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Health and Degrowth in times of Pandemic.

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1. Introduction

Today, after the explosion of the COVID-19 pandemic, the majority of degrowth scholars would probably agree on the fact that health is a crucial theme in the sustainability/degrowth debate. However, from the birth of the term degrowth - that we can date as approximately between 2001 (when the term "sustainable degrowth" is launched by the magazine "Casseurs de pub") and 2008 (the first international degrowth conference in Paris) - little attention has been dedicated specifically to health within the degrowth framework. Some authors have analysed case studies that share analogies with a degrowth transition, such as Cuba and Europe during an economic crisis (Borowy, 2013; De Vogli & Owusu, 2015), while other researchers have studied the link between growth and health from a historical (Borowy, 2017) and economic point of view (Hensher, 2020a-b; Hensher et al., 2020; Hensher & Zywert 2020). Furthermore, some degrowth scholars have developed a theoretical framework exploring the complex relationship between degrowth and health (Aillon et al., 2012; Missoni 2015; Borowy & Aillon 2017; Aillon & D'Alisa 2020).

This lack of an extensive reflection on health and degrowth should be analysed. In fact, several fundamental degrowth concepts (such as wellbeing, *buen vivir*, good life, care) are effectively shared with the current definition of health, especially if we consider it in the light of that proposed by the WHO in 1946: "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946). At the same time, considering the debate within the scientific community about the definition of health, we can see how some authors have questioned the WHO definition and proposed some alternatives. These are indeed more systemic, complete and coherent with current reality, showing even greater overlap with the basic degrowth concepts of wellbeing and autonomy, seeing health as "the ability to adapt and self-manage" in the face of social, physical, and emotional challenges (Huber, 2011, p. 8).

Ivan Illich, considered one of the main pioneers of degrowth through his fundamental book *Tools for Conviviality*, viewed health as a central and fundamental topic. In the introduction to the book, Illich referred to the health field to explain the concept of "counterproductivity", propose

the existence of two *watersheds* and introduce the notion of *conviviality* (Illich, 1973).¹ His following book, *Medical Nemesis: the expropriation of health*, put forward the concept of *iatrogenesis* of the medical systems, explaining why and how the limitation of the professional management of health is essential in order to profoundly critique the actual industrial system and to promote the birth of an alternative kind of society (Illich, 1976).

Increasing and irreparable damage accompanies present industrial expansion in all sectors. In medicine, this damage appears as iatrogenesis [...] only a political program aimed at the limitation of professional management of health will enable people to recover their powers for health care, and that such a program is integral to a society-wide criticism and restraint of the industrial mode of production (Illich, 1976, pp. 6, 270-271).

With the aim of focusing on the current pertinence of the ideas and reflections proposed by Illich and promoting a further debate around the relationship between health and degrowth, in October 2019 we launched a call for papers for this special issue. Shortly afterwards, while the authors were finalizing their papers, the COVID-19 pandemic broke out. This has caused a delay in submission, because most of the authors have been working in the health field during the ongoing emergency period. However, even if the focus of this special issue is not specifically on the pandemic itself, the delay has enabled authors to make various connections between their areas of interest and the actual crisis situation. At the same time, we have also received some contributions specifically focused on the COVID-19 crisis.

2. An overview of the papers

In line with the concept of degrowth as well as with the stated aim of the journal *Visions for Sustainability*, the contributors come from different disciplines (medicine, public health, biology, economics and social sciences) and also endeavour to articulate interdisciplinary approaches in order to examine various aspects of the relationship between health and degrowth. This leads to very rich and highly interesting reflections and debates, even if, as it often happens when working within an interdisciplinary framework, some studies can have some limitations when examined from each of the specific disciplinary perspectives.

In their letter to the editors "A degrowth perspective on the coronavirus crisis", Nathan Barlow, Constanza Hepp, Joe Herbert, Andro Rilović, Joëlle Saey-Volckrick, Jacob Smessaert and Nick von Andrian discuss the coronavirus pandemic situation specifically from the perspective of the degrowth theoretical framework. The authors highlight the connection between the pandemic emergence and the current growth-based capitalist system and the need of changing the current paradigm. Degrowth is proposed as an alternative path, emphasizing the difference between a degrowth scenario and the actual crisis (in which the transition has not been planned and not chosen democratically). At the same time, the authors point out how the quick socio-cultural and economic transformation due to the COVID-19 pandemic shows that rapid societal transformation could be feasible.

Two papers then propose, from a biological point of view, reflections on the spreading of infectious disease (in particular in the field of zoonosis), both from an overall perspective and more specifically for the COVID-19 pandemic.

¹ "At the beginning of his 1973 book *Tools of Conviviality*, Illich described what he thought was the typical course of development followed by contemporary institutions, using medicine as his example. Medicine, he said, had gone through "two watersheds." The first had been crossed in the early years of the 20th century when medical treatments became demonstrably effective and benefits generally began to exceed harms. For many medical historians this is the only relevant marker – from this point on progress will proceed indefinitely, and, though there may be diminishing returns, there will be no point, in principle, at which progress will stop. This was not the case for Illich. He hypothesized a second watershed, which he thought was already being crossed and even exceeded around the time he was writing. Beyond this second watershed, he supposed, what he called counterproductivity would set in – medical intervention would begin to defeat its own objects, generating more harm than good" (Cayley, 2020).

In "Alternative ecological and social suggestions in prevention of the global threat of emerging infectious diseases", Camille Besombes analyses several factors that have been associated with the emergence of infectious disease such as intensive agriculture and farming, change in land use, deforestation, human invasion of remote areas, loss of biodiversity, etc. The last example can be seen in terms of the health consequences of an intensive economic/agro-industrial model linked to a growth-based system. The author proposes coherent new frames for public health interventions ("One Health", "Ecohealth"), focused more on the promotion of health through creating a healthy environment rather than the struggle to provide secondary prevention against emerging diseases.

In "The environmental roots of zoonotic diseases: from SARS-CoV-2 to cancer viruses. A review", Carlo Modonesi analyses the link between emerging zoonosis and the loss of biodiversity due to anthropic activities. Pathogens shared by wild and domestic animals cause more than 60% of infectious diseases in humans from type A flu to HIV, from Ebola haemorrhagic fever to SARS-Cov2. The author traces the recent history of zoonotic epidemics and their relation to human impact on ecosystems and wildlife, analysing how poor ecosystems often are unsafe for humans because they increase the risk of spillover. The author extends these considerations also to viruses capable of promoting oncogenic transformation. In conclusion he suggests a multidisciplinary intervention to prevent zoonosis, by acting on ecological factors and restoring biodiversity in a degrowth economic paradigm.

The research of Nicole Weydmann is grounded in the field, in countries located in the Global South, and describes what different practices such as the use of traditional medical practices in Indonesia could mean to the health and degrowth debate. In "The Recovery of Healthcare: Paving the Way for Interweaving multiple healthcare competences", she illustrates some insights from her fieldwork and from qualitative interviews in Indonesia. In this context, 'traditional' and complementary medicine coexist with globalized biomedicine, and health seekers are often more likely to use 'traditional' than biomedical healthcare. The author describes how on one side a growth economy and culture influence negatively these practices, seeing them as in competition with the business of biomedical healthcare. On the other side she explains how different views of health, illness and healing could help in order to decolonize concepts and paradigms underlying "western imaginaries of healthcare". Finally, the author underlines the importance of building an alternative framework for medical practice, which is people-centred and context-sensitive, and where health seekers can be free to combine different tools, techniques and approaches available in order to address their particular needs and uncertainties, with the help of skilled healers.

Two more papers are grounded in the medical field and explore the relationship between health and degrowth both from a public health and a global health point of view.

In "Health workers and sustainable systems for health in a post-growth society", Eduardo Missoni and Edmundo Morales Galindo discuss the need for a new health care model starting from a critical analysis of the Sustainable Development Goals (SDGs). SDG 8 proposes achieving a "sustainable, inclusive and sustained growth", ignoring the limits of growth within a finite ecosystem; SDG 3 includes the target "3.8: achieving universal health coverage", a substantial regression from the original WHO's Primary Health Care (PHC) strategy, that responds to a globalized biomedical hospital-centric model, which is inadequate to meet populations' health needs. Finally, they conclude by proposing a paradigmatic shift in health and social care organization and health workers' educational model as pillars of a post-growth society's health systems.

In "Public health and degrowth working synergistically: what leverage for public health?" Marie-Jo Ouimet, Pier-Luc Turcotte, Louis-Charles Rainville, Yves-Marie Abraham, David Kaiser and Icoquih Badillo-Amberg show that there are several points of convergence between degrowth and public health goals (e.g., promoting environmental sustainability and fighting climate change, reducing inequalities, promoting healthy lifestyles, etc.) and that fruitful synergies can be implemented between these two research fields, giving some practical examples. In particular, the authors focus on how several theoretical and practical tools of public health could strengthen degrowth arguments and on the need for public health to promote degrowth. That could create the preconditions in order to elaborate and implement several effective public health strategies.

3. Insights into the COVID-19 pandemic from a degrowth point of view

In the light of the COVID-19 crisis, we have decided to dedicate our editorial to the pandemic emergency, in an endeavour to further articulate what emerges from the published papers, the actual situation, degrowth literature, and with further reference to medical anthropology and psychology frameworks.

3.1 Growth, emerging infectious disease and diminishing marginal returns

Some of the papers in this special issue clearly illustrate the connection between the current capitalist neoliberal and growth-based system and the SARS-CoV-2 pandemic. The researchers highlight how this current developmental system, in order to maximize productivity and economic growth, increasingly exploits the environment and animals. Indeed, intensive agriculture and farming, change in land use, deforestation, the human invasion of remote areas, and the consequent loss of biodiversity, have been related to the emergence of zoonoses and vector borne disease like dengue, ebola and zika and probably are at the core of the emergence of COVID-19 pandemic. A recent report of IPBES Bureau - *Intergovernmental Platform on Biodiversity and Ecosystem Services* (IPBES, 2020) - reinforced this correlation, concluding that escaping the era of pandemics will require a seismic shift in approach from reaction to prevention, restoring ecosystems and biodiversity.

COVID-19 has been called "the disease of the Anthropocene" (O'Callaghan-Gordo & Antó, 2020):

COVID-19 is a paradigmatic example of an Anthropocene disease. It follows a complex sequence involving disruption of the natural, social, economic and governance systems. The destruction of natural habitats and the extinction of species, the poorly regulated capture, marketing and consumption of non-human animals, the influence of lobbies to nullify or delay measures to protect natural and social systems, the limitation of current scientific knowledge and the contempt by governments and companies of the available evidence, have all worked in an orchestrated sequence to facilitate the current COVID-19 pandemic. This sequence of distal causes is closely related to the global climate crisis and the rest of environmental disruptions of the Anthropocene (O'Callaghan-Gordo & Antó, 2020, p. 2).

From this perspective, the actual pandemic could be seen as a global negative externality related to the current system of development within a framework of diminishing marginal returns (Bonaiuti, 2014). Beyond a certain threshold of exploitation of some natural systems, the productivity of our work diminishes because resources become less and more difficult to access/use and because of some retro-feedbacks related to the alteration of ecosystems that contributes to lessen productivity. In this line of thought the actual pandemic could be seen as one of the global "symptoms" (retro-feedbacks) of the "growth-sickness" of the actual socio-economic system. Before the current pandemic, western society has witnessed several other similar phenomena that have disturbed the calm complacency of our world: the emergence of global terrorism in 2001; the global economic crisis of 2008; massive migration flows related to poverty/wars and climate change, the rise of xenophobia and populism. While the global economic crisis could be seen as an internal failure of the neoliberal growth-based system, global terrorism and migrations could be seen as retro-feedbacks related to resource depletion, increase of inequalities worldwide and challenges posed by globalisation.

3.2 Why so much attention to the pandemic? The fear of nemesis for the "hybris" of western society

In contrast to past pandemics (e.g., Hong Kong flu) or from other current major issues which threaten public health (e.g., global pollution, climate change), COVID-19 has received enormous attention from the media worldwide. Politicians have implemented drastic - sometimes excessive

and not always evidence based² - public health interventions that have dramatically impacted on the daily life of citizens worldwide, on their psychological/social wellbeing and on the global economy.

In order to get a sense of the scale and magnitude of this phenomenon, we should truly listen to the provocative words launched by the philosopher Giorgio Agamben:

How could we have accepted, in the name of a risk that we couldn't even quantify, not only that the people who are dear to us, and human beings more generally, should have to die alone but also — and this is something that had never happened before in all of history from Antigone to today — that their corpses should be burned without a funeral? (Agamben in Caldwell, 2020).

In the same way, Serge Latouche underlines that:

[...] we have been dealing with pandemics since the Neolithic. The new thing, never seen before, is the confinement of three billion people. Sociability was never sacrificed to such an extent [...] We have done absolutely unnecessary wrong things. I read that in France, in August 1968, the Hong Kong flu broke out: 40.000 dead in France, one million in the world. There was almost no mention of it (Sacchi, 2020, p. 6-7).³

If we consider that, as of 24 November 2020, there have been 1.393.305 deaths worldwide from COVID-19 (WHO, 2020a), we can probably infer that Hong Kong Flu was a similar phenomenon but that the attention of the world at such a time was focused more on other events, probably on the 1968 protest movements, the Cold War, the Vietnam War, etc. In fact, "the Encyclopaedia Britannica estimates that the 1968 pandemic, due to an H3N2 influenza virus, was responsible for between 1 million to 4 million deaths globally [...] The New York Times described the pandemic as 'one of the worst in the nation's history', [but] there were few school closures and businesses, for the most, continued to operate as normal" (Honigsbaum, 2020, p. 1824).

What has changed from the recent past to present times? Why has the whole world been "knocked out" by a virus that by now caused nearly 1.4 million deaths, while people continue to be blind to the fact that in the world every year there are nearly 13 million people who die because of environmental factors that could be avoided (WHO, 2016) and that climate change will be the principal threat to human health in the 21st century (Costello, 2009), causing 250.000 additional deaths every year from 2030 and 2050 (WHO, 2018)? We can hypothesize that the cause is related to the co-occurrence of several factors.

a) Cultural iatrogenesis and the rediscovery of death

In contrast to the past and to other current diseases, the deaths from COVID-19 are highly visible and have been heavily mediatized. If we consider the effects of the cultural iatrogenesis promoted by the medical system, described by Ivan Illich (1976) - the inability of people to stand and to cope with pain, illness and death⁴ - we can clearly understand the anguish of a society that is forced to see something that it would prefer to continue to remove to the unconscious. In today's society,

² We do not question the importance of the lockdown for preventing the spread of the disease and of general public health measures (quarantine for potential cases, physical distancing, hand washing and the use of surgical masks when is not possible to respect safe distances, etc.) but rather the imposition of excessive and sometimes not evidence-based measures. In Italy during the first wave of pandemics, for example, the national government decided to close all parks and to forbid any kind of "unnecessary" open-air movement (some regions forbid even open-air physical exercise). There are several scientific research studies that illustrate that doing physical exercise and staying into a natural environment in fact promotes and protects health and can prevent infectious disease. Thus, if physical distancing is respected (not causing significant increase of COVID spreading) the above-mentioned measures may probably have caused more damages than benefits (*Rete Sostenibilità e Salute*, 2020; Thomson & Ip, 2020).

³ Translation from Italian by the authors.

⁴ "Iatrogenesis [...] is cultural and symbolic when medically sponsored behaviour and delusions restrict the vital autonomy of people by undermining their competence in growing up, caring for each other, and aging, or when medical intervention cripples personal responses to pain, disability, impairment, anguish and death" (Illich, 1976, pp. 270-71).

death, pain and illness are generally conceived of as something external to our life, something that we have to fight (with the help of the powerful science and medicine) and remove, in order to be "healthy" and continue to work and consume. In order to live well, we must not question too much the meaning and the limits both of economic growth and of our existence. If death, the extreme limit of our life, exits from hospital into society, something "taboo" circulates in the streets and it can touch us. At the same time, we do not know (we "have forgotten") how to cope with death and, thus, we fall in a severe state of anxiety. This is what Luigi Zoja (2020a) has called a "mild collective psychosis" related to coronavirus, similar to the collective paranoiac reaction that the author observed and studied after the terrorist attacks of 11th September 2001. According to Zoja, the paranoia manifests itself not at the individual and clinical level, but in the collective mentality, spreading as a "psychic infection" and leading people to lose the sense of proportions (Zoja, 2020a-b).⁵

b) The failure of the myth of growth/progress/science and the religion of medicine

Probably it is not only the presence of death that drives us crazy. The real nightmare is the possibility that our medical system might not have the energy to "win the battle", to adequately provide cure for everybody during the peak of the COVID-19 emergency. The powerful tools of science and medicine could lose the war against a disease, a small virus ... so little that we cannot see and control it. Thousands of people have died from an infectious disease, something that could be seen as "heresy" in the second part of the 20th century, where antibiotics have given us the illusion of control over the majority of infectious diseases. In this situation humanity feels once again frail and powerless in front of nature and death.

What we face is the failure of a myth: the myth of the fire of Prometheus, the myth of growth, progress and science. We have believed ourselves to be the masters of the universe and to be able to protect ourselves from pain, illness and death and to be able to be safe and happy in this world. On the contrary, we will have to deal with several menaces (climate change, wars, rising of inequalities, etc.) that make the future no more a promise (of paradise) but a threat to our very existence (Benasayag & Smith, 2003). In the face of the pandemic, we turn out to be much smaller and more powerless. We have not enough power to stop it and often scientists do not have a similar view of "the truth" concerning what we are facing and what we need to do. A prey to torment, we witness the failure of what Agamben (2020) has called the religion of science and medicine and, at the same time, feeling the near failure of the religion of capitalism and growth.

"[...] Medicine as religion [...] That science has become the religion of our time, that in which people believe they believe, has been obvious for some time now. In the modern West there have coexisted and, to a certain extent, still coexist three great systems of belief: Christianity, capitalism, and science. [...] There is a malign god or principle, namely disease, whose specific agents are bacteria and viruses, and a beneficent god or principle, which is not health, but recovery, whose cultic agents are medicines and therapy. [...] If this cultic practice up to now was, like every liturgy, episodic and limited in time, the unexpected phenomenon that we are witnessing is that it has become permanent and all-pervasive. It is no longer a question of taking medicines or submitting when necessary to a doctor visit or surgical intervention: the whole life of human beings must become in every instant the place of an uninterrupted cultic celebration. The enemy, the virus, is always present and must be fought unceasingly and without any possible truce" (Agamben, 2020-b).

Theoretically, science is the contrary of religion because, while the latter is dogmatic, science should be anti-dogmatic, based on rationality and on an objective and empirical methodology.

⁵ From a psychodynamic point of view, if we cannot stay with some emotions or feelings, and we cannot remove them in the unconscious because they are too evident, we are forced to use other pathological defence mechanisms in order to protect us. We split from our mind the affections and we project the negative affections toward something else. As an example, the fear of our death can become the fear of being damaged by other people and, consequently, the internal rage caused by our powerlessness transforms itself into the rage against every human (potential vector of infection) or again institutions that do not protect us adequately, etc. (Zoja, 2020b).

However what Agamben underlines, and has been highlighted by several medical anthropological studies, is that science contributes to create the cultural system whereby we live and that gives meaning to our reality, which is based on some basic assumptions/beliefs: our "faith". The core of science has embodied the heritage of Christianity and Hebraism and, in a different way, could be practiced as a religion from many people. For western religions, the past was evil, the present redemption and future heaven. For science the past is ignorance/superstition, the present consists of progress using the tools of science, and the future consists in the positivistic promise of a sort of heaven in the real world (Galimberti, 2007). Today the faith, born during the enlightenment, that science would have permitted us to resolve the major threats/evils of humanity is increasingly collapsing, together with other absolute principles and faiths of humankind (God, truth, capitalism, socialism, etc.) (Galimberti, 2007). Probably science and growth/capitalism could be seen as the last faiths, after the failure of all the others. The COVID-19 crisis threatens both these two religious frameworks that maintain the stability and cohesion of our psyche and society. It, therefore, places humankind in a nihilist perspective: a lack of meaning and direction similar to the cultural apocalypses described by De Martino with the concept of the "loss of presence" (Demartino, 1964; Consigliere and Zavaroni, 2020). In this situation it has become almost impossible to continue to live our lives and we need potent mechanisms in order to rebuild the faith. These actions sometimes consist probably more of rituals than of scientific practices and have the end of convincing us that we still are under control and we will "win the war", even if we are obliged to sacrifice our freedom and democratic practices.

Cultic practice is no longer free and voluntary, exposed only to sanctions of a spiritual order, but must be rendered normatively obligatory. That we are dealing here with a cultic practice and not a rational scientific demand is immediately obvious. The most frequent cause of death in our country by far are cardiovascular diseases and it is well known that these could be reduced if we practiced a healthier form of life and if we followed a particular diet. But it has never crossed the mind of any doctor that this form of life and diet, which they recommended to the patient, should become the object of a juridical norm, which would decree *ex lege* what must be eaten and how we should live, transforming our whole life into a health requirement. Precisely this has been done and, at least for now, people have accepted, as if it were obvious, renouncing their own freedom of movement, work, friendships, loves, social relations, their own religious and political convictions (Agamben, 2020a-b).

c) Hybris and the waiting for nemesis

These processes can be analysed within another framework provided by the polarity "hybris-nemesis", that Luigi Zoja (1995) described in "Growth and guilt: psychology and the limits of development". The Jungian psychoanalyst looks for the core of the origin of the current model of development/growth. He finds that there is a sort of nodal point in the psyche of the western society from which everything departed, and which intersects with a number of relevant social and cultural changes. In Ancient Greece the limit was something sacred. After the more famous "know thyself", the other maxim of the Delphi Oracle was "nothing to excess". Consequently, "hybris" was one of the worst sins: the transgression of the limit, the outrage, the arrogance to be like gods, to excel in a quality and to take it away from the god that represents it (Zoja, 1995). If humans exceeded limits, they had to face "nemesis", the punishment from the gods. As an example, the titan Prometheus, who stole fire (the technology, the knowledge) from the gods, was punished by Zeus by confining him forever to a rock, naked, where eagles came to feed on his liver, which every day was perpetually renewed.

However, in the Athens of the 5th century B.C., some particular geographical, historical and social factors - particularly undisputed military supremacy by Athens, first over the Persians and later all over Greece, combined with economic expansionism and developments in politics and democracy - led the Greeks to abandon the "hybris" paradigm and to embrace a model of infinite expansion both in the physical world and in the arena of human knowledge. Humanity projects itself towards infinity and human beings place themselves at the centre of the universe, partially replacing gods. Herodotus takes humanity out of mythical time (an eternal circular motion), making it enter into history (a linear progression towards infinity). In Philosophy, Socrates creates an abstract and conceptual field of knowledge that potentially sees no limits to its development.

In tragedy, Euripides places mankind and the dynamics of its soul in a more central and autonomous perspective compared to the will of the gods. These seeds of "hybris" will never fully blossom and they will quickly collapse with the end of the Greek civilization. Later on, however, the impetus towards infinity contained in the Greek seeds will become (in a different form) a backbone in the monotheism of the Jewish-Christian tradition. Afterwards, this embodied itself in modern scientific thought: a knowledge without limits strongly projected towards the construction of a paradise (on earth), with the faith no longer in a God, but in progress, technology and later on in economic development based on growth (Zoja, 1995).

At the present, we not only face the fear of the collapse of the myth of growth and science but something else reappears from the ashes of our collective unconscious. Zoja explains that, even as western society rationally conceived itself positively (the myth of growth), it narrates itself from a mythological point of view in a negative way. This is because in the collective unconscious the guilt for "hybris" is evermore present, probably in connection with the appearance of increasing threats for the human species (global terrorism, the global economic crisis of 2008, massive migrations, climate change, the COVID-19 pandemic and subsequent economic crisis), that we connect to our transgression of limits and to the effects of the current growth-based model of development.

d) The enemy inside ourselves and the need for reparation and atonement rituals

Like capitalism and unlike Christianity, the medical religion does not offer the prospect of salvation and redemption. On the contrary, the recovery which it seeks can only be provisional, since the evil God, the virus, cannot be eliminated once and for all, but mutates continually and assumes ever new, presumably more dangerous, forms. [...] It is possible, however, that the epidemic that we are living will be the actualization of the global civil war that, according to the most attentive political theorists, has taken the place of traditional world wars. All nations and all peoples are now in an enduring war with themselves, because the invisible and elusive enemy with which they are struggling is within us (Agamben, 2020a-b).

Linking the analyses of Zoja and Agamben, if we agree that the real evil is inside us and it spreads as a psychic infection creating paranoia, it could be hypothesized that this symbolic enemy, embodied by the virus, is composed mainly of the guilt for the "hybris" of humankind, of the fear related to the forthcoming nemesis and of the sense of powerlessness and insecurity connected with the menace of the collapse of our faith (myth of growth, religion of medicine).

If we follow this premise, some actions and strategies that have been adopted by governments and people could be interpreted and acquire a clearer meaning. In Italy during the peak of the first pandemic wave some regions obliged everyone to always use surgical masks in open air places (also alone or doing physical exercise),⁶ even if scientific evidences show that, respecting physical distancing there are not significant health risks while doing sport, while the continuative use of facial mask could probably lead to worse health outcomes also as regards infection prevention, other than related side effects (Alfelali et al., 2020; Donzelli, 2020; Lazzarino, 2020). During the second pandemic wave it has been mandatory in all open-air spaces to use facial masks, even where it was possible to respect physical distancing of 2 metres from other people. The only exception were cases in which the condition of isolation was continuously guaranteed (Gazzetta Ufficiale, 2020a).

In the lockdown decree of 10 April 2020 (#Imstayhome), everywhere parks have been closed and physical activity has been permitted only "close to home" (Gazzetta Ufficiale, 2020c) often interpreted by regions as 200 metres (Marchini & Marocchi, 2020). That means making it impossible in all the Alps to go walking or do other physical activity in the mountains. Several regions have forbidden all kinds of sports/physical activity. However, scientific evidence shows that physical activity and staying in a natural environment promote health and reduce risk of infectious disease, and that doing these activities, respecting physical distances, do not expose nobody to any significant increases of risk (Haubenhofner, 2010; RSS, 2020; Saint-Maurice et al., 2020).

⁶ In the Veneto Region, on April 13, 2020, the ordinance n.50 of the Region obliged everybody to always use a surgical facial mask, for any movement outside private property (home) (Regione del Veneto, 2020).

The authorities have justified these harsh laws as a must related to the protection of life, under the aegis of medicine and science, but this kind of practice could also rationally be understood more as a ritual of reparation.⁷ People have been forced or often they freely decide to use masks, even where it is not necessary, in order to "mask" their removal of reality (the fear of nemesis for their "hybris") and their frailty, and to give themselves the illusion of being able to control what was happening. To be safe - and thus feel able to continue to have faith in medicine, science and growth. Similar reasoning could be applied to the rhetoric of "#stay at home" and for the introduction of a "curfew", each of which could be seen as an extreme way to have the feeling to be able to gain control over the virus. Indeed, a recent study has analysed lockdown measures in 131 countries (Li et al., 2020) and it has been documented that the requirements to stay at home - extremely harsh and with psychological side-effects that can last also for years (Brooks et al., 2020) - was one of the less effective actions. It could reduce SARS-CoV2 R index (time-varying reproduction number) only by 3%, compared to public event bans (- 24%), school closure (-15%), workplace closure (-13%) and in equal measure to a ban on gatherings of more than ten people (- 3%). Concerning the curfew, an Italian immunologist (Antonella Viola) from the University of Padua has declared that "it does not have a scientific reason, but it serves to remind us that we must make sacrifices, that the superfluous must be cut, that our life must be limited to the essential" (Huffington Post, 2020). Therefore, it could be seen basically as a symbolic act of reparation or doing penitence (Wu Ming, 2020). Such measures could also be seen as rituals of atonement with which the population deals with its fear and guilt (internal feelings). The latter are removed and projected on the virus, into an external space that it is possible to try to control better than the internal one. It is a process comparable to a person that suffers from Obsessive Compulsive Disorder, who tries unsuccessfully to control with compulsive behaviours (washing and cleaning himself) other internal feelings/impulses that he cannot face and that are removed in the unconscious. Moreover, people do not only clean themselves and constantly use facial masks. They also get angry with other people that do not always stay at home or do not use masks in open air spaces, instead of being angry with themselves for their sins. They fear the virus instead of fearing the "nemesis" or the lack of meaning.⁸

4. Reification, biopower and structural violence

The coronavirus shows what is hidden: the role of inequalities and environmental degradation. Beyond the correlation between biodiversity loss and pandemic emergence, there is also a significant correlation between pollution and COVID-19 incidence and mortality. A large-scale survey conducted in the United States "found that an increase of only 1 $\mu\text{g}/\text{m}^3$ in $\text{PM}_{2.5}$ is associated with an 8% increase in the COVID-19 death rate" and concluded that a "small increase in long-term exposure to $\text{PM}_{2.5}$ leads to a large increase in the COVID-19 death rate" (Wu et al., 2020, preprint abstract).

In the same way as other viruses such as, for example, HIV (Farmer, 2004; Lane et al., 2004), "COVID-19 exposes the fault lines in society and amplifies inequalities" (income, social class, education, ethnicity,) and "it shows a clear social gradient: the more deprived the area the higher the mortality" (Marmot & Allen, 2020, p. 681). "The age-standardised mortality rate of deaths involving COVID-19 in the most deprived areas of England was 55.1 deaths per 100,000 population compared with 25.3 deaths per 100,000 population in the least deprived areas" (Caul, 2020, p.2). "New York City (as of May 7, 2020) reported greater age-adjusted COVID-19 mortality among Latino persons (187 per 100 000) and African American individuals (184 per 100 000), compared with white (93 per 100 000) residents" (Hooper et al., 2020, p. 1; NYC Health, 2020).⁹ These data

⁷ Alternatively, some actions, such as handwashing, have been framed as apotropaic rituals, aimed to turn away "evil" influences (Wu Ming, 2020b; Barwick, 2020).

⁸ It must also be added that there is also a specular mechanism that leads people to deny the problem ("the virus does not exist") and to use projective defence mechanisms in order to not cope with the problems, being angry with politicians or doctors who impose lockdown laws.

⁹ "The underlying causes of health disparities are complex and include social and structural determinants of health, racism and discrimination, economic and educational disadvantages, healthcare access and quality, individual behaviour, and biology [...] The most common explanations for disproportionate burden involve 2 issues. 1) First, racial/ethnic minority populations have a disproportionate burden of underlying comorbidities. [...] 2) Second, racial/ethnic minorities and poor people in urban settings

are not surprising from a public health or medical anthropology perspective (Manderson & Levine, 2020). In fact, in these disciplines this phenomenon has been called "structural violence". According to Paul Farmer (2004), structural violence is the violence resulting from the way in which economic and political forces structure the risk related to various forms of suffering within a population. It does not require the direct action of a subject and it acts in a procedural and indirect way, through the symbolic and social structures that allow the production and naturalization of the oppression, marginalization and dependence (Quaranta, 2006).

According to the Commission on Social Determinants of Health of the World Health Organisation, "social justice is a matter of life and death" (WHO, 2008). SARS-CoV2 is no exception to this. However, what should strike us is the fact that we continue to be blind to this evidence and that the biomedical framework plays a crucial role in this process. Medical systems are in fact "both social and cultural systems" (Kleinman, 1978, p. 85) and their main subjects (health, illness and care) are not true facts of nature but specific cultural and social constructions (Young, 1982). Medical systems and their corpus of knowledge are not merely neutral and passive, but rather they contribute actively with their existence to shape reality, acting as power tools, often with the aim to maintain a certain socio-economic and cultural order (Illich, 1976; Taussig, 1980; Young, 1982; Lindenbaum and Lock, 1993). This is what Foucault (1977-78; 1978-79) called "biopower" and "biopolitics". The latter consists of a sort of power that acts on the bodies of individuals and on their minds, through the lens and tools of medicine and science. In the past, at the birth of industrial society, biopower worked within the paradigm of discipline, through certain coercions that strongly obliged individuals to produce certain behaviours. "Deviant" individuals were punished and often isolated in asylums or prisons for maintaining social cohesion. Afterwards, with the naissance of liberal democracies, power has been reconceived within a different framework: that of "governmentality". In contrast to discipline, governability does not act on the individual but globally at a population level. It deals with the taking in charge of the biological dimension of human life, so that birth, death, health and disease have to be controlled. Power, from this perspective, is understood by Foucault as "biopolitical". It does not act simply through sanctions or punishments, but through a set of "devices" that are located within the population itself. These devices make people live or act in a given way, inducing certain behaviours through the guidance of the desire, making different people end up by expressing similar expectations. The body, its impulses, its desires, and the cultural and social processes of their construction, represents the arena within which the biopolitical government shapes and guides the life of populations (Foucault 1977-78; 1978-79; Pendzini, 2020).

As regards COVID-19 we must recognize that biopower, in order to maintain the current social order, is no more acting only in a subtle and hidden way (governmentality) but is rather operating in a harsh and open way (discipline), as in the first industrial societies. That has been caused by the pandemic "emergency", but it is probably also related to the progressive failure of the capitalistic/neoliberal and scientific paradigms.

Under the guidance of nation states, biomedical systems have acted with some mechanisms that contribute to hiding the social and political determinants of health, while focusing their attention on the biological causation. It is a mechanism well described by Michael Taussig (1980) and called "reification"¹⁰. The biomedical system operates "reification" processes that reframe socioeconomic factors, human relationships, people, and their experiences as things, objects, and true facts of nature. This contributes to the construction of a social reality that aims to preserve a particular political order, reintegrating suffering people in a shared order of meanings and thus cancelling out the social, economic, and political dimensions of disease (Aillon & d'Alisa, 2020; Quaranta, 2006).

If we believe that our diabetes or depression is mainly related to a biological alteration of our cells (probably mostly related to a genetic vulnerability) from which we can be healed only taking a drug, we will not question the inequality of our society (a strong determinant of both diseases) and the way of which medicine frames the world, thereby contributing to this blindness. Similarly,

live in more crowded conditions both by neighbourhood and household assessments and are more likely to be employed in public-facing occupations (e.g., services and transportation) that would prevent physical distancing" (Hooper et al., 2020, p.1).

¹⁰ This is a mechanism to what Illich called *social iatrogenesis*: "Health policies that reinforce an industrial organization that generates ill-health" (Illich, 1976, p.270)

the vision and the narrative built by biomedicine and political institutions ("the war against the virus") contributes to hiding the social and environmental structural determinants of the COVID-19 pandemic. If the real enemy is a virus in our cells, we must close ourselves in our houses, forbid every contact, always wear masks and gloves, wait for external aid from virologists and doctors, use the best treatment available, build more hospitals and have "faith" in the arrival of the vaccine. In this process, the alterations of ecosystems related to growth and overexploitation that are at the base of the development of pandemics and that contribute to increasing the mortality, just as the inequalities in the distribution of the disease, are hidden. Thus, the current socio-economic (capitalism/neoliberalism) and cultural (science/medicine) order is maintained. We might well ask what would have happened if people also possessed awareness of the other virus that lives in our psyche and in the world (growth and its consequences) and its relationship with COVID-19?

