

Emerging Infections

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1. Abstract

Over the last decades more than 100 infectious agents emerged or reemerged, bringing numerous epidemic outbreaks and three pandemics with a high cost in human lives and economical losses. This phenomenon is not new, and has its origin in the environmental, social, climatic, and behavioral changes resulting from the human demographic explosion which currently exceeds 7 billion. However, through human history there have been four previous transitions that have led to the emergence and reemergence of epidemic outbreaks and pandemics of infectious diseases, that are discussed from a historical and biological point of view.

2. Emerging Infections

In the last decades has been a renewed preoccupation about the emergence and reemergence of numerous infectious agents that has originated multiple epidemic outbreaks and inclusive pandemics, with great attention by media and social webs, were the word emergent has received and ominous significance, with a wrong perspective of an invasive and malignant agents against human's beings. However, from the apparition of humans in this planet, has been five major transitions in his relationship with the animate and inanimate environment, that has originated this phenomenon:

3. Nomadic Humans

Start thousands of years ago with the global dispersion of the first humans from Africa to other continents, with a nomadic style of life, surviving from the recollection of food, hunting and fishing, and despite of the fact that they suffer of a great variety of infectious diseases mainly zoonotic (Anthrax, Trichinosis, Tetanus, etc.) this do not have epidemic characteristics, because the small size and limited in-

terchange of clans, his rapid mobilization, leaving his sick and deads, limiting the dissemination and outbreaks of infectious diseases [1].

4. Neolithic Revolution

The Neolithic revolution, that happens 10,000 years ago, were multi-centric, when the humans abandoned his nomadic style of life and stablish settlements, with agricultural development, storage of foods, domestication and breeding of animals, construction of towns and villas, work divisions, irrigation systems, commercial and cultural interchanges, originating a population expansion, overcrowding of humans and animals, with deficient sanitation, water contamination, garbage accumulation, bad care of excretas, infestation with fleas and lice, that permit the emergence and dissemination of infections not seen in pre-neolithic populations, and that can only be sustained by stablished human communities. like: Leprosy, Tuberculosis, Cholera, Tifus, Brucellosis, Anthrax, Measles, Smallpox, Pertussis, Influenza, Intestinal Parasitosis [2-3].

5. Civilizations and Empires

Start with the expansion of Neolithic Populations that give place to development of Great Civilizations and Empires in Asia, Europe, Middle East, Meso and Sudamerica were the conditions of life of his habitants were very poor, with low expectancies of life, malnutrition, overcrowding, slavery, low or poor hygiene, and numerous wars and belic conflicts. The historical evidences shown successive epidemic outbreaks of infectious diseases between 3440 BC. AND 500 AC., and the endemic presence of Malaria and Tuberculosis. The Asian and European civilizations have numerous wars including the Cruzades, and commercial interchanges, and the predominant infections mixed with disastrous results. The magnitude and mortality of this

earlier epidemic outbreaks are difficult to imagine, the Medicine of that time were very deficient, and the origin of diseases were explained religiously, Measles, Smallpox, Dysentery, Tifus, Black Plague were the most predominant and frequent infections, and contributed to the fall and decadence of the most of civilizations and were associated to the loss of more than half of his populations. The first register of epidemic Smallpox is traced to the year 1350 BC., During the Hititian War. The Roman Empire was devastated during the Antonin Plagues (165-180 BC_) and during the Cruzades. Black

Plague ravaged in numerous occasions

(397BC.) with the loss of near of 70% of his populations. After this transition, the populations of Asia and Europe come to harmonize genetically and culturally, and the epidemic outbreaks of infections come to be endemic and recurrent, with the exception of the disaster of Black Plague in middle of XIV Century that marks of the final period of this epoque. In the (Table 1), we show the principal documented epidemics of this time, places and his contributing factors [4-7] (Table 1).

