

Zoonoses-pandemics and the Urgency of a “Zooimmunocament”

Ezekiel Kikoh, Ngai Roland Yinkfu

PhD Candidate, Departments of Philosophy, Psychology and Sociology and
Department of Clinical Biochemistry, University of Dschang, Dschang, Cameroon

ABSTRACT

The recurrence of animal-to-man pathologies and its lethality has motivated our inquiry into a rethink of our relationship with fauna species. Mindful of the lethality of zoonoses, the duration to develop vaccines for the prevention of zoonoses, the inevitable interaction of fauna and humans, the fragile nature of the human immune system to fight zoonoses, this paper proposes a “zooimmunocament” which humanity needs to borrow the genetic and immunologic ingredients from the fauna species where they don’t develop a malady and used for his therapy. This therapy is far from vaccines. Humanity thanks to his evolutionary advancement in intelligence can control and make use of the fauna immune system for the fight against zoonotic (zoonoses) pathologies. Since those pathogens in fauna species do not cause harm, humanity can exploit the set up of their defense system for a possible therapy thus the appellation zooimmunocament.

KEYWORDS: Zoonoses-pandemics, fauna, vaccines, eco-rethinking, zooimmunocament

INTRODUCTION

The relationship between the human species and fauna components of our ecology has never been a cordial one. From old days, most of the pathologies that have caused enormous damage to the human species had been identified to have animal provenance: thus the appellation “Zoonoses-pandemics”. Zoonoses refer to pathologies that can be transmitted from animals to people or more specifically a disease that normally exists in animals most often without harm but can infect humans and spread rapidly over multiple ecological areas causing enormous deaths. This migration of animal disease which causes pandemics in humans motivated us to rethink of the ecological order free from zoonoses spillover. Looking at this question from the ecoethicist perspective, it is probable that the ecological echelon must have been breached somewhere. Why do diseases harmless to fauna species cause enormous harm to man? Has man a weak defense system? Is man’s defense system an evolutionary misfit? Can he copy the defense system of animals? Hygiene and distancing potential zoonoses species are insufficient to block zoonoses spillover thus the need for a zooimmunocament. This will permit humanity to borrow the resist defense ingredient(s) in fauna species for a therapy. The archeology of salient Zoonoses-pandemics is man a weak species or he is victim of a bleeding ecological diseases spillover? An urgency for a zooimmunocament characterize the itinerary of our inquiry.

I. An archeology of salient Zoonoses-pandemics

Zoonoses date as far back as when humanity started interacting with fauna species, but the frequency of Zoonoses then might not be as recurrent and violent as today. Despite

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humanity’s sophisticated medical technology zoonoses still come and go with uncountable victims thus need to investigate what is missing. An archeology of zoonoses and efforts made will permit us propose an alternative ecoethicist panacea. Mark Welford in his book titled *Geographies of Plague Pandemics; the Spatial-temporal of Plague to Modern Day*¹ takes us memory to the history of Zoonoses-pandemics.

1. Athenian pandemic or plaque of Thucydides.

The Zoonoses-pandemic that first existed took place in the ancient period in 430 BCE and is called the Athenian pandemic or plague of Thucydides because he was the historian that narrated the zoonoses pandemic. Welford while commenting Thucydides² traces the etiologic agent of the Athenian pandemic to *Salmonella enterica*³. This was done of recent with the advent of modern methods of research during which DNA from three teeth from 150 skeletons excavated from Kerameikos ancient cemetery of Athens and dated to 430 BCE were tested using ‘suicide’ polymerase chain reaction (PCR) amplification protocols. Six putative causal agents of the Athenian Pandemic were tested separately. At the end of it all: “The ancestral strain of

¹Mark (Welford), *Geographies of Plague Pandemics; the Spatial-temporal of Plague to Modern Day*, New York, Routledge, 2018, 156p.

² Greek historian (460-400BC), noted for recording wars and pandemics in Greece in his days.