5. Lockdown, risk and democracy

What is a risk for health that could be acceptable for a society? The answer cannot be given by science, which can only give statistics and numbers about the entity of the risks of being sick or dying. This choice is a political act that has to be managed by the "polis", by citizens and their representatives (Cayley, 2020). In fact, risk is a social and cultural construction, that differs from country to country and of which our perception has changed during history. Each society identifies what is considered at risk and what degree of risk is considered acceptable, according to different values, beliefs and worldviews (Dake, 1992). As an example, in Italy, currently we define cycling without a helmet as an acceptable risk and, until relatively recently, it was also possible to not use the helmet for small motorcycles.

Each action that we take implies some risks for ourselves and others. As Sartre (1938) clearly formulated it, if we do not want to harm anybody the only solution would be to not do anything. Smoking cigarettes and alcohol use every year cause nearly 8 million (plus 1,2 million for secondary smoke exposure) and 3 million deaths respectively (WHO, 2020b; WHO, 2020c). Approximately 3.2 million people die each year in relation to insufficient physical activity (WHO, 2020d) and 2.8 million to overweight and obesity (WHO, 2020e). 1.35 million deaths derive from road traffic crashes (WHO, 2020f) and private transportation contributes significantly to pollution, that, taken as a whole, accounts every year for nearly 9 million deaths (Landrigan et al., 2018).

If life is considered an absolute value and we must at all costs "save lives", as Agamben (2020a, 2020b) argues concerning cardiovascular diseases, "a healthier form of life [...] and diet should become the object of a juridical norm, which would decree *ex lege* what must be eaten and how we should life, transforming our whole life into a health requirement". According to the above data, we must surely forbid smoking cigarettes and ban drinking alcohol. We should force people to do physical activity and to not eat too much. We must forbid the use of private cars when an alternative option is available (public transportation, bicycle, walking, etc.). Above all, as we know that inequalities are one of the strongest determinants of health – in the UK one third of the of premature deaths (35.6%) from 2003 to 2018, were attributable to socioeconomic inequality (Lewer al. 2020) – we should "make war" on inequalities worldwide (income, education, gender, ethnicity). We must prohibit being rich and redistribute wealth from the rich people to the poor ones, from the North to the South (some degrowth proposals are directly related to this end, e.g., maximum and minimum income).

The risk of COVID-19 has been described as "the most challenging crisis we have faced since the Second World War" (Secretary-General of U.N. António Guterres, 2020) and extreme measures have been implemented, which sometimes strongly limited the freedom of people: restrictions on personal movements; work, school and park closures; surveillance with drones, video or GPS phone tracking, etc. These decisions have been often taken through authoritarian forms of governance that have significantly reduced democratic procedures, even in liberal democratic states (Thomson & Ip, 2020). As an example, in Italy, since the beginning of the pandemic, within the framework of the "state of emergency", 91,9% of the acts adopted have not directly involved the Italian parliament (Open Polis, 2020).

One of the hallmarks of authoritarian governance during the COVID-19 pandemic has been the adoption of excessive and disproportionate emergency measures. Often these measures have simply been unnecessary. The measures have, nevertheless, posed a grave danger to human rights and civil liberties and are seen not only in semi-authoritarian states or weak democracies but also in liberal democratic states. [...] Another hallmark of authoritarian governance during the COVID-19 pandemic has been the attempted or successful bypassing or suspension of effective democratic controls on government. This is even seen in more democratic states whose governments have resorted to a highly centralized model of decision-making, sometimes without engaging in properly deliberative and transparent decision-making. (Thomson & Ip, 2020, pp. 16, 19).

All measures adopted by governments imply a different risk evaluation and balance with benefits and damages/costs of the interventions. However, who can decide what is the threshold of risk that is considered acceptable? Who can define what is a necessity from what is a renounceable desire?

Is it a necessity/acceptable risk to assist a woman during birth, a father that is dying, or to celebrate a burial? Is it a necessity for a person that has been alone for months to see at least a friend once a week in a open-air space? Is it a necessity for a child to be able to play with other children in a natural environment or to meet an old person that has been alone for months? How can we decide that a sixth-degree relative is more important than our best friend?¹¹

Often governments (but not necessarily parliaments) make these decisions and they tell populations that they are acting under the aegis of science and medicine. However, science alone cannot say what is the "correct" threshold of protection. Moreover, in a new and emergency situation, science often cannot give any definite answer on the real risk and on what is to be considered the best solution. Thus, every government in the world has taken its decisions, based on some scientific evidence (and not always),¹² but the decisions have necessarily been mainly political.¹³ This can be seen somehow acceptable in the first weeks of emergency because of the necessity to act quickly. However, the state of emergency has become the normality and, only in a very few countries, a public debate on these issues has been conducted in the months following the emergence of the pandemic. On the contrary, the debates have been often conducted between different "experts". Virologists and doctors have argued that science suggests doing one

¹¹ Examples of measures adopted by the Italian government:

- During the worst phase of the first pandemic wave, it was possible to go outside home only for reasons of "work, urgent situations, state of necessity or health" (La Repubblica, 2020a). It was decided to close every school, nursery and also day centres for the disabled (Gazzetta Ufficiale, 2020b).

- Within this framework, people were forbidden to see relatives while they were dying and to attend even a small burial. Some people were notified of the death of a family member days after the event (Pini, 2020).

- Without obligation by any law, many public healthcare services autonomously prohibited fathers/caregivers from accompanying their partners (even when COVID negative) during the labour, birth and the following days, without any scientific evidence that supports this choice (Ambrosi, 2020; Palermo Today, 2020, Raicaldo, 2020; Italia che Cambia, 2020). Even though on May 13, 2020 the National Public Health System (Istituto Superiore di Sanità, 2020a-b), with the support of gynaecologist scientific societies (SIGO et al., 2020) and the World Health Organisation (2020g), stated clearly that during labour, birth and post-partum the presence of the father (or a caregiver) has to be guaranteed, several hospitals continued to not allow it, mostly during labour and post-partum, but also sometimes during birth (Lanza, 2020; La Gazzetta del Mezzogiorno, 2020; Quotidianomolise.com 2020),

- After the situation had improved (phase 2), the government decided to allow people to see only close relatives ("congiunti"). After a few days, there was further clarification whereby the interpretation of "relatives" by the government was expanded to include: spouses, cohabiting partners, partners in civil unions, people who are linked by a stable emotional bond, as well as relatives up to the sixth degree (Il Presidente del Consiglio dei Ministri, 2020; Ziniti, 2020a-b).

¹² In Italy, as an example, it was discovered only after some months that the decision to close the entire country (#stayhome lockdown) was probably taken by the government, not in agreement with the scientific committee, which proposed initially differentiated closures (a severe lockdown in the region Lombardia and in several provinces, but not nationwide). The minutes of the meeting of the scientific committee were secret and they have been made accessible only after a legal action by the Fondazione Einaudi (Milone & Trinchella, 2020).

¹³ Countries worldwide show very different types of lockdowns, varying significantly from more restrictions and centralisation of power (e.g., China, Italy) to less restrictions and a more central role for the parliament (e.g., Sweden) (Ritchie et al., 2020; Marzocchi, 2020).

thing or another (e.g., the debate on herd immunity), not taking into consideration the points of view of citizens and societies. Often scientists that have proposed actions not coherent with the mainstream theories have been discredited, because their opinions might confuse citizens and prevent them from doing the "right things". For example, this happened in the case of the proponents of the "Great Barrington Declaration".¹⁴ Similarly, in the public debate, scholars or people that express opinions that differ (even slightly) from governments' guidelines have been often accused of being COVID-19 "negationists". Such approaches that do not admit the presence of divergent opinions have been criticized, highlighting that good science has to cope with uncertainty ("the more certain someone is about Covid-19, the less you should trust them"; Smith et al., 2020) and that, in these times of crises, often "the medical-political complex tends towards suppression of [good] science [and its uncertainty] to aggrandise and enrich those in power" (Abbasi, 2020, pp.1-2).¹⁵

Politicians and governments are suppressing science. They do so in the public interest, they say, to accelerate availability of diagnostics and treatments. They do so to support innovation, to bring products to market at unprecedented speed. [...] Science is being suppressed for political and financial gain. Covid-19 has unleashed state corruption on a grand scale, and it is harmful to public health. Importantly, suppressing science, whether by delaying publication, cherry picking favourable research, or gagging scientists, is a danger to public health, causing deaths by exposing people to unsafe or ineffective interventions and preventing them from benefiting from better ones. When entangled with commercial decisions it is also maladministration of taxpayers' money. [...] When good science is suppressed, people die (Abbasi, 2020, pp.1-2).

Some Italian psychoanalysts have further expanded this analysis, identifying "the deniers" as "insane" people and maintaining "it is not possible to discuss with them" (Galimberti, 2020). According to Lingardi and Giovanardi (2020), deniers suffer from an individual form of psychopathology and they should be treated with psychoanalysis in order to be healed and become generally more compliant with the doctor's advice.¹⁶ Even if there are some radical opponents who really deny COVID-19's existence, to frame everyone that has a divergent view on the pandemic as a "denier" and/or a mad person could be seen as a way of discouraging any dissent and maintaining more easily power and consensus, focusing on the psychological individual dimension (a psychiatric disorder) rather than on the political and social one (Wu Ming, 2020b; Sportello Ti Ascolto, 2020). In Bergamo (the "Italian Wuhan") on a wall in the cemetery area, where the soldiers in the first pandemic wave loaded the dead people to take away, is now written: "Wake up masked people, No to the health dictatorship". Should it really be something that we can interpret only as a denial on the part of some fools that have to be re-educated? Or should it be something that makes us deeply question what it is happening in our democracies? Ethnopsychiatry and medical anthropology oblige us to remind that even "the real mad people",

¹⁴ On one side 80 scientists published a letter in *The Lancet* (Alwan, 2020) arguing against herd immunity and for the necessity of stronger lockdowns. The paper has become the "[John Snow Memorandum](https://www.johnsnowmemo.com/)" (<https://www.johnsnowmemo.com/>), signed by more than 6.400 scientists, researchers and healthcare professionals. On the other side, three epidemiologists and public health experts from Harvard, Oxford, and Stanford universities launched the "Great Barrington Declaration" (source: <https://gbdeclaration.org>, accessed 30th October 2020), calling for a "focused protection" of the people most at risk, rather than generalized lockdowns. The declaration was signed by 11.428 of medical and public health scientists, 32.447 medical practitioners and 594.834 citizens. The latter declaration was accused of being supported by climate change denial corporations (Naafez, 2020).

¹⁵ McKee and Stuckler (2020) try to analyse the arguments of both positions and affirm: "Yet this is a false dichotomy. Most experts who support restrictions do so as a last resort, only to interrupt the exponential growth in infections that would occur if transmission was unchecked. And those who oppose restrictions concede that allowing the virus to spread could only apply to a proportion of the population who, in their view, faced limited risk [...] It is not whether we should open up or lock down. Rather, it is how we can break the chain of transmission while protecting those who are harmed by isolation. [...] The solution is, in itself, not a scientific problem but a political one" (p.1).

¹⁶ Lingardi comments on a paper published in *The Lancet* with the title: "Psychoanalysis in combating mass non-adherence to medical advice" (Ratner & Gandhi, 2020).

who can have psychotic delusions and denial, often have a lot to say in their hidden and embodied requests/critiques to ordinary society (Beneduce & Martelli, 2005; Scheper-Hughes & Lock, 1987).

From a degrowth point of view, what it is interesting to note, other than the role of science in this process of self-legitimization of governments actions (biopower), is that the evaluation of the acceptable risk and necessity have been strongly influenced by our growth-based culture and life views. The physical dimension of health - to protect what Agamben (2020c) depicted as "bare life"- have been emphasized much more than the psychological and social wellbeing (two key components of health, as defined above by WHO). A biological and reductionist approach has prevailed over a relational and systemic one. The cure has won over the care. A care that, furthermore, has been sustained mostly by women (Power, 2020). To work - maybe in a job that is not essential to the survival of society or which indeed produces both direct and indirect damage to health, such as manufacturing cars, weapons or advertisements - has been considered more important than accompanying a dying relative or a woman during childbirth.

Moreover, as regards our idea of risk, the recent work of David Cayley (2020) offers a provocative perspective on the relevance of the reflections of Ivan Illich to the COVID-19 pandemic. Risk awareness for Ivan Illich was:

'[...] the most important religiously celebrated ideology today'. Risk was disembodied, he said, because 'it is a strictly mathematical concept'. It does not pertain to persons but to populations – no one knows what will happen to this or that person, but what will happen to the aggregate of such persons can be expressed as a probability. To identify oneself with this statistical figure is to engage, Illich said, in 'intensive self-algorithmization.[...] this was an eclipse of persons by populations; an effort to prevent the future from disclosing anything unforeseen; and a substitution of scientific models for sensed experience'. [...] Life becomes an abstraction – a number without a story (Cayley, 2020).

6. Conclusions

The papers presented in this special issue illustrate how, in different ways, growth influences the health of human beings and the planet and how the transition proposed by the degrowth framework could produce positive health outcomes. This editorial tries to deeper analyse the links between growth/degrowth and COVID-19 pandemic. Two kinds of conclusions could be drawn, taking into consideration, on the one hand, the pandemic in itself (the infection) and, on the other hand, what the pandemic means for our society and its psychological consequences ("the psychic infection").

6.1 The infection

The evidence presented indicates that the emergence of the pandemic is probably related with the overexploitation of human and natural systems caused by uncontrolled economic growth and its consequences (hand intensive agriculture and farming, change in land use, deforestation, human invasion of remote areas, and the consequent loss of biodiversity).

From this perspective the actual pandemic could be seen as a global negative externality related to the current system of development within a framework of diminishing marginal returns. At the same time, the main negative consequences of the current capitalistic growth-based system (inequalities and environmental degradation) are impacting dramatically on COVID-19, provoking significantly more deaths in poorer and polluted areas.

In this sense, as argued by the editor in chief of *The Lancet* Richard Horton (2020), "COVID-19 is not a pandemic. It is a syndemic" (synergistic epidemic).¹⁷ The burden of disease and the prognosis of COVID-19 pandemic is not merely caused by the infection of SarCOv2 but mainly by the aggregation of the virus infection and an array of non-communicable disease (NCDs), within specific populations.

¹⁷ "The syndemics model of health focuses on the biosocial complex, which consists of interacting, co-present, or sequential diseases and the social and environmental factors that promote and enhance the negative effects of disease interaction" (Singer, 2017, p. 941).

These conditions are clustering within social groups according to patterns of inequality deeply embedded in our societies. The aggregation of these diseases on a background of social and economic disparity exacerbates the adverse effects of each separate disease [...] the most important consequence of seeing COVID-19 as a syndemic is to underline its social [and environmental] "origins" (Horton, 2020, p. 874).

The current biomedical system frames the disease in a way that hides its social and environmental origins, focusing on "the war against the virus", and thus contributing to not questioning and thereby restoring the current socio-economic order. On the contrary, within a syndemic approach "no matter how effective a treatment or protective a vaccine, the pursuit of a purely biomedical solution to COVID-19 will fail" (Horton, 2020, p. 874), while it should be fundamental to treat all the other conditions aggregated: NCDs, socio-economic inequalities, environmental degradation and unsustainability. All these conditions are related and somehow exacerbated by the pursuit of indiscriminate economic growth, in particular beyond a certain threshold. Therefore, it can be argued that in order to be able to cure the SARS-Cov2 pandemic (one of the symptoms of the unsustainability of the current model of development) it should be fundamental to cure the "disease" underlying the pandemic: a socio-economic system mainly aimed at economic growth (Aillon & D'Alisa, 2020). The degrowth framework has a great deal of potential to offer in moving in this direction (Borowy & Aillon, 2017).

6.2 *The psychic infection*

There is another "virus" that is affecting not lungs but minds. It spreads like a psychic infection and creates fear and paranoia. Death escapes from the hospital and circulates freely in the society, while we are not more able to live with it ("cultural iatrogenesis").

The psychological origins of this infection have to be traced back a long time ago, in the Greece of the 5th century B.C. At that time western society abandons the concept of limit and projects itself toward an unlimited path of growth. However, the guilt of "hybris" evokes nemesis (punishments for our sins), which could be the ghost that makes our souls even more sick during the pandemic. We are facing several challenges that we ourselves have contributed to creating (climate change, pollution, rising inequalities, etc.) and that science alone cannot solve. The future becomes no more a promise but a threat. In this scenario, in the presence of a miniscule virus, our whole world is creaking, science is confused and not able to protect us from pain and death. We face the failure of the myth of growth/progress/science and of the religion of medicine. However, to abandon our beliefs in a crisis period is too challenging and, as individuals and nations, we do not want to see the enemy inside ourselves, while we put into practice several measures (sometimes excessive, not evidence-based or in an authoritarian way), which could be seen as ritual of reparation and atonement, in order to regain the feeling of being able to control the situation.

In his *Lancet* editorial, Horton (2020) added one ingredient to the recipe to solve the syndemic: "our societies need hope". From a degrowth point of view, in order to fundamentally resolve the psychic infections and regain hope, it will be necessary to look deeply inside ourselves and recognize the "hybris" and fear of nemesis that work on the collective unconscious. That will mean recognizing our sins and being able to do something to repair them, rather than projecting our fear and our rage on external objects (the virus, the government, etc.).

From an Adlerian point of view, western society's venture could be seen as an overcompensation of our inferiority feeling that aims to discover superiority and security and to feel omnipotent and be able to control everything (Aillon & Simonelli, 2012). Paradoxically, after the "binge" of growth-based development, coronavirus shows us our frailty, powerlessness and limits, as individuals and as humankind. Therefore, it could be seen as an occasion to practice a collective form of "encouragement" (Dreikurs, 1957; Rovera, 2009). Encouragement for Adlerian psychotherapists means the ability to stay and live with our inferiority and frailty, accepting them. To remain humans and to be able to cope with uncertainty, pain, illness and death. In order to achieve this courage, we need more "social interest" (Adler, 1933). We need to not close ourselves in the houses of individualism but, still preserving safe distances, to cooperate and help each other

more. We need to build a convivial and autonomous society (Illich, 1973; Castoriadis, 1987), not based on fear but on faith in life, on hope and love (Fromm, 1955, 1956). We need the possibility to debate as citizens and to decide democratically the risks that our society thinks are reasonable to face, and not just to delegate these decisions to scientific experts, through truly implementing a post-normal approach to science (D'Alisa & Kallis, 2014).¹⁸

As Ivan Illich would probably have said, we do not need more hospitals and doctors to fight the virus and to win the COVID-19 war. We need to build a new world.

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¹⁸ A proposal in this sense is what Erich Fromm (1955) describes in "The sane society". We could promote at community level (also online) citizen discussions on different themes related to the COVID-19 emergency, after listening to a talk by experts. Some representatives of these assemblies could meet in further centralized assemblies and give feedback to the government/scientific committee. Parallely, it could be proposed to have an assembly of citizens (selected at random) that could assist and give opinions to the government and to the scientific committee more quickly. Furthermore, the scientific committee assisting the government on COVID-19 decisions should not only have biomedical figures (epidemiologists, doctors, virologists, biologists) but, because of the complexity of the question, it should include scientists from other fields, in particular the social sciences (sociology, psychology, economics, anthropology, philosophy, law, etc.).

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A degrowth perspective on the coronavirus crisis

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Dear editors,

the coronavirus pandemic (COVID-19) has caused upheaval across the world, high death tolls among the most vulnerable, border closures, financial market crashes, curfews and controls on group gatherings, among many other devastating effects.

Despite observations that pollution and emissions have reduced (McGrath, 2020; Myllyvirta, 2020; NASA, 2020), the sudden, unplanned, and chaotic downscaling of social and economic activity due to COVID-19 *is not degrowth*. Instead, it constitutes a clear example of why degrowth is needed, as it highlights the unsustainability and fragility of our current economic system and social structure. Additionally, the various responses to COVID-19 have shown that degrowth is actually possible, because societies and states have demonstrated a remarkable ability to change their modus operandi in response to a major crisis.

This letter will consider these three points in further detail: first, how the COVID-19 crisis is by no means degrowth; second, how COVID-19 shows that degrowth is needed; and finally, why COVID-19 indicates the potential for a degrowth transformation.

This crisis is not degrowth

Just because COVID-19, like an economically triggered recession, has resulted in a downscaling of production, transport, and emissions amongst other things, this does not mean it represents degrowth. Firstly, a degrowth transformation must be planned and democratic. In contrast, the COVID-19 crisis and its responses have been mostly reactive – meaningful measures were implemented only once people started dying – and highly undemocratic, characterised by top-down policies, the enactment of emergency powers, and a murky process of bail-out decisions.

Secondly, degrowth requires a long-term commitment to the downscaling of production and consumption as well as the reorganisation of society in a sustainable and just way. What the COVID-19 crisis has thus far shown is governments' willingness to slow down the economy in the short run, but without any intention of maintaining these reduced levels of economic activity. Rather, the shutdown of most economies was delayed as long as possible to maintain growth, and it has been conducted with the explicit motivation of rebooting economic growth as soon as possible.

Thirdly, COVID-19 has so far disproportionately affected the most vulnerable in society, and not only the very old and young, as is usually assumed. Many workers who don't have the option of paid remote work must face the trade-off between risky infection at work or staying at home awaiting unpayable bills (Jones, 2020). Diabetics, many of whom also have a lower income, are at a higher risk of infection from the virus (Fisher and Bubola, 2020). Homeless people are being particularly affected by the corona crisis, as services such as food banks, soup kitchens, crisis centres and overnight shelters have been forced to close due to insufficient access to protective equipment which would allow their safe operation. Making matters worse, in some places the police have issued fines to the homeless for not maintaining social distancing (Boffey, 2020a). Even the most basic sanitation measures, such as washing one's hands regularly, becomes an impossible task for communities without access to running water, as is the case for example in central Chile (McGowan, 2020). In contrast, the rich have not struggled to access basic needs or services in the same way that the poor and marginalized have. As an example, in March, the complete Utah Jazz professional basketball team was tested immediately following a game, accounting for 20 percent of the state's total conducted tests up to that point (Harris, 2020a). The corona crisis reveals the deep socio-economic inequalities in society, the unequal access to and distribution of basic goods and services, the uneven impact of crises and the many vulnerabilities faced by large sections of the population. In life under neoliberal capitalism, money saves lives and a lack of it can kill you.

In summary, a degrowth transformation would be planned and proactively pursued, and have justice and equality at its core. As these examples - among a myriad of others - show, none of this is the case in the current situation.

COVID-19 shows that degrowth is needed

The current crisis highlights the unsustainability of our current system. If a flu outbreak due to a hitherto unknown virus can cause such upheaval throughout our social and economic systems, then we should clearly consider different and better ways to organise our societies. Our current political-economic system is indeed incapable of responding to the crisis in a just and humane way. Strikingly, the G7's recent statement on the crisis portrays 'the economy' as an equal, if not greater, priority than social well-being:

"we will work to resolve the health and economic risks caused by the COVID-19 pandemic and set the stage for a strong recovery of strong, sustainable economic growth and prosperity" (Gray, 2020)

This declaration goes to the core of the relationship between societal well-being and economic

growth: despite claims to the contrary by mainstream economists, more economic growth *does not* underpin well-being (Steinberger et al., 2020; Portes, 2020). The current pandemic has become, in this sense, “a story of life versus growth” (Steinberger, 2020). There is no such thing as sustainable economic growth. The current extractivist model has long surpassed ecological boundaries and the ways to deal with the crisis and its aftermath should not be centred on economic growth. Instead, the priorities should be inverted: the economy must be at the service of society, and not the other way around. The alternative political-economic system that we need is one that is more resilient, just and explicitly prioritises human (and non-human) well-being over economic growth. We will explore here some of the causes of COVID-19, the structural mechanisms which have exacerbated it, and briefly consider how this could be different in a degrowth society.

Firstly, there is increasing evidence that the emergence of zoonotic diseases such as COVID-19 is connected to accelerating biodiversity loss and habitat destruction by humans (Ostfeld, 2009; Keesing et al., 2010; Vidal, 2020). Additionally, a strong case can be made that the global capitalist industrial agri-food system in particular creates conditions which enable the increased occurrence of viruses and enhances their potential to spread (Wallace, 2016; Lynteris and Fearnley, 2020). In contrast, serious biodiversity conservation and equitable agri-food systems based on agro-ecology and community-supported agriculture are part and parcel of a degrowth transformation (Bloemmen et al., 2015; Roman-Alcalá, 2017; Ruiz López, 2018). Some degrowth advocates have also argued for animal liberation more broadly (Herbert, 2020; Leitinger, 2020). Societies which effectively preserve their natural ecosystems and treat animals with more care and respect, rather than as mere commodities to be exploited, would greatly reduce the risk of pandemics such as COVID-19 (Osaka, 2020).

Secondly, the occurrence (and spread) of viral diseases like COVID-19 is greatly exacerbated by high living densities (e.g. in cities or cruise ships), inter-connected trade or industrial hubs, and/or substantial flows of tourists and business travellers (Florida, 2020). Cities have been growing in size and numbers since the agrarian revolution and have continued largely unchecked up until the present (UN, 2018). Larger and denser cities are a consequence of out-migration from rural areas due to a lack of employment opportunities, economic and transport policies that favour the centre over the periphery, and a culture which fetishizes the lifestyle and opportunities of the ‘big city’ (Lefebvre, 1970; Brenner & Schmid, 2015). Meanwhile, a degrowth transformation would emphasise the importance of community-based economic activity, re-prioritise essential work such as care and food growing, re-value proximity to nature, and demonstrate the possibilities for a multi-cultural, diverse, and socially rich life both within and outside of big cities (Chatterton, 2019; Fischer et al., 2017).

Thirdly, the economic fallout following the breakdown of global supply chains – notably the abrupt closing of factories in China – highlights what Gertz (2020) from the *Brookings Institute* describes as “hidden vulnerabilities”. Similarly, the *Harvard Business Review* is calling for more resilient supply chains (Linton and Vakil, 2020) and *Foreign Policy* argues that big firms like Apple have been “blindsided on the supply side” (Braw 2020). It almost appears as if the business pundits and consultants are suddenly waking up to the craziness of an economic system where an iPhone requires parts from dozens of countries (Costello, 2020), where ‘the cloud’ is dirty (Walsh, 2014; Xiang Gao et al. 2012; Bouley, 2010) and devours a huge amount of energy to support our streaming needs, and where those pretty white boxes embody lots of exploited human labour. Degrowth proposes to re-localise a significant amount of production based on bio-regionalism (Tokar, 2019; Cato, 2011), shortening supply chains and increasing their resilience through transparency and decentralisation (Khmara and Kronenberg, 2018).

Lastly, it is true that human settlements have experienced fatal pandemics for much longer than the existence of capitalism as we know it today. However, our hyper-mobile and interconnected global capitalist societies have exacerbated the spread of COVID-19 through frequent long-distance air travel (Robertson and Joiner 2020), massive cruise ships (Rocklöv & Sjödin, 2020), and short-distance flights, for example from Denmark, Sweden and Germany to the Austrian town of Ischgl for ski vacations (Karnitschnig, 2020). For now, COVID-19 has brought our hyper-mobility to a halt. We are forced to stay grounded, and maybe this is an adequate moment to reflect on why we feel compelled in modern society to be always on-the-go, from one activity to the next, or from one continent to another multiple times a year for holidays or conferences.

Of course, the motivations for ‘slowing down’ are different for COVID-19 and for degrowth. For the former, they serve to reduce the spread of infection of a virus, while the latter is concerned with reducing global greenhouse gas emissions and preventing further environmental degradation. However, both COVID-19 and degrowth can lead us to a similar reflection: perhaps a good life can consist of spending more time in our communities, with our families and friends, creating safe spaces and solidarity networks for those in need, and moving around more slowly and mindfully.

In conclusion, be it in terms of our relationships with non-human nature, the centrality of metropolitan life, unfettered globalisation, or hypermobility, COVID-19 reveals the social and ecological unsustainability of modern society. Thus, a different way of organizing society is needed and degrowth offers many promising alternatives.

COVID-19 shows that degrowth is possible

Planning, economic regulation, limiting certain social practices, high levels of community cooperation and a slowing down of life (of course not for all, but for many), have all been responses to COVID-19. Similar measures have previously been labelled ‘politically impossible’ or ‘unrealistic’ in the context of ecological and other social crises, yet they have now become a reality across the world.

COVID-19, like many other crises, highlights the potential for transformative action (and change) when societies *decide* that the crisis at hand warrants discarding the previous bounds of normalcy. For example, the Spanish government pledged to provide a regular payment to its poorest citizens in the wake of the corona crisis, and Scotland is seriously considering a comprehensive universal basic income (UBI) (Harris, 2020b). Rent strikes have been coordinated across the United States (Lowrey, 2020), sending a clear message that shelter is more important than absentee rents. People across the world are now planning domestic summer holidays based on the assumption that plane travel is unlikely, a restriction that would have been unthinkable pre-corona but is now being accepted as common-sense. The corona crisis has not only illustrated the possibilities of radical policy proposals (e.g. UBI and rent moratoriums), but it has also shown through lived experience that shopping, traveling and working less does not cause the sky to fall in, and maybe this has provoked us to reconsider what is most important in life.

If anything, the corona crisis teaches us that our lived environments can change rapidly and drastically, but also that societal responses can be swift and prioritise the most vulnerable in society, if there is a desire. A degrowth society, generalising these principles of social justice and ecological sustainability, would reduce the probability that such crises occur in the first place, and be far more resilient to a world full of unpredictability.

From analysis to action

Given how much society has changed due to COVID-19, it is clear that the potential exists to actively reorganize society around degrowth principles, even though this would be a significantly greater task. Of course, we should be aware that there is a historical precedent for right-wing, populist, and neoliberal governments exploiting crises such as the current one to re-embed their agendas and consolidate their power. After the financial crisis of 2008-2009, these powers enacted austerity policies for the majority and bailed out the financial and insurance sector with public money (Mirowski, 2013). We can already see this scenario repeating itself, with bailouts of KLM-Air France (€10bn; Morgan, 2020a), Lufthansa (€10bn; Russell, 2020), and Renault (€5bn; Morgan, 2020b), among others.

However, there is mounting resistance against a return to the status quo and business as usual. We have seen states planning, regulating and being challenged, communities creating mutual aid networks, and individuals radically adjusting their lifestyles. We have witnessed degrowth-aligned activism, organizing and policy-making across all scales of society. The global anti-aviation network, Stay Grounded, has denounced the bailouts of an unsustainable industry with public funds, demanding national governments to “save people not planes” (Stay Grounded, 2020). In the United States, flourishing networks of mutual aid, community support and local

resilience are responses of necessity to a crisis which has disproportionately impacted people of colour. The demands of Black Lives Matter for rent cancellation and food sovereignty explicitly link the vulnerabilities revealed by COVID-19 and highlight alternative ways of meeting basic human needs (Black Lives Matter Los Angeles, 2020). In Hawai'i, the State Commission on the Status of Women (2020) has developed an explicit feminist economic recovery plan to deal with the negative effects of COVID-19. Its policy recommendations include drastic changes to the ways in which women's work is valued and compensated, and calls for the strengthening of education, childcare and healthcare programs. The municipality of Amsterdam is employing Kate Raworth's model of 'doughnut economics' to guide a post-COVID recovery which prioritizes social and ecological wellbeing rather than economic growth (Boffey, 2020b). Finally, millions of acts of cooperation, solidarity and kindness that do not make the news, but abound in our neighbourhoods and communities, testify every day that humans are not selfish, utility-maximizing individuals, but care deeply for each other and their environments.

Moreover, from within the degrowth community a strong case has been made for a post-COVID economic system aligned with degrowth principles. This took the form of an open letter that was signed by more than 2,000 degrowth academics, activists and practitioners, and appeared in media outlets all over the world (Degrowth.info, 2020). This open letter, '*New Roots for the economy: re-imagining the future after the corona crisis*', outlined five key principles to tackle the crisis induced by COVID-19 and build a just and more sustainable society. The principles are as follows: **(1)** put life at the centre of our economic systems; **(2)** radically re-evaluate how much and what work is necessary for a good life for all; **(3)** organize society around the provision of essential goods and services; **(4)** democratize society; and **(5)** base political and economic systems on the principle of solidarity (New Roots Collective, 2020). The letter highlights the vulnerability of growth-based economies to crises (including pandemics), calls for the decommodification of health services, and highlights the potential of this crisis for society to properly value care work as well as other basic health services). We believe that the degrowth movement has a lot to offer in this moment of crisis, on the one hand in drawing the links between our unsustainable economic system and COVID-19, and on the other hand by presenting degrowth as a radically fair and more sustainable alternative based on the principles outlined above. Yet, for the movement to have a meaningful impact, it must ally and work with other emancipatory projects and social movements, going beyond diagnostics and theories towards the important, though messy work of organizing collectively and building these desired futures.

A diversity of futures is indeed constantly being shaped, contested and struggled for. Essentially, these futures will become what we, as individuals, groups, and society, make of them. So, let's get together, organise at different levels, decide collectively what a good life consists of and try to achieve this for all, humans and nonhumans alike.

We send our solidarity to everyone who needs it in this moment.

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Alternative ecological and social proposals for preventing the global threat of emerging infectious diseases.

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Abstract

Emerging infectious diseases are a major global health threat in the human, animal and plant worlds. Zoonoses and vector borne diseases are becoming prevalent worldwide. A large part of global health funding is dedicated to the fight against Dengue, Zika and Ebola diseases. Until now, public health strategies have been mainly based on vaccine development, medication testing or on proposals for “acceptable” cultural changes in local population practices to limit transmission risk, without thinking about the root causes. In this literature review, it will be argued that the current economic system, through its growth imperatives which ignore planetary limits, together with intensive agricultural practices, is related to infectious disease emergence. Monocultural practices, such as rubber/palm oil industrial plantations, through the ecological perturbation inflicted, act as a driver of vector borne and zoonotic diseases. Deforestation, loss of biodiversity, and human invasion of remote forested areas are followed by the emergence of zoonoses such as Ebola disease. Even if any emergence is always a multifactorial process, it is still fundamental to highlight the major influence of environmental drivers. The characteristics of specific ecological and social contexts within which emergence occurs should be explored. Alternative health and environmental paradigms could help impede the emergence of infectious diseases. A true “One health” approach which takes care of ecosystems and preserves the diversity of living things and of relationships corresponds to an “EcoHealth” approach. Ecological options and environmental solutions could produce a real innovation in public health. Stopping deforestation and ecosystem destruction and fostering peasant agroecology and *free evolution* for certain forested areas could slowly lead to rebalanced ecosystems. Furthermore, ecological actions would be less stigmatizing than promotion of cultural changes. An alternative public health program based on “health within a healthy environment” would be more effective than a secondary struggle against emerging diseases. This suggests introducing public health as a fundamental land use issue, inaugurating peasant agroecology, land use and conservation as fundamental public health issues, and developing coherent policies.

Key words: EcoHealth; ecological alternatives; ecosystemic approach to public health; emerging infectious diseases; pathogenic environment; Planetary Health; plantacionocene.