Table 1: Epidemic Outbreaks in Civilizations and Empires

OUTBREAK	DATE	ETIOLOGY	LOCATION	MOTIVE	COMMENTARY
Egyptian plagues	3440 B.C.	Miasis, Anthrax, Tularemia	Actual Cairo	Santorini Eruption	Ramses II Reign
Mursili plague	1321-1295B.C.	Tularemia	Irak,Egypt.Siria-Hitita	Egyptian War	Death of two Hitita Emperors
Ashgood plague	1190 B.C.-	Black Plague	Actual Palestin	Filistean-Isreali War	Referred in the Old Testament
Atenas plague	430.B.C.-	Typhoid Fever	Athens- Greece	Pelopones War	ADN of S.typhi in human remains
Siracus plague	397 B.C	Black Plague	Italy-Cartago	Greek War	Cartagines army
Cipriano Plagues	270-331.B.C	Smallpox	Roman Empire	Return of roman legions	Three roman emperors die
Antoninos Plagues	180-165 B.C	Smallpox	Roman Empire	Return of Roman Legions	
Justiniano Plague	541-542.A.C	Black Plague	Roman Empire, Central Asia	Return of Roman Legions	
Emmaus Plague	639 A.C	Black Plague	Emmaus: Actual Palestine	Muslim Occupation	
Black Plague	1347-1350 A.C	Black Plague	Europe	Maritimus Commerce	

6. The Encounter of Two Worlds

The discovery of America in 1492 and his European colonization give place to one of the most biggest catastrophic periods of human lethality in the history, specifically epidemic outbreaks of infectious diseases for those American natives has not immunity, this tragedy extends for more than four centuries and goes to other populations of the Pacific Islands, Asia and Africa in the subsequent European colonizations of this regions, from 1521 to 1610,were observed 50 mayor infectious diseases outbreaks, the magnitude and precise characteristics of this catastrophe is debatable, the estimate total population of the American Continent previously this encounter was 100 million,150 years after has been decimated between 75-95%. In Mexico the year of arrival of Spaniards (1519), the total population were between 15-30 million, in 1600 only survive 2 million. The Smallpox and Measles contributing to the fall of Aztec Capital, in the siege of Spaniards, and between May and August of 1521, dying more than 100,000 of his habitants, in the same year, Smallpox arrived to Peru reducing his population in more than 80%. After that, the

American Populations suffer from successive epidemic outbreaks of Measles (1531,1533,1557,1562), tifus (1545,1546), Smallpox (1521,1525,1538,1584), Influenza (1558), Chickenpox and Scarlet Fever (1585-1596). In 1545 and 1576, two epidemics of Haemorrhagic Fevers not associated with the Europeans, and favoured by severe droughts and slavery conditions of the native americans populations by the Spaniards, contributes with additional mortality [8-10].

7. Demographic Explosion

In the beginning of the 7th decade of the past century, the development and success in the use of diverse antimicrobial agents and vaccines, the general improvement in hygiene and nutrition standards, increase of life expectation, lower infantile mortality, in the mundial population, make think to some ones, that Infectious Diseases were a past thinks, However, from 1970 to 2020,more than 100 new infectious agents emerged or reemerged, given origin to numerous epidemic outbreaks of great morbidity and mortality, and three pandemics, mostly of viral and zoonotic origin, with huge economic impacts (Table 2). The explanation of this phenomen is complex

and diverse and fundamentally lies in the exponential growth of the human population, greater than 7 billion, 56% of them living in urban areas, 50% of the Woods, Jungles and Forests, has been lost, by the intensification of agriculture, fires, breeding of animals, housing, with reduction of natural animal habitats, severe contamination of air and water, extreme weather conditions, global warming, that has favoured the geographic expansion of reservoirs and vectors of infectious agents. The global commercialization of foods with four companies monopolizing 90% of his production, storage and mundial distribution has given place to numerous outbreaks of

gastroenteritis with high mortality and cost and the presence in humans of prions by consume of contaminated cattle meat. The legal or illegal consume of meat of wild animals, the use of animals for diverse purposes like pets, in circus, amusement parks. research, zoos, industry, that implies his hunter, management and sacrifice with contact with his blood, corporal fluids, secretions, tissues, has been determinant factors in the Marburg and Ebola viruses, Avian Influenza (H5N1), monkeypox, avian and porcine viruses (H1N2, H7N2, H7N3, H9N2, H3N2v, H7N9) outbreaks, AIDS, Influenza H1N1 and the COVID-19 Pandemias [17-31] (Table 2).

Table 2: Emerging Infections 1970-2021.