³ It is a rod-shaped, flagellate, facultative aerobic gram-negative bacterium causative agent of most fauna-man pathologies including the Athenian pandemic of 430BC.

Salmonella enterica did yield PCR reaction product, indicating the presence in the skeletal teeth of typhoid⁴. Symptoms of the ancient Zoonoses pandemic according to Thucydides commented by Mark Welford indicates that the: "Sickness first appeared in the form of fever, accompanied by a feeling of hopelessness that progressed to congestion, vomiting, and convulsions. Thucydides' eyewitness account noted the abrupt onset of fever, headache, fatigue and stomach pain followed by vomiting and if a sufferer survived this early onslaught after seven days, severe diarrhea, bleeding from the mouth also occurred, while fatal dehydration frequently followed diarrhea". It is therefore certain that the Athenian pandemic had as etiologic agent a fauna species. Other pandemics equally characterized the ancient period but their etiologic agent to fauna species isn't scientifically established. They include Antonine Pandemic⁵ of 165–180 CE and the Justinianic Plague⁶.

2. The Medieval Black death Zoonoses-pandemic

The Medieval Black death Zoonoses-pandemic was a catastrophic/horrible pandemic that stroke Europe and Asia in mid 300s. The Black Death is believed to have been caused by *Yersinia pestis* living in rodents from them is transmitted to the human species when bitten by infected fleas. The medieval Black Death Zoonoses is noted for its disappearing and resurfacing character. Contemporaries of this Zoonoses left many descriptions of the disease. According to one of the best known Italian author for pandemics Giovanni Boccaccio (1313–1375), related by J.N Hays, he precises the symptoms of Black Death and how it differed from the symptoms it manifested in the East. To him, it did not take the form it had assumed in the East, where if anyone bled from the nose it was an obvious portent of certain death. On the contrary, its earliest symptom, in men and women alike, was the appearance of certain swellings in the groin or the armpit, some of which were egg-shaped whilst others were roughly the size of the common apple. Sometimes the swellings were large, sometimes not so large, and they were referred to by the populace as *gavòcciolì*⁷ it is regrettable that later on, the symptoms of the disease changed, and many people began to find dark blotches and bruises on their arms, thighs, and other parts of the body, sometimes large and few in number, at other times tiny and closely spaced.

3. Modern/contemporary Zoonoses pandemics.

The modern period first. It would be cumbersome to enumerate the numerous Zoonoses in the modern period in an article like, the most succinct method would be just to signal some of the Zoonoses and direct their etiological agents to further research by prospective researchers. Another obstacle in handling Zoonoses in the modern period is the recurrence nature of most of the Zoonoses, some have even persisted into the contemporary period and its episodes/ outbreaks usually carries away many people. Among the numerous Zoonoses in the modern period are rabies, anthrax, glanders, plague, yellow fever, influenza,

⁴ Ibid.,p.16.

⁵ Also known as the Plague of Galen, the physician who described it, was an ancient pandemic brought to the Roman Empire by troops who were returning from campaigns in the Near East.

⁶ (541-549 AD), contagious disease that touched the entire Mediterranean basin, Europe and near east, named after the roman emperor who contracted the disease and recovered. It killed almost a fifth of the population and was caused by *yersinia pestis* bacterium.

⁷ Italian term for clusters (of varices)

small pox etc. Based on this complexity the, J.H Hays prefers to put the modern period under what he calls the second pandemic date then from the medieval period running into the modern. The end of the second plague pandemic therefore was a ragged affair and not clearly defined. The second plague pandemic may more clearly be separated from the third by geography than by dates. While the second pandemic was flickering out in western Asia in the early nineteenth century, another zone of plague infection had taken root in Yunnan in south China by the 1770:

No clear pattern is entirely convincing, the second pandemic was particularly widespread in the following years: 1360–1363; 1374; 1400; 1438–1439; 1456–1457; 1464–1466; 1481–1485; 1500–1503; 1518–1531; 1544–1548; 1563–1566; 1573–1588; 1596–1599; 1602–1611; 1623–1640; 1644–1654; and 1664–1667. This prolonged pandemic ended at different times in different places, and subsequent historical accounts have given different end dates depending on their regional or national focus. In the years after 1670, plague visited Europe only sporadically; for many historians the second pandemic ended in 1722, the date of plague's last appearance in Western Europe⁸.