2. Introduction

Since the 1960s, and particularly in the last 20 years, the emergence of infectious diseases has become a major source of concern on a global level (Jones et al., 2008). Emerging or re-emerging infectious diseases are defined as infectious diseases that have recently emerged in a population, or that existed previously but have increased in incidence or expanded their geographic distribution (Lederberg et al., 2003; Jones et al., 2008). There are two different types of infectious diseases: zoonoses, diseases transmitted from animals to humans as a result of cross-species spillover transmission, and vector-borne diseases, transmitted via a vector (mosquitoes, ticks) (Jones et al., 2008). Ebola disease and COVID 19 are current emerging zoonoses, while zika and dengue epidemics are recent examples of vector-borne diseases. Nearly 60% of human pathogens and about 60% of emerging infectious diseases are classified as zoonotic (Jones et al., 2008; Woolhouse & Gowtage-Sequeria et al., 2005). Satcher and Lederberg list "at least 29 diseases that have emerged in the last 28 years, most of which are zoonoses" (Satcher et al., 1995; Harper & Armelago., 2010). The number of both emerging infectious diseases and epidemic events has multiplied by 10 since 1940 (Jones et al., 2008).

In a world of major ecological and societal deterioration, these emerging diseases represent a global threat not only to human health but also to the health of the plant and animal worlds (Keesing et al., 2010). We cannot observe the ecological and societal changes in the anthropocene era without looking at the current globalized economic system and the dominant growth imperative along with a globalized intensive agro-industrial system. The changes in land use induced by the generalization of intensive agro-industry in order to increase world food production are held responsible collectively for 25% of infectious diseases and half of zoonoses (Keesing et al., 2010; Rohr et al., 2019; Karesh et al., 2012; IPBES, 2020).

During the modern era of public health policy, the attention paid to the natural environment has fluctuated as a result of biomedical thinking with a reductionist trajectory (Porter, 1999). In the 19th century, health campaigns based on acting on the causal chain of diseases focused on hygiene and the quality of housing and accommodation. The 20th century, however, saw the evolution toward a technological and biomedical turning point. A return to the root causes of diseases and environmental determinants has been taking shape in recent decades, particularly in terms of the epidemiology of infectious diseases (Eisenberg et al., 2007).

Biomedical approaches to understanding the causality between environmental determinants and infectious diseases need to be redefined. In fact, the clinical categories used by the medical diagnostic approach do not correspond with the categories used in ecology, with reference to environmental determinants. Indeed, the medical approach based on groupings by symptoms, by affected organs or by pathophysiological functioning is incompatible with the major categories of ecological effects. The use of both categories - zoonoses and vector-borne diseases, defined on the basis of modes and cycles of transmission - is already more relevant in attempting to analyze the environmental determinants of emerging infectious diseases (Wilson, 2001; Eisenberg et al., 2007). Similarly, the risk factor approach used until now is somewhat outdated in terms of the complexity of root causes, and in its ability to examine causal mechanisms at multiple scales (Pimentel et al., 1998; Eisenberg et al., 2007). The processes that affect human health have both a social and an ecological component, which are inextricably linked (Eisenberg et al., 2007; IPBES, 2020). To include social and environmental determinants and their impacts over the course of a person's life requires specific tools. A more appropriate approach in establishing causal networks would be to take into account these different components, their interactions and feedback loops.

A growing share of global public health spending is devoted to emerging infectious diseases, especially this year with the recent COVID 19 pandemic. To date, in the context of Global Health, global public health responses to infectious diseases have tended to focus on the biomedical and therapeutic aspects through drug development or vaccine research (IPBES, 2020). Prevention is mostly secondary prevention, usually focused on suggestions for acceptable cultural changes or the promotion of new social norms (Biehl & Petryna, 2013). The fundamental thesis of Global Health is based on the triad: technical solution, individual compliance and cultural barriers (Biehl & Petryna, 2013). In emerging and developing countries, the multiplication of vertical silo approaches, paying attention to a single disease, remains the rule (David et al., 2020). Horizontal and holistic approaches to strengthening the public health system as a whole are not favoured

(David et al., 2020). Furthermore, “colonial legacies shape the geopolitics of Global Health and work their way into programme and research design, implementation and monitoring” (LSHTM, 2020, p.1; Anderson, 2014). Such a paradigm needs to be questioned: both as regards the objectives of this colonial medicine, aimed at maintaining a population in good physical and reproductive health in order to ensure its economic productivity (Pépin, 2020) and also in light of the results obtained by these medical practices (Pépin, 2020; Lachenal, 2014; Anderson, 2014).

It is now established that the ecological, societal and human imbalances inherent in the functioning of our global economic system contribute to an increase in the probability of infectious disease emergence (Daily et al., 1996; Morse et al., 1995; Morand & Walther, 2020; Crutzen et al., 2002; IPBES, 2020), and many authors have begun to explain the links between large-scale ecological imbalances and these emergences. However, there has been very little research done on the fight against the root causes of these emergences and the preventive responses to be considered in order to curb these processes.

In this literature review, we will try, firstly, to shed light on the impact on public health of the growth-based global economic system by focusing on the consequences of the intensive agro-industrial system, through some practical cases and general considerations concerning zoonoses and vector-borne diseases. Secondly, having focused on the root causes of emergences will enable us to examine what public health responses could look like in terms of ecological, social and ecosystemic alternatives in the fight against emerging infectious diseases.

2. Emerging Infectious Diseases as Health Consequences of an Intensive Economic/Agro-industrial Model

The growth-based global economic system, particularly through the spread of intensive agriculture and monocultures, the extraction of fossil fuels and the globalization of transport, has well-known global consequences such as pollution, climate change, the destruction of ecosystems and ecofragmentation (Morand, 2020; Crutzen et al., 2002). However, the impacts of this system on public health related to emerging infectious diseases have been less directly highlighted.

This globalized functioning based on economic growth objectives, without taking into account planetary limits, has led to the ecological and social state of the world now known as the Anthropocene. Thus, we will use the term Anthropocene to discuss the consequences and different aspects of this growth-based system, even if the term *capitalocène* could be more relevant to describe what makes the current system pathogenic (Crutzen et al., 2002; Bonneuil & Fressoz, 2013). While the term Anthropocene is highly controversial, the environmental signatures of this epoch have profoundly affected the state of global public health (Mac Michael et al., 2014; Whitmee et al., 2015; Zywert, 2017; Zywert & Quiley, 2020). Deforestation has increased at an unfaltering rate since the 1950s: five million hectares were deforested each year between 2001 and 2015, mainly in Brazil and Southeast Asia. The reason for this deforestation is the strong demand for soybeans for livestock and palm oil for industrial food and biofuels. Oil palm plantations currently cover more than 27 million hectares of the Earth's surface. Humans are destroying natural environments at an accelerated rate: 100 million hectares of tropical forest were cut down between 1980 and 2000 and more than 85% of wetlands have been removed since the beginning of the industrial era. These Anthropogenic processes have resulted in the emergence of a multifaceted degraded environment, ultimately resulting in the creation of pathogenic ecosystems. Indeed, the inherent demands of this economic system, and in particular intensive agricultural practices, have changed the world to the point of causing the emergence of ecological and social environments conducive to the development and establishment of various pathogens and infectious diseases. In this way, environments in reshaped areas (ecotones) and periods of major restructuring over time (chronotones) appear to have played a determining role in the genesis of emerging infectious diseases (Bradley et al., 2004). Pavlovski established the connection between a disease and a defined geographical landscape (Pavlovski, 1964). In the same way that we use the term Anthropocene, we could also use the term *pathonocene* to allude to a period characterized by specific diseases resulting from anthropogenic changes, such as emerging infectious diseases (Méthot, 2016; O'Callaghan-Gordo & Anto, 2020).

As suggested by Donna Haraway (2016) and Malcolm Ferdinand (2019), the term *Plantacionocene*, might be an even more appropriate and accurate way to describe both recent history and the present-day, stemming from a global change in land use and human resources. "The use of the term 'plantationocene' connects the development of a plantation form of production to the beginning of the current geological era that we are in" (Hameed, 2017, p.2). "[We use the term] Plantationocene for the devastating transformation of diverse kinds of human-tended farms, pastures, and forests into extractive and enclosed plantations, relying on slave labor and other forms of exploited, alienated, and usually spatially transported labor..." (Haraway 2016, p.162) "Plantations eradicate the diversity of what is cultivated, devastating the land, and expropriating the bodies working on the land and destroying any possible autonomy for self-sustenance for those living in these areas" (Hameed, 2017, p.2). The *plantacionocene* is characterized by a homogenization of living beings and their interconnectivity. This way of inhabiting the world cannot be understood independently of capitalism. Moreover, the anthropogenic processes at the origin of today's environmental devastation are intertwined with a colonial and slave-oriented way of thinking (Ferdinand, 2019). The intensive agro-industrial system based on the generalization of monoculture and plantations, irrigation and the use of fertilizers, has had a profound impact on rural lifestyles. Concerns about the health impacts on communities has been raised, from the occupationally exposed farm worker, to the inhabitants of agricultural areas that are subject to multiple routes of exposure. Moreover, these modified ecosystems and the non-resilient communities resulting from such changes are now having increasing difficulty coping with the numerous disturbances incurred. On a global scale, these modified environments correspond to *hotspots* of emergence: since the 1960s, South Asia has been the site of a large number of emergences (Dengue virus, Kyasanur forest disease, Nipah virus, Cov2 SARS, etc.) (Karesh et al., 2012; Bradley, 2004). Moreover, the concentration of humans in big cities, the centralization of the food production system (Rohr et al., 2019), together with the failures of public health systems following international austerity policies (Lachenal, 2013) have led to a very vulnerable world (Satcher, 1995; IPBES, 2020).

The focus of this paper is on these deep roots of emergences and I will not discuss other diseases which are also characteristic of the Anthropocene such as certain respiratory and cardiovascular diseases, obesity or certain neoplasias, nor the impact of current food production patterns on nutritional status. It is, nevertheless, important to note that chronic non-communicable diseases may contribute to the occurrence of severe forms of infectious disease, as seen in the current COVID 19 pandemic (Cicoella, 2020). This recalls the concept of pathocenosis, which emphasizes the interdependence between different diseases. A community of diseases emerging in an ecological and social context specific to a particular period of history is also influenced by the interrelationships with other diseases of that time (Grmek, 1969; Whitmee et al., 2015; Mac Michael., 2014; Gonzalez et al., 2010).

Vector borne diseases

Recent decades have witnessed the expansion of vector-borne diseases with, in particular, the epidemic of Zika in South America in 2015, the worldwide spread of Dengue fever and its severe forms of haemorrhagic fever, and the spread of Lyme disease in Western countries (Lowe et al., 2018; Stanaway et al., 2016 ; Li et al., 2019). Several factors come into play in the geographical distribution of vector-borne diseases, including land use changes, anthropization and urbanization of areas, climatic factors, and socioeconomic inequalities.

The relatively rapid transformations characterizing this period are called *chronotones*, whereby rapid change brings together risks inherent in the current, previous and following periods (Bradley, 2004). The epidemiological importance of chronotones should be emphasized. For example, changes in land use through the expansion of monoculture and industrial plantations lead to major disturbances at each stage of the transformation, whether during the initial phase of deforestation or during the phase of planting a single/clonal plant species over a large area, or during the exploitation phase (Bradley, 2004). These modified environments cause functional changes in local biodiversity and changes in the distribution and balance between different species. (O'Callaghan-Gordo & Anto, 2020; IPBES, 2020). The resulting altered environments are often unfavourable for many wild species but can become favourable for generalist species that develop the capacity to adapt to these anthropized environments. For example, the installation of

permanently irrigated rice fields or oil palm plantations provide favorable conditions for the development of mosquito larvae and are followed by malaria epidemics (Kuriakose & Ittyachen, 2018). The model of permanent irrigation of rice fields is a relatively new phenomenon resulting from the demands of ever-increasing productivity and yields caused by a system of international trade. Similarly, the expansion of palm oil plantations has taken place in the context of the globalization of trade and the generalization of processed food. Another example is the use of chemical fertilizers that promote the proliferation of *Aedes aegypti* and *Anopheles gambiae* (malaria vector) (Darriet, 2018). The generalization of the use of chemical fertilizers is also a byproduct of the demands of growth within the agricultural model. Furthermore, monocultures appear more susceptible and less resilient to crop pests that can lead to food insecurity. The existence of plantations also changes the relationship between humans and their environment, increasing human exposure and the interfaces between different species. Indeed, this system leads to movements of susceptible populations of workers to plantations and increases their exposure within environments that have become ideal habitats for vectors. Thus, rubber workers must go to the plantations each morning to harvest the sap, at a time that is most favourable for the bites of malaria-transmitting mosquitoes. In Thailand's Chachoengsao province, 60% of malaria cases were identified among rubber plantation workers. (Ecohealth Asia, 2011) The exploitation of rubber to supply various industries, especially the tyre industry, illustrates one aspect of the growth imperative. The world expansion of rubber exploitation took place first during the colonial period and then during the Second World War, two periods that correspond to important moments in the emergence of the current economic system. Exposure to zoonotic malaria based on human use of space in Borneo, Malaysia has been studied. At the community level, data indicate that areas near secondary forests and houses have the highest probability of human exposure to *P. knowlesi* (zoonotic malaria), providing quantitative evidence of the importance of these border zones between heavily reworked and wilder areas called *ecotones* (Forgnace et al., 2019). Finally, the rural exodus and urbanization, together with the proliferation of informal and precarious housings and a lack of waste and wastewater management, have favoured vector-borne diseases, such as Dengue fever and Zika (cluster of microencephalies following Zika infections among pregnant women in the favelas in Brazil) (Paupy et al., 2009; Ali et al., 2017).

Dengue fever poses a health threat to two fifths of the world population, with an annual incidence of around 80 million cases, 500,000 severe haemorrhagic forms and 300,000 related deaths (Halstead, 1999). The incidence of Dengue fever in the world has increased more than 30 times over the past 50 years. In Southeast Asia, and particularly in Malaysia, the re-emergence of Dengue occurred in the early 1950s at a time of significant and early land use changes, with the expansion of oil palm and rubber tree plantations, and associated deforestation and urbanization (Toha et al., 2014). It has been argued that the transformations of forest ecosystems into industrial plantations have had an impact on the epidemiology of Dengue (Brown et al., 2018). During the 1950s, vector-borne disease management based on environmental vector control measures was successful and led to the eradication of some vectors such as *Aedes aegypti* (vector of Dengue, Zika, Yellow Fever and Chikungunya) from several South American countries (Paupy et al., 2009). After the development of a Yellow Fever vaccine, vector control efforts and more broadly environmental and ecological vector control measures were abandoned, leaving room for the reintroduction of the vector in the 1980s (Paupy et al., 2009). Since then, the density of immunologically susceptible human population, human migration, and uncontrolled urbanization have led to the proliferation of vector and epidemics (Paupy et al., 2009). Poor housing seems to be the cause of the amplification of epidemic and human mobility a determinant of the spreading of pathogens.

Other anthropogenic processes influencing vector-borne diseases, including disturbances of aquatic environments caused by mining or the creation of irrigation channels, have an impact on diseases transmitted via freshwater crustaceans, such as Buruli ulcer or bilharziasis. Buruli ulcer is caused by a bacterium and manifests itself in the form of decaying skin ulcers, while bilharziasis is caused by a parasite and leads to urinary tract obstructions and neoplasia. The recent expansion of illegal and legal mining in French Guiana has caused epidemics of Buruli ulcer in areas previously free of the disease (Jagadesh et al., 2019; Combe et al., 2019; Douine et al., 2017). The increase in industrial and small-scale mining extraction puts pressure on ecosystems and causes major public

health problems among the indigenous populations of the exploited areas (direct effects: water pollution, intoxications; and indirect effects: alcoholism, prostitution, insecurity). In the same way, the construction of major historical canals has resulted in the spread of malaria and bilharziasis around the world and particularly in Egypt (Guerra et al., 2012).

Other environmental factors such as climatic disturbances have already brought about changes in the geographical distribution of different vectors, notably *Aedes aegypti/albopictus* (vector of Dengue, Zika and Chikungunya) leading to new clusters of Dengue and Zika in previously unaffected areas (Lowe et al., 2018; Stanaway et al., 2016). In Western countries, the expansion of the distribution of *Ixodes ricinus* ticks (vector of Lyme disease) is leading to an increase in the incidence of Lyme disease cases (Lin et al., 2019). Indeed, climate seems to be a major determinant of the geographical and seasonal distribution of arthropods and mosquitoes (Karesh et al., 2012), which operate as ecological drivers of vector ecology.

Finally, socioeconomic inequalities must also be highlighted as determinants of vector-borne diseases: the estimated incidence of Dengue fever is 32% among the population on the Mexican side of the US-Mexico border while it is 4% on the Texan side. That can be caused by differences of living standards, quality of waste management, wastewater, access to drinking water and access to a quality health system (Ramos et al., 2005).

Zoonoses

Zoonoses and epizootics result from the exchange of pathogens between species. Cross-species transmission by spillover occurs in humans both through domestic animals and wild fauna. The Neolithic agrarian revolution, characterized by the advent of animal domestication and the settlement of human populations, corresponds to the first period of emergence and establishment of several zoonoses such as measles and tuberculosis (Morand, 2020; Harper & Armelago2010). More recently, the industrialization of animal husbandry in the 1960s with the establishment of high animal concentration farms paved the way for the development of zoonoses such as H1N1 influenza (Keck & Lynteris2020; Karesh et al., 2012). The encroachment of livestock farms on wildlife habitats ever closer to forests is increasing the interfaces between wildlife and livestock. The weakening of the genetic diversity of domestic animals through genetic selection increases the genetic susceptibility to a pathogen that may have been benign in wild populations (Morand, 2020). Finally, the industrialization of the world and the globalization of the meat/food market have played a crucial role in these emergence processes, allowing the rapid spread of these diseases around the world among susceptible populations (Morand, 2020).

Tropical regions are the areas of greatest and most rapid ecological change, in which "only remnant patches of undisturbed forest in a sea of cropland persist" (Haddad et al., 2015, p.1; Wilcox & Gubler, 2005; IPBES, 2020). Deforestation has resulted over time in the fragmentation of about 60% of the subtropics and 45% of the tropics (Haddad et al., 2015). Timber extraction, road construction in remote areas and eco-fragmentation of wildlife habitats all have direct ecological impacts on wildlife (IPBES, 2020). The increase in poaching that results from the easy access to the forest, and the growing demand for bushmeat in the cities contribute to the loss of biodiversity and the increase of zoonotic risk (Guégan et al., 2020; Morand 2020; IPBES, 2020). These ecological degradations, directly linked to a mode of land use, favour the interspecies transmission of zoonotic viruses, through the increase in interface and contact zones. The conversion of natural spaces into agricultural or urban areas, the simplification of habitat and the reduction of species diversity all lead to the proliferation of potential reservoirs (Morand, 2020; IPBES, 2020). These altered environments, or anthropogenic ecotones, seem to be particularly implicated in the processes of infectious disease emergence (Despommier et al., 2006). The connection between ecotonal processes and ecological and evolutionary biophysical processes is arousing interest in studying these specific areas (Despommier et al., 2006). For example, Ebola epidemics preferentially occur in recently deforested areas (Oliveiro et al., 2017). In these areas, the expansion of oil palms acts by "truncating ecosystemic barriers that interrupt chains of transmission and driving a coevolutionary socioviral system across a critical point" (Wallace, 2016, p.3).

Potential changes in these areas in the local abundance of certain susceptible species, or the introduction/proliferation of invasive species may cause ecosystem imbalances and induce

human-assisted pathogen diffusion (IPBES, 2020). The scarcity of native species, the collapse of fauna and the disappearance of predators lead to the disruption of ecological communities and the hyperabundance of invasive species such as rodents (Wilcox & Gubler, 2005). Invasive rodent species are indeed recognized as reservoir hosts for many zoonoses: lassa virus, leptospirosis, monkeypox virus, etc. (Meerburg et al., 2009). Changes in land use seem to have a particular impact on the proliferation of rodents. On the one hand, plantations or rice fields appear to be favourable for rodent feeding and, on the other, the disappearance of predators has led to the colonization of these anthropized areas (Singleton et al., 1999). Bats have also been identified as a reservoir of many pathogens: the Ebola virus, the Marburg virus, the Nipah virus, the SARS Cov virus, etc (Bordes et al., 2015). The displacement of bat populations through the destruction of their habitat, the increase in the areas of exchange between bats, livestock and humans are also implicated in these multiple emergences (Morand, 2020).

However, the problem is not only that of the species carrying the pathogens, but the impoverishment of ecosystems that reduces the dilution effects of opportunities for transmission to humans (Keesing et al., 2006; Everard et al., 2020; Civitello et al., 2015). "In a rich ecosystem, a pathogen is more likely to encounter so-called 'poorly competent' hosts, i.e., unfavorable to its multiplication, or even 'dead-end' species" (Keesing et al., 2006, p. 489; Everard et al., 2020). On the contrary, the less rich the ecosystem, the more likely it is that a pathogen will eventually pass into humans. The impoverishment of ecosystems therefore considerably increases the risk of transmission to humans (Keesing et al., 2006; Everard et al., 2020). Even more than the loss of biodiversity, the loss of functions promotes the transmission of pathogens and its persistence (Wilcox & Gubler, 2005; IPBES, 2020). Certain points of no return, or tipping points, induce irremediable imbalances after being exceeded. Wilcox & Gubler (2005) introduce the concept of *pathogenicity thresholds*: "existence of threshold of pathogen persistence to explain much of the increase in emerging infectious diseases". As described by Plowright et al (2017), "Zoonosis emergence corresponds to the rare alignment of gap in barrier". The alteration of complementarity between species may affect the regulatory functions of bi-directionality and thus influence infection dynamics (Cunningham et al., 2017). Disease containment could therefore now be considered an ecosystem service. Indeed, preserving ecosystem services is recommended, at least as regulators of disease (Cunningham et al., 2017; IPBES, 2020), and above all in themselves for their intrinsic value.

The third epidemiological transition?

The first epidemiological transition occurred with the Neolithic revolution, human settlement and the beginning of agriculture, which resulted in a specific pattern of infectious and nutritional diseases. The second epidemiological transition is characterized by a decline in infectious diseases and an increase in chronic/degenerative diseases. This appeared during the last two centuries following the establishment of an intensive agricultural system. If an epidemiological transition is defined by a break in the causes of mortality, does this shift in threats related to emerging and re-emerging infectious diseases, such as zoonoses, vector-borne diseases or antibiotic resistance, generate enough evidence to speak of a new epidemiological transition (Harper & Armelago, 2010)? Do these emerging pathogenic environments, accompanied by diffusion capacities never before equaled in global transport, lead to what would correspond to a third epidemiological transition? Could the health impacts of the generalization of pathogenic environments characterize our era? If so, emerging infectious diseases and anthropocene-induced pathogenicity make up the third epidemiological transition. In this case, the agro-industrial system and especially the use of land for plantation would be at the origin of the third epidemiological transition, providing the basis for the term *plantacionocene*. The recent international crisis linked to the COVID 19 pandemic is further confirmation of this transition. Indeed, if emergences always correspond to multifactorial processes, it is fundamental to highlight the major influence of environmental determinants in recent emergences and the current health crisis. Ecological and social ecosystems are characterized by dynamic equilibriums, and the disruption of these beyond certain thresholds has led to major disruptions threatening human life on a global scale. Global causes generate long-term systemic effects. These emergences reveal an extreme fragility through the homogeneity and the major interconnections of our life styles, leading to a systemic impasse composed of system-based issues and to long- and short-term harmful pathways.

General effects of the growth-based economic system on the current health care system

Driven by the global growth-based economic system, today's healthcare system promotes a technomedical vision of health, based on reactive medical and curative approaches (IPBES, 2020), on technoscientific solutions mainly defined by Western countries and on preparation policies for potential health or security crises (Lachenal, 2013). These approaches have long been questioned both for their ineffectiveness and for their difficult acceptability. The Western biomedical approach to health and disease, through the medicalization of lives, has come to exceed deleterious thresholds and to generate multiple iatrogenies (Illich, 1976; Zywert, 2017). Health policies defined according to the current economic model sometimes result in counterproductive measures and can worsen the health situation. The control methods developed in response to certain zoonoses transmitted by rodents can lead to significant health consequences. For instance, compensating for the disappearance of predators through the use of chemical pesticides has important limitations in terms of effectiveness but also in terms of human and environmental health (Jacquot, 2013). The destruction of all rats during human plague epidemics has the paradoxical consequence of increasing the human epidemic, with fleas seeking new hosts after the rodents have died (Plowright et al., 2017). Some methods also induce counterproductive effects: "inadequate or inappropriate policies of vector control promoted vector or disease emergence", for example, the selection pressure on mosquitoes through the generalization of pesticide use has selected resistant mosquitoes (Wilcox & Gubler, 2005). Moreover, in the past, failure to consider the ecological and ecosystem roots and contexts of health problems has led to counterproductive measures. Reaching counterproductive thresholds could be summarized as follows: "Exploitation of the environment has contributed to human health. By exploiting Earth resources we have a more comfortable existence, and our life spans have increased considerably. But we're now at a tipping point in which the exploitation of the environment is beginning to have a negative impact on human health" (Seltenrich et al., 2018 p. 1; Aillon & D'Alisa, 2020). Finally, top-down and authoritarian public health interventions, such as the promotion of acceptable cultural change or quarantines are not very well accepted by populations, regardless of geographic location. They sometimes lead to the rejection of proposals by the communities concerned and to stigmatization. Indeed, in the recent Ebola epidemic in North Kivu, community mistrust resulted in the lynching of health workers involved in the public health response (Changle, 2019). While current vertical programs may appear to be ineffective or even counterproductive, community-led and controlled interventions are likely to be more appropriate (Sturmberg & Njoroge, 2017).

In addition, there are inconveniences inherent in the medico-technical health system and new biotechnological innovations: the techno-scientific world co-produces problems and needs, hopes and promises. It pursues the utopia of eradicating infectious diseases initially carried out by colonial medicine, particularly in sub-Saharan Africa, with the same disproportion and the same potentially deleterious effects and failures (Anderson, 2014). In fact, efforts to eradicate African trypanosomiasis, also called sleeping sickness, in French Equatorial Africa, through forest management, agricultural development of the area, and the isolation of diseased populations in specific villages, paradoxically led to an increase in the incidence of sleeping sickness during the colonial period. In addition, the massive campaigns of treatment for eradication using non-sterile material led to secondary contamination and the spread of other infectious diseases (Pépin, 2020; Lachenal, 2014). Moreover, the promotion of technoscientific solutions is currently being updated, for example, in the fight against vector-borne diseases with genetically modified mosquitoes by genetic forcing. Malaria in sub-Saharan Africa or Dengue fever in South America are the object of these highly technological battles. Firstly, the health benefits are not ensured, while the uncertainties linked to biotechnologies and the risks of off-target effects induce "unknown unknowns" (Boëte et al., 2002). Field experiments in southern countries of techniques incompletely developed by northern countries, without proven epidemiological effectiveness in terms of the current state of knowledge, appear ethically questionable (Boëte & Koella, 2002; Meghani & Boëte, 2018). Moreover, these techno-scientific solutions are promoted through philanthropic funding, as in the case of genetically modified mosquitoes promoted by the Bill and Melinda Gates Foundation (MacGoey, 2015). Finally, the specialization and expertise of public health responses, which cannot be appropriated by populations, leads to South-North dependence and a loss of autonomy in health matters. Yet, in the history of public health interventions, the most effective strategies to reduce the burden of infectious diseases have been

found to be hygiene and improved living conditions, where vaccination or antibiotic therapy have played only a secondary role quantitatively. Basic interventions and health prerequisites thus appeared to be more effective at the population level than the latest technological innovations (Armstrong et al., 1999; Szreter, 1988). Moreover, success obtained with antivirals or antibiotics is always temporary, notably due to inherent antimicrobial resistance, although basic interventions are more durable.

The concept of preparedness now dominates in Global Health institutions, referring to a programme of long-term development activities whose goals are to strengthen the overall capacity and capability of a country to manage efficiently all types of emergency and to bring about an orderly transition from relief through recovery and back to sustainable development. This concept of preparedness has replaced the concept of prevention and the precautionary principle, and so has heralded a new era in public health. This concept of preparedness for specific and anticipated risks has erased other previous modes of operation that favoured the resilience and basic functioning of health systems, allowing for the unexpected. Paradoxically, these systems have never appeared less prepared to respond, less effective in times of crisis, than since when the concept of preparedness has been dominant.

At the same time, with the emergence of Global Health, funding for public health has shifted from state and public funding to philanthropic and charitable funding (MacGoey, 2015; Packard, 2016), while the guarantee of fairness and justice is borne by taxation according to income and on the equitable participation of all in the financing of public services. European countries, which until now have been more backward with respect to these practices, have recently reinforced this model, notably to deal with the COVID 19 crisis (calls for donations to provide medical equipment to hospitals have multiplied). With the emergence of Global Health in the 2000s, public health became a market like any other, defined by financial investments and health products (MacGoey, 2015; Packard, 2016). This new approach is also characterized by two types of health interventions: security interventions against emerging threats/biosecurity and humanitarian interventions (Lachenal, 2013). This represents a major change in the concept of international health developed after 1945 (Packard, 2016). Finally, the infiltration of the economic context into the public health system has induced reactive and short-termist choices, while the temporal dimension of ecosystem balances would require protective interventions in the long term (Everard et al., 2020). Faced with an epidemic, the development of a treatment is the preferred type of intervention: rapid intervention, focusing only on the consequences, centered on the symptoms of the imbalances at the origin of the emergences and not on the imbalances themselves. Conversely, identifying the pathogenic relationships and determinants of the ecosystem involved, and then attempting to restore the ecosystem functions and balances at stake in the epidemic, are long and demanding processes that attempt to act on the upstream causes of emerging infectious diseases. Like the globalization of the economic system, the consequences in terms of public health are found worldwide, as are the causes. The large-scale commodification of nature and the industrialization of the world have similar consequences on all continents, even though the countries of the South are by now decades ahead in terms of ecological and social/societal degradation.

Finally, a by no means negligible effect of the economic system is the chronic destruction of public health systems and of the health capacities of countries, through the economic adjustment policies conducted by the Global Fund (David et al., 2020; Lachenal, 2013). These restrictions result firstly in major failures of health systems, and subsequently in economic and social conditions conducive to epidemics and their severe societal consequences. The role played by economic adjustments in the spread and severity of the 2014 Ebola epidemic in West Africa has been already described (Lachenal, 2014b).

The health crisis linked to COVID 19 sheds light on this phenomenon, this time in Western countries (Soener et al., 2020). In fact, the policies of financial restrictions and layoffs in public hospitals have led to a breathless and ill-equipped hospital system (both in terms of material and human resources) at the start of the epidemic, with all the difficulties that we have become familiar with. The European countries that have been most affected by the disengagement of the state and by the budget cuts in public health financing in recent years are also the countries that have appeared to be the most vulnerable and most affected by the health crisis, such as Spain and Italy (Soener, 2020). Economic austerity policies are leading to humanitarian crises, this time in

developed countries: "Years of austerity have left us ill-prepared for the coronavirus and exposed how vulnerable we are" (Soener, 2020, p.8). The coexistence of public and private systems in the health sector has led to inequalities in access to care and a loss of state control over the health care provided (MacGoey, 2015). Not surprisingly, India, a country characterized by a 60% privately based health system, found itself without care capacity during the COVID 19 epidemic, with the private sector initially refusing to treat COVID patients (Nair, 2020). Furthermore, vaccines and new drugs induce fears and reluctance among populations, fears that could probably be avoided if research and development around curative approaches were entirely public, ensuring a non-profit approach.

Ecological vulnerability, epidemiological vulnerability, health system vulnerability, social vulnerabilities: these multiple incurred vulnerabilities characterize the Anthropocene. Such systemic and interconnected vulnerabilities can thus lead to cascading effects and the aggravation of health crises (Machabala & Karesh, 2015). Understanding the ecological changes that play the role of drivers of pathogen emergence and spread is essential for effective and targeted measures against emerging infectious diseases.

3. EcoHealth: ecosystemic approaches and ecological and social alternatives.

Alternative approaches to health

The results on the health consequences of a system that creates the conditions for the occurrence of diseases and their potential spread are the same as those described by Aillon et. al., who argue that "the current model of development is not compatible with the protection and promotion of health of present and future generations" (Aillon & Dal Santo 2014, p. 1; Aillon & D'Alisa, 2020). In this respect, the global expansion of pathogenic environments appears as the result of the artificialization of wild environments themselves, linked to an extractivist and productivist system and a land use based on industrial plantation. Dealing with the complex public health problems resulting from the combination of Western lifestyle and capitalist socio-economic structure calls for a break with the dominant paradigm, to move beyond it to an alternative framework. Could alternative approaches to health be able to influence these human-made health problems?

Alternative approaches to public health could mean thinking about health holistically. Thinking about health in historical and evolutionary terms, taking a step back far enough to understand the emergences, dynamics and pathocenoses (combinations of diseases characteristic of an era and the interrelationships between them). Long-term studies of the impacts of anthropogenic modifications on environments are necessary, as a short-term scale does not allow for the identification of imbalances inherent in any modification of ecosystems (IPBES, 2020). The understanding of health leads to an interest in the health of the environment at all scales: from the health of the external environment (health of the ecological and social environment) to the health of the internal environment (microbiota). Our ecological external environment influences directly our microbiota, reminding us that we are part of a single living environment (Leroij et al., 2020). If thinking upstream of health is based on encouraging health promotion through a healthy environment, thinking downstream of health is also important: in particular to avoid environmental degradation which ensues from many action which aim at the production of health itself (medical waste management / contribution of disposable medical material to environmental pollution/ testing drugs on animals) (Lavocat, 2020). It is important not to reinforce, on the grounds of an exceptional situation, the factors that have led us directly to the current impasse. Thinking about emergences in terms of causal networks, complex causality, complex interactions with adapted approaches would make possible to better define the determinants of health. Approaching health in an alternative way would also call for considering decolonial health, which means questioning current and past public health networks, and fostering the autonomy and independence of action of populations for their own health. Conceptually, this way of thinking has the aim of producing cross-fertilization with humanism, decolonialism, collective management of the common, eco-feminism, etc. The question to be asked would therefore be: which human health should be favoured so as to promote the health of environments and other living beings as a prerequisite for promoting human health in return?

This would correspond to health promotion and *primary* prevention, rather than *secondary* prevention or preparedness, based on fighting diseases once they have emerged. Such alternative approaches to public health would promote an alternative use of land that pays attention to the sustainability of our planet, its limits, and to the health of ecosystems and non-human beings *for a more-than-human public health* (Kehr, 2020). Environmental health calls for action on the environment to reduce the risk of disease emergence, focusing on the ecological and social conditions of life prior to the onset of disease. Understanding the origins of the viruses implicated must also complement this holistic approach, focusing on their animal reservoirs and potential hosts, their ecological habitats and the reasons for their sudden emergence at a particular time and place, when some of these viruses are known to circulate in that area at a level undetectable for a long period of time. Once again, public health policies focused on the prevention of the ecological and social determinants of emerging infectious diseases, in particular, on the prevention of imbalances and on the repair of ecosystems, are necessary.

