

# Global Crisis of Public Health under the Anthropocene



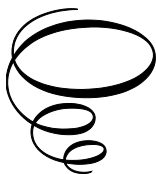
# Global Crisis of Public Health under the Anthropocene:

*Actions for Nursing and Health  
Professionals*

By

Alice M.L. Li

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Actions for Nursing and Health Professionals

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To my families with love



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## PREFACE

This book combines conceptual insights with scientific knowledge to define and reflect on the critical moments of existential and unprecedented health threats in this age of eco-environmental and climate crises in the Anthropocene. As the theory of public health often emerges from crises, this assertion seems indisputably correct. The matter of concern, perhaps, is how we can conceptualize the essential needs for desirable and new theoretical knowledge to renew our systems thinking in response to the arising global crisis of public health. We are now in the Anthropocene epoch, characterized by significant anthropogenic adversity affecting the Earth's ecosystems and planetary health, which presents the biggest challenges for the sustainability of health developments across generations. To address these emerging challenges, healthcare professionals must adopt relevant synergistic strategies to make healthcare systems more resilient, efficient, and sustainable, thereby improving the sustainability of health developments. This is the ultimate goal for global ecological public health in transition under this new epoch.

The possibilities for any such variation and/or subsequent recognition of required change—just like the evolution of new knowledge—always imply a new direction of change. This book will be a key reference in advancing sustainogenic-based systems thinking for the field of global ecological public health in this age of eco-environmental and climate-mediated health threats under the mediating effects of the Anthropocene. Such expertise provides an outstanding foundation for tackling these unprecedented issues of concern. In fact, this current idea originates from my book, “Ecological Public Health for Nursing and Health Professionals in the Anthropocene,” which served as a means for stimulating the present creation of new understanding and further encoding scientific reflections for this current writing. I am now deeply aware of the significance of the implications arising behind these unprecedented phenomena, together with their ongoing influences on the transitioning state of global sustainability for ecological public health developments.

This book also intends to introduce, for the first time, two newly coined terms: “Anthropogenesis” and “Sustainogenesis.” These terms are significant for understanding the possible adverse implications and how we can act to counter such potentially catastrophic impacts on the

sustainability of health developments across the present and future generations. Henceforth, my writing will use the term “Anthropogenesis” to represent the challenges arising from unprecedented phenomena under this new epoch of the Anthropocene. This is not meant to disregard the positive or creative products, outcomes, and innovations that have been established during the Anthropocene.

Nevertheless, we must develop proactive thinking alongside the evolving sciences in the 21<sup>st</sup> Century by creating synergistic insights to counteract the potential catastrophic effects of this unprecedented phenomenon, referred to as “Anthropogenesis.” This is crucial because its domino effects on global public health could drastically impact present and future generations. In contrast, the other postulated health paradigm, “Sustainogenesis,” emphasizes the necessity of ensuring the full potential of sustainable health developments across generations. This new priority involves paving and necessitating the required “sustainogenic” paths for foundational knowledge-to-action synergies for sustainable transitioning towards the proposed sustainogenic public health movement. It requires a forward-thinking and systems-thinking approach, along with scientific justifications, to advance health professional praxis collectively.

Therefore, it is significant to (1) recognize the actual and potential mediating effects of the Anthropocene as critical influences arising from unprecedented ecological and global determinants of health, which sooner or later become underlying drivers propelling the postulated shift towards “Anthropogenesis,” directly and indirectly threatening the continuum of sustainable health developments across future generations; and (2) emphasize and create long-term, solution-oriented, knowledge-to-action synergistic interventional strategies for sustainability in transition, along with this proposed sustainogenesis paradigm shift.

Ultimately, this innovative synergism emphasizes the importance of utilizing epistemological and evolving scientific knowledge to address the changing critical health needs, with a focus on sustainability to uphold the resilient capacity of sustainable health developments for present and future generations. This is our critical time to join this collective journey with integrative and systems thinking that resonates with the necessity of sustainability in transition. Perhaps, a form of situated learning with relationality opens the possibility for us to create the required public health ideals for this unprecedented epoch of the Anthropocene through innovative ways of using evolutionary knowledge as shared legacy-based values to empower the resilient capacity for developing sustainable health outcomes across generations. At the level of this collective learning journey, this required planetary and ecological consciousness that

cultivates our shared human civilization under “One World” concept within this globalized society.

