

The emerging infectious disease

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The 70's represented the *nadir* in regards to the attention put into infectious disease research and the public's general attention in this area.

Smallpox was officially eradicated in 1977. William Beveridge published an article intitled "Influenza, The Last Great Epidemic". Susan Sontag wrote, "Illness as a Metaphor," and professed that cancer would substitute, in a contemporary metaphor, for tuberculosis. Antibiotics, chemotherapy and vaccines created optimism but the reality didn't confirm the expectations. In 1979, with the first descriptions of Legionnaires disease, The New England Journal of Medicine published an editorial called "Another new Pneumonia: Pandora's Box Re-opened?" The title turned out to be prophetic. Since then new and re-emerging infectious pathologies have been uninterrupted. Today it is clear that infectious diseases are and will be constant in human history. Microorganisms constitute for 60% of the earth's biomass, and overall it is a biomass that is continually changing and adapting to mutating environmental conditions.

The last 25 years have been characterized by new epidemics and new epidemic risks. The reasons are correlated to microorganisms as well as mutated epidemiological conditions that facilitate the emerging persistent microorganisms. We are not looking at new events here but ones that are constantly being verified during human history. Conversely, we are looking at events that have accelerated during the past quarter of a century. The 20th century has been defined as the "fast century."

There have never been so many rapid structural and behavioral changes in the history of humanity, because of this none could expect that there would not be repercussions in the relationship between man and microorganisms. Globalization has determined a stop to the exclusive regionalization of infections. It has even been defined that globalization has rendered an entire planet vulnerable from events that have occasionally taken place in remote and circumscribed areas.

The AIDS pandemic is the most striking example of an infection brought on by a new virus. Human Immunodeficiency Virus, HIV, which differentiated from the Simian Immunodeficiency Virus that developed in limited areas of Western Sub-saharan Africa between the 1930's and the 1950's. The epidemic diffusion was unstoppable. The HIV epidemic has been defined as "behavioral". The infection is exclusively correlated to hygienically incorrect behaviors which became a mass phenomenon. AIDS has demonstrated how these "behavioral" epidemics are so difficult to control.

The SARS-related Coronavirus (Co-SARS) is another new virus that the human species was confronted with and luckily was rapidly extinguished, but it represented an event that will not be forgotten. It remains an example of what could inevitably happen in the future with less favorable outcomes. Co-SARS went from one species to another, specifically from a still unidentified animal reservoir to humans. The outbreak was verified in the district of Foshan in the Chinese province of Guangdong.

The characteristics of this outbreak were due to socio-economic conditions characterized by high population density and promiscuity, that exist between human beings and different animal species. SARS put these places "on the map" and with that represented a danger for the rest of the world. The diffusion of SARS was associated with one individual index case: Dr. Ly who became infected and then traveled from Guangzhou, the capital of Guangdong, to Hong Kong and there infected 16 other people. These 16 people then diffused the virus in the next 48-72 hours to Ireland, Canada, USA, Germany, Vietnam, Singapore, Bangkok, and Hong Kong.

Avian flu viruses (RNA viruses) are distinguished by their very distinct capacity to mutate. The avian flu virus can acquire the capacity to infect man directly or indirectly with genetic recombination with the human flu virus. Migratory birds can disseminate the pandemic avian flu virus, either mutated or recombined in remote areas of the world. These epidemics of avian flu among winged animals with sporadic contagions to man are old phenomena but recently have accelerated. The first known example of this was the Spanish Flu (1918, strain H1N1) followed by H2N2 (1957), H3N2 (1968), H1N1 and H5N1 (1997), H9N2 (1999), H7N7 (2003) and again H5N1 (2003-2006). H5N1, the avian flu that is now in circulation, which could very likely be related to the pandemic virus, is particularly worrisome for its elevated pathogenicity. Places in the far east, such as South China, Thailand, Vietnam, and Laos could be where the flu pandemic had its origin. These being the same places where SARS had its origin. The coincidence is not casual. In these areas there is the largest production of poultry and swine that exists and that are close to large pockets of poverty and promiscuity.

Globalization is a complex phenomenon that touches upon man, animal, and goods. It is basically something that has just begun to have an impact on human society. However, 3% of the world's population now live in countries different from their

original country of birth. This means that 175 million people having varying reasons for this exodus: general immigration, nomadism, political refugees, military and diplomatic personnel, NGO employees, crew members, religious pilgrims, company employees, and tourists. The world's tourism flow began with 25 million in 1950 to 166 million in 1970, 500 million in 1993, 664 million in 2000 and will reach an estimated 937 million in 2010.

This phenomenon has opened up a base for a new sector of medicine: Travel Medicine. It is a multi-disciplinary sector that links up with technological, organizational, and complex informational support. Tourists, in fact, are exposed to many different risks depending upon the place and duration spent in that specific place.

The CDC in Atlanta reported a case of Lassa fever in which the patient died after returning to the USA after being in Liberia and Sierra Leone and concluded that "increasing travels result in importation of agents from endemic areas to the USA, posing diagnostic challenges. Clinicians should consider both uncommon and common causes of fever in persons arriving from Africa."

Globalization impacts animals as well as goods. By now there are many examples of negative relationships on infectious pathology. In 2003, there were 11,600 tons of exotic animal meat (monkey, elephant, camel...) illegally imported into Great Britain that were given to ethnic restaurants. In May, 2003 the importation of 800 rodents from Ghana into the USA and a successive infection from prairie dogs that were sold as "pets" provoked 81 cases of monkey smallpox in children.

Microorganisms are only seemingly fragile. They anticipated man's arrival on earth by three million years and have always displayed an ability to adapt. Darwin was correct in saying: "In the fight for survival the one who wins is not the strongest but the one who adapts to the ever changing conditions".

The adaptation to globalization is one of the challenges for human kind at the beginning of the third millennium.