Peasant agroecology could be one approach (Les notes de sud, 2020). This is a set of agricultural practices that rely on the functionalities offered by ecosystems, aiming at reducing the impact of agriculture on biodiversity and natural resources, coupled with a social movement in defense of sustainable and equitable agricultural and food systems respectful of humans. Such approaches emphasize the traditional knowledge of local communities, preserving local specificities and habits, while being nourished by the most recent global knowledge. Environmental and social justice and the respect of human rights are an important part of this agroecology, together with solidarity. Small-scale animal husbandry, with a reasonable animal density, a high genetic diversity and a farming method that respects living beings could help limit the impact of pathogens on livestock and humans. Agriculture preserving landscape mosaics, diversification and large forests, developing active hospitality practices for biodiversity, would all have a positive impact on ecosystems. The aim would be to reintroduce agriculture in its place within ecosystems, agriculture as a link between ecosystems and humans. Instead of being a driver of epidemics, agriculture could in this way assume a regulatory role. Halting the extraction of fossil resources should also be encouraged not only to avoid the deterioration of ecosystems and the physical health of riverine populations, but also to preserve the social health of communities by stopping the deterioration of human relations. More broadly, alternative approaches to health would also involve a deglobalization of trade and a reduction in global transport, which would contribute to reducing the risk of transmission and spread of pathogens but would also imply a more global transformation of our societies so as to make it acceptable. These restrictions on travel should not be equated with restrictions on freedom, since they will not be so when accompanied by other transformations of lifestyles within territories and ecosystems.

Changing our relationship with our environment involves changing the way we relate both to humans and non-humans. The concept of cooperation could be explored in the way proposed by Kropotkine in the same period during which the dominant paradigm was the competition between living beings as defined by Darwin. Kropotkine's ecological observations in the hostile and harsh environment of Russia, at the same time as Darwin was conducting his observations in the abundant environment of the equatorial zone, led the two men to different conclusions. In difficult environments, cooperation and mutualism appear to be fundamental for survival (Kropotkine, 1902).

The "One Health" concept

Different ideas of an integrated approach to health have been developed in recent decades, such as the "One Health" concept that considers health at the human-animal-environment interface (Roger et al., 2016; IPBES, 2020). While the "One Health" concept is indeed a step forward in terms of a holistic approach, it is now widely accepted within traditional institutions and remains mainly focused on the health of domestic animals within the agro-industrial system, while wildlife or ecosystems are under-represented (Roger et al., 2016). Such an approach cannot be integrated into a truly alternative approach. In this model, the fight against threats related to zoonotic infections focuses on improving the health and productivity of animal husbandry and food safety and security, without questioning the functioning of the system and the root causes of the health problems encountered (Mi et al., 2016). Moreover, this approach, despite its desire to integrate, still maintains the traditional separation between domestic and wild, and is based on the danger

that animals represent. A truly “One Health” approach should favour “living with”, “living together” with ecosystems and non-humans and take into consideration ecological, environmental and ecosystemic solutions in order to be a real breakthrough in public health.

The “EcoHealth” concept

Another concept, that of “EcoHealth”, has been developed in the same period. For the moment, it has remained essentially at the stage of local experimentation, while it has the potential to correspond to concrete applications of the principles of sustainability in health (Morand & Walther, 2020; Morand et al., 2020) and constitute such a breakthrough. In contrast to “One Health”, “EcoHealth” is a socio-ecosystem approach to health, more focused on environmental and socio-ecosystemic problems (Nguyen Viet et al., 2015; IPBES, 2020). The foundations of “EcoHealth” are based on disciplines such as ecology, ecosystem health, population health, and the focus is on optimizing ecosystem health in order to improve human health (Mi et al., 2016). “[The] ecosystem approach to health formally connects ideas of environmental and social determinants of health with those of ecology and system thinking” and diseases appeared as “Public health issues, individual and population expressions of interacting systems” (Wilcox et al., 2012, p.4). “EcoHealth” is based on the inextricable links between the health of all species and the health of their environment, taking into account social, ecological, population and ecosystem health, the intrinsic values of an ecological system, and the participation of indigenous societies and knowledge (Lerner & Berg, 2017). It is a method based on community ecology, population ecology, landscape ecology and system ecology, with the aim of determine a “disease landscape”: a more coherent vision of the local determinants of diseases and of the local imbalances leading to emergences. The ultimate goal is to highlight the potentially most effective interventions in terms of prevention and to seek to understand and mitigate the factors of the physical and social environment affecting health (Mi et al., 2016). This paradigm shift allows us to move from a linear, thematically-segmented approach to a systemic and multidisciplinary approach more adapted to the complex systems under study.

More recently, within the context of the Anthropocene and the awareness of planetary limits, the concept of “Planetary Health” has also emerged, accompanied by the slogan “our planet, our health” (Myers et al., 2018; Morand & Walther, 2020; Morand et al., 2020). This highlights unexpected health outcomes of climate change and human influence on the Earth and focuses on characterizing the health impacts of anthropogenic alterations in the structure and function of Earth’s natural systems. It responds to a pressing need for new directions for environmental health: “If you’re building a highway through the Amazon, you need to methodically look at what that means for vector-borne disease. And today, we don’t do that. We have to look at the pros and cons of these actions in terms of economic impact, social impact, environmental impact, and public health impact” (Seldenrich, 2018, p.6). However, in the “Planetary Health” approach, the ecosystem is considered as the biosphere and the external environment and not as the lived environment of living beings.

Both “EcoHealth” and “Planetary Health” could be summarized as proactive health promotion rather than surveillance and preparedness in term of public health policies (Mi et al., 2016; WHO, 1986). Such approaches could be the precursor of a radical transformative switch from reactive behaviour toward proactive preventing pandemics (IPBES, 2020). Thus, “EcoHealth” and “Planetary Health” could have benefits to develop mutually in collaboration, both in terms of a theoretical view and practical applications.

Practical applications of the “EcoHealth” concept: ecosystemic approaches and ecological and social alternatives

What is necessary for us is to try to act on the root causes of emerging infectious diseases and on the health problems defined by the communities themselves, rather than just managing the health consequences of ecological imbalances. From this perspective, a better understanding of each determinant specific to the emergence studied would make it possible to subsequently decide on the level of intervention specifically adapted to the disease and especially to its ecological context, and not simply to suggest the use of a solution independently of the context. These suggestions

favour both more targeted measures, specifically adapted to the local context, and more radical public health policies with a broader global scope.

Methods

The methods developed by the "EcoHealth" approach begin with an ecological/ecosystemic diagnosis: an assessment of the specific health situation and the area concerned by a recent emergence, conducted on the basis of indicators of animal health, human health and ecosystem health. The ecodiagnosis of the bio-social-ecological zone enables us to determine its pathogenic potential, in order to try to avoid the emergence of the disease or its spread by acting on the management of the eco-social environment. This starts with the definition of the health problem of a community by itself, followed by understanding the complex causalities, the virtuous and vicious cycles at stake and the possible consequences of different interventions, through the exploration of multiple perspectives. Finally, it results in several choices. Which relationships should be the focus of the intervention? How, where and when should we intervene in a system to better address critical relationships? What underlying mechanisms are at the origin of these emergences in this community at a given moment in human and environmental history? What recent short- or long-term ecological changes have occurred in this area and can explain the imbalances that have emerged? Several tools are useful for this practice, such as village resource maps or village weakness maps that help identify critical points (Nguyen-Viet et al., 2015).

This first stage of analysis is then followed by environmental management adapted to natural resources to promote a healthy ecosystem and "filling the gap between disease and health" (Roger et al., p.2; Nguyen-Viet et al., 2015). It consists of the search for "practical solutions that reduce or reverse the negative health effects of ecosystem change and which can bring about improvements to human, animal and ecosystem health" (Nguyen-Viet et al., 2015, p.5). Finally, it corresponds to strategies to reduce and reverse the risks on the environmental aspect. "EcoHealth" based on field experiences seeks to understand how agricultural practices can contribute to improve health (Nguyen-Viet et al., 2015), how to develop more sustainable agricultural practices by integrating the avoidance of eco-fragmentation or the establishment of ecological corridors for wildlife movement. Indeed, ecohealth is an approach focused on the territories and populations concerned and emphasizes the essential role of ecobiosocial strategies focused on the community.

Examples

Public health responses to vector-borne diseases, after a shift from chemical to biological control, could now move towards environmental management/source reduction with community involvement. This approach would correspond to changes in agricultural practices, based on vector ecology, notably through the identification and management of larval breeding areas. The seasonal increase in vector-borne diseases such as Dengue fever and malaria is a major concern in rice paddies in tropical parts of the world. A health ecology experiment is taking place in Mwea Kenya (SIMA System Wide Initiative on Malaria and Agriculture) (Mutero et al., 2005). It is based on agricultural alternatives to rice cultivation, through the cultivation of soybeans 6 months a year, in parallel with the use of insect repellent plants around the home. This experiment has resulted in the reduction of malaria cases along with a better nutritional status for the populations (Mutero et al., 2005). Practical examples of the Ecohealth approach could also correspond to the fight against vector-borne diseases by favouring the predators of the vectors: bats, insectivorous birds, amphibians, dragonflies (ID4D, 2020).

The "Building out Vector" program is another example of the implementation of environmental planning for health purposes. This program proposes fighting against the socio-sanitary determinants of health problems and in particular vector-borne diseases by improving human housing and accommodation in order to eject the vectors. Waste management programs and the improvement of sanitary conditions in informal urban settlements, leading to the destruction of larval breeding areas, can reduce the incidence of vector-borne diseases such as Dengue fever (BOVA network, 2020). Another illustration of this approach took place in a Mexican city with multiple health concerns (Dengue fever epidemic, intestinal diseases, and polychlorinated biphenyl pollution). An environmental health promotion intervention involving all

levels of civil society and government resulted in a decrease in the risk of Dengue fever according to different entomological indices (Breteau index: from 50 to 13.3%, household index: from 40 to 6.7%, container index: from 4.6 to 1.1%) in a pre- and post-intervention evaluation (Alamo-Hernandez et al., 2019).

The meta-analytic work carried out by Keiser et al (2005) is rare. Through the study of various malaria control methods built around environmental management, she examined the impact of these interventions on reported clinical cases of malaria around the world, on the basis of different eco-epidemiological parameters. In 16 studies involving environmental modification (permanent) or environmental manipulation (temporary), the risk ratio was reduced by 88%. (Keiser et al, 2005). In mathematical models based on the modification of human habitats, the malaria risk ratio was reduced by 79% (Keiser et al., 2005). This type of evaluation and inter-community comparison between different interventions in different countries is essential in order to assess the effectiveness of interventions based on environmental modification such as health ecology. However, in order to achieve a truly significant impact on disease incidence, both large-scale and long-term interventions are a prerequisite (Alamo-Hernandez et al., 2019). The involvement of multiple partners such as the community and state institutions is the cornerstone of the success of these interventions.

Alternative methods based on ecosystem-based management have also been tested for several years in the United States against another vector-borne disease, Lyme disease. Management measures based on the choice of plant species in the gardens (Cosson, 2017), on the management of tick predators such as birds (D'Estries et al., 2017), livestock (van Wieren, 2016a and 2016b; Hassan et al., 1991), and wild animals (Hofmeister et al., 2017a, 2017b) presented interesting results in terms of the reduction of risk.

Emerging rodent-borne diseases are also a major public health concern. Refocusing control strategies towards rodent management, rather than rodent control (traditional methods based on culling and eradication), could be more efficient, and requires promoting research in rodent ecology and ecosystem approaches (Singleton et al., 2004). Ecological Based Rodent Management research (EBRM) based on the biology and ecology of rodents considered as pests has enabled the implementation of management strategies that are more sustainable and less harmful to the environment than previous methods (Singleton et al., 2004). The importance of ecological, taxonomic and behavioural studies is to be emphasized in order to develop effective strategies. Specific environmental studies can help to determine the best way to be effective and what role could be played by the strengthening or reintroduction of predators, such as foxes (Singleton et al., 1999). Only a rigorous observation of territories and the species interacting in them over a long period of time can allow the definition of targeted and efficient control methods.

Metapopulation approaches and spatial population dynamics in farming systems have also been tested. Furthermore, knowledge of population dynamics and factors limiting rodent population growth has been used effectively in the management of rodents in palm oil plantations (Singleton et al., 1999). Rodent ethology-type training can also be used to limit animal resistance behaviour to control measures. Research needs to be conducted on the real impact on disease transmission of rodent abundance, of host community structure, of host density, of spillover mechanisms and of transmission chains (Bordes et al., 2015). All this while encouraging the involvement of local communities and farmers, who are the most familiar with their territories and have precious observation time at their disposal, reinforcing the relevant role of a peasant agroecology. The same approach could be used concerning bat-transmitted pathogens, which are also responsible for an increasing number of emerging zoonoses (Bordes et al., 2015).

Interventions to restore ecosystems or ecosystem functions, through the reintroduction of key species or through the concept of *free evolution* could also correspond to other examples of the "Ecohealth" approach (Roger et al., 2016; Morizot, 2020). The concept of *free evolution* promotes a "restoration" of ecosystems in the long-term by providing the minimum conditions to allow living things to express their own regenerative capacities (Morizot, 2020). Although the United Nations already recommends ecosystem restoration, a more radical approach is needed (Breed et al., 2020). Understanding the causal link between ecological restoration and health problems is essential, while causality is still difficult to establish when it comes to taking into account the inherent complexity of ecological systems (Terraube et al., 2017). Moreover,

ecological restoration is often considered in the context of economic cost reduction rather than for ecological or health benefits. The policies envisaged must be a break with classical, coercive and exclusionary conservation, heir to colonization, and must be truly community-based conservation. Restoring a healthy environment in a sustainable manner for humans and non-humans constitutes a fundamental public health intervention.

4. Conclusions

Anthropogenic environmental changes, inherent in the capitalist socio-economic structure, have a fundamental role in the creation of pathogenic environments, the landscapes of emerging human infectious, as well as chronic, diseases. Changes in land use, through the transformation of areas previously predominantly forested and the homogenization of living things, have led to major imbalances in ecosystems. These geographical areas, or ecotones, and these periods of change, or chronotones, are the scene of major epidemiological changes in terms of emerging infectious diseases (Bradley, 2004; Despommier et al., 2006). Indeed, if emergences always correspond to multifactorial processes, it is fundamental to highlight the major influence of environmental determinants in recent emergences and the current health crisis. Ecological and social ecosystems are characterized by dynamic equilibriums, and the disruption of these beyond certain thresholds has also led to threats to human life on a global scale (IPBES, 2020).

Recent changes in terms of causes of mortality and burden of different diseases seem to herald the advent of the third epidemiological transition characterized by infectious diseases, pandemics and treatment resistance (Harper & Armelago, 2010). Like the two previous epidemiological transitions, this transition seems related to the intensive agricultural system and land use pattern, and confirms the characterization of our times as the *Plantacionocene*.

Until now, a significant portion of health funding has been dedicated to the fight against these infectious emergences through a curative biomedical approach and planning preparedness for pandemics and crises. In our society a reversal has taken place between health promotion, on the one hand, and the fight against diseases on the other hand. Conversely, we feel it is particularly important to highlight the health/disease continuum. This paper proposes that primary prevention and health promotion should be encouraged through the promotion of favourable social and ecological environments. As Mi et al (2016) affirm, to "enhance a revival of environmental and social determinants of diseases after period of reductionist approach of infectious epidemiology which highlighted only behavioural risk factor for diseases". Seeking to understand possible alternatives in the field of public health leads us to an approach based on an ecology of health focused on ecosystems and applying ecological and social alternatives (Karesh et al., 2012). Ecological and ecosystemic approaches to public health attempt to understand and mitigate environmental risk factors before reaching critical thresholds for ecological systems which lead to pathogen emergence, and to avoid the creation of pathogenic environments.

This "EcoHealth" approach starts from local community-based ecodiagnosis of the community members' environment and their health issues and is followed by ecological and social proposals for dealing with the identified root causes of imbalances: "ecological thought also offers a rich entrance to understanding living systems, with its emphasis on connectedness and interdependence" (Horwitz & Parker, 2019, p.1). Such alternative approaches could bring together both a conceptual model and practical control methods within a complex ecosystemic understanding of health problems, applied differently according to local socio-ecological and health specificities. The concept of "EcoHealth" is seen as a promising foundation of a more equitable and resilient public health model.

Stopping deforestation, advocating living-based practices promoting the natural functions of ecosystems and the solidarity of interdependencies such peasant agroecology and free evolution of certain forested areas (Morizot, 2020) could slowly lead to a rebalancing of ecosystems, with the preservation of diversity of species and of relations and a process of reappropriation by indigenous communities. Taking into consideration and highlighting the knowledge and know-how of indigenous communities to take care of each environment according to local specificities, could also be the point of departure for "EcoHealth" work. Actions for ecological restoration of ecosystems will potentially be less stigmatizing for local populations than campaigns promoting cultural change, such as the prohibition of traditional hunting activities. Overall, they will be

decided and designed by the indigenous populations themselves. Moreover, this bottom-up community-based approach will ensure the support and motivation of the populations, without all the efforts currently required to obtain acceptability following external interventions.

These approaches involve long-term work and need to be systematized. The current challenge is to scale up these approaches, particularly through the training of future health ecologists (Nguyen-Viet et al., 2015). Training that mixes ecological and ecosystemic approaches with public health approaches would enable the cross-fertilisation of these disciplines. In this way, connecting ecology and health provides frameworks for us to learn from and understand the nuances of context-specific ecologies, that will also yield corresponding context-specific solutions (Horwitz & Parker, 2019). More attention has to be allocated to “EcoHealth” fields, to promote *undone science* (Frickel et al., 2010) and to implement these alternative ecological and social proposals. Avoiding an extractivist mode of research through fostering of participatory research should be encouraged. The next step is the scaling up of ecosystemic and environmental health approaches both in practice and in conceptual and policy frameworks. This suggests both introducing public health as fundamental land use issues, inaugurating peasant agroecology, land use and conservation as fundamental public health issues, and developing coherent policies. These developments should be based on real ecological and agricultural transitions (Everard et al., 2020) and on the project of *a more-than-human health* (Kehr, 2020).

Such an analysis could also be helpful in the understanding and management of the current COVID 19 crisis (Everard et al., 2020). This has brought the world to a brutal and difficult halt. We could imagine a general and voluntary slowing down in good conditions based on the preservation of ecosystem functions, and regenerative capacities of the living, and on the strengthening of the welfare and social state as an emancipatory system. The awareness acquired through health crises can be the driving force behind a break with the current paradigm, in order to reduce the human footprint on the Earth. The recent report of Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) workshop about Biodiversity and Pandemics is a move in this direction (IPBES, 2020). Philosophically, these alternatives call for us to search in the turmoil of the ruinous ecologies of capitalism and economic growth, to invent other possible worlds, other relationships to the world. Inventing stories of rehabilitation and care for ecological and societal ecosystems, creating the conditions for collective survival in the ruins, finding allies to bring about a different world that is more resilient and sustainable, more desirable (Haraway, 2020).

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The environmental roots of zoonotic diseases: from SARS-CoV-2 to cancer viruses. A review.

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Abstract

The destruction of natural habitats and change in land use contribute to biodiversity loss by increasing species extinction and weakening the functions of ecosystems. Ecosystems often are unsafe for humans because animals that host viruses or other pathogens become dominant within impoverished biological communities. The risk of infection propagation from one animal species to other species depends on the size of the reservoir population and the “ability” of pathogen to spillover: an event that is more likely to occur in phylogenetically related hosts. Zoonotic spillover is the transmission of pathogens to humans from vertebrate animals. If human activities contributing to the alteration of ecosystems do not slow down, the critical state of biodiversity can turn into an important driver of emerging pathogens, including viruses involved in neoplastic diseases. A radical reform of the current growth-based economic model is urgently needed to counter the unsustainable human pressure on the natural environment and the risk of new pandemics.

Key words: biodiversity loss; biological communities; cancer viruses; dilution effect; eco-epidemiology; economic growth; ecosystem functions; environmental health; nature/nurture debate; viral epidemics and pandemics; zoonoses.

Introduction

Infectious and parasitic diseases contribute to over 20% of the global disease burden, while in some areas of the planet the figure reaches over 70% (Patz et al, 2005; Engels and Savioli, 2006). The number of epidemic emergencies resulting in human and economic losses has grown considerably over the past century and Emerging Infectious Diseases (EIDs) have been widely monitored over the past two decades (Patz et al, 2005; Jones et al, 2008). The environmental disturbance due to human activities – industrial agriculture (including animal farming), soil erosion, greenhouse gas emissions, deforestation, urbanization and increased global mobility of people, goods, plants and animals – plays a crucial role in the way these diseases develop and spread worldwide (Daszak et al, 2001). Greater attention to the interaction between global change

and global health today reveals a high frequency in animal-borne diseases, in particular viral infections, while biodiversity loss is considered as a major challenge both globally and locally (Patz et al, 2005).

The mounting number of diseases has been described as a side effect of civilization, with its anthropization and transformation of the natural environment, and zoonoses are no exception (Dobson and Carper, 1996). Recent unprecedented rates of anthropogenic land use change, including agricultural conversion or intensification and habitat fragmentation, have led to a progressive ecological erosion of natural environments essential for the survival of human beings (White and Razgour, 2020).

Land use change can be an important source of zoonotic diseases due to its impact on human-wildlife interplay. By removing or reducing the natural habitats of many animal species, over-exploitation of the land leads them to live closer to human settlements (Jones et al, 2013). The problem is further complicated when an area is inhabited by one or more species that host one or more zoonotic pathogens (Jones et al, 2013). The transmission of pathogens tends to increase in response to anthropogenic impact, although for the moment this effect cannot as yet be considered universal (Gottdenker et al, 2014).

The recent history of viral epidemics related to human impact on ecosystems and wildlife is full of interesting and worrying cases, some of which are paradigmatic (Sharp et al, 2001). In the last three decades of the past century, the pandemic strain of HIV-1 was found to be closely related to a virus identified in several chimpanzee populations of the *Pan troglodytes* subspecies living in the forests of Central Africa (Cameroon, Equatorial Guinea, Gabon, Congo-Brazzaville and Central African Republic). The ape-human spillover occurred in rather critical conditions, characterized by a strong human presence in those habitats (Hahn et al, 2000). According to the so-called “hunter theory” (or “bushmeat theory”), the “jump” between species is based on the hypothesis that the virus was transmitted by chimpanzees to humans through hunting or slaughtering or consuming bushmeat (meat from wild animals). Subsequently, the virus spread to all continents through unprotected sexual habits and other dangerous human behaviours, including the consumption of injectable substances such as heroin and other drugs which have proved to be particularly devastating (Hahn et al, 2000).

In recent decades, emergencies caused by arenaviruses responsible for the spread of haemorrhagic fevers in Argentina and Bolivia have been linked to ecologically aggressive agricultural practices and the fragmentation of natural areas in order to build infrastructures and carriage roads (Mills, 2006).

In Southeast Asia, the Nipah virus, a pathogen first identified in the late 1990s that causes severe encephalitis and acute respiratory syndrome, has spread from wildlife to humans due to the expansion of industrial pig farming in a biodiversity hotspot full of frugivorous and nectarivorous bats. In that region, bats are the main natural reservoir of the virus and carrier individuals can release the pathogen through saliva, urine and feces without themselves developing any disease (Mazzola and Kelly-Cirino, 2019).

As many ecologists and epidemiologists know, the global picture of zoonotic diseases is much broader and more varied than the short repertoire described above, which only serves to understand the geographical and ecological dimension of the problem. When a forest habitat is cleaned and replaced by human settlements or domesticated environments, such as industrial crops and farms, the previous biological community is literally emptied and filled by a new environment mostly for economic purposes. In these unnatural contexts, persistent mammal species are often host to zoonotic viruses and their dominance over agricultural and peri-domestic areas increases the human risk (Hussein et al, 2016). As human activities that contribute to unsafe ecosystems continue to accelerate, interest in the role of diversity and community composition in changing disease risk will increase (Patz et al, 2004; Johnson et al, 2015). Based on such evidence, territorial surveillance actions should be implemented to promptly detect the infectious risk through appropriate environmental indicators.

However, when zoonotic outbreaks such as those discussed above occur, our attention should not be limited to their ecological and climatic triggers. It should primarily be focused on the multiple critical factors produced by the economic and cultural context. These factors could make infectious outbreaks more frequent in the future (Weiss and Cattaneo, 2017). For example,

further expansion and intensification of land use for agro-industrial purposes on a local and global scale could determine the conditions for the appearance or reappearance of new and old diseases (Lewontin and Levins, 2008).

Looking at current events, the SARS-CoV-2 pandemic requires attention to the critical connections between environmental deterioration and the emergence of pathogens, as well as the role played by intensive agriculture and land use changes in fostering the infectious outbreaks. Further scientific efforts are needed to obtain a more complete understanding of the phenomena underlying the observed health outcomes and to implement the transition toward an agroecological model of food production (Altieri and Nicholls, 2020). There is no doubt that the food demand of humanity needs an alternative agricultural paradigm, one that encourages more ecological, biodiverse, resilient, sustainable, safe and socially just forms of agriculture (Altieri and Nicholls, 2020). From a methodological point of view, the need for a systemic approach based on the integration of ecological, social and public health data clearly emerges.

Zoonoses: what are they and where do they come from?

The term “zoonosis” refers to all diseases transmitted between humans and animals. Zoonoses represent a large part of recurrent and emerging infectious diseases and are now regarded as one of the major threats to health systems globally (WHO, 2014). Out of the 175 EIDs described at the turn of the millennium, 75% were animal-borne diseases (Mills, 2006). Today, about 200 zoonotic diseases are hosted by a wide variety of vertebrate species, including fishes, amphibians, reptiles, birds and mammals (Mills, 2006). Pathogens shared by wild and domestic animals cause more than 60% of infectious diseases in humans (Taylor et al, 2001). Such diseases include leptospirosis, cysticercosis and echinococcosis, toxoplasmosis, anthrax, brucellosis, anger, Q fever, Chagas disease, type A flu, Rift Valley fever, severe acute respiratory syndrome (SARS), Ebola haemorrhagic fever and HIV (Karesh et al, 2012). The most significant impact on global health is represented by about one billion cases of disease and millions of deaths that occur every year due to endemic zoonoses (ILRI, 2012). These infections are often enzootic (i.e., they remain limited to some animal populations) but sometimes they pass from animals to humans (ILRI, 2012). While animal species that share an evolutionary and/or ecological affinity with humans can transmit various viral or other zoonoses, here we focus mainly on viral ones.

Pandemics that have taken their first steps in animal populations living in perturbed habitats are common, but the underlying processes are not so clear. Recent studies show that animal species that have increased in abundance and/or have expanded their range in anthropized environments are more likely to transmit zoonotic pathogens (Pandit et al, 2018). A chain of viral infection is often the result of viral molecular changes induced by the complex interactions occurring between wildlife, domestic fauna and our species. The conditions that precede the spillover often depend on over-exploitation of the soil and the increasing pressure of economic activities on natural systems (Johnson et al, 2020). Activities such as monoculture, intensive animal farming, industrial fishing, wildlife hunting and illegal trade of protected species are typical factors that destroy natural environments by promoting conditions of ecological instability and infectious outbreaks (Johnson et al, 2020).

Many of these activities are accused of triggering a significant decline in wild populations by exacerbating the risk of extinction in already endangered species. It is worth pointing out that the epidemiological features of viral transmission at the animal-human interface have sometimes revealed dynamics that in the past have led to zoonotic spillover events (Johnson et al, 2015). This suggests that a historical perspective on how our species has managed its relationships with the animal world could be useful in order to identify and map the main factors of zoonotic risk.

Spillover: bats but not only bats

While some ecological conditions make the cross-species transmission of animal viruses more likely, researchers can rarely observe animal-human spillover events leading to emerging diseases, and therefore the detailed dynamics related to these phenomena have yet to be clarified. Bats (Order *Chiroptera*) belonging to the Chinese horseshoe bat species (*Rhinolophus sinicus*) are reservoir animals of a large number of zoonotic viruses, including coronaviruses (CoV) that cause

infectious outbreaks in human populations and farm animals, such as the Severe Acute Respiratory Syndrome (SARS) (Wang and Anderson, 2019). SARS-CoV is the pneumonia virus that spread to 32 countries in 2002-2003, infecting around 8,100 people and causing 774 deaths (WHO, 2019a). Another lung disease caused by a bat-borne coronavirus (MERS-CoV) is the Middle Eastern Respiratory Syndrome (MERS), which in the first few months of 2019 killed 823 people and caused 2,374 disease cases in 27 countries (WHO, 2019b). The lesser-known coronavirus (SADS-CoV) which caused severe acute diarrhoea syndrome (SADS) in most pig farms in southern China in 2017-2018, killing over 20,000 piglets, is a further pathogen of bat origin (Zhou et al, 2018).

For many viral zoonoses, spillover is the seemingly random result of a series of events. Usually, it requires the concurrence of the following conditions: (a) a reservoir species must be present in the biological community and must be infected with the virus; (b) the virus must survive outside the reservoir species and have access to a receiving host species; (c) the receiving species must be exposed to a sufficient amount of viral source (viral load) and must also be susceptible (host competency) (Plowright et al, 2015).

Often the receiving species is an intermediate animal that lives in contact with humans, which in turn can become infected. For example, although a large variety of coronaviruses, including SARS-related coronaviruses (SARSr-CoVs), were first discovered in bats, in 2002-2003 humans were infected with SARS-CoV by civet cats (*Paguma larvata*). The same probably occurred with the MERS epidemic, spreading from bats to humans through camels (*Camelus dromedarius*) which are now the main reservoir species of that virus in the Middle East (Wang and Eaton, 2007; Wang et al, 2011). Similarly, the most recent coronavirus (SARS-Cov2) involved in the COVID-19 pandemic first appeared in bats but is suspected to have infected humans by passing through the Malayan pangolin (*Manis javanica*) (Cui et al, 2007).

It is assumed that in some cases viruses can be amplified by the intermediate host species (Drexler et al, 2012). However, the ecological events that determine the interactions between the natural reservoir and intermediate species are poorly understood, probably because the predisposing conditions and the cross-species contagion occur at different temporal, spatial and ecological scales (from within-host pathogen evolution to spatially extensive processes such as land use and climate change) (Plowright et al, 2015). Compared to other taxa of eutherian mammals, such as rodents, bats could be perceived by the non-expert reader as unusual carriers of infectious diseases; conversely, they may have played that role for a long time (Calisher et al, 2006; Luis et al, 2013). According to some investigations, many viral pathogens, including viral ancestors of measles, mumps, parainfluenza, canine distemper and hepatitis C virus, may actually have originated in bats (Drexler et al, 2012). An interesting hypothesis suggests that their immune system differs substantially from that of most mammals as an effect of flight adaptation (Zhang et al, 2013). The ability to fly, therefore, could be the key element to a better understanding of the coevolution of bats and viruses: a milestone that would have transformed bats into a natural reservoir capable of tolerating and transmitting to other animals many viral pathogens (O'Shea et al, 2014).

Ecology of viral zoonoses

In general, natural habitats with a high level of biodiversity could be expected to be a favourable substrate for the development of a greater number of pathogens potentially transmissible to humans. Based on this assumption, it has also been argued that biodiversity loss could make a substantial contribution to reducing the frequency of zoonotic diseases (Wolfe et al 2005). However, a series of studies refutes that hypothesis by showing a different perspective. Disturbed environments can be unsafe for humans when animal hosts (reservoir species) become dominant within altered biological communities, thus increasing the prevalence of zoonotic pathogens (Patz et al, 2004). In these cases, the structure of the biological community is significantly different from the original and ecosystem functions are weakened (Karesh et al, 2012). The new community composition makes it possible to favour zoonotic viruses shared by *Homo sapiens* and other vertebrate hosts, which include most human EIDs agents (Taylor et al, 2001).

For example, rodent-borne haemorrhagic fever outbreaks have shown that when habitats have undergone a significant reduction in biological diversity (e.g., due to human activities), there is a greater risk of contracting viral infection compared to habitats that maintain a good level of

biodiversity (Johnson and Thielges, 2010). Interesting hypotheses have been developed to explain these dynamics, such as the so-called “dilution effect”. According to this model, there is an inverse correlation between biodiversity and disease risk. This is observed whenever a reduction in biodiversity occurs leading to an increase in the abundance of focal species potentially capable of favouring viral transmission to humans (Johnson and Thielges, 2010). Evidence from many cases of host-virus interaction highlights that the “decomplexification” of biological communities can easily turn into a threat to our species. On the other hand, in natural systems characterized by greater diversity, the susceptibility of animal species to infections (host competency) is much more variable, leading to a reduction of infection prevalence and a significantly lower risk of disease spreading.

The dilution effect is supported by well-tested data over the past 20 years (Ostfeld and Keesing, 2000). The model was formalized to explore the key points of the relationship between biological communities and human diseases. The underlying concept dates back to about a century ago and derives from the ancient practices of crop rotation and zooprophylaxis (the use of farm animals to protect humans from pathogens), typical of many rural communities around the world (Elton, 1958). In those rural societies the livestock is strategically placed around human residences to keep malaria-carrying mosquitos away from people (WHO, 1982). In other contexts, similar roles have been played by rabbits in reducing sand fly-borne leishmaniasis, cats and dogs in reducing mosquito-borne encephalitis, and lizards in reducing tick-borne Lyme disease (Hess and Hayes, 1970). It is worth noting that the dilution effect framework in zoonotic systems was developed for the tick-borne Lyme disease, an infection caused by the spirochete *Borrelia burgdorferi* (LoGiudice et al, 2003). Although the pioneering study was based on a bacterial disease, the model is equally applicable to viral zoonoses. In fact, very similar results were obtained by exploring the negative correlations between diversity and viral infections in birds, rodents, sheep, and other vertebrates (Keesing et al, 2006).

The species structure of a biological community reflects a pattern in which the reservoir animals tend to be generalists in their ecological habits, and furthermore they have a short lifespan (Karesh et al, 2012; Johnson et al, 2020). These species adapt well to disturbed environmental conditions and usually develop large populations in a rather short time. In general, larger populations are more likely to spread cycles of infection (Karesh et al, 2012). Conversely, animal species with more specific needs in the use of natural resources and small population sizes, such as many predators or species with a longer lifespan and slower reproductive cycles, tend to disappear from altered ecological situations.

Finally, it may be interesting to note that in a broader geographical context threatened species share relatively fewer viruses with humans, supporting the principle that the risk of viral spillover is influenced by the frequency of human-animal interactions (White and Razgour, 2020).

The blurred border between chronic and infectious diseases: viruses and cancer

Diseases that were once believed to be non-communicable have been recognized to have infectious cofactors. Conversely, degenerative diseases and their treatments can alter individuals' immune systems leading to associated infections that put the patient at risk and make the clinical work more complicated (Modonesi et al, 2017). According to the World Health Organization (2011), many cancers are linked to chronic infections with pathogens, especially viruses. Some authors recognize in this aspect an individual susceptibility to cancer induced by infection and inflammation rather than a direct and specific relationship between viruses and carcinogenesis (Voisset et al, 2008). After all, the coexistence of animals and *Homo sapiens* goes back to the mists of time and the sharing of viruses and other microorganisms could be seen, in a sense, as an inevitable ecological implication of life on Earth, regardless of its negative effects on human health, including malignancies.

