ESSAI

Volume 15 Article 23

Spring 2017

A Book Review of "Six Modern Plagues and How We Are Causing Them" - Mark J. Walters

Jennifer Kunstman
College of DuPage

A Book Review of *Six Modern Plagues and How We Are Causing Them* - Mark J. Walters

by Jennifer Kunstman

(Microbiology 1420)

Mark Jerome Walters provides some disturbing evidence in his book, *Six Modern Plagues and How We Are Causing Them*, by showing that the human race is ultimately responsible for six emerging diseases that have become major health threats. He writes of each disease separately, going into detail of the human action and it's resulting cascade effect that leads to the proliferation of each epidemic. Walters cites over and over, and not so subtly, that unless people can learn to live as a part of the ecosystem instead of trying to dominate, control, or modify it, that these diseases are just the beginning of our health problems.

The setting for the first disease is West Sussex, England, where a dairy farmer noticed his cows behaving strangely and violently (Walters, 2003). Of the cows that eventually died or were put down, autopsies showed that the cows had BSE, bovine spongiform encephalopathy, or Mad Cow Disease. The brains of the cows were spongy in appearance and looked very much like the brains of sheep who would sometimes succumb to a virus called scrapie. By 1995 there were a handful of cases of CJD, Creutzfeldt-Jakob disease, which is the spongy encephalopathy disease in humans and it was determined that the cause was a prion. Ultimately the source of the BSE in the cows was traced back to the feed the farmers were buying for their cows because companies had started using the by-products of killed livestock to add filler to their feed in a process called rendering. By doing this, the feed was much cheaper to produce, the extra protein in the feed was making the cows grow faster and bigger, so the companies made a bigger profit. The problem was, the prion that is responsible for scrapie is not killed during the rendering process which makes it then possible that the cows were infected with sheep byproducts of sheep infected with scrapie. This disease could have been prevented if human beings, with increasing profits as their motivation, had not tried to modify the cow's diet. Since the digestive system of the cow has evolved to a plant eater, to digest plants, it is unimaginable that people would think that feeding animal products, would not have dangerous consequences.

It is customary for the people of Gabon, Africa to eat bushmeat, and it is most often their only source of protein (Walters, 2003). French timber companies began logging practices through the area in the late 1980s and early 1990s which added to the demand for bushmeat to feed the loggers. HIV, the virus that causes AIDS, has been studied for over 30 years and there's strong evidence that the HIV-1 virus jumped from non-human primates to human beings. Not only has the virus jumped once but there's research that shows it could have jumped twice and that there is a potential for it to jump again. The people who slaughter these animals are at a very high risk of contracting the virus from an infected animal through blood and open wounds. Interestingly, the animals do not seem to be affected by the virus but they hold the information about the evolution of the virus itself, and the mechanisms for controlling it. Because these animals are being slaughtered almost to extinction, Walters stated, "AIDS is not only a medical issue but also an ecological one" (p. 49).

One of the most frightening epidemics the human race is now facing is the bacterial resistance to antibiotic drugs used to treat life threatening infections (Walters, 2003). Walters writes specifically about Salmonella DT104, which has become resistant to a multitude of current antibiotics. Walters suggests a cascade effect that starts with antibiotics given to farm animals in their feed. The reason is greed; in order to have enough cows to turn a big profit it is cheaper to cram them into small, confined spaces and give them antibiotics in their feed so they don't get sick from the

deplorable living conditions they are forced to endure. The bacteria in these animals is flooded with these antibiotics, and those bacteria that survive this onslaught become stronger against those same antibiotics. Humans, if they undercook their meat or contaminate parts of their kitchen with the juices from meat, can risk becoming infected with the resistant bacteria. Even more alarming, bacteria can travel, are very good at sharing genes, and Salmonella DT104 specifically can live in and infect many different species. As an example, Walters uses the case of a bird carrying a fish that is carrying antibiotic resistant bacteria from a fish farm and having it end up in a stockyard. There the bacteria can live in the cattle, pass on its genes for resistance, and end up on someone's kitchen counter. Walters reminds us once again, "Humans are connected not only to one another but also to the myriad other species, seen and unseen, with which we share the earth" (p. 87). There has been evidence of antibiotics ending up in soil and water also as the drugs get passed through the animals, end up in waste lagoons, get spread on crops as fertilizer, ultimately ending up in the groundwater and getting into the soil.