The etiology of these pandemics are traced to animal bites scratches or ingestion and then transmitted from human to human in the different unhygienic contacts with infected individuals.

Secondly the contemporary period. This period has a mélange of primitive, medieval and modern Zoonoses that resurfaces in one way or the other. The symptoms of contemporary Zoonoses resemble those of old days. From all that precedes, it is clear that either the human species is a fragile species or he keeps violating rules of living with Zoonoses fauna species.

II. Is the human species a fragile species or there is a breach in the ecological chain?

Diseases that fauna species host but remain healthy each time in humans cause lots of harms, so, it is either the human species is biological weak compared to animals or he is disordered when it comes to respecting hygiene with other potential zoonotics. Is he victim of revolutionary rank or an ecological vagabond?

1. Human species caught between fragility and ecological disorder

Man as a fragile species in the sense that he has special traits different from other animals and should be protected and treated different. This view is highly defended by David Hume. Denis.G Anold in "On the Moral Difference between Humans and Other Animals"⁹ digs into Hume's analysis. Hume appeals to comparison between humans and other animals support his analysis of human, human sympathy, human passion and human morality built to protect weakness of the human species. He did this comparison for two reasons: "To identify uniquely human capacities. For example, he identifies the capacity for justice as a quality unique to humans based on his observation for other animals, to provide explicit analogical support for his conclusion regarding such elements of human nature as

⁸ Ibid.,p.47.

⁹ Denis .G Anold, "On the Moral Difference between Humans and Other Animals" in *History of Philosophy Quarterly*, Vol. 12, No. 3, 1995. P.1.

reason and the passions"¹⁰. Hume's argument places the human species as a weak though special species that needs to be handled with care compared to other beings. Added to it, of the animal species, the human species is only that finds difficulty in inserting itself into the ecological order. He is exposed to numerous, biological behavioural and environmental changes. It is never an easy task from the gestation period in human till the human being gains its autonomy from the parents and beyond.

In a question that appeared in Quora¹¹, Adriana Heguy a Genomics researcher, attempts an answer to: why did we evolve to have such weak vulnerable bodies when you would think evolution would have given us better body armour and protection for organs? Her response begins by a distinction between evolution and design. Evolution doesn't design organisms; it doesn't have a big table where it draws organisms. Evolution molds based on structures and features that are already there. The case of humans, we are primates and there isn't a single primate that is armoured. In Heguy's opinion, humans took an evolution that favoured hand dexterity, a big brain to support hand-eye coordination, throwing and supporting sophisticated communication to thrive in complex and cooperative social environment: "we may have soft bellies but we are not weak animal. We are an agile intelligent and social mammal. We are the most deadly predator of all mammals and we also opportunistic, flexible and adapted to life from tropics to poles. From the evolutionary point of view, we are being very successful much more than any armoured mammal I can think of"¹² Unfortunately, his immune system hardly resists diseases that do not cause harm to intelligently weak mammals. Man surely took a wrong evolutionary track, instead of evolving gene-wise he went intelligent and predatory-wise which is exposing him to zoonoses today. Let us borrow the evolutionary fighting weapon (it could be the immune system) of those low intelligent mammals.

2. Civilization and zoonoses-pandemics.

The evolutionary trend in favour of man as an intelligent and ecologically barrier-crosser exposes him to Zoonoses pandemics. Nathan Rott¹³ establishes the link between deforestation and Zoonoses. His observations based on the Ebola and COVID19 pandemics will help establish a link between deforestation civilization and Zoonoses pandemics. To him, in 2013, an 18-month-old boy got sick after playing near a hollow tree in his backyard in a remote West African village. He developed a fever and started vomiting. His stool turned black. Two days later, he died: "Two years and more than 11,000 deaths later, the World Health Organization put out a report saying the Ebola outbreak that likely emanated from that hollow tree may have been caused in part by deforestation led by foreign mining and timber operations"¹⁴ The tree the boy played near was infested with insectivorous bats that may have been pushed into the boy's village because upward of 80% of their natural habitat had been

¹⁰ Idem.