Several zoonotic viruses, basically DNA viruses and retroviruses, are involved in some way in the malignant transformation of biological tissues causing 15 to 20% of all human cancers worldwide (Parkin, 2006). The prevalence of these viruses varies in different parts of the world. Almost 30% of cancers in developing countries are linked to infectious agents, while that percentage drops to 10% in developed countries (Parkin, 2006). For example, Papillomavirus has been related to cervical cancer, Epstein-Barr virus to Burkitt lymphoma, hepatitis B and C viruses

to liver cancer, HTLV to leukemia in humans and KSHV to sarcoma of Kaposi. Other parasites linked to human tumors are bacteria like *Helicobacter pylori* (stomach cancer) and small invertebrates such as *Schistosoma hematobium* (bladder cancer) (Parsonnet, 1999).

An infectious etiology for cancer was first documented in animals during the early part of the 19th century, with the diagnosis of pulmonary adenocarcinoma in sheep caused by the Jaagsiekte sheep retrovirus (JSRV) (Tustin, 1969). With the development of biological research, it was discovered that many animal species such as rodents and other *taxa* could be hosts of viruses suspected of promoting carcinogenesis. For example, the reticuloendotheliosis virus induces cancer in chickens (avian leucosis-sarcoma). A wide variety of viruses mirroring their human analogues are spread among animals and common types include viruses of the *Polyoma*-, *Adeno*-, *Retro*-, and *Papilloma*- virus families (Hundesda et al, 2006).

Modern research into the carcinogenic potential of viruses has helped broaden conventional perspectives on the mechanisms of cancer. For example, interesting results indicate that adenoviruses, HPV (Human Papilloma Virus) and HTLV-1 (human T-lymphotropic virus) commonly block the cellular function required to establish the correct cell polarity, a property lost in almost all epithelial-derived tumor cells (Javier, 2008). These findings suggest that the loss of cell polarity directly contributes to malignant tissue transformation, showing that the investigation of viruses can clarify relevant dynamics of many human cancers (Javier, 2008). Another example comes from the “hit and run” hypothesis, according to which some viruses promote cancer by interfering with the immune system of hosts, but do not integrate into their DNA, thus contradicting the common assumption that tumor development is always the effect of a genetic change (Nevels et al, 2001). Future studies on the role of viruses in the carcinogenic process will have to address the complex nature of cancer by taking into account the interaction of biotic and abiotic factors, the multiple causation of the neoplastic transformation of cells and the related stochastic risk largely neglected by conventional mechanistic research. Currently, the ecological and biological connections between viral zoonoses and cancer, as well as the related role of animals, remain largely unclear and would require more scientific studies (Weiss, 2007).

While the general population is commonly exposed to animal viruses, many of which are known to promote cancer development in animals, a direct and mechanistic role for them in human carcinogenesis remains substantially speculative. The same infectious agent may react in different ways depending on host factors, including health status, environment, physiology, geography, seasonal variation, climate, population density, and so forth. That said, the etiological action of most viral agents in the neoplastic process deserves major attention and suggests that they commonly act within networks of multiple factors. Gene-environment interplay and epigenetic phenomena also are important pieces of a puzzle frequently missing in epidemiological studies of complex diseases such as cancer (Weiss, 2007).

Animal viruses believed to have oncogenic properties generally tend to be species-specific and do not replicate easily in human cells. However, as we have seen above, it is widely recognized that zoonotic viruses can infect different animal species, particularly when they share a common evolutionary background, contributing to the development of animal diseases. This aspect should not be overlooked, since the exchange of pathogens between domestic and wild animals can generate severe problems for humans and ecosystem health (Efird et al, 2014).

It should be remembered that infections caused by zoonotic viruses put the most fragile part of the general population at risk: primarily, elderly, young, pregnant, and immuno-compromised people. Individuals belonging to these high-risk categories should absolutely avoid any kind of exposure to pathogens, especially cancer patients who take drugs that suppress immune system. According to a recent investigation, 20% of patients who died from COVID-19 in Italy in the first half of 2020 were cancer patients (Burki, 2020). These people included subjects undergoing active chemotherapy or radical radiation therapy for lung cancer and patients with blood or bone marrow cancers.

Although biological evolution has provided adaptive immunity against many external adversities, human self-defense capacity against infections and cancer is often compromised and sometimes circumvented by the environmental pitfalls generated by our own species.

Discussion

Unfortunately, most of the problems discussed in this paper are generally addressed in specialized scientific forums where epidemiologists, ecologists, tropical medicine experts and veterinarians present their data and opinions separately. A transdisciplinary approach is rarely implemented, and the result is that many interconnected dynamics are treated as if they belonged to different realities. The consequence of this is a fragmented and short-sighted science that neglects the fact that the two crises (biodiversity loss and disease growth) should be explored and addressed in parallel (Levins and Lopez, 1999). Nowadays, a timid consensus is slowly beginning to manifest itself within the scientific community, leading to view health and ecological calamities as the rebound effect of a broader anthropological crisis affecting most of the world. Based on present and future trends, a more effective approach for preventing zoonotic diseases will require a more extensive view of human and natural sciences, emphasizing the urgency of an integrated knowledge of the ecological, evolutionary and social phenomena occurring at the intersection between animals, humans and the environment.

Many infectious diseases have an old record of cosmopolitan appearance, disappearance and reappearance. The challenges due to economic globalization processes are connected with the scale and the speed with which people, products and pathogens can move across the planet (Institute of Medicine, 2006). The number of potentially infectious contacts has exploded as trade and transport bring goods, organisms and human beings closer than ever before. Nowadays, the duration of the longest intercontinental flight is shorter than the incubation period of a multitude of known pathogens (Institute of Medicine, 2006).

While some human health outcomes due to biodiversity loss may be directly and easily observable, others may not be so directly recognized (Mills, 2006). As reported by Patil and colleagues, according to the World Health Organization, the negative health effects of biodiversity erosion outweigh those caused by climate change (Patil et al, 2017). Even though the Convention on Biodiversity was approved and signed by nearly 200 countries in 1992, after 20 years we are witnessing the failure of the sustainability policies developed by international institutions, starting with agricultural policies for the conservation of land and biodiversity (Pe'er et al, 2014).

Healthcare professionals and public health researchers should support biodiversity conservation for its key role in promoting primary prevention and keeping human communities healthy. Engaging ecologists, epidemiologists and policymakers in a global campaign endorsed by governments and international organizations to support ecosystem health and environmental justice could be an important action for its pragmatic and ethical value. The two priorities of this initiative should be the following: i) stop plundering environmental resources; and ii) minimize the trade-offs between economic development and physical, chemical and biological deterioration of the ecosphere. In addition, it would be equally urgent to eliminate the differential exposure of population subgroups to pathogens and environmental risks, planning effective tools for the fight against poverty and access to health services.

Recent studies highlight the fundamental role of the environmental and social context as a determinant of people's health. A major aspect of many contextual variables is that they cannot be measured individually, because they are essentially properties of groups (ecological variables) (Diez-Roux, 1988). A metaphorical example can perhaps explain this principle better. If we try to study the determinants of automobile congestion that poisons our cities, investigating the characteristics of individual drivers is useless and misleading. The phenomenon can be more effectively understood by exploring the opening/closing cycles of businesses, offices and shopping centers, the location of schools, the organization of public mobility, the structure of urban spaces and other contextual variables (Giuliani and Modonesi, 2011). Likewise, the analysis of ecological variables and community factors can clarify better than an individual approach how context affects public health (Diez-Roux, 1988).

A more accurate understanding of the interaction between individuals and their environment must take into account our knowledge of the interactions between different levels of social organization and the connections between different systems (Sandberg et al, 1996). Since the relationship between our species and the environment depends on the basic rules established by the socio-economic framework, an objective and adequate evaluation of these rules is necessary when considering their effects on environment and public health. Many communicable and non-

communicable diseases are sensitive to ecological and socio-economic factors, which shows the extent to which such outcomes are avoidable or preventable. Furthermore, the most sensitive effects of these factors also vary between social groups, reflecting the wide distribution of responses to stressors to which the human population is exposed (Karpati et al, 2002).

Unfortunately, contemporary neoliberal capitalism seems to have little interest in these issues. In the richest part of the world, the fundamental principle of human organization is based on the idea that a limited planet can sustain an unlimited economic growth. Such a paradigm pursues, rather than combats, an irrational and unscientific use of ecosystems, effectively legitimizing the over-exploitation of the natural resources that sustain life on Earth, including human life.

The approach to the recent COVID-19 pandemic, as well as to the environmental health crisis of recent decades, is exactly a part of this context and, as such, it is affected by all its consequences. Its rules are based on the dogmatic supposition that the ecology of the planet is a small component of the human economy, rather than vice versa. Within this perspective, the socio-ecological roots of the good or bad health of the human population are institutionally removed. A stereotype supporting this view is that the natural world can be used by humans for exclusively economic purposes. Weak sustainability advocates who operate within this horizon are convinced that *the global economy can grow indefinitely* thanks to the power of technological innovation in overcoming natural constraints. This belief reinforces the idea that human happiness can be achieved through individual initiative and private appropriation/accumulation, regardless of any culture of solidarity, conviviality and the common good.

The ecology of the human species is becoming an increasingly critical force that destructively interacts with social and natural dynamics on a local, regional and planetary scale. To date, the leading indicator of “human temperature” worldwide is based on GDP, which overlooks the staggering costs of many human activities. It is worth noting that conventionally GDP takes no account of the role of ecosystem services and puts within the positive values column the expenses aimed to remedy depleted and degraded natural resources. Consequently, a country could clear its forests, deplete its fisheries and pollute its aquifers, thereby causing heavy damage in its ecosystems and human population, still claiming to pursue the well-being of its citizens: all while invoking that its interventions helped GDP to grow.

There is little knowledge on how macro- and micro-economic variables are related to local and global disease burden and how this relationship varies by disease and geographic area (Karpati et al, 2002). Moreover, there are still many barriers to understanding the global incidence and mortality rates for many diseases. While there is no real consensus on what the main cause of the decline in mortality over the past century could be, some authors have argued that an inverse correlation with economic growth is likely (Tapia Granados, 2005). Data from a variety of sources lead to the conclusion that only 20% of the massive international improvements in mortality that occurred between the 1930s and 1960s could be assigned to better living standards, measured in terms of per capita income (Preston, 1996). Interestingly, Sen suggested that the rate of decline of mortality in Britain between 1900 and 1970 reveals an inverse relationship with economic growth, with decades of high economic growth associated with low increases in life expectancy (Sen, 2001). Shifting our point of view slightly, the problem is that human health is both a product and a determinant of well-being and is strictly dependent on environmental health. Changes in the quality or quantity of environmental goods and services that regulate and affect the quality of food, air, water and soil can have very important impacts on human health.

The current sophistication of man-made environments reshapes biotic and abiotic characteristics and produces new patterns of human disease. Unfortunately, in recent decades, public health systems of developed countries have slowly moved away from environmental concerns, progressively narrowing their efforts on individual and genetic susceptibility to diseases, focusing intervention strategies on selective case management or specific disease prevention technologies in groups at risk.

Given that biomedical researchers are not accustomed to looking at their work within a historical and spatial perspective, usually they also neglect the ecological and evolutionary side of diseases. This bias prevents them from grasping the basic interaction between public health and contextual determinants of human diseases. Different societies living in different environmental

conditions (climate, geo-morphology, fresh waters, vegetation cover, etc.) interact with them in different ways. The structure of man-made environments and the functional correlation between their components reflect the particular patterns of interaction of anthropized (urban) contexts and public health. There is a clear indication that human ecology – in the broad sense of environmental variables, lifestyles, culture, and social organization – has a predominant role in shaping health and disease profiles.

Conclusion

Human culture and technologies may act as a selective force affecting the environment, biology and health of *Homo sapiens* and other species. The evolution of human culture involves changes in the intergenerational transfer of ecological legacies, in the reconstruction of biological and social development's conditions, in the transmission of behavioural and symbolic information, as well as in the selective stabilization of survival practices and preferences (Jablonka, 2011). As such, human culture can be viewed as a “place” where cultural (economic, political, scientific, ideological, religious, etc.) beliefs meet with each other. This should provide the opportunity for rethinking the particular kind and scale of consequences that the human presence on Earth produces, both on the organization of the environment and on physical, mental and social health of our species.

Over the last decades we have dramatically learned that the paradigm of economic growth conceived by classical scholars is neither compatible with a public health system based on the preservation of well-being nor with a sustainable relationship between humans and the natural world. The adjective “sustainable” has often accompanied the term “degrowth” in order to stress that its meaning is linked to the improvement of well-being, social equity and the human-nature bond. Degrowth scholars are increasingly interested in the intersection between income and well-being. The Easterlin paradox refers to the lack of positive correlation over time between reported subjective well-being and income growth, at least for countries with sufficient means to meet basic needs (Easterlin, 1974). Moreover, the “threshold hypothesis” holds that, beyond a certain threshold point, economic growth does not bring about improvements in people's quality of life (Neef, 1995).

Degrowth should not be understood in its literal meaning of “negative growth of GDP”, or simply as a decline in well-being (Sekulova et al, 2013). Degrowth is a provocative word to challenge the ideology of growth (and its absurd implications) and to promote a different project of human society. “Degrowth” is an invitation to “decolonize the imaginary”, (Latouche, 2009), that is, to design different relationships with other human beings, with other creatures and, more generally, with the social and ecological environment. “In a degrowth society, everything will be different: different activities, different forms of thinking, different relations, different allocations of time between paid and non-paid work and different relations with the non-human world” (D’Alisa et al, 2014, p.4).

As Pope Francis has explicitly explained “The time has come to accept degrowth in some parts of the world, in order to provide resources for other places to experience healthy growth” (Pope Francis, 2015).

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The Recovery of Healthcare: A case study of Javanese medical practices and related discussions about pluralism in healthcare

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Abstract

The use of 'traditional' medicine is a common phenomenon throughout Indonesia. In today's Indonesian healthcare system 'traditional' and complementary medicine coexist with globalized biomedicine and even urban, educated households are still more likely to use 'traditional' than biomedical healthcare. This paper explores the fundamental differences between Western and Javanese understandings of health, illness and healing. It highlights first the Javanese relational perspective on healing, which involves resonance with the surrounding whole. It contrasts this with the entanglement of biomedical knowledge and economic interests, which is identified as a major problem of governmental healthcare services, as it enables overshadowing the medical objective of helping health-seeking persons with the objective of generating profit. Relationships with biomedical experts are described as shaped by monetary considerations, while rejecting non-biomedical treatment methods is suspected of being a way of protecting the interests of biomedical businesses. Based on these categorical and structural barriers between different medical traditions, the nationally structured and formally recognized system of healthcare is contrasted with a common informal, socially and culturally rooted way of navigating healing. Therefore, against the formal background of these conceptual differences, the paper highlights health seekers' sensual experiences, embodied realities, and their common routines of tinkering and combining healthcare practices between conceptual differences. This provides glimpses into everyday informal cooperation between distinct medical traditions, which easily bridge categorical, structural and economic barriers.

Key words: Healthcare Bricolage; Indonesia; Jamu Medicine; Javanese Tradition Medical Degrowth; Medical Pluralism; Primary Healthcare; Traditional Knowledge; Traditional Medicine.

Introduction

The Covid-19 pandemic and related questions of accessibility of healthcare services have exposed the fault lines of both the human right to health and current medical realities in Europe and around the world.

Decades before the COVID-19 crisis, the 1978 International Conference on Primary Health Care held by the WHO in Alma-Ata stressed the “need for urgent action by all governments, all those working in the fields of health and development, and the world community to promote the health of all people of the world” (WHO, 1978). 40 years ago, this conference already highlighted that achieving primary healthcare for all means changing the paradigms underlying primary healthcare, for example, to base healthcare approaches on different medical traditions instead of exclusively relying on biomedical practices. Today, politicians and scholars are still struggling in search of new visions for primary healthcare in the 21st century. In this context one group of researchers is inviting discussion about transforming the current healthcare system by overcoming the growth-based economic orientation and to develop sustainable socio-economic bases and systems for healthcare (Aillon D'Alisa, 2020; Borowy Aillon, 2017; Missoni, 2015). During the COVID-19 pandemic, with its immense effects on global economies, arguments to strengthen health systems are getting even more traction, with a view to creating truly universal, publicly funded health services, that reach and include entire populations (Prince, 2020; Yates, 2020; Whittal, 2020). In this sense universal public healthcare and welfare services are key issues of egalitarian policy and crucial alternatives able to overcome market-oriented healthcare (Lucchese Pianta, 2020).

This paper will present formal and informal healthcare structures and everyday routines of health seekers in Indonesia, highlighting their autonomous ways of navigating healing between categorical, structural, and economic barriers. These insights into distinct knowledge and practices of healthcare in Indonesia contribute to ongoing discussions about the social and economic concepts and paradigms underlying Illich's vision of a 'convivial society' (Illich, 1973; Samerski, 2016).

1. Medical Pluralism in Indonesia

In Indonesia the use of 'traditional' medicine is a common phenomenon. In today's Indonesian healthcare system 'traditional' and complementary medicine coexist with globalized biomedicine. Recently, it has been found that even urban, educated households are still more likely to use 'traditional' than biomedical healthcare (Nurhayati Widowati, 2017). The Indonesian market for 'traditional' and complementary medical practices (TCM) has experienced a veritable boom during the past 30 years. The use of a “whole range of over-the-counter (i.e., non-prescription) medications, pharmaceuticals, tonics and new forms of herbal or other mixtures has sprung up, and promise renewed energy and stamina, and to protect one from the onslaughts of hardship and distress” (Lyon 2005, p. 14). In addition to the established market for 'traditional' medicine, a new market of modern alternative remedies is growing, with a wide spectrum of herbal energy products and stamina remedies. The far-reaching economic, political and social changes in past decades are considered to even encourage the use of non-biomedical health-seeking models (Lyon, 2005; Liebich, 2003; Sciortino, 1995). The complexities of transformation processes in Indonesia also implied a transformation of identities. The way of being Indonesian in the time of Suharto has been different, so that through the use of drugs and medications “one in effect tinkers with the relationship of the self to the world, and, through the enactment of that process itself, thereby embodies that world” (Lyon, 2005, p. 14). In this regard, the increasing use of traditional jamu medicine could be understood as a way of establishing a closer relationship with the Javanese part of the self and thereby becoming more Javanese oneself.

This commitment of Indonesian society to traditional Javanese healing practices, particularly the traditional herbal jamu medicine, has also been evident since the beginning of the current pandemic. As the COVID-19 crisis deepened, a new market emerged offering 'Corona jamu' that contains turmeric, ginger and other ingredients, to strengthen the body's immune system against viruses (Weydmann et al., 2020). Various Indonesian politicians have pointed to the benefits of traditional medicine in the current crisis, and in the initial phase some even claimed publicly that COVID-19 infections could heal without intervention, as long as a person's body has a strong resistance to disease, causing some public criticism and questioning of whether politicians are intentionally withholding important information to avoid panic (Lindsey Man, 2020). Despite this criticism the Indonesian President, Joko Widodo, posted a statement on a government website saying that he started drinking a mixture of red ginger, lemongrass and turmeric three times a day

since the outbreak of the virus started (Bloomberg, 2020). He was convinced that a herbal concoction could ward off the coronavirus. This statement of the Indonesian president on his use of jamu medicine contributed to a rapid price increase so that prices of red ginger, turmeric and curcuma multiplied (“Coronavirus: Indonesia's panic buying of herbs, medicinal plants takes toll on 'jamu' vendors”, 2020). The Jakarta Post reported that several jamu producers have seen an increase in revenue of up to 50 per cent and predicted that the habit of drinking jamu will be ‘a new normal’, promoting jamu as ‘the new espresso’ (Prasidya, 2020).

As these insights into current medical policy illustrate, traditional medicine and combinations of multiple healing traditions are a common phenomenon in Indonesia – in rural as well as in urban areas. This coexistence of globalized biomedicine with traditional and alternative medicine in today’s Indonesian healthcare system is, however, not reflected in the Indonesian national Primary Health Care (PHC) program. Only a limited number of TCM practices are officially recognized and only a few hospitals have started to open TCM wards. The public provision of healthcare is almost exclusively based on biomedical treatment approaches and the corresponding way of defining health and disease.

2. Structure and Difficulties of Primary Health Care (PHC) in Indonesia

The government provision of healthcare in Indonesia aims to provide biomedical services for all members of society. In practical terms, considering the physical characteristics of Indonesia with its 13.000 islands spread over 1.9 million square kilometers, it is only to be expected that a healthcare program designed by the central government located in Jakarta will be difficult to uniformly implemented in full, especially in the remote areas of this vast country. Nevertheless, in line with the goal of accessibility, each Indonesian sub-district is expected to facilitate one community health center (Puskesmas). These centers are supposed to have at least one medical doctor on the staff and provide all aspects of primary healthcare services. The centers are furthermore, at least potentially, supported by subordinate facilities, which are regularly headed by nurses and other biomedically trained personnel (Noerdin, 2014; Sciortino, 1995).

After promoting the accessibility of governmental healthcare for the poor and the near-poor in 2014, the reform was criticized for addressing only the need for greater coverage, but ignoring the urgent need for improving the quality of medical supply and treatment. Rural districts of Indonesia in particular face great difficulties in providing biomedical services for curative and preventive purposes, as medical doctors notoriously prefer settling in more comfortable urban areas. Doctors working in remote health centers with difficult supply situations are commonly not willing to stay in those regions (World Bank, 2008). As this is widely known, an increase in wages for medical doctors working in very remote areas compared to wages in central regions is intended to raise the attractiveness of these health centers. Nevertheless, many health centers continue to have difficulties in attracting medical experts. Cristobal Ridao-Cano, a lead economist at the World Bank Indonesia, commented: “Say with the KIS card¹⁹, if you go to a health center and the doctor is not there, then it's an empty promise – it's a card that gives you access to nothing” (Hewson, 2014, para. 3).

Another structural difficulty in Indonesia's healthcare system is that most medical doctors working in public clinics and health centers (Puskesmas) run private practices in parallel to boost their income. According to the World Bank figures, 70% of doctors working in Puskesmas use this 'dual practice' of working in parallel in the private sector, which has limiting effects on the working hours and quality standards in public health centers (World Bank, 2008).

For some time, there has been rising criticism of Indonesia’s public healthcare, including the closeness of pharmaceutical industries to medical practitioners and related ‘unhealthy practices’ of corruption (Jong, 2017). Now, the existing structural and personnel shortage in the public health system has become glaringly stark due to the pandemic. The latest World Health Organization (WHO) data shows that Indonesia’s ratio of doctors per 10,000 people is 3.8, and it has 24 nurses and midwives per 10,000 people (WHO, 2020b). This is well below Malaysia’s 15 doctors per

¹⁹ The KIS Card (Kartu Indonesia Sehat) enables and guarantees the supply of public healthcare services to registered poor and near-poor households and individuals. Regulations for the KIS Card are specified through the National Health Insurance (JKN).

10,000 people and Thailand and Vietnam's eight. Besides this, questions about pharmaceutical monopolies and cartel practices in the medical sector, and cases of malpractice and fraud at the expense of patients are mounting. Underlying this mood is a latent mistrust not only of the pharmaceutical industries, the medical profession, and the medical structures of hospitals, but also of the national elites in general and the civil servants of health-related authorities in particular (Weydmann, 2019).

3. Contextualizing Healing

To develop new visions for primary healthcare in the 21st century, we urgently need to ask and discuss the fundamental question of what constitutes our health and how people maintain their health. Furthermore, given structural changes, we need to draw conclusions about these discussions and develop new medical and political systems of trust. In this respect, Latouche (2007, p. 32) developed the 'concrete utopia' of a degrowth revolution, to build "convivial societies that are autonomous and economical in both the Northern and the South" and therein confront concepts and paradigms underlying 'Western imaginaries of healthcare'. To promote processes of transformation, he formulated the circle of the eight R's²⁰, which has been developed for the transformation of the health field into a model of four steps (Aillon D'Alisa, 2020). These four steps entail the re-evaluation and re-conceptualization of health, illness and healing, the related re-structuring of health services according to this re-conceptualization, health promotion and prevention, as well as the involvement of citizens and patients in health management.

In what follows, I will present insights from my study on Javanese health seekers' way of navigating healing and related boundaries and challenges to the paradigms of medical knowing (Weydmann, 2019). The conceptual discussions form a basis to advance and promote the re-evaluation and re-conceptualization of health, illness, and healing.

3.1. Methodological and Methodical Fundaments

The underlying case study draws on the transdisciplinary field of health psychology and medical anthropology to discuss concepts and approaches that explain the use of TCM in urban Yogyakarta (Indonesia). Discussions of this study are based on the methodological approach of Reflexive Grounded Theory (Breuer, 2009), which allows cross-cultural researchers to distance themselves from their personal constructs and highlight in their building of a constructivist Grounded Theory (GT) the entanglements of conceptual meaning with the given narrative context (Breuer, 1999, 2009; Charmaz, 2000). The specificity of this methodological approach is the way in which researchers trace their own journeys in search of meaning to give a specific sensitivity to the underlying research context. Such a methodological approach is particularly important in sensitive contexts, for example, the postcolonial nature underlying this study, in which a 'Western' researcher is in search of the meaning of healthcare practices in urban Yogyakarta. By engaging in research about healthcare in a postcolonial society, it is only too likely that colonial aspects contribute to the social and cultural production of knowledge in this field. It is therefore crucial for a research methodology to enable reflections about continuations of colonial and neo-colonial relations into the present and emphasize how schools of thought from the past still infuse the present (Bal, 1991; Shohat, 1992).

Another major methodological focus is to enable research participants to communicate their experiences from within their frames of references and at the same time involve the researcher's underlying worldview (Chilisa, 2012). How individuals communicate and interact with their environment must be taken into account during any research activity, so that "indigenous epistemologies and axiologies can inform the undertaking of participatory and collaborative research" (Nicholls, 2009, p. 120). In practical terms, this approach unavoidably entails an emphasis on the way to present research, by making explicit the specific angle from which the phenomenon under study is reflected, and therein traces the author's processes of making meaning in the field of healthcare in Indonesia. This includes the explicit positioning of the author's perspective and voice within descriptions of interviewees, the questioning of assumptions,

²⁰ The virtuous circle of eight R's: Re-evaluate, re-conceptualize, restructure, re-distribute, relocalize, reduce, re-use, and recycle (Latouche 2007).

noticing and facing uncertainties, as well as reflexive processes, all as part of making conceptual meaning throughout this study. All of these provide extensive insights into the multiplicity of perspectives and dimensions involved in the field of health-seeking. This means that, even though this paper primarily focuses on casting light on issues of healthcare in urban Yogyakarta in the context of the discussion about processes of medical degrowth, it also finds a textual form to trace the insights of a 'Western' researcher, who tries to make meaning of healthcare in urban Yogyakarta.

The findings are based on a study involving 28 semi-standardized interviews with female health seekers as the main body of data, and an additional 19 semi-structured interviews with medical experts from Yogyakarta. The interview questions for health seekers were designed to elicit narrative elements addressing previous experiences and evaluations of illness and previous treatment as well as possible combinations of medical practices. The expert interviews with different health agents illustrate conflicting interests and controversies between medical traditions. Additional other data, such as observation protocols, were used to supplement the analysis in terms of triangulation, helping to reflect, classify and interrelate codes and categories. The main data corpus for the study was collected between 2010 and 2015, while additional data has been collected during on-site research in Yogyakarta in 2019 and online data collections in 2020.

The sampling strategy for selecting female health seekers was informed by theoretical sampling, aiming to cover the range of women's health-related concepts and approaches underlying the use of TCM in an urban setting, thereby resulting in a heterogeneous sample. A major restriction to the sample was the inclusion of only interviewees who at least partially presented themselves as being Javanese (criterion sampling). Thus, being Javanese was not equated with an ascription of a rigid and enduring attribution of ethnic identity but as a temporary way of localizing themselves in relation to time, place, and context. In this way, my interviewees' being Javanese was not the only narrative location of belonging throughout the interviews. Rather, being Javanese was just one identitarian location of belonging among 'others'. In practical terms, this meant that my interviewees regularly shifted their frame of reference from one moment to another. For example, one woman at the beginning of our interview used 'we' and 'women' to locate her identity, compared to 'them', the 'men'. Shortly after, she introduced her Madurese influences, referring to herself as 'we' and 'Madurese' in distinction to 'them' and 'Javanese'. Finally, when describing approaches to healthcare, she shifted to 'being Javanese' in contrast to 'Western you' and 'Western them' and associated ideas about differences in healthcare. Therefore, my interviewees location of 'being Javanese' was only one location within the multiplicity of 'selves' and particularly highlights how the 'self' is significantly shaped by the 'others' (Butler, 1993; Yuval Davis, 2010). Accordingly, this study is based on a sample population that affiliates itself with a 'Javanese way of healthcare', which is particularly constituted by difference from a 'Western way of healthcare' (Weydmann, 2019).

3.2. Insights of Javanese health seekers into their navigation of healing

Healing categorically presumes the existence of illness and, therefore, aims to restore health, no matter how this is defined. When discussing concepts and approaches to illness and healing, it is inevitable to face issues regarding the beliefs underlying the conceptualization of health. The exploration of health beliefs, at its core, is interested in what people consider to be the nature and essence of health and illness and which aspects enable them to avoid disease themselves, as well as which aspects cause illness (Frankenberg, 1980; Good, 1994; Kleinman, 1980, 1988; Pfleiderer Bibeau, 1991). Concepts of feeling well and the experience of the embodied self invariably underlie healing navigations. Accordingly, issues of being and having a body are of major interest if one is concerned with making meaning of health approaches. When questioning approaches to healing, the dimension of 'doing' cannot be differentiated from the dimension of 'being' healthy (Eriksson, 1994, 1997; Eriksson et al., 1995). This means that a health-seeking person is necessarily part of a diversified 'drama' which begins with the confirmation of the health seeker's suffering, continues with the health seeker's performance of illness and suffering in a given place and time and finally leads to a possibility of reconciliation. Mol (2014) extends this idea of 'doing' to physical bodies themselves, as in her perspective that there is no disease as such, which would presume a fundamentally underlying 'object', the physical body, and imply that there is "a timeline with a

before and an after; and materials out of which x or y might be made". Instead, she identifies the body as an object multiple which is performed, done, and enacted. Bodies are no longer understood as biologically determined objects, but as collective expressions and presentations which are closely interconnected with their historical and anthropological contexts, as the body itself and related perceptions therein become multiple, and related embodiments convert into collective processes with a direct linkage to histories and ethnologies. From this perspective, even though diseases are negotiated within the same 'society', they are still enacted differently in connection with different actors, materials, techniques and sites (Mol, 2002). Against this background, illnesses and diseases are embedded in a particular context, relating to specific individuals and their related collective experiences, ideas and beliefs.

To contextualize these conceptual considerations, I will introduce one of my interviewees, to illustrate paradigmatic characterizations and differentiations against the background of her common ways of navigating healing and related tensions between medical paradigms.

Introduction of Ibu Dewi

Ibu Dewi is a 43-year-old woman, who was born on the outskirts of Yogyakarta and identifies as Javanese. She grew up as the daughter of a small-scale farming family, who worked in their rice paddies and vegetable garden. Today Ibu Dewi is the mother of three children, who are between 7 and 13 years old. Her household consists of her children, her mother, and her disabled adult sister. Her husband is working abroad as a laborer in the construction industry; however, for about 6 years, she has not been in contact with him. She assumes that he has probably started a new family somewhere else.

Ibu Dewi herself attended primary school for about 4 years and left school without any degree. She earns the living for the entire family on her own, by working six days a week as domestic worker for a Javanese industrial family. Her mother takes care of the house, the garden, and the children. The family is not registered in the national health insurance system – too much administration says Ibu Dewi - and in this sense, healthcare is always a consideration of cost and benefit. On the one hand, healthcare services, as well as medications, incur substantial costs, in the governmental community health center as well as any other kind of healthcare services or medications. At the same time, whenever Ibu Dewi is ill and unable to work, she loses the essential daily income of her family.

In terms of self-care, Ibu Dewi has a broad range of knowledge in order to deal with various common illnesses. Usually, her first idea for treatment is simply to sleep and rest and afterwards see whether things are already better. If not, she typically prepares a herbal remedy, whose recipe was passed on by her parents. She prepares these remedies by herself and mostly uses herbs that grow around her house in that particular season. She uses those herbs to prepare teas and pastes to reduce heat inside the body, infections, pain, or to support wound healing. The most common disease in her family is masuk angin²¹, which she treats by giving warm water to drink, sleep, and kerokan²² massage. Concerning techniques and methods of self-healing, Ibu Dewi reported meeting a gendong²³, at least two times a week who walks along the street to provide her freshly made herbal remedies. This jamu gendong woman is the daughter of another jamu gendong, and in this sense learned the techniques of producing and prescribing herbal remedies already as a child. Therefore, she is characterized as 'having seen every wave in the wide ocean of illness and healing'. Ibu Dewi's family has been consulting the jamu gendong for decades, meaning that their relationship is characterized by a shared medical history. Ibu Dewi fully trusts her medical advice and remedies and, in this sense, the relationship with this jamu gendong is her major source of support for all health-related questions.

In cases of severe illness, which, 'thankfully' rarely occur, Ibu Dewi additionally consults a nearby community health center (Puskesmas). There, she can get blood checks and further tests.

²¹ Javanese health concept, in which a draft or wind is expected of having entered the body.

²² Massage technique, to stimulate blood circulation and/or open a path for trapped wind to escape the body. For this kind of massage an oiled coin repeatedly is scraped over the skin, until the skin turns bright red or black (for details see Weydmann, 2019:143ff.).

²³ Traditional Javanese salutation for a woman selling traditional herbal medicine, which is typically carrying glass bottles with different jamu remedies in a basket on the back.

Ibu Dewi described that before she goes to the Puskesmas, there have been situations of great uncertainty, in which severe, unknown symptoms rapidly appeared, accompanied by unsettling and worrying feelings. In most cases, she then used these diagnoses of the Puskesmas and passed it on to her jamu gendong or to a trusted Javanese ritual healer (dukun), who is well known to handle different kind of obsessions. In most cases, family members simply went home and continued with their habitual herbal treatment. Only in one case, Ibu Dewi's sister was directly admitted to hospital, as she had been diagnosed with severe dengue infection and instantly required intense medical care, otherwise she might have died. During her time in the hospital, her sister had been examined by two doctors, treated by nurses, with Ibu Dewi's brother selling a cow to pay for her treatment. Furthermore, the trusted jamu gendong visited Ibu Dewi's sister in the hospital to administer important herbal remedies and provide a particular kind of massage to reduce her fever.

3.3. Knowing about healing and the business of healthcare

In her stories, Ibu Dewi always emphasized that her knowledge about herbal remedies has been passed on from generation to generation. Thereby, she directly felt connected to her Javanese ancestors. For her, this direct relationship with her ancestors and the related validation by experience from her familial ancestors made her feel safe. She therefore traced a direct relation between the Javanese conceptions of illness and her own experiences. Van den Daele (2004) has conceptualized this kind of traditional knowledge as 'embedded knowledge' and also as 'embodied knowledge', as it does not just convey information, but also has social and cultural meaning and gives the bearer of such knowledge a sense of belonging and certitude. He specifies that this kind of knowledge cannot be adequately conveyed in rules or textbooks, as it is ingrained in people through socialization and in their skills and habits (Van den Daele, 2004, p. 27ff).