The most common vector borne-illness in the United States is lyme disease caused by a bacterium that could be as old or older than the forests of the United States (Walters, 2003). Lyme disease is carried by mice and other small rodents, but does not cause disease in these small animals. Ticks feed on these mammals but eventually will multiply and live on deer for years. The more mice and deer in a certain area, the more cases of lyme disease can be found in humans in that same area. In the Northeastern part of the United States, the woodlands of Hutcheson Memorial Forest have been cut up into sections to accommodate the building of homes and roads. In doing so, more light was let in on the sides of the forest, and the forest floor began to grow leafy green plants that deer love to eat. The deer population has exploded because of this lush new food source, but they harbor the ticks that carry lyme disease. Humans are now in very close contact with the forests and the deer having built their homes right on the edges of these pieces of forest, making them easy targets to be bitten by a lyme disease carrying tick. Walters added that people's homes have also become sanctuaries for deer since hunting deer is not allowed within 450 feet of a residence without their permission. Walters also surmises that the building of homes and roads have evicted predators of the deer and has forced many of the species that have lived in the forest to move elsewhere upsetting the biodiversity of the forest. Because of this decrease in biodiversity, mice and chipmunks have begun to thrive and they are responsible for 90% of the transmission of Lyme disease to the ticks. Once again the human race has tried to modify nature. By dicing up these ancient forests into little plots of woods and setting up homes next to them, the balance of the diversity of the forest has been altered. Walters states, "The ecology of Lyme disease reminds us that the connections between the earth and human health are ancient" (p. 110).

Our climate is changing and the evidence points to global warming due to reckless practices and behaviors of the human race. One result of this climate change is that excessive rain from El Nino has poured so much water on the Colorado Plateau that there's increased soil moisture, which makes the juniper and pinons woodlands trees make more nuts, downy chess grass seeds germinate, and snake weed grow (Walters, 2003). According to Walters, this increase in vegetation and food has caused a dramatic increase in the number of mice, many of which carry hantavirus. Hantavirus can be transmitted to humans from the urine of these mice, and the resulting HPS, or hantavirus pulmonary syndrome, can often be fatal.

Walters continues with another effect of global warming; severe drought and excessive heat. In 1990 birds migrating from Europe to Africa had to stop in Israel because the temperatures were so high the birds became exhausted and could not fly any longer. These storks, who were carriers of a flavivirus, or West Nile virus, were bitten by the local mosquitos who in turn, bit the local geese. West Nile virus ended up in Queens New York just one year after it killed the geese in Israel and draught and international travel are to blame. Millions of people and other animals come through JFK international airport every year with documented (and undocumented) animals. Mosquitos can

stow away in the aircraft, and birds can be bitten by mosquitos then migrate from all over the world. The summer of 1991 was so hot in Queens, NY, that the mosquitos were able to multiply at an alarming rate in the sewer drains before flying out with the eventual rains. Many people were infected that hot summer and some died.

Walters traveled next to Southern China, where people were becoming sick with SARS, severe acute respiratory syndrome. SARS is caused by coronavirus, which is very common in animals, and is thought to have jumped to humans from a species like a cow or a cat. Because space is a premium in China, people often share their homes with their animals like pigs and chickens and many times chicken coops are situated above the pigsties so that when the chicken defecates it ends up in the intestines of the pig. The pig waste then runs off and drains into shrimp ponds where ducks who swim on the ponds eat the food. This intermingling of species gives these viruses a way to swap their genes, allowing them to survive from species to species. The interesting point Walters makes with respect to SARS is how human action was able to control the spreading of the virus and make the virus change to a milder version. Walters believes that because infected people were quarantined, the virus stopped spreading. The thinking is if the virus wants to survive, then, it would have to make a modified version of itself so that its host can be up walking around to spread it from person to person. This epidemic is really a question of space and international travel. Walters believes how closely we co- habitat with nature will have an effect on the microbes that can infect different species and how they can swap their genetic information.

Mark Jerome Walters makes the reader take a deeper look at how people live and interact with the world. The reader is taken on a journey throughout the world, and if survival is in the human race's future, Walters encourages everyone to be more responsible and make smarter decisions on how animals are treated, how life saving medicines are used, how our environment is protected, and how to deal with an increasing population. None of these epidemics has a simple root cause, but it is very evident after reading *Six Human Plagues and How We Have Caused Them,* that the human race is partly or mostly responsible for every one of them. Walters recalls his discussion with the Navajo Indian healers concerning the hantavirus and HPS infections, "Each healer spoke about how humans are not the dominant force in nature but instead are dependent upon other forms of life for existence. The outbreak had resulted from disharmony in the environment, they claimed, and now ceremonies were needed to reestablish harmony between patients and the universe" (p. 121).

References

Walters, M. J. 2003. *Six modern plagues and how we are causing them*. Washington: Island Press/Shear Water Books.