And what epistemological implications will arise from this historical development requiring synergistic perspectives of evolving professional praxis for nursing and healthcare professionals, as well as the obligatory paths of professionalism? Especially these are interconnected for the process of professionalization regarding the concerns arising from the increasing complexity of global and ecological determinants of health *per se*. Echoing my previous book, “Ecological Public Health for Nursing and Health Professionals in the Anthropocene,” we must learn in this respect and commit to these greatest challenges, as there is so much for our professional position that we need to advocate. It is indeed an extensive global responsibility and one of the greatest challenges for developing collective health professionalism in this historical moment under the Anthropocene.

As we hold unique professional positions and obligatory responsibilities for supporting sustainable ecological public health in transition under the Anthropocene. Notably, this existing unprecedented phenomenon of global sustainability requires our professional insights to be more fruitful in facilitating proactive change. These insights lead us to rethink the possible parallel consequences from various interlinked dimensions. Therefore, we must make our professional and axiological commitments to join this collective journey, expanding our professional praxis. A new foundation of evolutionary knowledge for global crisis of public health under the Anthropocene is the essential scientific and scholastic communications for these emerged complexities of global concerns. The dynamics of safeguarding global public health and its sustainability in transition at this Age of eco-environmental and climate-mediated health crises under the Anthropocene require action-oriented solutions. Knowledge articulations for the emergent properties of complex healthcare systems is one of the enabling factors.

Accountably, what is needed more is to persist considering intelligence with professional- and forward- thinking for a sustainable healthcare system. Only with such a systems-thinking could help us achieve this unprecedented transition in fulfillment of “Our duty, our legacy” for sustainable health outcomes across present and future generations. In this context, the reflective points at issue from the logical and relational sense of delivering collaborative actions are to build upon our professional capacities through various innovative interventional synergies. As I have illustrated, all these transitional risks arise as parts of the whole perspective from the mediating effects of ecological and global

determinants on health and disease, which should not be limited to the current conceptions of disease causation. Perhaps we have chiefly diverged by expanding and cultivating conceptions of the scientific necessity for modelling the future directionalities of professional caring praxis, which acts as obligatory professionalism during this critical time in need under the Anthropocene.

There may be other ways to engage with cogent scientific thought as expressed, for there is more to advance the creative evolving conception or idea that sustains the great variety of purposes to ascertain what is needed for this historical change. These historicized changes require special and cautious interpretation by way of assigning the required evolutionary knowledge of sustainability in transition, for instance, a new stage of eco-epidemiology towards the transitioning phase of planetary health for ecological public health under this new epoch of the Anthropocene. Perhaps, as what I have proposed for the sustainogenic public health movement towards “the Age of Sustainocene” in its new context for the sustainable future.

Hope is the compass that guides our quest, bringing us together with professional determinations to expand and apply this required scientific and epistemological understanding from the known to the unknown. Through health education, as we learn from the past, we gain courage in the face of these unprecedented challenges and take in stride every relevant parallel to promote potential benefits towards sustainable health outcomes as part of professional contributions across generations. So here is the start of our collective journey in pursuit of knowledge-to-action articulation with these directionalities for unveiling educational truths, where only education breeds hope—a hope to further pursue the fertile land of our planet Earth—to thrive in global public health transitioning for sustainable health developments during the Anthropocene in transition—to nurture and share our global responsibilities.

As we look back to the early days when public health was a mystery, we remember a common history of plagues and epidemics. However, as knowledge grew, so did our scientific understanding. The results were achieved through dedicated efforts at each stage of epidemiological transition, requiring a new understanding of public health wealth.

We must emphasize a broader point to anticipate the challenges for revolutionary transformative agendas. These agendas should guide professionalism in a way that supports and necessitates global public health transitions in this new epoch of the Anthropocene. This underscores the importance of emerging correlative notions determined by circumstantial,

scientific, and epistemic conceptual facts, which are essential for sustaining the enduring health needs of the 22<sup>nd</sup> century.

The global crisis of public health under the Anthropocene must be addressed and counteracted with the power of knowledge, which we trust through health education, preventive medicine, and sustainable care. We can improve sustainability for global public health by recognizing, addressing and tackling a web of wide range issues as we face this unprecedented Age of Eco-environmental and Climate-mediated Health Risks in the Anthropocene.

I, therefore, look forward to this journey of collective movements aimed at improving our scientific and conceptual understanding to develop action-oriented solutions and synergism that empower sustainability for transitioning global public health. Scholarly communications are the best way to express this power of knowledge, and I would like to extend my utmost sincere thanks and deep appreciation to the team at Cambridge Scholars Publishing for preparing this book for publication.