By contrast, Ibu Dewi characterized the biomedical body of knowledge as a non-personal way of obtaining knowledge about health, illness and healing. It is taught in specific institutions, and for this reason the source of medical knowledge for the physician at the Puskesmas has not been his or her ancestors' experience, but rather professional studies in a medical degree program or institution. In this sense, biomedical knowledge is described as separate from empirical knowledge, and effects are seen as being tested in scientific clinical trials instead of empirical validation. Accordingly, biomedicine is seen as being distant from 'true, real life'.

This idea of distance and closeness to real life was also stressed by contrasting medical relationships underlying different medical traditions. Whereas Ibu Dewi and many other interviewees described their close and established relationships with their traditional and alternative medical professionals, by contrast, they highlighted that there is no such relationship with the medical professionals in the Puskesmas or hospitals. Through the services provided by the national healthcare program, patients make use of a formally guaranteed program and related institutions, since the staff on duty are constantly changing, due to high staff turnover, and the medical services as such not being based on the idea of personal relationships.

The consumption of herbal plants as medicine has been part of Indonesian culture for thousands of years (Beers, 2001), mainly based on oral traditions and without systematic canonization. However, at the same time, it needs to be mentioned that jamu today is no longer the medicine of the poor, but also a vibrant economic sector partially dominated by large international companies such as Air Mancur, Djamu Djago or Nyonya Meneer, which produce a variety of jamu remedies sold as instant powders, tablets or capsules. Therefore, street vendors, such as Ibu Dewi's jamu gendong, compete with big drugstores over jamu sales. This could also be observed when the COVID-19 crisis deepened in 2020, and a new market emerged offering "Corona Jamu" that is based on existing traditional remedies, for example Wedang Uwuh – a herbal specialty in the region of Yogyakarta. In this sector, remedies have been promoted which are traditionally used to prevent colds, warm the body, and boost immunity. The Jakarta Post summarized several reports from marketing and consumer research agencies, e.g., McKinsey, and emphasized that several jamu producers have seen an increase in revenue of up to 50 per cent and predicted that the habit of drinking jamu will be "a new normal", portraying jamu as "the new espresso" (Susanty, 2020). Already within the last decades, traditional jamu remedies have become an important "economic pillar for the nation" (Prabawani, 2017, p. 81) that generated

21.5 trillion Indonesian rupiah (US\$1.38 billion) in 2019; up 13.1 percent from 19 trillion Indonesian rupiah in 2018.

Ibu Dewi's emphasis on jamu medicine does not simply point towards the conceptual ideal of traditional herbal medicine, but also to the different aspects of her relationship with jamu medicine: her particular relationship to her jamu gendong, her specific way of obtaining healing knowledge from her ancestors, her involvement in healing by cultivating and collecting medicinal plants and preparation of herbal remedies and pastes.

In contrasting his work with the paradigmatic approach of a professionalized biomedical doctor, the traditional healer Pak Agusti characterized his relationship with health seekers as follows:

It is very easy to say I help people (.) people say they help me (.) but in the real sense of the word helping (.) this is not easy (.) helping people only with remarks (.) this kind of help requires the helping people (.) if it does not require me it is a lie (.) for sure we choose the requirement if I help Nicole (.) help which is really to help you definitely requires me (.) requires power (.) requires my feeling (.) it requires my heart (.) requires my thoughts (.) I am for you (.) I am helping you (.) maybe requiring material (.) my money (.) if I am not required this is not helping.²⁴

In the above statement, Pak Agusti stresses his personal involvement with the people he is taking care of in his role as a traditional healer. In the course of the interview, he highlighted that in biomedicine doctors are required to maintain a professional distance to not get personally involved in their healthcare practices. For this reason, he identified the medical employees working in the local Puskesmas as simply fulfilling an institutional function, which is remunerated and ends after official hours. Instead, he identifies his approach to healing as devoting his full attention and care to the person in need of help, for whatever reason. This devotion means to involve himself to the point that he is not able to knock off work because he is so fully devoted. Therefore, from his perspective, healing never can be a professionalized activity, as it requires personal feelings and involvement of the person, without professional boundaries.

In this respect, both Ibu Dewi and Pak Agusti described in detail the entanglement of medical knowledge and economic interests as one of the major problems of biomedical healing practices, as it has the potential to overshadow the social obligation of helping health-seeking persons for the sake of profit. In particular, drug prescriptions have been characterized as problematic. In another interview, Ibu Rini emphasized how in her experience doctors are particularly focused on 'open[ing] up business'²⁵ by selling pharmaceutical products and in this sense, she suspects healthcare services to be driven by economic interests and is wary of the related orientation towards personal economic gains. Some interviewees also suspected that biomedical practitioners commonly reject non-biomedical treatment methods in order to protect their medical businesses.

What emerges from these perspectives is that medical care generally should focus on the needs and sufferings of health seekers and not on their social class or financial circumstances. Another interviewee, Ibu Budiwati, stressed that the differentiation of medical treatment based on economic situation causes major harm, especially to poorer segments of Indonesian society. They are caught in the dilemma of, on the one hand, their inability to pay the immense costs of the highly professionalized biomedical practices, and, on the other hand, being at the mercy of confusing and time-consuming administrative procedures involved in registering as a poor or near-poor person in the national healthcare program. These aspects have been described as critical flaws in the formal healthcare services, which thereby fail to provide reliable access to medical care for large parts of Indonesian society. Therefore, interviewees regularly reported that entire families suffered as they need to borrow money to pay for expensive biomedical treatment, and subsequently resorted to selling their land, cows, or other essential goods to save the lives of their loved ones. However, at the same time, the loss of a cow erodes one's economic basis for living.

²⁴ Excerpt from interview with Pak Agusti 00:33:25-7, original in Bahasa Indonesia. Translation by the author.

²⁵ The original term "mau buka pasaran" (Bahasa Indonesia) has been used by an interviewee (interview with Ibu Rini 00:10:45-0).

4. Medical realities and the context of healing

Even though a condition may be considered an illness in one social group, the same condition may be classified differently in another group (Kleinman, 1973). How people cope with major life events like birth, illness, and death, as well as all aspects having to do with a comprehensive understanding of well-being, are embedded in a particular context and related to specific individuals and their collective experiences, ideas, and beliefs (see section 3.2.). Therefore, on the one hand, there are biophysical realities and/or psychological processes, and on the other hand the experience of illness involves feelings, ideas, values, language and non-verbal communication, symbolic behaviour, and the like. In this context, Kleinman has differentiated between the experience of illness by health seekers and the diagnostic perspective on illnesses by doctors (Kleinman, 1988). This perspective enables the distinction between two worlds: the outside disease perspective of doctors and the patient's personal perspective in which the realities of health and illness are moulded. Accordingly, the related act of healing needs a "plausible practitioner who can deploy a credible system in a successful negotiation that brings order to the patient's experience" (Harley, 1999, p. 434).

4.1. Conceptualizing Illness

Understanding someone's health world means making implicit or explicit assumptions about what characteristics and associations constitute the idea of health and, since directly related, the idea of illness. Understanding conceptions of health and illness, therefore, goes beyond a simple meaning-making of biological conditions, but involve orientations of health desires and illness undesirabilities, culture-specific conditions of illness and abnormalities (Fedoryka, 1997; Nordenfelt, 2007; DeVito, 2000).

Before characterizing specific aspects of a Javanese conception of health, I will first introduce a short excerpt from a personal illness experience in Yogyakarta which I recorded in my research diary. The short anecdote highlights the conceptual basis of illnesses and related negotiations of approaching healing:

[...] Since two days ago I feel really, really sick. It began on Saturday morning with a headache, a sick feeling in my stomach, and a bloated belly. I was thinking about whether I had eaten something wrong, whereas my daughter and my flatmate who shared plates with me seemed to be pretty fine. I decided to go to bed again and sleep for a few more hours. During the day my condition worsened, my headache became stronger (terribly strong!), and my sickness increased until I started to vomit. I could not eat or drink anything. Since Sunday my body temperature has also risen considerably. As I nearly never get a fever, or better yet, do not easily get a fever, the temperature rise started to seriously concern me. I was worried whether my symptoms were indicators of a serious tropical disease, as the combination of high fever and strong sickness with headache seemed to me very serious and completely foreign in its characteristics. Finally, this morning when Ibu Yuli came to do the washing, she found me staying in my bed. When I reported my symptoms and concerns, she said smiling: Oh, no worry, Nicole, this is only masuk angin. I give you [...]²⁶.

As this diary excerpt illustrates, the emergence of masuk angin has been entirely foreign to me since I had regularly experienced symptoms of the common cold and also stomach flu, but this bundle of incoherent symptoms had been foreign to me. As I could not recall any personal experience, nor personally accompanied anyone who had suffered from this combination of symptoms, this illness left me feeling uncertain, unsettled and worried, particularly as I have been worried about suffering from a severe tropical disease. Ibu Yuli, however, knew this set of symptoms ever since her childhood as a common and minor illness, which she experiences regularly, and which was also common in her social environment. Therefore, she had a wealth of

²⁶ Excerpt from research diary from 3.1.2011, original in German.

experience and coached me on how to approach healing and coping with these symptoms. Based on her experience, Ibu Yuli identified the descriptions of my symptoms as single markers for the common illness of masuk angin which for her and her social environment is one of the most common illnesses. In contrast to my state of uncertainty, she had a clear idea of how to cope with this illness.

The above example from my diary highlights how there is a close relationship between previous experience, the assessment of illness, and related ways of handling it – which in this context explicitly comprises the respective cultural and local imprint. In intra-cultural contexts, children gain experience of common illnesses in the context of families and communities at a very early age and build on these shared experiences of their social environment. In the context of my research, it was the cross-cultural context that led to this meeting of ordinariness and complete strangeness in the context of a common illness. In this sense, I needed to understand that the experience of illness is inevitably a relational issue – which builds the basis for the Javanese conception of illness.

In line with my own experience and the reports of Ibu Dewi and many other interviewees, the phenomenon of masuk angin has been widely characterized as one of the most common diseases in Java (Ferzacca, 1996; Triratnawati, 2011; Weydmann, 2019). Nevertheless, in professional biomedical diagnoses, there is no conceptual framework corresponding to the Javanese illness conception of masuk angin²⁷. This means, when Ibu Dewi consults a Puskesmas or general physician to receive treatment or medications for her experience of masuk angin, this doctor needs to cope with the fact of not having a direct reference in the biomedical canon. This leads to the fact that physicians in Indonesia either need to refer back to their own empirical knowledge about Javanese humoral medical diagnostic and related healing practices like jamu remedies or kerokan treatment (Triratnawati, 2005, 2011; Weydmann, 2019). The other option – which has regularly been reported by doctors at the university hospital in Yogyakarta (Weydmann, 2019, p. 337) – is to overcome the lack of recognition of masuk angin by simply subsuming the phenomenon of masuk angin under the diagnostic framework of the common cold, which, however, is determined by different causes and symptoms. In this sense, Javanese doctors are caught between a rock and a hard place. On the one hand, there is the cultural background and its accompanying awareness of their own and familial experiences with masuk angin and related treatment methods. On the other hand, there are their fixed professional frameworks from biomedical science, where the phenomenon of masuk angin is ignored so that their professional reality implies that they need to transform their habitual treatment into a biomedical understanding.

This obvious disregard of local experience in terms of illness has already been described in early colonial reports about medical practices, when Western medicine was not yet familiar with tropical diseases, and, therefore, medical practice struggled with poor treatment results as a logical consequence (Sciortino, 1996). Even today, after 500 years of biomedical experience on Java, the biomedical framework still struggles with the recognition of local phenomena. For this reason, as long as patients perceive their physical realities especially through sensory experiences, there is a fundamental paradigmatic difference between subjective experiences of illness and the professional diagnoses of diseases within the framework of biomedical systems and related hospitals and community health centres. Besides Kleinman's differentiation between the internal experience of illnesses by patients and the external assessment of diseases by doctors (Kleinman, 1988), Ibu Dewi and Pak Agusti highlight another dimension which is beyond the conceptual framework of illness and disease, but which points towards structural questions of the human body and the nature of things by relating to the wider social dimension involved in the navigation of healing. The following section will introduce the Javanese relational approach to illness and healing as a basis for further discussions.

4.2. The Javanese Relational Conception of Health, Illness, and Healing

The traditional Javanese conception of health and illness is based on the principles of humoral medicine, which has a long and sophisticated tradition. It identifies bodies as having four important fluids that are characterized as hot/cold and wet/dry and are based on the belief that a

²⁷ Interview with Ibu Maya 00:46:51-4.

balance of these bodily fluids is fundamental to good health. According to this understanding, a balanced unity of body, mind, and spirit is also necessary to withstand outside influences such as viruses, evil spirits, or social discrepancies and in this sense, there is no clear distinction between inside and outside, between mind and body, the personal and the collective (Ferzacca, 2001). Throughout their daily lives, Javanese people experience various embodiments, just as they have different social identities and constellations. Therefore, any Javanese approach to healing is understood as being related to the health-seeking person and the relative context, so that the people involved, spatial aspects, economic aspects, techniques, applications, and the like, need to be considered with respect to the health-seeking person. Accordingly, treatment approaches are necessarily bound to the specific situation in time, as at any moment new aspects can potentially contribute to different considerations, feelings, and meanings. This means that the rationale for choosing a particular treatment method is that both the treatment and the person are *cocok*, meaning that all relevant factors and agents fit together harmoniously or are congruent. However, being *cocok* is not to be understood as a perspective in which treatment options are compared and weighed based on an individualistic worldview in which navigations are centered around what is best for a specific individual. Rather, *cocok* needs to be understood as a relational perspective in all its aspects, which involves the resonance with the surrounding whole. The personal positioning in relation to others, therefore, builds the basis for one's own personal experience. In this sense, the biomedical approach to generalize diseases across cases and persons in a Javanese perspective would mean simplifying the relevant complexities of human nature.

One example which Geertz (1973) used to highlight the relational notion underlying Javanese healing conceptions concerns tasty food: the idea of food that is *cocok* does not focus on rational considerations but is rather based on sensed experiences. The ascription of taste is directly linked with sensory perceptions. Rational considerations fade into the background when discussing taste and considerations of whether a food is healthy, affordable, and so on. Fit, in the case of tasty food, directly takes place between the tongue and the food and no external measurements or categories are to be identified. Hence, without someone to taste the food, tasty food as such does not exist. The same applies to Ibu Dewi's approach to healing when she describes her specific way of preparing a herbal remedy for her son: she simultaneously highlights that this remedy is bound to the person of her son and that, accordingly, it is not necessarily applicable to another person. As Ibu Dewi describes, even though she possesses knowledge about the intricacies of the ingredients and manufacturing process of this specific medication, and she knows that this medication has the potential to heal her son, she has nevertheless had the experience that this medication does not provide any relief for her when she has a similar kind of injury. Instead, she argues that any kind of healing navigation is not to be related to a specific illness or injury but rather needs to fit or resonate with the health-seeking person. A curative approach which is not *cocok* with a person in question is therefore not expected to improve the condition of this person.

5. Overcoming conceptual boundaries - the Javanese medical syncretism

When looking at Ibu Dewi's way of navigating healing, it becomes obvious that her negotiations of approaches are bound to the very moment of consideration and related relevant aspects. This means any other situation potentially contributes to valuing other aspects and therefore potentially leads to different conclusions. In this context, Ibu Dewi described a situation in which she cut herself in the foot with a machete and the wound got infected, even though she thoroughly cleaned the wound and used specific herbs to support healing. She described different considerations and approaches to healing, which involved monetary aspects as well as considerations about practicability, which at the end lead to the fact that she used herbs which had been readily accessible. She adapted and tested different combinations of herbs, leaves, barks and roots to prepare a tea, which she also used to bathe her foot in and clean her wound. Before drinking the tea, she also added a painkiller to the herbs, thinking that this could also help.

This story of Ibu Dewi's foot injury highlights that her general approach to healing is bound to her own sensually experienced, embodied, reality. She is the expert of her own suffering and she herself knows and decides which approaches to healing are necessary. Therefore, as her stories highlighted, she herself is the person who decides which approaches and persons to involve and which approaches and persons to avoid. These insights make it glaringly obvious that in this

perspective, navigations of healing are not exclusively bound to a specific theoretical conception of Javanese herbal treatment, but rather involve a mix and combination of 'whatever is at hand' (Lévi-Strauss, 1966). This also means Ibu Dewi mixes biomedical medications with traditional herbal remedies. She also draws on Traditional Chinese Medicine, for example when an aid organization was providing acupuncture treatment for free and she happened to be suffering from recurring headaches. She described using painkillers, whenever she needed to go to work and there wasn't any time to rest or to prepare other remedies and her headache, thus, simply needed to stop. Another situation led her to identify the bad condition of her son as being caused by a spirit that entered his body and which a traditional Javanese healer needed to drive out. And, last but not least, she only rarely used the biomedical services of the Puskesmas, especially because consultation times are in the morning hours and therefore clash with her working hours. Furthermore, she needs to borrow a motorbike to go there, as the bus does not stop near the community health center.

These insights into Ibu Dewi's approaches to healing show, overall, that her ways of dealing with a particular illness are not to be understood as the most suitable ways, but only 'one' way which in this specific moment is most suitable. At another time, she might deal with the situation differently, as the immediate outside or inside conditions change the way things fit together or another previous experience enables different ways of dealing with this illness which are best in this new situation. This means that the emphasis of my Javanese interviewees on being *cocok* illuminates the provisional and relational nature of 'fitting' between health seekers and healing approaches. In the context of healthcare, this means that the Javanese conceptual orientation on healing in terms of being *cocok* is not understood as descriptions of illness realities that are 'out there' but emphasize the significance of relational considerations in the context of healthcare. My interviews with Javanese medical professionals from different medical traditions²⁸ confirm the descriptions of Ibu Dewi and other interviewees, highlighting common routines in tinkering and combining healthcare practices between medical conceptual differences – not only for health seekers but also for medical practitioners (Weydmann, 2019). In interviews and focus group discussions Javanese medical professionals from all sectors located their own medical traditions within a pluralistic medical system and recognized that each school of thought presents both limitations and benefits.

Unfortunately, even though the interviews of my study are testaments for a medical syncretism of everyday healthcare practices, allowing for personal ways of tinkering healthcare in between different medical traditions, at the same time, medical professionals stressed the informal character of these co-operations. As one might expect, hospital regulations in Indonesia, as in most hospitals of the world, restrict formal cooperation with non-biomedical outside healing experts. And, accordingly, the hospital visits of the *jamu gendong* to treat Ibu Dewi's sister by no means constitute formal cooperation but are rather testaments to a silent acceptance by the hospital medical staff. My interviewees also emphasized the paradigmatic differences between different medical approaches, even though they traced common routines of combinations and conjunction of medical practices. Besides different fundamental conceptual understanding of the nature of health and illness, the alignment of interests underlying medical practices has been at the heart of this differentiation.

These discussions about paradigmatic differences between medical approaches are not intended to provide a new version of the simple and sometimes sterile dichotomies of local healing knowledge versus scientific biomedical knowledge, to claim justice from a local 'indigenous point of view' in order to obtain recognition from the 'superior scientific Western regime of knowledge' (Nygren, 1999; Silitoe, 2007). The insights into Ibu Dewi's and Pak Agusti's way of approaching healing stress the strong and common normative notion of knowing in the global natural sciences (which at the same time entails that not all scientists agree with each other) and at the same time highlight that, however, there are numerous different ways of knowing within, as well as across,

²⁸ An overview of the experts involved in the study is given in Weydmann (2019, p. 402). These experts provide insights into following medical traditions: practitioners and researchers from the field of biomedicine and psychology, the field of traditional herbal medicine (explicitly from the traditions of *jamu* and *Unani* medicine), the field of traditional Javanese *Kejawèn* practices, the wide field of black and white magic approaches, as well as the field of traditional Chinese medicine (TCM).

local sciences (Silitoe, 2007). Instead of emphasizing the integrity and homogeneity of my interviewees as part of a closed Javanese community, in terms of a victimized society left without reason and agency, collectively struggling with the lack of recognition by ('Western') science communities, the discussions point towards my interviewees' autonomy in their ways of navigating healing. Tracing their approach to healing in accordance with their own sense of *cocok*, stresses their routines in intertwining different spheres of healing and knowing, joined together by their situatedness in time and place. These insights into their ways of navigating healing in direct relation to the sensual experiences and embodied realities of the ill person highlight that life is much more complex than is captured in or acknowledged by biomedical perspectives. Reflecting the ordering of formal healthcare systems specifically in the light of persons and contexts, as is shown in above narrative insights into Ibu Dewi's and Pak Agusti's healing reality, leads to focus on the contested ecology of healing in urban Indonesia²⁹. The pluralistic medical system in Indonesia is characterized by differences between the epistemological fundamentals of scientific biomedical approaches and other (local) medical approaches. Biomedical healing approaches are identified as competing with any other (local) form of healing and related ways of knowing, testing validity and transfer of knowledge. In the context of Malaysia, the researchers Connolly (2017) and Connolly, Kotsila D'Alisa (2017) similarly outline conflicts between local medical knowledge and official understandings of health and disease. Within the last two decades academic discussions increasingly move away from fixed dichotomous epistemologies to allow for more complex and hybrid spheres³⁰. From this perspective human understanding is characterized as diverse and dynamic, so that all knowledge traditions are considered to be based on a complex basis of knowledge relations (Silitoe, 2002, 2007), as the insights into Ibu Dewi's rich and diverse perspectives and approaches on healing demonstrate. However, unfortunately these discussions up until now only rarely extend beyond the social sciences, so that for instance the structures of healthcare still primarily rely on one-dimensional, normative understandings of healing. Voices of health seekers and scholars arguing for the re-evaluation and re-conceptualization of health, illness, and healing and related re-arrangements of healthcare in accordance with hybrid spheres of knowing are not widely heard. As Lyon (2009) has shown in detail, educational training of medical doctors at universities still ignores engagement with the epistemological and ontological situatedness of the medical sciences and corresponding relations to preconceptions, limitations and specific performances. Even today, biomedical students are trained in tenets and procedures of scientific medicine, omitting any kind of local medical beliefs, philosophies and practices. Thus, as long as medical practitioners are not socialized into a given local medical context or adapt themselves to their working environment, the respective local medical concepts and approaches are unknown to formally – scientifically – trained practitioners.

6. Conclusions: The Recovery of Healthcare³¹

Medical anthropology and research into the history of the body have shown how representations of the body differ through time and space (Duden, 1994; Lock, 2001a, 2001b). Healing processes are therefore likewise related to a particular local space and time. Accordingly, experiences of healing involve local characteristics, discourses, and tensions underlying these healthcare practices. In this sense, this paper highlights the tensions of recurring epistemological discussions between a one-dimensional biomedical approach to healing and local, hybrid and diverse approaches, which contribute to the renovation of healthcare services.

The insights into health seekers' navigation of healing in accordance with their personal sense of *cocok* particularly questions epistemological principles underlying the national Indonesian healthcare program and scientific biomedical approaches in general. The narratives of my interviewees trace their wish to reduce polarization between medical approaches and to enable

²⁹ Fundamental insights into the discussions of 'contested political ecologies' are given by Green (2012; 2013). Further insights into the discussions of a 'political ecology of the body': see Carney, 2014; Connolly, 2017; D'Alisa, Germani, Falcone & Morone, 2017.

³⁰ Examples of these discussions are the *Decolonial Turn* (Maldonado-Torres, 2011; Mignolo, 2012), the *Mobility Turn* (Landri & Neuman, 2014) and the *Boundary-Turn* (Bagga-Gupta, 2013; Bagga-Gupta & Surian, 2014).

³¹ Ivan Illich in *Medical Nemesis* (1976) entitled the last chapter of his book "The Recovery of Health".

healing in their own way, arguing for cooperation as well as negotiation of different understandings of health, disease and healing. Fundamental for their arguments is the wish of Javanese health seekers to follow their own autonomous approach of healing, tinkering, and combining all tools, techniques, and approaches available. Thereby health seekers become a kind of “professional do-it-yourself person” (Lévi-Strauss, 1966, p. 17), who, as craftswomen and craftsmen, combine available and accessible elements in an attempt to solve problems. My discussion highlights the use of a heterogeneous and limited repertoire of healthcare approaches and related ways of combining available and accessible elements in an attempt to solve health issues. Within the conception of Lévi-Strauss (1966) this would identify my interviewees as “bricoleurs” who with ‘whatever is at hand’ navigate their healing, even if this involves using kerosene as a massage oil, as Simbah Mita highlighted in her interview, since she could not afford other massage oils for economic reasons. In this context, Lévi-Strauss described the bricoleur as a ‘primitive scientist’ who makes use of familiar and available materials and resources, trying to reach the best possible outcome. My interviewees unanimously highlighted this common routine of healing as a way of tinkering and combining in between conceptual differences of biomedical and non-biomedical healing approaches. Fundamental to these discussions is therefore the direct basing of healing approaches on the sensory embodied experiences of the health seekers. In the sense of Illich’s vision of a ‘convivial society’ (Illich, 1973; Samerski, 2016) healthcare necessarily implies heterogeneous spheres of healing, enabling health seekers to balance their suffering between autonomous self-care and heteronomous advises. In this respect, Ivan Illich (1973) stressed the fact that “people have a native capacity for healing” (p. 68), as long as people are primarily dependent on their own capacities, without major dependencies on external commodities. Underlying this argument is the assumption that any kind of ‘professionally engineered commodity’ inevitably replaces a culturally shaped use-value (Illich, 1995, p. viii). As a result, this would mean that Ibu Dewi’s navigation of healing in the official healthcare services would lead her to separate herself from her sense of self, her desires, and habits, thereby involving a new logic of production and consumption (Illich, 1973, 1995; Samerski, 2016). In this respect, it must be emphasized that it is Ibu Dewi’s own sense of *cocok* which builds the basis to overcome the normative categorical differentiation between sometimes dichotomous medical traditions and enables her to navigate healing in accordance with her own experiences and embodied realities. Healthcare, however structured, needs to be primarily based on these sensed experiences of health seekers, instead of rational considerations. In this respect, Samerski argued: “Today, it is more important than ever to give space to those concepts and practices that relate to a sensually experienced, embodied reality - first in the mind, and then in the world around us” (Samerski, 2016, p. 9). Such a structuring would also enable the combination of all tools, techniques, and approaches available to address the needs and uncertainties of the ill person, which of course also entails legitimating hybrid approaches to health, illness, and healing, even when these approaches differ or sometimes even contradict each other. Central to a recovery of healthcare, and in this sense a fundamental reform and re-orientation, is therefore the ill person as such. Such a reform would not ‘simply’ involve the transformation of the economic orientation of healthcare systems, but the transformation of our understanding of ourselves.

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Health workers and sustainable systems for health in a post-growth society

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Abstract

The Agenda 2030 signed by the Heads of State and Government in 2015 set out 17 indivisible and universal Sustainable Development Goals (SDGs) and 169 targets. Among others the Agenda 2030 proposes to achieve "sustainable, inclusive and sustained growth" (SDG 8), in fact an oxymoron due to the global "limits of growth" in a finite ecosystem. The SDG 3, "Ensuring a healthy life and promoting well-being for all at all ages", included among others the target "3.8: achieving universal health coverage". Besides representing a substantial regression from the original WHO's Primary Health Care (PHC) strategy, which addressed among others the social and economic determinants of health, the UHC target and the SDG3 are deemed to be unattainable due to the constant increase in demand on the one side and inappropriate offer of health services on the other, both largely determined by factors outside the health sector and linked to the present hegemonic unsustainable growth-defined development model. Focusing on the health care model and the generation of its human resources, we highlight how both remained mostly anchored to standardized and, today, globalized biomedical hospital-centric models, which are inadequate to meet populations' health needs and expectations. We then suggest the need for a paradigmatic shift in the health and social care organization (toward a human rights and social determinants approach, home-community-based care, integrated-holistic approaches, patients' empowerment, etc.) and the health workers' educational model (linking it to the specific characteristics of local contexts in terms of needs and resources, and to a new ethical framework). Both are pillars of the transformation of health systems towards a post-growth society.

Key words: Health personnel medical education; Healthcare systems; Sustainable Development Goals; Universal Health Coverage.

1. Background

Following an intergovernmental process that involved also significant sectors of civil society, the Agenda 2030 for Sustainable Development was adopted on 25 September 2015 by the Summit of Heads of State and Government convened in New York by the United Nations (United Nations, 2015). The new agenda committed governments to the adoption of a set of 17 "indivisible" goals to end poverty "once and for all" by 2030; to combat inequalities; to ensure lasting protection of the planet and its resources; and to create the conditions for "shared prosperity" and "sustainable, inclusive and sustained" growth (United Nations, 2015).

By definition, sustainable development, which "meets the needs of current generations without compromising the ability of future generations to meet their own needs" (UN, 1990), includes intergenerational equity. It involves, on the one hand, the use of renewable resources and strict environmental protection, and on the other hand the ability to ensure that human progress (first and foremost the improvement of the living conditions of the populations) lasts over time.

Sustainable Development Goal 3 (SDG3) has been set out in "Ensure healthy lives and promote well-being for all at all ages". Undoubtedly, the goal cannot be achieved exclusively through efforts in the health sector, this is supported by the indivisibility of the 17 SDGs. Similarly, inequality in health is a mirror of all other inequalities, as well as constituting a "common danger" as stated in the Constitution of the World Health Organization (WHO, 1946).

On the other hand, the achievement of "Sustainable, inclusive and sustained" economic growth (SDG8), one of the pillars of the Agenda 2030 (United Nations, 2015), is conceptually an oxymoron (Kopnina, 2016; Spaiser et al., 2017). Theory and evidence from various scientific disciplines, including physics and ecology, support the idea that the current notion of development, centred on the economic growth paradigm, implying a 'sustained' increase in the production, consumption and waste, are incompatible with the planet's finite space and resources (Greenham & Ryan-Collins, 2013). It is not a matter of simply "greening" growth, rather it is urgent to identify alternative approaches that can safeguard wellbeing while protecting the environment, including the downscaling of economic production and consumption in the wealthiest countries (Parrique, Timothée, et al., 2019). The concern was made evident already more than forty years ago. The first Report to the Club of Rome, insisted on the existing "Limits to growth" and called for "the initiation of new forms of thinking that will lead to a fundamental revision of human behaviour and, by implication, of the entire fabric of present-day society" to avoid "the tragic consequences of an overshoot" (Meadows et al., 1972). The rapidly approaching global crisis forecasted some fifty years ago based on mathematical models was recently confirmed based on more solid data (Meadows et al., 2004; Turner, 2014). Low-income countries are the most affected by the current multifaceted crisis, most evidently environmental, with enormous human and economic costs (UN, 2019; Landrigan et al., 2015; Briggs, 2003).

Despite good intentions achievement of SDGs seems to step every year further away: "At the current pace, around 500 million people could remain in extreme poverty by 2030. Global hunger is on the rise. Violent conflicts, climate change, gender disparities, and persistent inequalities are undermining efforts to achieve the SDGs." (Steiner, 2019). Emerging and re-emerging infectious diseases and epidemics strictly related to above mentioned societal and environmental changes, including the current Covid-19 pandemic, represent an additional challenge (Nii-Trebi, 2017; Abrams, 2020).

Among the 9 health targets of SDG3, the WHO considers Universal Health Coverage (UHC) "the centrepiece" (Ghebreyesus, 2018).

Besides UHC representing a substantial regression from the original WHO's Primary Health Care (PHC) strategy, which addressed among others the social and economic determinants of health, thinking of the UHC as a mere expansion of current health services, without questioning the foundations of the economic paradigm in which they are embedded, arguably makes of it an unsustainable goal.

In particular, social, economic and environmental unsustainability is linked to the current conventional healthcare systems' structure and approach, including among others: the excessive focus

on specialized medical care and neglect of the first level of care and the Primary Health Care (PHC) strategy (Hurst, 2000); the inefficient use of human, financial and technological resources which increases costs with limited benefit in terms of health outcomes (Papanicolas et al., 2018); the high production of bio-medical waste, especially in rich countries (Shrank et al., 2019).

If health systems are not built on the needs, as well as the socio-economic and cultural characteristics of the population they are supposed to serve, they tend to reflect instead the needs of the market. In turn, this tends to generate significant inequities in access to healthcare both among and within countries.

Also in poor countries, the hegemonic health care model remains anchored to an approach focused on biomedical interventions emphasizing the second and third levels of care, with a disproportionate use of costly technology and treatments, often fragmented in a vast array of care providers and private insurance schemes, with limited access for the poorest population groups and neglecting the basic needs of the majority of the population. The health personnel education and development model mirrors the healthcare model and contributes to its perpetuation.

If the social and economic determinants are left unattended, not only health systems become instrumental to the mitigation of the harmful effects of societal failure and inequity but also concur to further deepen inequalities through the exploitation of disease as a mean for profit-making and capital accumulation, taking advantage of inadequate and insufficient primary prevention strategies tackling the “causes of the causes” (CSDH, 2008).

In the following sections, we first briefly analyse the link between the economic growth paradigm, human health and the health care system, focussing on the resulting increase in demand. We then examine the inadequacy of the current healthcare model in providing adequate response to the specific needs of the population they serve, so hindering the achievement of SDG3 and the UHC target specifically. Thirdly, we look at the educational model of health personnel and how it is functional to the perpetuation of the healthcare model. Finally, we discuss our findings and propose a paradigmatic shift in both the way health systems need to be rethought and health workers educated to build a post-growth society that we imagine as community-centered and aimed at producing health, rather than curing diseases.

2. Economic growth and health

Over a certain level of GNI per capita economic growth does not lead to further improvements in people's quality of life, nor is it indicative of improvements in health conditions, while increasing GDP without an equitable distribution of wealth and appropriate social policies does not bring benefits to health (Aillon and D'Alisa, 2020; CSDH, 2008).

Healthcare accounts for a significant part of world's Gross Domestic Product (GDP) and its growth. In 2018 OECD member countries dedicated an average of 8.8% of their gross domestic product to health care (OECD, 2020).

The global healthcare market reached a value of nearly \$8,452 billion in 2018, having grown at a compound annual growth rate (CAGR) of 7.3% since 2014, and was expected (before the Covid-19 pandemic) to grow at a CAGR of 8.9% to nearly \$11,908.9 billion by 2022 (The Business Research Company, 2020).

The healthcare industry is one of the largest in the world and contributes substantially to global economic growth. Between 2000 and 2017, a group of 42 countries experienced rapid economic growth and dramatically increased their overall spending on health. On average, real spending on health per capita grew 2.2 times and increased 0.6 percentage points as a percentage of GDP. For most of these countries, growth in health spending was faster than that of GDP (WHO, 2019). However, this growth in health spending shows large gaps between rich and poor countries. In recent years, the global average of health spending has increased steadily and for 2016 it represented an average of 12.6% of the gross domestic product (GDP) of high-income countries and 5.38% in low-income countries (WB 2020). Where the market allows it, the healthcare industry thrives on disease.

While there is a general correlation - but not necessarily causation - between health care spending and life expectancy, it has been shown that above annual spending of approximately \$ 75 per capita, that relationship is not predictable. The efficiency of health spending can be drastically different, as can be seen in some of the OECD member countries (Barthold et al., 2014). Improvement in health outcomes is strongly conditioned by the way money is spent and the possibilities of access to health services (Savedoff et al., 2012). Demand is an important driver of health spending. The increase in demand for health care is undoubtedly linked to a growing burden of disease, which in turn is heavily related to social determinants. However, it should be borne in mind that demand is often also induced by offer.

