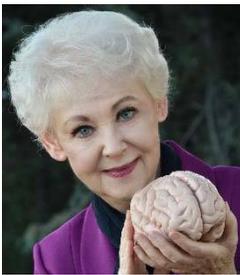


Price of Pandemics

Part 4— Plague Contributors

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A *plague* is typically defined as a serious and potentially life-threatening disease and usually transmitted to humans through some vector, e.g., bites of infected insects, contaminated water, parasites spread by mosquitoes. Because it can have a high death rate, just the word *plague* can strike terror into the heart of some.

Euphemistically the word has also been applied to a perceived pestilence, such as a swarm of insects that attacks plants or an infestation of grasshoppers—or even the proverbial “wicked” stepmother or “impossible” mother-in-law.

A plague is more likely caused by a bacterium rather than a virus. What is the difference between the two? In a word, bacteria tend to live in space *outside* of a human cell, where they can often be treated using antibiotics—unless they have become resistant to them through overuse and adaptation. Viruses live *inside* human cells where they can create their own type of chaos but are typically safe from antibiotics. Did you know that viruses can also infect bacteria?

Make no mistake. Bacteria (some 40 trillion) and viruses (perhaps 400 trillion) are essential to the health of the human body when they are the “good guys.” Along with your genome and epigenome, they form your microbiome and virome. When they have gone rogue, the result can be deadly.

Plague has a rather colorful history on Planet Earth. The most common form in humans is bubonic plague, characterized by chills, prostration, delirium, and the formation of buboes—swollen lymph nodes—in the armpits and groin. Septicemic plague invades the blood stream and is especially dangerous. These two forms do not spread from person to person. Pneumonic plague, however, that attacks the lungs, can be spread from one human to another, likely through the air. The causative bacterium, *Yersinia pestis*, is spread by the bite of infected fleas—and perhaps lice, as well. It also caused the Justinian Plague in AD 541, which brought the Byzantine Empire to its knees and continued to strike relentlessly for 200 more years, killing over 25 million people.

Yersinia pestis or one of its variants, reportedly arrived in Sicily in the fall of 1347, when 12 ships from the Black Sea docked at the port of Messina. Dubbed the Black Death, it peaked in Europe a couple of years later and is considered one of the deadliest in human history, wiping out more than a third of Europeans to the tune of about 75 million.

Scrub typhus—caused by infection with one or more rickettsial bacteria—is a serious public health problem in the Asia-Pacific area. It is transmitted by mites (or chiggers), fleas, and lice. A million cases occur annually with a death rate of up to 70 percent without adequate treatment.

Typhoid fever is caused by *salmonella typhi* or by a related bacterium *salmonella paratyphi*. Fairly rare in industrialized countries, it remains a serious disease in the developing world, especially for children. It spreads through contaminated food and water causing high fever, abdominal pain, and diarrhea. An estimates 21 million cases occur annually, of which 600,000 die.

Cholera is caused by a highly contagious bacterium known as *vibrio cholerae* that also spreads through contaminated food and water. It causes nausea, vomiting, diarrhea, and dehydration. If untreated, it can kill previously healthy individuals within hours. The year 2017 saw over a million people infected in Yemen. Close to 150,000 succumb every year worldwide.

Malaria is caused by a microscopic parasite transmitted by mosquito bites. The World Health Organization typically reports 300-500 million cases a year with over a million deaths.

These examples are just the proverbial tip of the ice burg and contribute to the high cost of epidemics and pandemics in every way imaginable.

The truth is, the over seven billion human inhabitants of Planet Earth are vastly and exponentially outnumbered by organisms. Estimates are that bacteria alone account for five million trillion trillion (i.e., 5 times 10 to the 30th power) of organisms, with viruses perhaps 10 times greater. Fortunately, not all are harmful, yet history has shown what can happen when they are—be they called epidemics, pandemics, or plagues.

Your best defense is to live a healthy lifestyle, one that strengthens your immune system and prompts you to avoid behaviors that would increase your risk for being felled by one of these miniscule but powerful critters.

If you need to brush up on information about your immune system, review “The Doctor Within” series. Meantime, be well, be happy, and make healthier choices. Embracing a Longevity Lifestyle Matters.