¹¹ It is a Platform that empowers people to share and grow world's knowledge on many fields of study. www.quora.com

¹² <https://qz.com/520801/why-are-humans-so-weak/>. 20/12/2020 at 10 :18. AM

¹³ He is a correspondent on NPR National Desk where he focuses on environmental issues and American West.

¹⁴ Nathan Rott, "Like Poking a Beehive": The Worrisome Link Between Deforestation And Disease in *Environment and Energy Collaboration*, 2020. At 10:33.

destroyed. Nathan, quoting John E. Fa, a professor of biodiversity and human development at Manchester Metropolitan University, who was part of a team of researchers that linked recent forest loss to 25 Ebola outbreaks that have occurred since 1976 says "When you disturb a forest, it actually upsets, if you want, the balance of nature, the balance between pathogens and people"¹⁵. From this, we can see a direct link between our civilization based on deforestation and zoonoses.

3. Neo-liberal economy, ecological and non-ecological factors of Zoonoses spillover.

Neo-liberalism which is transcontinental commerce centered on profit making at all cost has destabilized ecological equilibrium. Hervé Kempf exposes how these neo-liberalists he calls "oligarchie prédatrice"¹⁶ exploit the planet and exposes humanity to perils. The inability of capitalists to reconcile profiting making and ecological equilibrium has exposed man to animal diseases spillover. We can only target these spillovers and block potential ones if we give it the status of other global crises like terrorism. Ecological crisis and social inequality as two sides of the same coin: «Mais on ne peut comprendre la concomitance des crises écologique et sociale si on ne les analyse pas comme les deux facettes d'un même désastre. Celui-ci découle d'un système piloté par une couche dominante qui n'a plus aujourd'hui d'autre ressort que l'avidité, d'autre idéal que le conservatisme, d'autre rêve que la technologie»¹⁷.

Benedict McAleenan and Will Nicolle, in an article titled: "Outbreaks and Spillovers: How the UK and international community can lower risks of zoonotic disease"¹⁸, on their part exposed the dual factors: ecological and non-ecological factors, that favour the spillover of animal-man diseases which are in turn divided into what they called "different drivers"¹⁹. The drivers of zoonotic disease emergence never act in isolation; rather different drivers both ecological and non-ecological interact to create a situation where an infectious pathogen existing within an animal host can be transmitted to humans. At a high-level, the spillover from animals to humans can be thought of through three key stages: "Reservoirs, increased human-animal contact, localized transmission"²⁰

Talking about the reservoir driver, pathogens exist within 'animal reservoirs and these animals often harbour pathogens while suffering minimal or no health impacts, due to a long history of years of co-evolution with the pathogen, similar to the common cold in humans. Alternatively, animal reservoirs might be intermediary hosts, which act as a bridge between normal hosts and humans. For example: "Measles appears to have jumped from cattle to humans around 1,000 years ago. The IPBES, an international scientific advisory body, estimates that 17% of infectious diseases are spread via such animal contact"²¹. Concerning the human-animal contact driver, owing to various possible reasons, humans

¹⁵ Idem.

¹⁶ Hervé Kempf, *Comment les riches détruisent la planète*, Paris, Seuil, 2007, p.5.

¹⁷ Idem.

¹⁸ Benedict McAleenan and Will Nicolle, in "Outbreaks and Spillovers: How the UK and international community can lower risks of zoonotic disease in *Policy Exchange* , London, Policy Exchange. 2020. p.44.

¹⁹ Ibid.,p.7.

²⁰ Idem.