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# CHAPTER 1

## GLOBAL CRISIS OF PUBLIC HEALTH UNDER ECO-ENVIRONMENTAL AND CLIMATE- MEDIATED HEALTH RISKS IN THE ANTHROPOCENE

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In the dawn of this new epoch under the effects of the Anthropocene, a transition emerges. All healthcare professionals witness a change, as health and climate intertwine. A new priority has now emerged under these unprecedented phenomena of our historical time.

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### **Learning Objectives**

1. Understand the global crisis of public health posed by eco-environmental and climate-mediated health risks in the Anthropocene.
2. Comprehend the adversities of transitional health risks and relational complexities arising from the mediating effects of the Anthropocene.
3. Expand health professionals' knowledge with broader and multiple perspectives on global public health in transition.
4. Understand the actual and potential processes of health crises in relation to the dynamics of multilevel systems under eco-environmental and climate-mediated effects in the Anthropocene, including:
  - a. The increasing burden of emerging and re-emerging infectious diseases.
  - b. The pyramidal effects threatening the continuum of sustainable health developments across generations.
5. Identify arising global and ecological determinants such as global drivers, global changes, ecological effects, planetary health systems,

and Earth's carrying capacities in relation to "Global Health Systems" (GHS).

6. Understand the Eco-bubble of GHS and its symbolic interrelationships among ecological and global determinants of health in this new epoch of the Anthropocene.
7. Integrate concepts for ecological public health actions to achieve sustainable and legacy-based health outcomes.
8. Explore and establish the evolutionary professional praxis towards ecological public health as a collective journey in advancing professional practices.
9. Extend the essential role of our professional praxis through ecological public health actions.

## **Introduction**

We are now facing an increasingly complex and difficult global public health crisis, particularly due to the deteriorating condition of the climate and natural eco-environment. Such eco-environmental disruptions, coupled with climate change, continuously contribute significant mediating effects that jeopardize global ecological public health and the integrity of our planet, presenting critical ecological threats through the relational complexities of multilevel systems. This can be reflected in: (1) Earth systems trends, (2) Socio-economic trends, and (3) Food systems trends, along with concurrent changes in demographic and nutritional transitions. All these factors are integral parts of the emerging global and ecological determinants threatening the continuum of sustainable development in health across generations.

In fact, the required sustainable health development is inseparable and evidently interlinked with multiple dimensions of relational complexities derived from these arising global and ecological determinants under the Anthropocene. Therefore, the reflections on sustainable health needs are closely associated with the stability of Earth-planetary systems as a whole, as only this will allow the safe flourishing of human health developments. However, the existential eco-environmental and climate changes will continually impose mediating effects and propel transitional health risks globally. Particularly, their cumulative impacts from this frame of reference will exert pressure on the ecological systems of the planet, which in turn affects present and future global public health during this intergenerational transition.

Based on this fact, some philosophers concluded that we cannot exist independently of our relationships with others, and that a person's

humanity depends on the humanity of those around them, for the simple fact that they are part of this world (Sfetcu, 2020). Humanity has entered a new geological epoch with dramatic environmental trends that are transforming natural systems on a range of scales from local to global (Haines, 2018). As Renn (2020) recognized, the transformative power of humanity is based on knowledge accumulated and implemented over generations, and ever more quickly since the Scientific Revolution, the Industrial Revolution, and the so-called Great Acceleration beginning in the 1950s. As he states:

*In the course of the Industrial Revolution, science and technology became involved in the expansive dynamics of capitalist economies, with planetary consequences. But in the course of this process and because of its planetary impact, science and technology have been transformed from boundary conditions of economic development into indispensable factors of cultural evolution, on whatever form of economy or societal organization it will be based in the future” (Renn, 2020, p. 326).*

Echoing the progression of this similar notion of parallel relevance, as referred to in the Six Waves Culture for Health at different historical developmental stages, is of significant ecological importance for humanity, along with an “Integrative Conceptual Literacy for Ecological Public Health Culture,” which will be discussed in Chapter 2. Envisioning the necessary synergies in support of the required changing needs for sustainable developments in health, the evolving professional sense of relational coherence must focus on the necessary connectivity for the changing sustainable health needs under this new epoch. All healthcare professionals must recognize these growing threats by understanding the consequential impacts of Anthropocene effects on human health, alongside its mediating and transitional health risks across generations. Only by understanding these evidential facts that destabilize critical biophysical planetary health systems can we address the catastrophic crises threatening the continuum of sustainable health developments across generations globally. Furthermore, this unprecedented manifestation could possibly lead to a global public health crisis with a catastrophic cycle across generations.