	VIRUSES	BACTERIA	PROTOZOA	HELMINTHIS	OTHERS
1970-1978	Monkeypox, Simian foamy, Norovirus, Hepatitis A, Rotavirus, Astrovirus, Parvovirus B-19, Flexal, Sapovirus, Marburg, Hepatitis Delta, Ebola, Hantavirus.	Legionella pneumophila	Cryptosporidium sp		
		Clostridiodes difficile			
		Campylobacter jejuni			
1980-1989	Lymphotropic I, II	Helicobacter pylori	Enterocytozoon Intestinalis		
	AIDS-1,2; Human papiloma, Herpes 6,7; Hepatitis C, Guanarito, Influenza A H1N2, Torovirus Kasobera, Banna	Borrellia burgdoferi	Pleisthopera sp		
		Escherichia coli 0157-H47			
		Ehrlichia chaffensis			
1990-1999	Sabia, Oliveros, No name virus, Lymphotropic III, Herpes 8, Arroyo White-water, Hendra, Influenza H7N7, H5N1, H9N2, Pirital, Nipah, Torquenavirus, Hepatitis E	Ehrlichia ewingii	Encephalitozoon Intestinalis	Bronchiola vesicularum	Spongiform Encephalopathy
			Pleistophora sp		
2000-2010	Human metapneumovirus, Influenza H7N3, H1N1, H5N2v Dhori , Lujo, Heartland, Bocavirus, Kokoba, Chapare, Lymphotropic IV, SARS-COV	Capnocythopaga canimorsus		Gymphalloides seoi	Creutzfeld Jakob Disease
		Ehrlichia muris			
2011-2020	Influenza H3N2v, AH7N9, Mers-Cov, SARS-Cov-2, SARS-Cov-2-NUi 202101/01, Trubanam, Gan gan	Escherichia coli 0104 H4			Candida auris

Undoubtedly the emergence and reemergence of infectious diseases for the human race continues to be a continue challenge, if all the determinant factors are not resolved. However, like we see in this revision this transitions have been continuously given in the human

history. We must look for a interdepend system and ecologically sustainable form of living in the earth, the humans and microorganisms are not in war, we must have a relationship suspended in a evolutionary necessity.