²¹ Ibid.,p.15.

increasingly come into contact with animal reservoirs of pathogens. This can range from directly human driven processes, such as farmers expanding agricultural land into previously wild areas, or more indirect processes, such as food chains being disrupted, causing fluctuations in ecosystems. For example: "Urbanization and farm abandonment in the USA's East Coast region caused changes to owl, hawk, deer, wolf and rodent populations that led to higher numbers of white-footed mice carrying the bacteria that causes Lyme Disease"²² and finally localized transmission driver, The pathogen 'jumps' the species barrier from an animal reservoir to humans whereas human immune systems can resist most novel pathogens, occasionally such unfamiliar pathogens can evade these defenses. The specific way in which a pathogen spills over varies, but often includes direct contact with infected wildlife, contact with a domesticated species, or the consumption of wildlife for meat or pseudo-medicinal purposes. Local, clustered outbreaks can occur at this stage, and the pathogen and the disease it causes begins to be identifiable by researchers and authorities. For example: "Localized clusters of COVID-19 were identified among workers at the Wuhan wildlife market in early December 2019"²³.

III. The impasse in handling zoonoses through principles: towards an zooimmunocament.

Our interaction with fauna species is inevitable; our sophisticated medicine and technology have proven futile to handle zoonoses. At this juncture, humanity needs to remunerate like in the Cartesian fourth rule of the method which consist in going back in bit to ensure if no step is omitted. It is either humanity has violated an ecological law or he needs to borrow from other animals what he didn't develop in terms of diseases defense during evolution if must shun zoonoses, what we have stipulated as: "zooimmunocament", from the look of things handling zoonoses through ecological, hygiene and sanitation principles is inefficient.

1. Attempting the restoration of the ecological chain in 4 principles

Shane Mahoney in a video in *Conversation Visions* titled: "The Covid19 challenge zoonotic diseases and wildlife" proposes 4 principles humanity needs to observe in order to reconcile blockage of the animal-man disease spillover, wildlife preservation, food security and different cultures: 1st principle, recognize the importance of the use of wildlife for many communities, including indigenous Peoples and Local communities, in policy responses, 2nd principle, maintain and restore healthy and resilient ecosystems to reduce risks of zoonotic spillovers and future pandemics, 3rd principle, recognize that persecution including killing of wild animals suspected to transmit diseases will address the cause of the emergence or spread of zoonotics, and the 4th principle, regulate, manage and monitor harvesting, trade and use of wildlife to ensure it is safe, sustainable and legal²⁴ it is rather regrettable that these principles add to others whose mudis-operandi are still to be determined. They remain unadapted and ecological predators continue with business as usual while humanity perishes.

²² Idem.

²³ Ibid.,p15.

²⁴Shane Mahoney, "The Covid19 challenge zoonotic diseases and wildlife" in *Conservation Visions*, Newfoundland, Water street, 2020.

