerve cells. For U.S. citizens and service members traveling or stationed abroad, a major risk of infection lies in traveling to areas where the disease is endemic. There is no vaccine or cure for Zika, which makes it challenging to handle. The DoD urges service members to remain vigilant in protecting against mosquitoes while serving in at-risk areas.

Ebola
Ebola virus disease, also known as Ebola hemorrhagic fever or Ebola, causes severe bleeding leading to death from organ failure. The transmission of Ebola occurs through blood or other body fluids from infected individuals. Discovered in 1976 near the Ebola River, the disease appears periodically in African countries. In 2014, however, the Ebola outbreak in the West African countries Sierra Leone, Guinea and Liberia was unprecedented for two reasons. During this outbreak, there were nearly 29,000 reported cases of Ebola in just two years, compared with approximately 2,500 reported cases in the previous 37 years since the discovery of the Ebola virus. In addition, President Barack Obama issued a directive to send U.S. troops set up a military command center in Liberia to support civilian efforts fighting Ebola. Deploying troops for humanitarian missions is not uncommon, however, this is the first time U.S. forces were mobilized and dispatched to a foreign country specifically to assist in disease treatment and control at this magnitude. Although clinical trials are underway, there is no vaccine for Ebola.

Yellow Fever
The DoD has been intimately familiar with Yellow Fever since the late 19th century, when Walter Reed led efforts in Cuba to combat the disease. A recent outbreak in the Democratic Republic of the Congo and Angola, however, has been the worst in nearly 30 years and brought the disease back into the spotlight. Although a vaccine for Yellow Fever has existed for nearly 80 years, a recent supply shortage could provide challenges. In addition, Yellow Fever is endemic to parts of South America and Africa, including areas already affected by Ebola, and is carried by the same type of mosquito that carries the Zika virus. Though many infected individuals display no symptoms, Yellow Fever symptoms typically include a sudden onset of fever, chills, headache, backache, muscle pain, fatigue, nausea and vomiting. Of individuals displaying symptoms, approximately 15 percent may experience a brief remission followed by jaundice, hemorrhagic shock and eventually multi-system organ failure. Approximately 200,000 cases of yellow fever occur each year, with infections predominantly occurring in Africa, as well as Central and South America. Although the current outbreak in West Africa has 952 confirmed cases, nearly 17 million vaccines have been administered.

Summary
Although the Ebola outbreak in West Africa has ended, the threat of additional viral flare-ups remains a concern. The DoD maintains a small number of personnel in the most impacted countries, including Sierra Leone, Liberia and Guinea. As seen in the Ebola outbreak in 2014, future outbreaks may affect nearby countries under the United States Africa Command’s area of responsibility, such as Mali, Nigeria and Senegal. Zika and Yellow Fever remain a concern, particularly for personnel stationed in Africa and South America, although cases of Zika occur in Asia and the Pacific as well. The overlay of multiple outbreaks can also strain global resources and the public health infrastructure. Diseases do not always stay contained to their initial outbreak zone. They may spread to other countries via travel of infected vectors or hosts. To combat this threat, the DoD requires effective preventive methods such as vaccines, as well as surveillance studies to monitor and prevent the spread of emerging infectious diseases.