2.1 Social determinants of increased health care demand

Ensuring that health care offer meets demand is the greatest challenge that health systems are increasingly facing to provide sustainable universal access. Thus, understanding what originates demand increase is of fundamental importance to reduce it.

The steady increase in the world's population and its progressive ageing, with its corollary of chronic and multi-morbidity diseases are among the main causes of increased demand for health services. Between 2015 and 2050, the proportion of the world's population over 60 years of age will almost double from 12% to 22% (WHO, 2018).

The health of elderly people is heavily influenced by social, economic and environmental determinants, including the quality of food, housing conditions and the consistency of family and community networks, as well as by life experiences and behaviours since early childhood. Thus, the social determinants that affect people from infancy today, will also influence the type and frequency of diseases in the coming decades. Complex adult and geriatric multimorbidity syndromes lead to a greater demand for health care and require totally new care approaches (WHO, 2018) that we will discuss below.

The considerable increase in the global burden from chronic diseases cannot be attributed exclusively to the ageing of the population. In fact, it affects all age groups and almost all countries, with a much greater impact in poorer countries which are experiencing an epidemiological transition with a double burden of disease, while they still record a high morbidity and mortality due to infectious diseases, they experience the rising burden of chronic non-communicable diseases. Three quarters of deaths from chronic diseases are recorded in low- and middle-income countries (Haider & Bibb, 2017).

Everywhere, the clear distribution of infectious diseases among social groups, with an impressive social gradient, highlights their link with low education, precarious housing, lack of access to potable water, sanitation and solid waste collection services, originated in historical processes of dispossession and restructuring of the territory, which forced impoverished sectors of society to live in underserved rural areas and vast marginalised urban peripheries (Doyal, 1981).

A "pandemic" of chronic diseases, especially heart disease and cancer, observed since Second World War, clearly parallels the globalization of western socio-economic and lifestyle model requiring a constant increase in indiscriminate consumption (Luzzati et al., 2018). Faster, resource intensive, highly contaminant industrial and agricultural production, transformation and distribution cycles inexorably destroy natural resources, increase pollution of soil, water and air, and are at the roots of climate change, with dramatic impact on populations' health. The direct and indirect impact of the ever-increasing global exposure to electromagnetic fields on human health is widely underestimated and is an additional matter of concern (Bortkiewicz, 2019).

The disruption of the ecosystems and climate change are also at the origin of emerging and re-emerging infectious diseases and epidemics (Nava et al., 2017; Missoni, 2017).

Pushed by the expectation of high returns, aggressive market strategies further push consumption of harmful food (processed foods with added sugar, salt, preservatives and colorants; high-calorie drinks, etc.), alcohol and tobacco, and other unhealthy or otherwise potentially harmful consumer products (such as home and personal care), which all contribute to the dramatic increase of chronic diseases such as obesity, metabolic diseases (first of all diabetes), respiratory diseases, cardiovascular, neoplastic, as well as neurodegenerative and mental illnesses (Willett et al., 2019);

Landrigan et al., 2015). Packaging, and its mostly unsustainable disposal, close the cycle. It is estimated that by 2050, 20,000 Mt of plastic waste will be in landfills or in the natural environment (Geyer et al., 2017). Microplastics in the food chain are just one of the latest concerns about the impact of waste on human health (WHO, 2019b). Also, future generations will probably suffer transgenerational effects of pollution, besides the environmental depletion that they will inherit. Indeed, many widely disseminated pollutants have been shown to produce epigenetic changes transmitted from one generation to the other (Xavier et al., 2019).

With the externalization of social and environmental costs - diseases and environmental degradation – companies increase their Return on Investment (RoI) while impoverishing the community and transferring costs on health systems.

Similarly, the economy and the market grow through the commodification of common goods such as water with negative impacts in terms of water security, as well as quality and water-related diseases (Brisman et al., 2018).

The globalisation of capitalist growth society and its neoliberal extreme (progressive deregulation and liberalization of trade regimes, extensive privatization and scaling back of the State, commodification and commercialization of vital social determinants) have been shown to be indissolubly linked with rising inequalities (Picketty, 2014) and a significant body of evidence strongly suggests that inequalities affect population health and wellbeing (Pickett and Wilkinson, 2015).

2.2 Commodification of health increases demand

Demand for health services is also induced through the healthcare industry's market strategies. For example, disease mongering strategies, i.e., creating patients, offering a distorted perception of the severity of a condition or presenting as pathological a physiological condition, pharma industry induces unnecessary consumption of drugs and increase in health expenditure (Doran & Henry, 2008).

Many new pharmaceutical products placed on the market do not offer significant therapeutic advantages, while the global system of protection of intellectual property rights (IPR) may contribute to price increases and reduced access to medicines and vaccines (Smith et al. 2009). Speculation rather than research and development costs determine the prices of new drugs offered on the market. In addition, "evergreening" of pharmaceutical patents - introducing minor changes and formulations that allow for extension of the length of the exclusivity period beyond the legitimate patent term - seriously challenges the access to affordable drugs as it delays the generic competition without improvement in the efficacy of the already patented drug (Abbas, 2019).

The global expansion of the online market has additional impact on the increase in health demand. Social networks represent an easily accessible market of hundreds of millions of users through direct-to-consumer advertising of improper or illegal use of often counterfeit medicines with considerable health risks and an inevitable increase in health expenditure. Online interaction now allows legal restrictions to be violated everywhere (Liang & Mackey, 2011).

Especially under circumstances where healthcare is privatised, thus responding to the investor's need for RoI, the healthcare system is often in itself iatrogenic (Illich, 1976) and causes increased demand.

Iatrogenesis and increased demand may also be due to consolidated medical culture. Over-prescription is an important cause of increased health care costs (Lown Institute, 2019). The abuse of medicines, technologies and services, including ineffective or inappropriate, is also linked to the culture and choices of prescribers (often under the marketing pressure of manufacturers and pharmaceutical representatives); patients' requests (induced by misleading and increasingly pervasive advertising); conflicts of interest; levels of care fragmentation leading to repetition of clinical investigation; and remuneration criteria for facilities and professionals (Geddes da Filicaia, 2018).

The health care system is one of the causes of the spread of antibiotic resistance, although 80% of antibiotic consumption happens in the livestock industry (IACG, 2019).

In the health sector "the increase in supply generates demand" (Geddes da Filicaia, 2018), particularly in the absence of control mechanisms and in health systems mainly based on private care.

Particularly in developing countries, governments are mostly in control only of the public sector and are not able to create appropriate mechanisms to regulate private sector's activities and performance. Screening and early detection programs offered by health services are important means of secondary prevention. However, "periodic check-ups", which are often promoted as part of well-designed market strategies of the biomedical industry, imply some risks. They often have "no effect in reducing diseases and deaths from either cancer or cardiovascular disease" and may lead instead to an increase in diagnoses and "incidentalomas" with consequent risks related to further investigation (Geddes da Filicaia, 2018).

3. The inadequacy of the current healthcare model

According to WHO, the main goal of a health system is to protect and improve the health of the population it serves and reduce health inequalities. In addition, healthcare systems should respond to people's non-medical expectations, enable community participation in decisions that have an impact on people's health, protect individuals from the risk of financial hardship due to the costs of health services through fair risk pooling mechanisms and ensure equity in access to services (WHO, 2000; WHO, 2007; WHO, 2010a).

Indeed, as we highlighted in the previous sections, many determinants external to the health sector (i.e., the policies and operations normally under the responsibility of health authorities) strongly influence population's health, thus demand for health services, that the healthcare system provides. In a social system where the wellbeing of the people supposedly comes first, health should be considered a priority in all public policies and become a "whole of government" issue. If health of the population rather than GDP becomes the measure of human progress, all those activities, goods (actually "bads") and services that have a direct or indirect negative impact on health outcomes should be strongly discouraged. In such a perspective, a system *for* health is envisaged, caring at all levels for health protection, promotion and improvement, including the delivery of social and healthcare services, which mainly contribute to maintain and, when needed, restore health.

Nowadays, health systems are mostly understood as healthcare systems, mostly delivering preventive, diagnostic, therapeutic or rehabilitative biomedical services.

Just as for demand, the offer of these services and the way the care model is structured, "are subject to powerful forces and influences that often overwhelm the rational formulation of policies" (WHO, 2010a). Among others "these forces include a disproportionate focus on specialist care, fragmentation into a multiplicity of competing programmes, projects and institutions, and the pervasive commercialisation of health care into inadequately regulated systems" (WHO, 2010a). Weaker states and economies are more susceptible to the influence of multiple domestic, international and transnational forces on their national health policies and are less prepared to deal with them. Global interdependence and the interactions between global forces and national systems suggest important global governance implications (Missoni, 2015).

In the late 1960s and 1970s the political context was marked also by the emergence of decolonized African countries, the spread of nationalist and socialist movements, and new theories of development. A new "basic needs approach" was favoured over top-down interventions (Dag Hammarskjöld Report, 1975). The WHO also shifted towards strategies more attentive to the development of basic health services, community participation and the immediate health needs of the population. In this context in 1978 the Declaration of Alma-Ata identified Primary Health Care (PHC) as the best strategy toward "Health for all", the goal adopted by the World Health Assembly the previous year. According to the then WHO Director General, Hafdan Mahler, "it was a true revolution in thinking [...] Health for all is a value system with Primary Health care as the strategic component" (WHO, 2008). However, the new value system was soon challenged. The focus on rural and most deprived urban populations groups and on basic health services was confronted by resistance from the social hierarchy and power base almost everywhere. The following year, a workshop hosted by the Rockefeller Foundation in Bellagio, with the leaders of the World Bank, Unicef, USAID and the Ford Foundation in attendance, launched an alternative "Selective Primary Health Care approach, which soon reoriented health systems toward the traditional biomedical disease -rather than health-oriented

approach. A top-down approach that also led to the fragmentation of health systems in multiple "vertical" programmes and the complete detachment between the health sector and other sectors of development (Missoni et al., 2019).

In the 1980s, under the auspices of the Bretton Woods institutions, indebted countries were forced to adopt Structural Adjustment Plans (SAPs), leading to the dismantling of universalist health systems, fragmentation, privatization and commercialization of health services and the introduction of user fees (Missoni et al., 2019).

Similar macroeconomic measures were imposed more recently by international and supranational bodies also in more advanced economies, such as Greece, affected by the economic crisis, causing the impoverishment of large sections of the population (Kondilis et al., 2013). Ideologically mandated "rigorous" one-fits-all austerity policies impose social expenditure "cuts", including on salaries, maintenance costs and investments and where an explicit privatization of health services would inevitably cause social unrest (e.g. in the case of countries with well-established "Beveridge Model" National Health Services), progressive cuts on the budget of public services, respond to the undeclared purely political objective of promoting the privatization of services, in a veritable "assault on universalism" (McKee & Stuckler, 2011).

In Official Development Assistance (ODA) recipient countries, health policies and priority setting are strongly influenced by earmarked resources and donor conditionality, which often do not consider the priorities and needs of partner countries and may foster inequities (Biesma et al., 2009).

Not only have health systems been suffering the hegemonic influence of the neoliberal doctrine leading to their privatization and fragmentation, with reduced access to care, but the adoption of the culturally dominant commodified healthcare model further pushed toward medicalization, hospital-centrism and specialization. Systems have progressively lost contact with the people, their local context, their culture, their real needs and access to needed care has become a privilege for the few and universal coverage a desirable but unsustainable goal (WHO, 2008).

The delocalization of the production of essential biomedical resources (drugs, equipment, etc.) based on the rationale of reducing costs and increasing profits, taking advantage of the globalised market sometimes exploiting cheap unprotected labour in third countries, has reduced countries autonomy in facing their needs. The ongoing pandemic of Covid-19 has dramatically highlighted the paradox of lack of medical masks in Europe when hit by the epidemic, due its total dependency on import of such a basic device from China (Missoni et al. 2020).

While technological innovation can contribute to more accurate diagnoses and better therapeutic responses, it is not always real progress; indeed, it can create sustainability problems. New bio-medical technologies are introduced responding to companies' RoI and do not necessarily respond to the promise of real therapeutic advantage. The health sector is also often a prey to "planned obsolescence" as a market strategy for manufacturers to induce the replacement of equipment with new models that bring nothing substantive in terms of diagnostic or therapeutic results; instead, they create dependence on accessories and consumables (Rosenthal, 2014). What is too often lacking is good management of existing technology and an adequate maintenance culture, an often-forgotten aspect in infrastructural and technological aid projects in low-income countries.

Finally, in many countries, healthcare management is substantially inspired by theories and practices adopted in culturally, economically and technologically distant contexts. Management and governance systems are often imposed from above and are not consistent with the local context, while the "western" model, dominated by neoliberal market-oriented policies, has become the universally adopted standard (Fattore & Tediosi, 2011). With resources being taken away from the public system to the advantage of the private system, important sections of the population are excluded from access to both curative and preventive care (UNRISD, 2007).

4. Human resources are functional to the care model

Health workers are possibly the most important asset of health care systems. Shortage and inadequate competence (knowledge, experience and motivation) in relation to local needs and socio-economic context seriously challenge healthcare systems effectiveness and sustainability.

The inadequacy of health workers' training in relation to the needs of the population is a longstanding issue. With a few exceptions medical faculties continue to follow a bio-medical approach, leading to 'hospital-centrism' at the roots of the failure in achieving the health for all goal (WHO, 2008a), and functional to the reproduction of the consumeristic, marketized and globalized social model. Practice in medical studies is mainly based on the observation of an hospitalized individual in a "horizontal" position, a "patient" in bed (Missoni, 2018) and in a context too often socially and/or culturally alien to the social reality in which people in their countries "are born, live, work, grow old and die" (CSDH, 2008).

The standardization of skills and learning objectives (specialization, high complexity, technological sophistication, etc.) respond to healthcare models that, besides being socially and culturally inadequate, are economically and environmentally unsustainable even in middle-high income countries, and elsewhere are accessible only to high-income population groups (Missoni, 2018).

The current educational models for the training of health professionals did not originate from the health needs of the population, but from the need to incorporate medical care and, in general, western medical thought, into the free market. The current hegemonic paradigm for the training of health professionals is the result of an aggressive process of dissemination of the educational model formulated from the Flexner Report (Flexner, 1916). The report served set the bases for the institutionalization and standardization of the teaching of "scientist" medicine, serving the adaptation of scientific discoveries and technological advances to the demands of the growing monopoly of capitalism. Improving health of the working class was functional to increase the pace of production, profit margins and economic growth (Berliner, 1975).

It also promoted the incorporation of medicine into an intense process of commodification. Additionally, this model consolidated an ideological framework that shifts the responsibility for the disease to the individual and to his most immediate conditions, eliminating responsibility of political and economic structural factors (Berliner, 1975). The technological nature of Flexnerian medicine shaped the priorities and vision of health systems worldwide. Also colonized countries and emerging economies were pushed to establish research and training centres, high-specialty hospitals and medical centres. This required large investments that were financed by governments, private investments including the Rockefeller Foundation (2020).

Due to its characteristics, the highly technological model of care was concentrated in main cities, which added to the high costs of its operation and exacerbated inequities in accessing this type of care. Despite the new emphasis on basic needs and primary health care which followed the Declaration of Alma-Ata (1978) and adoption of mechanisms to expand coverage of basic health services, although through "vertical" programs, the Flexnerian training model prevailed in universities and professional schools which in most cases remained detached from the needs of the population, being instead consistent with the economic aspirations of the expanding consumer society (Pereira, 1980).

As already pointed out 50 years ago by Giulio Maccacaro, who fought for the democratic renovation of the medical care in Italy, medical schools still produce health workers who are incapable of "usefully integrate an urban or rural community, of take care of it, understand the problems of its illness and of defend its right to health" (Maccacaro, 1971).

The ideological roots underlying the hegemonic medical education model prevent the building of awareness of the social determinants of health and leads future health personnel to act as mere intermediaries between the bio-medical industry and the patients, generating also evident ethical conflicts when the industry is the sponsor of medical training (Holloway, 2014).

With few exceptions, academic programs focus on acquiring technical skills in the hospital environment, where there is generally a wide range of human, technological and pharmacological resources.

Such an approach tends to produce "export" health personnel. Indeed, health workers and in particular doctors, who are not prepared and are unmotivated to serve in their own communities, will seek (often unsuccessfully) elsewhere - first in the private sector and large urban centres, then abroad – the kind of professional integration that requires the skills, and meets the aspirations suggested in their medical studies and that respond to the globalized stereotype of the successful doctor, the mythical hero of most popular TV series (Missoni, 2018). "Brain drain", is fuelled by "import" agencies from high-income countries lacking human resources, often bypassing the norms that some of those countries have adopted based on the WHO global code (WHO, 2010b).

In countries where a period of social service is compulsory upon completion of the degree, recent graduates are destined to first level of care units, for which they are neither trained nor motivated. For a large number of students this period becomes an undesirable step between their university life and specialization.

Medical personnel are the main victims of such a training responding to market logics, without a real link to the health needs of the population. Their professional practice is increasingly dependent on diagnostic and therapeutic resources (i.e., drugs) that are often very scarce in community settings. In situations where laboratory and cabinet diagnostic facilities are scarce, clinical skills and the capacity to rely on a limited spectrum of drugs are paramount. However, at community level the effective health worker will need a wide set of skills and competences that, to date, medical and health sciences schools rarely provide, such as the capacity to value and eventually integrate local knowledge and resources; managerial, leadership and advocacy skills to promote community involvement in dealing with social determinants of health; pedagogical skills, emotional intelligence and intercultural competences to interact with people and groups in the community. Medical schools and health sciences faculties rarely train students to a future role as actors of change, of true health promoters of the communities they will serve. Development of empathy and sensitivity, and above all social and environmental awareness and commitment are seldom found in the contents and objectives of academic program nor are reflected in the teaching-learning methods.

5. Discussion: the need for a paradigmatic shift in the health- and social care organization and the health workers' educational model

As we described the characteristics of the current growth society contribute to the increase in the global burden of disease, more and more made of chronic and complex comorbidities, but also of emerging and re-emerging infectious diseases, which translate in heavy and unsustainable demand for healthcare. The analysis of the policies and interventions aimed at controlling the social, economic and environmental determinants of this situation, go beyond the purpose of this paper, but clearly require a paradigmatic systemic shift toward a healthy, equitable, socially and environmentally sustainable societal model, in line with a vision of degrowth (Borowy and Aillon, 2017). Environmental policies, education, social protection, urban planning, regulation, taxation and public awareness programs aimed at reducing and improving quality of consumption, could go a long way towards addressing many strategic issues. Only if collective and planetary health, rather than economic performance, will become the priority of our society, as we would expect in a post-growth society, we will be able to build a societal system *for* health.

5.1 Healthcare

We have focussed our attention on the health care model and specifically on the generation of its human resources, highlighting how they both remained mostly anchored to standardized and, today, globalized biomedical hospital-centric models, which are inadequate to meet populations' health needs and expectations. *For* health systems may represent a fundamental building block of the post-growth society and in that sense some general criteria can be identified.

In a system *for* health, healthcare is people and community centered. Access is universal at all levels with no costs for the citizen at the point of delivery and success is measured in health outcomes, with the best possible use of resources. The focus is shifted from treatment to primary prevention, from the hospital (or care institution) to the community where the disease originates, and where an integrated social and health care system contributes to improving the living and working conditions of the population (housing, workplace, public spaces, transport, natural environment, recreational and sports facilities, etc.) in strict intersectoral coordination, involving all local stakeholders and citizenship in the building of a socially, economically and environmentally sustainable local system. Holistic - rather than "selective" - Primary Health Care remains the strongest pillar of "health for all". With the increasing burden of chronic diseases this approach becomes even more strategic. Integration between primary and secondary care, between health and social care, and between prevention and care, contributes to the social wellbeing of the patient, to a better relationship with health workers and to reduce costly hospital admissions.

The social and, to any possible extent, economic integration of the disabled and the elderly people also contribute to improve their quality of life. Experiences such as extended families, life-communities, the sharing of living spaces (co-housing) and other cooperative social and economic approaches at community level, all go in that direction. Socialization is itself both preventive and curative, and offers a consolidated alternative to hospitalization and institutionalization of people with reduced autonomy, including disabled and elderly people (Missoni, 2015). Whenever feasible homecare should be promoted and healthcare systems reorganized to ensure the needed logistics including the involvement of local community social-networks (volunteers, self-help groups, grass-roots organizations, etc.) and the collaborative link between care provided at home and the other levels of the care system. Recent systematic reviews have shown the benefits of such approaches to chronic care, both in terms of health outcome and costs (Desmedt et al. 2016; Yeoh et al. 2018).

In many countries, natural, traditional and complementary medicine (T&CM) play a relevant role at community level. In 2019, 170 out of 194 Member States of the World Health Organization had acknowledged their use of T&CM, having formally developed initiatives, policies, laws or regulations (WHO, 2019). The integration of T&CM with conventional healthcare is necessarily part of systemic approach to health, besides further contributing in a sustainable and culturally respectful way to pathways toward UHC (WHO, 2013; Park & Canaway, 2019). In some contexts, integration is also an indispensable link with the social and cultural reality and contributes to community empowerment and participation.

Today the connection between primary care and higher level of complexity may take advantage from new information and communication technologies (e-health, m-health, big-data, social networks, etc.). However, these also require guidance, regulation and organization within the health system for their optimization.

In advanced countries, innovative approaches and technologies are transforming healthcare, moving from reactive and hospital-centered to preventive, proactive, person-centered and focused on well-being rather than disease. Indeed, they may offer great opportunities, however, technical literature highlights that e-health comes with many challenges including security; privacy; design; performance; efficiency; fragmentation and heterogeneity; interoperability and regulatory and legal issues (Aceto et al., 2018).

Opportunities and threats vary radically depending on socio-economic environments both among countries and within countries. In that sense, due to costs and accessibility ICT may also increase disparities and further challenge UHC, unless its introduction is carefully evaluated and planned to take into account its social and economic appropriateness and long-term sustainability according to the context. This is a sector heavily pushed by and depending on the market, with "numerous, powerful and intelligent forces and actors" with an "immense thirst for technological and economic conquest" (Comtesse, 2017). This calls for additional thoughts and caution if analysed from a degrowth perspective; most healthcare systems are not prepared to face the challenge.

5.2 Health professionals

The Lancet commission on professionals for the 21st century has recognized the need for a new generation of educational reforms that aim to adapt basic skills to specific contexts, without neglecting global knowledge (Frenk et al., 2010). In our view, these new competences should be thought not only as mere reformulations or extension of the conventional academic content, but as the starting point for a change in the educational paradigm, rethinking the role of health workers as active agents in the process toward health and wellbeing for all, not only supporting people's reappropriation of self-care, that Iván Illich suggested in the "*Expropriation of health*" (Illich, 1976), but also in facing the challenge of complex and multifaceted societal determinants of health and wellbeing.

However, as discussed above, health professionals' education is strictly related with and functional to the characteristics of the health systems they will equip. The systemic logic of sustained economic growth and the principle of profitability affects the functioning of many healthcare systems, especially if widely relying on private providers with weak public control. Educational systems (including in the area of health sciences) are equally affected and have increasingly abandoned the original humanist aspirations (preservation of life, health, well-being, knowledge or creativity). In the health field, universities mostly train human "resources" that healthcare systems need for their unmodified production line, with a private sector thriving on diseases and a public sector paying the costs.

The pedagogy of most of the schools of medicine and other health related disciplines, is still based on a dynamic in which the teacher works as the holder of the knowledge that he/she transfers to the students considered inert containers to be filled with predefined rather worldwide standardised contents. This approach consolidates what Illich (1971) defined as the 'radical monopoly' of the dominant technologies of education, which is functional to the conservation of unfair and commodified society that needs to be replaced. This "banking education model" (Freire, 2005) based on the uncritical transfer of information and values, nullifies the creative power of students and teachers, and the potential of their interaction.

The consequences of this educational model are catastrophic when transferred in the real world. Healthcare personnel reproduce in the community the same power position of the teacher at school. The doctor-patient relationship, as well as health education and communication, are pedagogical acts, that recently trained health professionals are not prepared to manage; they were not exposed to alternatives to the banking education that they received, thus they are not able to build a cooperative approach with patients and the community, and risk to become instrumental to the perpetuation of injustices and inequities in health, more than actors for change. They will tend to blame the patient for his/her condition or harmful behaviour and provide medical answers to social illness. In the words of de Beauvoir (1963) they will rather "transform the mentality of the oppressed and not the situation that oppresses them" (de Beauvoir, 1963), adopting a paternalistic and technocratic attitude, result of a hidden message in their curriculum and academic experience, that tends to perpetuate the patient's position of dependency and the inherent asymmetry of the doctor-patient relation (Hafferty and O'Donnell, 2014).

Based on the above considerations, our argument is that the reformulation of the educational model starts from its logic and cannot be limited to the incorporation of new subjects. Introducing assignments on social determinants from the beginning of undergraduate studies, may be a good start, but it will not lead to change nor provide students with the needed transformative competences (Frenk et al., 2010) if the students are not endowed through direct experience with the capacity to act before these determinants in solidarity and collectively with the people of the communities they serve. In Freire's words "To say that men are people, and as people they are free, and to do nothing to concretely make this statement objective, is a farce" (Freire, 2005).

In some universities, groups of teachers and students have questioned the academic programs and their lack of ability to educate professionals with competences to practice medicine with principles of Primary Health Care, rather focusing on high hospital-centered specialization (Parada-Lezcano et al., 2016). In search of an alternative model, some medical schools have incorporated subjects and projects aimed at strengthening areas of competence related to social determinants, ethics,

community work, appraisal of the local socio-economic context and primary prevention. As adds-on to traditional curricula, which throughout the career continue to privilege hyper specialization, these initiatives suffer the challenge of the hegemonic culture that disparages social medicine (Martinez and Campos-Rivera, 2009; University of Pavia, 2020).

The recently created University of Health, in Mexico City, has chosen to propose a more balanced academic program, in which equal importance is given to clinical and biomedical courses and those aimed at understanding the phenomena that determine health in communities and primary prevention (Universidad de la Salud, 2020).

Other experiences, such as one of international cooperation between a Nicaraguan and an Italian University, have insisted on the role of University as agents of cooperation and local development and implemented intercultural, interdisciplinary field work and an integral approach toward the multiplicity of determinants of health and life conditions of the population and the complexity of their interactions. (Missoni and Giasanti, 2011).

In Italy, the need to change medical education in order to prepare future health professionals for the challenges of the globalized and unequal world is also increasingly emphasized in the context of global health courses (Civitelli et al., 2020).

However, in our opinion, due to their limited number and extension, these experiences and fora are insufficient to counteract the hegemonic medical training model and respond to the health challenge in a sustainable and caring society in very diverse cultural and socio-economic contexts. A much wider, interdisciplinary and inclusive debate is needed, extending well beyond academia to include relevant sectors of society, aiming at discussing and promoting structural changes in medical education, keeping in mind the need for a context-specific approach.

Recognizing the influence of the logic of economic growth and capital accumulation in the educational field of professional training and the consequences of this model in professional practice is the first step in generating a model that allows constructive and humanist learning.

If we wish to educate professionals that may be transformative toward the current hegemonic unsustainable and iniquitous healthcare system, capable to break their role of intermediaries between the consumer patient and the “health” market and assume instead that of health promoters and leaders in the construction of a *for* health system responding to the principles and needs of a post-growth society, the current competitive, theoretical and purely quantitative approach should be drastically transformed, encouraging a cooperative, active, emotionally involving approach, empowering future health professionals to subsequently recreate a similar approach with the communities they will serve.

6 Conclusions

In the long term, the combination of three factors will be essential for the sustainability of universal healthcare, in the wider context of a *for* health system capable to ensure “healthy lives and promote well-being for all at all ages” (UN, 2015): action on social, economic and environmental health determinants; socially, technologically and context-appropriate healthcare; transformative human resources.

The universality and indivisibility of the SDGs set with Agenda 2030 represent both an opportunity to rethink the growth-led societal model, and a considerable challenge; especially considering the contradictions contained in the Agenda itself.

Granting universal access to care is strictly linked to the sustainability of healthcare systems, which in turn is heavily dependent on the intertwined action of multiple and diverse forces and determinants acting at various levels, with global determinants playing an increasing role.

Wide disparities in wealth, health and life conditions are the outcomes of a hegemonic capitalist development model, involving accelerated, energy-intensive production, consumption and distribution systems with truly human values, integrity of the ecosystem and health sacrificed in the

name of growth and return on investments. Thus, the pathway toward health for all is inevitably inscribed in deep societal changes paving the way to a post-growth society.

Rethinking the way healthcare is understood and organized is a fundamental starting point, including adopting a human rights and social determinants approach, privileging home-community-based care and integrated-holistic approaches, empowering communities and individuals as actors of their own health.

But healthcare systems reflect the mindset of the people who manage and operate it and they are the result of the educational model. Thus, in a move toward a post-growth society, we could start with reforming the way future health professionals are educated, providing them, among others, with the ethical framework that will make of them the actors and the leaders of a *for* health system.

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Public health and degrowth working synergistically: what leverage for public health?

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Abstract

The climate crisis represents the the biggest public health threat of our time. It interacts with the rising inequalities, chronic diseases and mental illness widely associated with capitalism. Though degrowth and public health approaches differ, both share common values. The former proposes a path for transformation intended to halt the destruction of life-supporting systems by infinite economic growth. The latter aims to maximize health and wellbeing while reducing health inequities, using strategies ranging from health protection to health promotion.

In various jurisdictions, public health is legally mandated to act when population health is threatened. Some jurisdictions have also adopted a "Health in all Policies" approach. Though public health has leadership for climate change and health adaptation planning, decisions and efforts on mitigation strategies are often left to the economic and environment sectors; several tools such as health impact assessments, healthy public policy development, and socio-economic determinants of health frameworks, are often ignored.

Utilizing a critical public health lens, we present theoretical analysis and empirical examples from Canada to discuss barriers and facilitators to achieving synergy between public health and a degrowth perspective. We argue that public health has an ethical and legal duty to lead debates around sustainable living, and to unequivocally use its leverage to support degrowth ideas. However, as long as public health networks are embedded in governmental bodies, it may be difficult to fully support social transformation towards degrowth to the extent required by the biggest challenge of our time.

Key words: degrowth, public health, equity, social and ecological determinants of health, health promotion, ecological transition, sustainable living

Introduction

According to the World Health Organization (WHO, 2015, 2018 [1]), the climate crisis represents the biggest public health threat of our time, interacting particularly with rising inequalities, chronic diseases and mental illness. These issues are widely associated with our dominant capitalist economic system. Defined as the ability to participate in meaningful activities within the contexts of everyday life (WHO, 2001), health has historically been considered to be improved by economic growth (Borowy, 2017; Knight et al., 2013). The pathway for improved health outcomes is referred to as social determinants of health (SDOH), namely: access to healthcare services, education, housing and transport. However, for this to become a reality, a set of conditions must be met to reach the most vulnerable, including a better distribution of resources (Lange & Vollmer, 2017). Drawing on a capitalist framework, the growth paradigm neglects the social health inequalities that occur concurrently (The Lancet Planetary Health, 2019). Indeed, while economic growth has been possible in the Global North, though unevenly, we consistently observe a rise in inequalities, showing that the health benefits associated with growth might not reach populations in an equitable manner (Berg & Ostry, 2017; De Vogli & Owusu, 2015; Missoni, 2015). The ongoing COVID-19 pandemic has highlighted these inequalities in the richest countries of the world in a very crude manner (Horton, 2020).

Though there is a well-developed body of literature on degrowth theory (Weiss & Cattaneo, 2017), literature focused on health and degrowth, public health and degrowth or SDOH and degrowth is not as broad and explicit. While there may not be much evidence linking degrowth to better health outcomes (Borowy, 2013; De Vogli & Owusu, 2015), there is evidence that an economy pursuing infinite growth leads to poor outcomes (Szreter, 1997; Hancock, 2017; CPHA, 2015), such as exposure to contaminants and pollution, poor mental health and substance use, social isolation, chronic disease, and workplace burnout and injuries. The existing evidence may be sufficient to advocate against infinite growth from a public health perspective, adopting a precautionary approach (Abraham, 2019). Yet a comprehensive synthesis of the possible synergies between degrowth and public health is still lacking. Such a synthesis would be relevant to support advocacy for degrowth ideas by public health actors.

The aim of this paper is thus to explore theoretical and empirical evidence concerning the relation between degrowth and public health. In the following sections, we will 1) introduce our perspective on degrowth and public health, 2) identify synergies between degrowth and public health and discuss why and how public health networks, particularly in the Canadian context, should embrace a degrowth perspective, and 3) illustrate barriers and facilitators to this integration by providing practical examples from Canada, including one Indigenous jurisdiction. We will conclude by providing brief preliminary thoughts on the potential impact the COVID-19 pandemic could have on these synergies.

Situating our perspective: our perspective on degrowth

The explicit call for a sustainable 'degrowth' emerged as a response to the sustainable 'development' ideology and was initiated in France in the early 21st century (Duverger, 2011; Parrique, 2019; Parrique et al., 2019). This call reached the province of Québec (Canada) in the middle of the 2000s, perhaps because of the close relationship this province has with France. In 2007, the Mouvement Québécois pour une Décroissance Conviviale (MQDC; Québec Movement for a Convivial Degrowth) was created and led to various research and scientific activities. From these activities, a new and original perspective of degrowth arose with a relatively 'à la québécoise' accent. Originally framed according to the French degrowth movement, the Québec perspective now takes its grounds into various philosophical perspectives (Abraham, 2019), namely André Gorz's political ecology (1980), the critique of technosciences (Günther Anders, Jacques Ellul, Bernard Charbonneau) and the industrial society (Jorge Semprun, Ivan Illich, Lewis Mumford), as well as a neo-marxist critique of capitalism (Guy Debord, Robert Kurz, Moishe Postone). To those influences we could add the feminist (Nancy Fraser, Sylvia Federici, Sally Scholz) and animalist perspectives (Valéry Giroux, Will Kymlicka & Sue Donaldson, Corine Pelluchon).

Our article will mainly be drawing on a Québec perspective of degrowth. In this perspective, the

growth ideology is criticized for three main reasons (Abraham et al., 2011; Marion, 2015; Abraham, 2019; Polémos, 2020). First of all, growth is accused of being destructive, not only for what is called 'nature', but also the very societies it continues to threaten. Second, growth is blamed for being intrinsically unequal and unjust, with regards to either intergenerational relationships, but also among actual generations or between animal species. Those injustices are considered a consequence of growth, but also a condition for growth to be possible. The third and last reason best illustrates how the Québec perspective differs from the predominant barcelonian approach to degrowth which prevails in academic spheres; it criticizes growth for being alienating. In that sense, growth is arguably transforming humans into instruments of use within broader technical and economic macro-systems on which it relies. As means of our own tools, using the words of Henry David Thoreau, we no longer have the possibility to decide how to organize our ways of living together.