2. Zoonoses merits the status of global terrorism threat: an anti proliferation approach

Zoonoses emergence and re-emergence is a growing threat to human health and economies. It should be treated with the same severity as other threats to global security, such as terrorism or weapons of mass destruction. According to Benedict McAleenan in such security areas, international systems have been developed for the prohibition of dangerous practices, including close monitoring of early stage risks such as uranium enrichment. Prohibition, mapping and monitoring of high-risk practices and regions are in place, supported by international inspection regimes. The regimes governing anti-proliferation of weapons of mass destruction (WMDs) provide a model for risk-based governance. For nuclear risks, the IAEA, reporting to the UN General Assembly, has the ability to perform ad hoc inspections based on its assessments of risk. These are based on a range of criteria, but use accounting of nuclear processes and tamper-proof cameras to monitor activities in situ. It recognizes that nuclear power generation is a legitimate civilian activity, but that there are ways in which this can spill over into higher risk categories. He further indicates that: "Under the Biological Weapons Convention 1975 and the Chemical Weapons Convention 1997, there are bans on stockpiling and usage of certain weapons. Refusal by countries to allow inspections under the terms of the respective treaties attracts suspicion and opprobrium on the world stage. The same should be applied to the risks of zoonotic disease emergence"²⁵. There are identifiable, high-risk activities and policies that must be phased out. Where they cannot be phased out, they should be monitored and inspected. Contravention should attract attention and penalties, such as trade sanctions. Governments must be forced to choose between valuable trading relationships and risky domestic practices. An important reason for an international inspection regime is that it helps to circumvent local, regional and national reporting mechanisms. What shocked the world were the actions of Chinese officials in Wuhan during the earliest stages of the COVID-19 outbreak. A doctor who attempted to draw attention to the possibility of a SARS-like pneumonia outbreak was temporarily locked up for doing so and others were admonished for causing "social panic", while Chinese authorities censored the social media hashtag #WuhanSARS. It took over two weeks for the Wuhan Health Commission to publish details of the outbreak on its website and inform the WHO. These analysis show a close link between the management of terrorism which can be borrowed in zoonoses. The same prescriptions, monitoring, and conventions on terrorism and terrorism related equipment could be harnessed and used when zoonoses break out. We are still pessimistic that despite the Wuhan zoonoses scandal and British model of putting zoonoses at the status of terrorism issues, profit making tendencies will dominate the laudable idea. It is due to this fear that we propose a broad spectrum immune rearmament which targets all the imminent pathogens responsible for zoonoses: zooimmunocament

3. Eco-rethinking and zooimmunocament

In rethinking eco-order or completing our evolutionary directions, a central concept is that of the human-wildlife-environment interface. This refers to how often humans and

²⁵ Benedict McAleenan and Will Nicolle, "Outbreaks and Spillovers: How the UK and international community can lower risks of zoonotic disease in *Policy Exchange* , op. cit.,p.38.

animals interact, in what ways they interact, and under what conditions. Added to the human-wildlife-environment concept, there is zooimmunocament which humanity needs to borrow genetic and immunology ingredients from the fauna species where they resistant and used for his therapy. This therapy is far from vaccines. Humanity thanks to evolutionary advancement in intelligence can harness the might in the immune systems of fauna for his fight against zoonoses. The duration to produce a vaccine, the lethal character of certain zoonoses, the inevitable interaction between man-fauna species warrants that we go but for a zooimmunocament.

The WHO program “One Health” is initiative of WHO in the year 2000 is a collaborative, multisectoral and transdisciplinary approach working at local, regional, national and global levels to achieve optimal health and well-being outcomes recognizing the interconnections between people, animals, plants and their shared environment. Unfortunately, this program didn’t take into consideration the disparity in the immune systems of the animals and people. Zooimmunocament will take into consideration the therapeutic capacities each eco-biotic component and arm it so it can interact with others without diseases spillover. We can draw inspiration from Doctor Raoul’s chloroquine and azithromycine combination in France as well His lordship Samuel Kleda’s therapy of Douala in Cameroon.

Conclusion

In the search for urgent contemporary anti-zoonoses, a flash back to the different Zoonoses from ancient period to the contemporary era indicated that humanity’s interaction with fauna species is never safe. The relationship has worsen in times of mass migration and transcontinental commerce catalyzed by modern-fast means of transportation, worst of it, the exploitation of animal habitat and reservoirs for commercial purposes. The voracious appetite for gain and profit at all cost by multinationals and greedy individuals has exposed the entire human species to recurrent Zoonoses

with untold deaths. Attempts to counter zoonoses in terms of repairing the ecological order, vaccines, hygiene and sanitation etc have always been futile thus the need to rethink zoonoses. It is either the human species rethinks its ecological relationship with fauna species and borrow from fauna species or he perishes. This paper proposes the *zooimmunocament* which is a broad spectrum medication with provenance fauna species disease defense mechanism. Fauna species seems to resist zoonoses than us, in light we can pick the immunology power of fauna species and thanks to our advanced technology harness it into a zooimmunoplex for zoonoses.

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