The 21st Century: Age of Pestilence?

A Summary of “Catching Diseases” by Charlie Furniss, Geographical Magazine, April 2006

Research suggests that almost three quarters of new human diseases are zoonotic in origin. In other words they are diseases that have been acquired from animals and that have adapted to attack the human population. Such diseases include Ebola, HIV, SARs, E.coli, salmonella, variant CJD and H5N1 avian influenza.

Some experts believe that we are now entering an age of pestilence the like of which was last seen in Biblical times. Are we ready for the onslaught?

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Microbes are always jumping across the species barriers, usually without success, but the more often they get a chance, the greater the probability that one microbe, with a mutation that better suits its new human host than its old, will establish a foothold. From then onwards, if it can achieve onward transmission, it will become a human infection.

It is not in the interest of the microbe to kill its human host, but the unfamiliarity of the relationship can cause the pathogen to be so virulent, that death of the host may be an accidental outcome. More successful pathogens usually adapt to becoming less deadly and, at the same time, the host develops his or her own resistance. In prehistoric times, new diseases probably emerged when patterns of human behaviour changed, for example eating meat regularly, or when our ancestors moved away from East African into new environments and climates. The earliest civilisations, such as the Ancient
Egyptians, were probably where many of today’s ‘herd’ or ‘crowd’ disease began.

Diseases such as measles, mumps, chickenpox, influenza, smallpox, tuberculosis, leprosy and the common cold require their human hosts to live in close proximity if they are to succeed. They probably killed off large numbers when they first emerged in the human population, but, after a period of adjustment, the pathogens became less deadly and the humans more resistant, many gaining immunity.

When herds started mixing with other herds, for example when European explorers and conquistadors took their diseases to the New World of the Americas, the consequences were devastating as there was no ‘herd’ immunity amongst the indigenous population. New diseases such as yellow fever and malaria, brought in with slave labour from Africa added to the devastation of both Europeans and Native Americans alike.

By the mid 20th century, a state of balanced equilibrium was achieved, particularly in the richer countries as the medical establishment felt that disease had been conquered through treating water, improved hygiene standards, vaccination, antibiotics and antiviral treatments. Many assumed that the battle had been largely won.

By the 1990’s it became increasingly obvious that the battle was far from won. The World Health Organisation (WHO) reported that infectious diseases were claiming more lives and that diseases that had been in decline, such as malaria, tuberculosis, diarrhoeal and respiratory diseases, were now resurgent. HIV, a relatively new disease was about to become the worst of them all. In addition, other new human diseases had emerged including Hendrea virus in Australia, Nipah virus in Malaysia, new strains of influenza, West Nile virus in the USA and SARS.

Research has shown that between 62% and 73% of these newly emerging diseases have been contracted from animals and that the rate of emergency has slowly risen over the last 50 years. Epidemiologists have pointed to urban and agricultural expansion into previously wild habitats as a key factor in this increase, leading to closer interaction between wildlife, such as bats, birds and rodents, and humans and their livestock. Intense farming methods add to the risk by providing a large enough ‘herd’ to support and maintain the emerging pathogens.

Another principal factor in the emergence of zootonic diseases is environmental disturbances such as deforestation. Deforested areas are more attractive to malarial mosquitos, providing ideal conditions for them to breed. Bats carrying the Nipah virus are forced to feed in orchards close to humans and their domestic pigs, as their natural habitat is altered. In Africa, the bushmeat trade has been linked to the transmission of high profile diseases such as Ebola, HIV, Lassa fever, Marburg fever and monkeypox. There is nothing new about humans eating wild animals, but the sheer quantity of bushmeat eaten increases the risk. In Central Africa alone, an estimated 579 million wild animals are eaten every year, increasing the risk of a
pathogen making the leap from animals to humans. The growth in international transport helps the disease to spread greater distances than ever before.

In some parts of Africa, the problem is compounded by poorly equipped hospitals which, far from helping the victims, act as amplification centres in which more people become infected. State-of-the-art hospitals in wealthy hospitals are not exempt as has been witnessed by the spread of SARS and HIV/AIDS. In addition, microbes have the potential to mutate in such away that they become increasing resistant to antibiotics and other weapons in our armoury against them. The rate of mutation far exceeds our ability to develop new treatments, so a new approach is necessary.

Some epidemiologists believe that we now need to move the war against disease toward predicting and preventing new disease from emerging by bringing together the combined skills of ecologists and virologists to predict where diseases are likely to emerge in future. This way, scientists could advise governments and their expanding logging, livestock and farming industries about places they should avoid in order to reduce the risk of new zootonic diseases.

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