Degrowth is seen as a phase of a wider transformation toward post-growth societies, relying on three combined and intertwined principles: produce less, share more, decide together (Abraham, 2019; Polémos, 2020). The matter is therefore to promote more sustainable, just and democratic ways of living. To put these principles into action, the requirements are: 1) relocation of the means of producing the goods and services we need toward self-subsistence goals, 2) orchestration by local municipalities using direct democratic principles, 3) Low Tech, i.e. techniques of production that are controlled and activated by resources, energetically available at the local level, 4) 'commons', i.e. self-managed collectives, constituted with a self-production mindset and whose members share use and decisions over the means of production (Abraham, 2019). Finally, one of the main concerns of the Québec degrowth perspective is to marginalize or abolish private companies, which are at the core of growth societies (Solé, 2015).

A critical public health lens

In addition to a Québec perspective of degrowth, our contribution is aligned with a critical theoretical perspective of public health. Critical public health is both a practical and theoretical perspective that seeks to challenge dominant and mainstream discourses in public health (Green & Labonté, 2007). Originally labeled as radical community medicine or community health, critical public health questions issues of power in medicine and health sciences, advocates for participative democracy and active community engagement in public health, while also calling for actions on the social determinants of health. The paradigm of critical theory (Guba & Lincoln, 1998) has become more and more popular in the field of public health, with researchers and practitioners seeking to understand experiences of health and illness by proposing alternative paths to the dominant postpositivist paradigm. According to Guba and Lincoln (1998), critical theory is an alternative research paradigm that includes feminism, neo-Marxism, queer studies, and postmodernism (poststructuralism, postcolonialism, anticolonialism). By critically appraising principles of public health imposed as regimes of norms and truths by means of governmentality (Foth & Holmes, 2018), critical public health scholars propose alternative paths to the mainstream biomedical discourse.

In this paper, this perspective will be of particular use to challenge and interrogate the discourses surrounding the health benefits of economic growth which are almost self-evidently imposed as uncontested 'truths' (Szreter, 1997). A critical public health perspective also allows to recognize the unequally deleterious effects of capitalism and colonialism on the lives of women, black, indigenous, and people of color (BIPOC), LGBTQ+ communities, as well as people with disabilities (Green & Labonté, 2007). Consistent with a degrowth perspective, critical public health scholars often advocate for a decolonial approach of global health development goals, thereby questioning growth-based and unequal North-South relationships (Büyüm et al., 2020). For example, De Vogli and Owusu (2015), two critical public health scholars, clearly connected degrowth and public health by introducing the notion of 'healthy de-growth' as a response to the causes of the Great Recession of 2008 and the collateral effects of neoliberalism. Using data from developed and developing countries, these authors argued that despite the negative immediate outcomes related to those recessions in both areas, the policies introducing a more equal redistribution of wealth and social protection led to an increase in life expectancy in developing countries, due to reduced unemployment and suicide indicators – what De

Vogli and Owusu describe as a healthy degrowth. In that sense, the authors seek to challenge and de-link the traditional association between public health and economic growth, while also showing that public health and degrowth can be synergetic. The next sections will provide some examples of these synergies.

Synergies between degrowth and public health: de-linking public health with economic growth

Various authors have described the negative impacts of economic growth on population health, while others suggest different synergies between public health and degrowth, including in the mainstream public health literature. For instance, the Lancet Commission on Planetary Health questions the benefits of economic growth on the health of people and the planet (The Lancet Planetary Health, 2019). It even equates the low-energy demand scenario of the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C to “a planned reduction in the material and energy throughput of the global economy; what is sometimes referred to as degrowth”.

In its 2015 position paper titled *Addressing the Ecological determinants of health*, the Canadian Public Health Association (CPHA, 2015) states that affluence beyond the meeting of reasonable needs becomes a negative force. It stresses that gross domestic product (GDP) is a poor indicator for wellbeing, and for equity; GDP fails to account for harmful impacts of economic activity and excludes contributions to social welfare that are non-monetized. Though not explicitly supporting degrowth, its authors are aligned with what many scholars have described since the report “The Limits to Growth” (Meadows et al., 1972): the fact that economic growth and development are key human forces driving changes in ecosystems, and that indefinite growth of resource consumption in a finite system, such as Earth, is not sustainable. In their view, the public health network is essential to catalyzing the transformations needed to reverse the severe ecological changes associated with our consumption patterns; they call for public health to act on the ecological determinants of health – oxygen, water, food, and other vitally important ecological processes and natural resources – and to challenge power and policies created by corporations, using legitimate confrontational strategies in protecting the health of populations and Earth’s natural systems.

In the *Planetary health manifesto*, Horton et al. (2014) write: “Our patterns of overconsumption (...) will ultimately cause the collapse of our civilization. The harms we continue to inflict on our planetary systems are a threat to our very existence as a species”. He points at neoliberalism and globalization as drivers of inequities and calls for “(...) a new principle of *planetism* and wellbeing for every person on this Earth - a principle that asserts that we must conserve, sustain, and make resilient the planetary and human systems on which health depends by giving priority to the wellbeing of all”. He adds that the voice of public health is critical in achieving this vision.

Linking public health with alternatives to growth

At its 2018 annual conference, CPHA (O’Neill, 2018) hosted a presentation titled *LIVING WELL WITHIN LIMITS*. The presentation is summarized here:

“There are very large health costs to our current way of life, and thus very large potential health benefits from a shift to a more sustainable society. What changes would be needed to achieve a sustainable economy within planetary boundaries in recognition of the relationships between resource use and human wellbeing? What role can public health play(...)? While economic growth is the dominant mantra in wealthy nations, there are a number of good reasons to question this perspective.”

This shows some interest of the public health community in discussing changing paradigms on our current economic system. Missoni (2015) argues for global governance for health and leadership by the WHO, recommending that public policies in all sectors be formulated taking into consideration their impact on health. “To support degrowth and health, a strong alliance between committed national and global leaderships, above all the WHO, and a well-informed, transnationally

interconnected, worldwide active civil society is essential to include and defend health objectives and priorities in all policies”.

In the recent book *Health in the Anthropocene*, Aillon & D’Alisa (2020) argue that a growth-based economy is unsustainable from a health perspective, calling for degrowth as a path to act on the principal determinants of health: "Because growth is based on the unlimited exploitation of natural and human capital - causing the increase of inequalities, climate change, pollutions and promoting unhealthy lifestyles related to consumerism (...) - a transition to a degrowth system is necessary in order to protect and promote the health of present and future generations”.

Thus, more and more public health literature points toward the need for overcoming economic growth, emphasizing the public health gains envisioned from adopting a degrowth approach, as well as the need for strong public health involvement to achieve the transformations proposed by degrowth.

Convergence between degrowth and public health values

Degrowth and public health share common values. Indeed, some core values of public health have been defined as social justice and fairness, collective action, empowerment and participation of communities (Horton et al., 2014). Its objectives are to protect and promote health and wellbeing, to prevent disease and disability, to eliminate or mitigate conditions that harm health and wellbeing, and to foster resilience and adaptation, while reducing inequalities in health resulting from unjust conditions.

Based on the logic of “commons”, a degrowth perspective struggles to create links between diverse groups sharing common values such as conservation of life on Earth by reducing consumption of natural and energy resources; justice towards all living beings; and emancipation and collective autonomy (Abraham, 2019). Indeed, degrowth proponents promote a voluntary, soft and equitable transition towards a system with less production and consumption (Demaria et al., 2013). In order to achieve the above, Borowy & Aillon (2017) propose: to reduce socio-economic inequality by redistribution through maximum and basic income (Alexander, 2014); to translate increased productivity to fewer working hours and more free time while also promoting a reduction of unemployment (De Vogli & Owusu, 2015); to relocalize economic life by bringing production closer to consumers, while encouraging “low-tech” (Alexander & Yacoumis, 2018); to acknowledge and expand non-commercial forms of work---including care--- and product exchange (Abraham, 2019); to reduce waste and material consumption (Latouche, 2010); and to promote different forms of social interaction, such as urban gardening, cohousing and eco-communities (Nelson & Edwards, 2020), as well as creation of commons, i.e. self-managed collectives whose members equitably share the means of production (Berkes, 2018). In short, degrowth suggests placing human needs at the center of the system, while reducing the economy to a means to achieve full realization of human beings with the goal of respecting biosphere limits (Aillon & D’Alisa, 2020).

Among these proposals, redistribution to reduce socio-economic inequality is the most obviously linked to public health goals (WHO, 2008). Though taxation is the most common redistributive measure, one proposal that is gaining visibility is guaranteed basic income (GBI), which has been advocated for by several public health authorities for decades as a way to reduce health inequities (Forget, 2011; BMJ, 2016). GBI, by decoupling revenue from work, could allow for individuals to engage in meaningful activities such as caring for friends and relatives, connecting with neighborhoods and natural environments, producing their own goods, and being more physically active, while avoiding work in precarious situations under the threat of unemployment. The few experiments on GBI showed improvements in health (Forget, 2011; BMJ, 2016). Interestingly, the idea is regaining attention in Canada as a way to mitigate the deep social and financial consequences of the COVID-19 pandemic (UBI works, 2020). Several health associations have endorsed the idea, including the Canadian Medical Association (CMA,2015), the Canadian Public Health Association (CPHA, 2017), and the Chronic Disease Prevention Alliance of Canada (CDPAC, 2020).

While remaining largely ignored, a key component of degrowth theory is the reduction of work

hours (Knight et al., 2013; Schor, 2014). The argument is that decreasing the global productive occupations would reduce the overall consumption capacity, diminish the needs of production, thereby leading to reduced work hours (Schor, 2005) as well as reduced unemployment (De Vogli & Owusu, 2015). This would in turn contribute to reducing greenhouse gas emissions (Nässén & Larsson, 2015). While conducting to reduce unemployment by allowing more people to work (De Vogli & Owusu, 2015), fewer working hours is also associated with more leisure time (Cui et al., 2019; Jones & Klenow, 2016). Across the globe, reducing work hours to increase leisure time has been pursued as a path to happiness, quality of life, wellbeing and health more broadly (Fleck, 2009). In addition to representing an effective way to reduce air pollution (Nässén & Larsson, 2015), multiple synergies can be found between reduced work hours and public health (Cho et al., 2018; von Thiele Schwarz et al., 2008; Wong & Ngan, 2019).

To support these synergies, public health professionals can turn to studies on work-life balance (Wagman & Håkansson, 2019), which has been defined as the perception of having the right number of occupations and the right variation between occupations. Many studies have reported that improving work-life balance introduces health benefits (Wilcock et al., 1997), such as reduced stress (Yu et al., 2018), improved wellbeing (Douglas, 2006), improved mental health (Eklund et al., 2019), and a higher quality of life (Park & Park, 2019). While strategies to promote work-life balance have traditionally been operationalized through individual self-management programs (Wagman et al., 2015), such efforts might reproduce neoliberal individualistic values (Clouston, 2014). In targeting solely individual behaviors, these programs might not allow to reduce inequities in work-life balance across social groups, thereby contributing to health inequities (Wagman & Håkansson, 2019). Consistent with degrowth theory (Knight et al., 2013), strategies aimed at reducing work hours must be operationalized at a collective level through laws and policies (Clouston, 2014). The most popular option is the four-day week (Autonomy, 2019; Walker & Fontinha, 2019). One important benefit of this model is increased worker efficiency (Pencavel, 2015), namely due to reduced days of sick leave (Walker & Fontinha, 2019). Other outcomes include increased quality of life, improved work happiness and reduced work-related stress (Autonomy, 2019; Walker & Fontinha, 2019).

Pathways for public health networks to embrace a degrowth perspective

While the climate crisis is a starting point to discuss the links between degrowth and public health, it is only one aspect of the global ecological crisis. Other crises, closely related to planetary boundaries (Steffen et al., 2015), include ecotoxicity (pollution), resource depletion, species extinction and ocean acidification (CPHA, 2015). Their apprehended health impacts are less clear, but quite real. These interacting crises are also closely linked to the dominant consumer-extractivist paradigm; this paradigm must therefore be challenged, since it largely contributes to shaping global and local health inequities.

The rationale for public health interest in degrowth can be summarized by the following elements: direct and indirect negative impacts on health associated with economic development (pollution, climate change, etc.); inequities associated with the dominant economic paradigm, and failure of our “traditional public health approaches” to reduce these inequities; and intergenerational inequities (degradation of health determinants for future generations).

For public health to embrace and promote a degrowth perspective, its legitimacy to orient the decision-making process, and the shift in social norms, must first be established. Increasingly, voices recognize the role of public health. Some have clearly expressed their desire to see public health at the forefront of the decision-making process (Lang & Rayner, 2012): “Public health success is as much about imagination as evidence: challenging what is accepted as the so-called normal, or business as usual. Public health must regain the capacity and will to address complexity and dare to confront power”. According to the CPHA (2015): “Public health should join others in working towards a fundamental shift in the values and social norms (...) to address the emerging ecological crisis. (...) Public health organizations and practitioners need to listen to and learn from those already working toward alternative, more positive futures, and to foster alliances with other efforts that demonstrate socio-ecological approaches to the health of present and future generations”. More recently, Poland

et al. (2020 [1]) have called for a changing role for public health in the Anthropocene “(...) to reconsider what actors, which knowledge and evidence are needed”, in the form of “unusual allies”, calling for recognition that “powerful vested interests frequently are mobilized to block changes designed to bring about greater social equity and ecological sustainability”.

Also, as will be demonstrated below, both degrowth and public health call as much for action on public policy as for participation of citizens and grassroots movements in health and social decision-making, promoting change from a bottom-up perspective through empowerment of communities (WHO, 1986; Illich, 1995). WHO has repeatedly demonstrated how community participation results in substantial health gains and promotes the approach, while acknowledging that “the actual capacity of communities to participate in defining and implementing health agendas has been limited by resource constraints, entrenched professional and social hierarchies, and public health models focused on individual behaviors and curative biomedical interventions” (WHO, 2013 [1]). Promotion of social connectivity and resilience are also central to both movements. One approach that has been supported by public health actors is the Transition movement (Poland, 2020 [2]), and though its health impacts still need to be demonstrated, Poland argues that true societal change is more likely to happen through grassroots movements (Poland, 2020 [2]).

Enacting public health’s legal mandate toward degrowth

In various jurisdictions, the governmental public health network is legally mandated to act when population health is threatened (Gouvernement du Québec, 2020). As we have seen in the case of a sanitary crisis such as the ongoing COVID-19 pandemic, the public health network, through its Chief medical officer of health, has the power to impose and enforce measures on individuals to protect the population against an imminent threat.

To promote public health even in the absence of an imminent threat, some jurisdictions have adopted WHO’s “Health in All Policies” framework: “*an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts in order to improve population health and health equity*” (WHO, 2013 [2]). In order to achieve this, an important tool is called the Health Impact Assessment (HIA). It is defined as a combination of procedures, methods and tools by which a policy, a program or a project can be judged or evaluated on the basis of its potential effects on the health of a population (NCCHPP, 2020). HIA is most frequently used to assess proposals outside of the traditional health sector, and which do not target health. The approach attempts to estimate, with the help of contextual and scientific information, the possible effects on health and wellbeing, with a goal of minimizing the negative effects while maximizing the positive effects. The HIA process is gaining in popularity in Canada but is hindered by insufficient resources and political will to let the public health sector play the important role it should exert in the policy making process (Nour et al., 2019; Buregaya et al., 2019; 2020).

In Canada, public health is under provincial jurisdiction (Government of Canada, 2020). Exceptions exist for specific populations such as prison inmates, military, refugee claimants and most indigenous communities, with some jurisdictional heterogeneity in the latter group when it comes to health and public health systems. Also, in some provinces, socio-sanitary regions have the responsibility for providing public health services, while in others it is a municipal role.

In the province of Québec, article 54 of the Public health act (Gouvernement du Québec, 2020) is a strong legal tool for implementing a Health in All Policies (HiAP) approach. It gives power to the health sector to intervene when policies formulated by other ministries are seen prospectively as having a potential negative impact on population health. This approach seemed very promising when it was first proposed, but it rapidly encountered numerous barriers (Benoît et al., 2012). In particular, ministries and governmental agencies with an economic mission showed limited adherence to the principles of the approach. They also demonstrated a lack of knowledge of the social determinants of health. These barriers have been slowly overcome with awareness and education campaigns on the process, as well as a shift towards earlier consultation.

Lastly, the precautionary principle, a powerful tool already included in some public health

legislation, needs to be applied to the ecological determinants of health (CPHA, 2015). The precautionary principle lies on the rationale that when there are potentials for causing harm associated with a certain situation or intervention, the decision should emphasize caution, pausing and review before undertaking new intervention that may well prove disastrous (Kriebel et al., 2001). In the same vein, when evidence is not available in an emergency context where the risks are imminent, we should not wait for further evidence to be provided prior to undertaking low-risk interventions. As it was the case during the COVID-19 pandemic, decision-makers often had to choose between several options while there was no available evidence for their effectiveness at a given time and, based on the precautionary principle, had to rely on the less damageable option. Though it has been criticized for being too vague or unscientific and for canceling new advances and progresses, this rationale could be used facing the ecological crisis, and in the same manner, degrowth could be seen as a cautious option to prevent further damage (Kriebel et al., 2001).

Drawing on key public health frameworks

Public health practice is reliant on theoretical frameworks to orient interventions and strategies. As will be described below, several frameworks could help justify why public health should promote degrowth. One of the most basic frameworks is a stepwise prioritization that helps choose which interventions are most likely to have a positive impact on population health (Pineault & Daveluy, 1995): 1) how important is the problem, 2) how severe are its consequences, 3) how much is known about solutions, and 4) how feasible are solutions. Depending on the weight attributed to these four criteria, a problem will be either prioritized for intervention, prioritized for research on effective intervention, or dropped altogether. When applied to the planetary crisis, this framework suggests that 1) there is little debate about the magnitude and severity of the health consequences of the problem (WHO, 2015, 2018 [1]; United Nations, 2020); 2) there is much less consensus about degrowth as an effective and feasible solution. Therefore, according to this framework, promoting degrowth as a pathway for solving population health problems linked to the planetary crisis would need to build on a stronger evidence base.

Perhaps the most well-known public health framework, the Ottawa Charter for Health Promotion (WHO, 1986), has been conceived as a powerful tool to address system change, and has been acclaimed by degrowth scholars (Aillon & Dal Santo, 2014; Borowy & Aillon, 2017). Since it was introduced in 1986³², it has stated the following prerequisites for health: peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity. However, despite great promises, more than 30 years into the Ottawa Charter, we are still waiting for most of these prerequisites to be implemented broadly. In the same vein, the vocabulary used in the framework may sometimes reproduce a growth ideology, drawing on a sustainable development discourse, rather than a degrowth perspective.

Later on, the Marmot commission (WHO, 2008) reinforced the importance of action on the SDOH to improve population health and, more importantly, health equity. Its extensive analysis led to three main recommendations:

1. Improve the conditions of daily life – the circumstances in which people are born, grow, live, work, and age.
2. Tackle the inequitable distribution of power, money, and resources – the structural drivers of those conditions of daily life – globally, nationally, and locally.
3. Measure the problem, evaluate action, expand the knowledge base, develop a workforce that is trained in the SDOH, and raise public awareness about the SDOH.

While improving conditions of daily life and tackling unequal distribution of power, money and resources may seem consistent with a degrowth perspective at first blush, it could nevertheless be used and remain within the boundaries of a growth ideology. Therefore, one could be critical of the real implications of this framework if it has to lead to a profound transformation toward a post-growth

³² Approximately 40 countries committed to the Ottawa charter.

society, and should perhaps be complemented with other degrowth theories, such as those described above.

The Dahlgren-Whitehead framework, one of the most widely used determinants of health frameworks (fig.1), further illustrates the importance of general socioeconomic, cultural and environmental conditions as proximal determinants of health. The Population and health promotion model (fig.2) combines the SDOH framework with the dimensions of the Ottawa Charter, adding the different levels of intervention relevant to public health. These frameworks position public health intervention within its broader context and highlight the importance of upstream action for effective public health intervention.

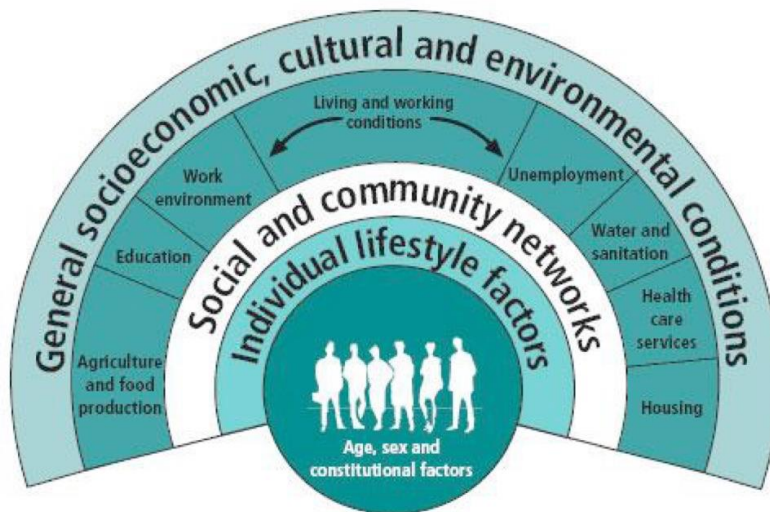


Figure 1. The Dahlgren-Whitehead determinants of health framework (Dahlgren & Whitehead, 1991)

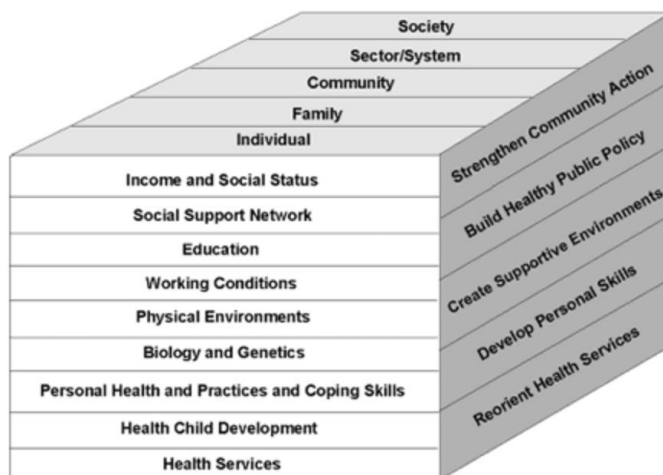


Figure 2. Population and health promotion model (Health Canada, 2001)

Finally, the WHO 2016 Shanghai declaration is an updated version of the Ottawa charter for health promotion (WHO, 2018 [2]). It reiterates the need to make health a central line of government policy, advocating for a *Health in All Policies* approach. It also emphasizes the importance of social mobilization: “Engaging and galvanizing people, (...) to take action towards the achievement of good health and wellbeing in a way that gives ownership to the community; (...) members of institutions, community partners and organizations, and others collaborate to reach specific groups of people for

intentional dialogue. Social mobilization aims to facilitate change through an interdisciplinary approach.” (WHO, 2018 [3]). Interestingly, though it is directly aligned with the sustainable development goals (SDGs), that include goal eight “to promote sustained, inclusive and sustainable economic growth” (United Nations, 2015), the Shanghai declaration also claims that “People’s health can no longer be separated from the health of the planet and economic growth alone does not guarantee improvement in a population’s health”, and as “powerful commercial forces work to counteract health, (...) governments have a fundamental responsibility (...) to address the damaging effects of unsustainable production and consumption. This includes offsetting economic policies that create unemployment and unsafe working conditions, and enable marketing, investment and trade that compromise health.” Although we could read a tentative criticism of growth, the intention is not yet to embrace a degrowth perspective. Again, it could be argued that complementing those public health frameworks with other post-growth social and economic theories would be essential to achieve sustainability and health.

As we can see, the WHO health promotion framework has evolved with time, and its implementation has undoubtedly faced enormous challenges, due to powerful adverse forces. The paradox of WHO’s ongoing support for SDGs, including the goal of economic growth, is obviously debatable, and has indeed led to a certain distrust from degrowth scholars (Abraham et al., 2011).

Examples illustrating existing or potential synergies

In this section, we illustrate how the theoretical analysis outlined above can be applied to public health interventions through examples taken in urban, rural, and Indigenous context of the province of Québec, Canada.

1. Urban setting: Montreal

The Montreal regional public health department (MPH) serves a diverse urban population of nearly two million. MPH has a long history of action on the SDOH; reducing health inequities has long been an organizational priority (Lessard, 2012; Massé, 2015). As in many cities across Canada, poverty and income inequality are fundamental drivers of several of the most pressing public health issues in Montreal, including food insecurity and housing affordability. MPH has, for several decades, provided financing to support community-based initiatives in the domains of sustainable development and food security (DRSP, 2019). More recently, MPH has contributed to developing a public health perspective regarding minimum basic income (Massé, 2017). Although health inequities have been clearly and repeatedly identified as a public health priority (Massé & Desbiens, 2017), the need for fundamental change in the economic system has not been articulated from a public health perspective.

The case of *Bâtiment 7*, a project whose development was supported financially by MPH, provides an example of an alternative, community-based approach to local economic development. The project’s mission statement includes notions of accessibility, self-reliance, resource-sharing, democratic management, social justice and collective engagement, many of which echo fundamental tenets of degrowth, in line with the concept of commons (*Bâtiment 7*, 2018). This project illustrates one of the ways in which a public health unit can contribute to a bottom-up approach to challenging the dominant economic paradigm.

A second example of a public health approach that is convergent with a degrowth framework is in the domain of transport (Cristiano & Gonella, 2019). MPH has long called for a reallocation of space and resources from private vehicle transport to active and public transport, putting forward a vision where the collective is prioritized over the individual, both in the interest of individual and population health (DRSP, 2020), namely by proposing promising interventions, publishing public advisories, and participating in public consultations. MPH works in collaboration with city councilors and community organizations to promote wide and safe use of bicycles, and urban development that promotes connectivity of public transportation with cycling paths and walking routes (DRSP, 2020).

The MPH example illustrates the convergence of public health objectives to reduce health inequities with several of the proposals of degrowth, such as the orchestration by local municipalities

using direct democratic principles as well as the logic of commons central to the Québec perspective (Abraham, 2019). However, in order to move towards a more systemic perspective on the economy as a determinant of health, the public health benefits of various approaches to the issue (economic growth, wealth redistribution, etc.) need to be exposed and revisited.

2. Rural setting: Gaspésie

Similar convergences are also emerging in rural areas, where health inequities are also a major public health issue. In the Gaspé peninsula of the province of Québec, over a third of the population lives in an area qualified as a food desert, showing that access to healthy foods and services can be limited, especially for households with reduced mobility due to financial or health issues (Robitaille & Bergeron, 2013). In order to answer this issue in Haute-Gaspésie, Québec's poorest county (ISQ, 2018), a series of public consultations were organized in 2017 by the county's integrated approach to social development actors, with support from the Gaspésie regional public health department (GPH). Under the name of *Nourrir Notre Monde* (Unpointcinq, 2019), the consultation quickly became a community-based movement, as local actors were not only conscious of the food security issue but ready to act. Two years later, the movement involved municipalities, social development actors, school boards, food producers and processors as well as consumers. Together, they now work on the development of local food production efforts, including community gardens and kitchens, school gardens, food recuperation, various training or skill exchange opportunities; they also facilitate the emergence of new commercial producers. The GPH has offered logistic and professional support to the movement as efforts to develop food security and community resilience have a strong potential to contribute to the health of the county's population.

The impacts of the movement are now also touching other determinants of health. Because many local communities are also at risk of isolation due to coastal erosion, the *Nourrir Notre Monde* movement has received funding from a climate change adaptation and mitigation program. Improved food autonomy is also an important factor in community resilience to the impacts of climate change, be they extreme weather events or the increased cost of food supplies (IPCC, 2019). Their community-based approach is also seen as a social innovation that will help develop rural communities' climate resilience.

Although this development is still recent in Haute-Gaspésie, it will be interesting to observe over the years how this movement, and similar ones emerging in other rural communities, will become a basis to discuss the impacts of the economy on resilience and health, while maintaining a priority on practical answers to social inequalities.

As was shown in both examples, certain public health actors have some degree of margin of action to implicitly support social movements, adopting a bottom-up approach, rather than taking an official posture, with a top-down approach, that would go against its political leaders.

3. Indigenous context: the James Bay Cree region of Québec

In Canada and globally, various forms of colonialism have perpetuated violence that proved outrageously damaging for the health of native populations. Colonialism is intrinsically connected to a growth dynamic, in which an ever-growing extraction of human and natural resources benefits only the colonial force to the detriment of colonized populations. Drawing on the work of Frantz Fanon, post-colonial scholars have put forward decolonization as a way to liberate colonized populations from their colonial oppressors (Gibson, 2011), thereby challenging the idea of infinite growth. The inherently unequal growth underlying colonialism and its deleterious public health consequences provide a unique lens to analyze degrowth from a decolonial perspective. To this effect, we will turn to the case of the James Bay Cree region, in Québec (Canada).

In Canada, several Indigenous worldviews have a lot in common with a degrowth perspective. Indeed, just as Aillon & D'Alisa describe it (2020), "the degrowth approach does not oppose mankind to nature through a logic of absolute domination and control (without limits), but sees human beings as part of nature itself, in harmony with it. It promotes a reconceptualization of health that takes into account care and respect for the environment and all beings". This view is consistent with a Cree

conception of health and well-being that perceives living beings as an integral part of their natural surroundings: “If the land is not healthy, how can we be?” (Adelson, 2000). Also, the concept of commons, though it has been undermined in recent years due to pressures linked with accelerated development needs, is still very much practiced in many indigenous traditions (Berkes, 2018).

The Cree First Nations of Eeyou Istchee in Québec were the first Indigenous Peoples in Canada to sign a modern treaty with both the provincial and federal governments (Gouvernement du Québec, 1975). Still, while emphasis is made on protecting the land and its living inhabitants, the Cree worldview is not as central to the development model as one might think. Though the Cree population oppose a vision of land and resource planning made without their participation, consent is often constrained by development goals and needs for job creation (Cree Nation Government, 2010, 2011). They are not alone: Indigenous leaders all over the world are often compelled to adopt the capitalist paradigm under neo-colonialist pressures (Carlson, 2008; Loppie, 2017).

The environmental and social impact assessment process (ESIA) was created with the James Bay and Northern Quebec Agreement in 1975 after the Cree First Nations of Eeyou Istchee fought for their rights during the hydro-electric project of La Grande river (Cree Nation Government, 2020 [1]). It codifies the specific recognized rights of Indigenous peoples, whether territorial or cultural, with the goal of preserving their autonomy and including them in the region’s economic development while protecting their traditional harvesting activities (Gouvernement du Québec, 1975).

The public health sector is involved in the ESIA process, providing recommendations within its traditional areas of expertise, i.e. physical health impacts triggered directly by project-induced environmental change, and social determinants limited to those aspects of health and wellbeing that the project proponent directly controls - for example, employment opportunities and workers’ health and safety (Robinson et al., 2017; Noble & Bronson, 2005). Public health is more often than not suggesting strategies to mitigate the negative impacts of a project, with very limited power to halt a project. For example, in the past years, despite increasing evidence of cumulative impacts of development projects (JBACE, 2016), the public health sector has only been able to support the halt of a uranium mining project (BAPE, 2014), based on its anticipated negative health impacts. Thus, public health may have undermined its credibility within populations that feel they are not being properly protected from the effects of resource extraction (Niezen, 2016).

In a way, the ESIA’s unique framework for community participation based on early engagement, trust, respect and transparency (JBACE, 2019) could be a strong facilitator for engaging dialogue around a degrowth perspective. Though its influence is limited due to its numerous actors and credibility issues, the public health sector could play a stronger role in ensuring the participation is made in a thorough, respectful and equitable manner, ensuring that the Cree vision of health and wellbeing outlined above is at the center of the process.

Conversely, degrowth proponents may benefit from adopting indigenous worldviews more explicitly and could hence gain more popularity within indigenous jurisdictions that are for historical reasons distrustful of any theory brought by the “White man”. This would be coherent with the recent proposal to “decolonize degrowth” (Nirmal & Rocheleau, 2019; Büyüm et al., 2020).

Remaining barriers and the potential for leverage

Public health is networked with all levels of government as well as NGOs, the private sector and civil society. However, it has not recently been at the forefront of debates on societal change towards a more sustainable way of living, and on degrowth theory in particular. It could be that, in health promotion, public health actors are not the leaders, but rather they support or partner with communities (Litvak, 2016). Their voice is silent; this makes them less threatening but could render it difficult to make significant gains in a timely manner.

Public health is still seen as technocratic and not involved in shaping the big picture: « Political pragmatism, opportunism, and so-called realism about what is feasible within the balance of forces are features of public health history » (Lang & Rayner, 2012). Therefore, though public health has leadership for climate change and health adaptation planning, decisions and efforts on mitigation

strategies are largely left to other sectors, despite the existence of the several tools described above (Bélanger et al., 2019).

Some explanations for this may be that, as mentioned above, the credibility of public health networks in certain jurisdictions has been undermined by apparent inaction. Chronic underfunding and, more recently, severe budgetary cuts in Quebec and other Canadian provinces, are likely central to this perception (Guyon, 2017). In some provinces, the independence of Medical Officers of Health has been eroded by a form of muzzling (Guyon, 2017). Also, many scholars see public health actors as “lesson-givers” and do not understand well the concept of health promotion (Brown, 2018).

Public health has a much longer history than degrowth and may very well be more reluctant to embrace new paradigms. Though the precautionary approach is often invoked, public health largely relies on evidence-informed decision-making. The mere fact that there is paucity of evidence in favour of degrowth approaches is likely to remain a significant barrier to integrating degrowth theory into public health practice. It may be time to nuance the evidence-based paradigm by taking into account the context surrounding the impacts of economic growth on ecosystems and population health and to embrace other forms of knowledge, including Indigenous perspectives, thus allowing us to bounce forward into a new era (Holmes, 2006).

Conclusions

Public health has the necessary tools to engage in debates around sustainable living, and to unequivocally use its leverage to support social movements aiming at the necessary radical changes, including degrowth. Public health must therefore be central to decision-making about energy policies, industrial development, redistributive mechanisms, and social change. However, barriers remain for the public health network to act as a voice on the ecological determinants of health, as a part of their all-encompassing framework, i.e., physical health impacts, social health impacts, and planetary health impacts.

Since degrowth proposes a transformation towards healthy alternatives for sustainable living, public health should become a strong supporter of its vision. In the midst of the COVID-19 pandemic, public health is no longer working in the shade. The crisis has highlighted the legitimacy, expertise and relevance of public health intervention. However, the usual perception that public health is all about infectious disease control, without legitimacy to intervene on public policy and economic factors, may be reinforced. Still, now that the world is turning to public health experts for guidance (Leblanc, 2020), they must seize the opportunity to speak up against conditions and decisions that are likely to lead to poorer health in the long run, particularly at a time when world leaders are already reflecting on post-COVID-19 strategies to revive economic growth. Already, several public health and, more widely, health professionals are calling on world leaders to position public health at the center of the process (Marin, 2020).

The post-COVID-19 transition may well be an opportunity not to be missed to underline the synergies between both perspectives. However, as long as public health networks are embedded in governmental bodies, it may be difficult to fully support transition towards degrowth to the extent required by the biggest challenge of our time.

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