References

1. Comas I, Coscolla M, Luo T. Out of Africa migration and neolithic coexpansion of *Mycobacterium tuberculosis* with modern humans. *Nat Genet.* 2013; 45: 1176-82.
2. Pearce-Duvet JM. The origin of human pathogens: evaluating the role of agriculture and domestic animals in the evolution of human disease. *Biol. Rev. Camb. Philos. Soc.* 2006; 81: 369-82.
3. Isreal DM. Early human settlements as an opportunity for infectious microorganisms. *J Biosci.* 2005; 30: 411-4.
4. Trevisanato SI. Ancient Egyptian doctors and the nature of the biblical plagues. *Med Hypotheses.* 2005; 65: 811-3. Dagnino JS. Qué fue la plaga de Atenas? *Rev. Chil. Infect.* 2011; 28: 374-8.
5. Trevisanato SI. The biblical plague of the Philistines now has a name, tularemia. *Med. Hypotheses.* 2007; 69: 1144-6.
6. Harbeck M, Seifert I, Hansch SP. *Yersinia pestis* DNA. from skeletal remains from the 6th Century AD reveals insights into Justinian plague. *PLoS Pathog.* 2013; 9: e1003349.
7. Sabbatani S, Fiorino S. The Antonine plague and the decline of the Roman Empire. *Infez Med.* 2009; 17: 261-75.
8. Cordero CM. Las grandes epidemias en la América colonial. *Arch. Zootec.* 2001; 50: 697-612.
9. Acuña SR, Stahle DW, Therrell MD. When half of population died: the epidemic of hemorrhagic fevers of 1576 in Mexico. *FEMS. Microbiol Lett.* 2004; 240: 1-15.
10. Acuna SR, Romero LC, Maguire JH. Large epidemics of hemorrhagic fevers in Mexico 1545-1815. *Am. J. Trop. Med. Hyg.* 2000; 62: 733-9.
11. Darling NI, Donoghue HD. Insights from paleomicrobiology into the indigenous people of pre-colonial America. A review. *Mem. Inst. Oswaldo Cruz.* 2014; 109: 1-11.
12. Favila CH. Entre cerros, lagos y ciénegas. Sociedad y condiciones de salud en el México prehispánico. *Ciencia.* 2014; 20: 182-192.
13. Mac Kenzie WE. A massive outbreak in Milwaukee of cryptosporidium infection transmitted through the public water supply. *N. Engl. J. Med.* 1994; 19: 161-7.
14. Gessain A, Rua R, Betsem E. HTLV3/4 and simian foamy retrovirus in humans: discovery, epidemiology, crossspecies transmission and molecular virology. *Virology.* 2013; 435: 187-194.
15. Field H, Schaaf K, Kung N. Hendra virus outbreak with novel clinical features, Australia. *Emerg. Infect. Dis.* 2010; 16: 338-40.
16. Centers for Disease Control and Prevention (CDC). Update: multistate outbreak of monkeypox-Illinois, Indiana, Kansas, Missouri, Ohio and Wisconsin. *M.M.W.R. Morb. Mortal. Wkly Rep.* 2003; 52: 642-6.
17. Aguzzi A, Heikenwalder M. Pathogenesis of prion diseases, current status and future outlook. *Nat. Rev. Microbiol.* 2006; 4: 765-75.
18. Gallo RC. The discovery of the first human retrovirus HTLV-1 and HTLV-2. *Retrovirology.* 2005; 2: 17.
19. Kalunda M, Mukwaya LG, Mukuye A. Kasokero Virus: A new human pathogen from bats in Uganda. *The American Journal of Tropical Medicine and Hygiene.* 1986; 35: 387-392.
20. Chai JY, Choi MH, Yu JR, Hyung SL. *Gymnophalloides seoi* a new human intestinal trematode. *Trends in Parasitology.* 2003; 19: 109-12.
21. Gauci PJ, McAllister J, Mitchell IR. Genomic characterization of Trubanaman and Gang gan viruses, two bunyaviruses with potential significance to Public Health in Australia. *Virology Reports.* 2016; 6: 1-10.
22. Kyaw Ak. Chikungunya Virus Infection in Blood Donors and patients during outbreak Mandalay, Myanmar. *Emerging Infectious Diseases.* 2020; 26: 2741-5.
23. Hayan JJ, Carias C, Rudd J. M. Estimation of Severe Middle East Respiratory Syndrome Cases in the Middle East-2012-2016. *Emerging Infectious Diseases.* 2016; 22: 1797-9.
24. Salam AP, Rojek A, Cai E, Raberabona M, Harby P. Deaths Associated with Pneumonic Plague, 1946-2017. *Emerging Infectious Diseases.* 2020; 6: 10.
25. Newman BC, Sutton WB, Moncayo HC. Heartland Virus in Lone Star Ticks, Alabama USA *Emerging Infectious diseases.* 2020; 26: 154-1955.
26. Jula A, Waris M, Kantula K, Peltula V. Primary and Secondary Human Bocavirus 1 infections in a family, Finland. *Emerging Infectious Diseases.* 2013; 19: 1328-31.
27. Meseret GA. Emerging and Reemerging Viral Diseases: The Case of Coronavirus Diseases 19. *Int. Journ. Virol. and AIDS.* 2020; 7: 1.
28. Wolfe DN. Bushmeat, hunting, deforestation and prediction of zoonotic disease emergence. *Emerg Infect Dis.* 2005; 11: 1822-7.
29. Briand S, Bertherat E, Cox P et al. The international Ebola emergency. *New Engl. J. Med.* 2014; 371: 1180-3.
30. Abdel-Ghafar AN, Chotpitayasunondh T, Gao Z. Update of avian influenza A (H5N1), virus infection in humans. *N. Engl. J. Med.* 2008; 58: 261-273.
31. Dawood FS, Juliano HA. Estimated global mortality association with the first 12 months of 2009 of pandemic influenza. A H1N1 virus circulation a modeling study. *Lancet Infect. Dis.* 2012; 12.
32. Oliveros virus. A novel arenavirus from Argentina. Bowen Peters MP, Mills CJ, Nichol N, *Virology ST.* 1996; 1: 217.
33. Van Doorn HR. Emerging infectious diseases. *Medicine (Abingdon).* 2014; 42: 60-63.