In this context, those arising interwoven public health threats under Anthropocene effects are predominantly derived from two major systems—i.e., global health systems (“GHS”) and planetary health systems (“PS”)—which form the ultimate foundation for the dynamics of planetary consequences. Thus, the survival of both humanity and planetary health towards sustainable development at large is perhaps the synergistic

way to continue with this ultimate foundation of these two major systems. Therefore, identifying the underlying driving forces that are associated with these two systems as a dichotomous position embracing sustainability development in health is the assertional focuses in this collective journey. Of significance and interest in this context, health professionals must develop a broader perspective with a growing relational sense of their emerging critical role in engaging evolving professional praxis as a collective journey.

Cultivating a sense of relational coherence towards this evolving professional praxis is therefore absolutely indispensable, as it requires us to further position our perceptual and ecological thinking towards such changing health needs under the arising Anthropocene effects in transition. Even though ecological thinking in public health has only been revived relatively recently, the roots of this perspective originated within the Victorian era, albeit with very limited expression at that time (Rayner, 2009). At the heart of this ecological thinking are the natural ecosystems that are used to help understand human systems and environments; and the origins of this approach pertaining to health have, in fact, emanated from multiple disciplines over the past century or more (McLaren and Hawe, 2005).

The concept, as proposed in the conceptual framework of integrative paradigms for ecological public health in action, is indeed meant to create conditions in which all health professionals can contribute to realizing this cogent vision. This assertional directionality aims to foster the process of change toward legacy-based actions for sustainable health outcomes across generations.

Professionally, it is our obligation and commitment to persevere by preserving these precious legacy-based values, which fundamentally intersect with sustainable caring praxis. This praxis is a central part of the transformative paradigmatic shift and systems thinking embraced by ecological public health in action. The current proposed integrative paradigmatic concepts for ecological public health action specifically focus on addressing changing health needs in this age of eco-environmental and climate-mediated transitional health risks in the Anthropocene.

Simultaneously, the proposed collective journey of evolving professional praxis for ecological public health actions complements for advancing our professionalism. It guides the necessity of sustainable health needs as an interconnected platform for creating sustainable caring praxis during this critical time. Our sense of significant relational coherence with this parallel relevance for global public health in transition is meant to pave the

pathway toward legacy-based actions for sustainable health outcomes across generations during the Anthropocene in transition.

## **Global Transitional Health Risks with Mediating Effects of the Anthropocene**

Public health was born of crisis, and yet crisis so often afflicts public health. Currently, public health has entered a phase of global crisis (Rayner, 2009). The ecological effects of global environmental degradations and climate changes, along with pollutions accumulating to the eco-environments, have already imposed massive underlying driving forces, adding to the mediating effects of the Anthropocene. More insidiously, most anthropogenic activities are rapidly disrupting several global ecological processes through eco-environmental pollution, including air, water, soil, chemical, and plastic pollutions, as well as ocean and soil acidification, biogeochemical flows and eutrophication, land conversion, biodiversity loss, climate change, and food chain contamination. All these disruptions, in turn, imposed a vicious cycle, further aggravating sustainability development. If this continuum is adversely affected by these dynamical components, it will only add further burdens to the process of transitional risks globally and intergenerationally.

Simply put, our human environment is heavily dependent on the integrity of Earth's biosphere, located at the Earth's crust where life exists, often called the global ecosystem of the Earth system (Li, 2022). The significance of ecological health embraces these deeply fundamental complex interrelationships that collectively influence human and environmental health. For instance, approximately 60 percent of the ecosystem services examined, from the regulation of air quality to the purification of water, are being degraded or used unsustainably (Schettler, 2006). In particular, this global development of epidemiological transition under the Anthropocene is continually affected by demographic transition, nutritional transition, and the arising ecological and global determinants, producing possible interwoven health impacts associated with:

- Temperature-related illness and death
- Extreme weather-related health effects
- Air pollution-related health effects
- Water and food-borne diseases
- Vector-borne and rodent-borne diseases
- Effects of food and water shortages

- Mental, nutritional, infectious, and other diseases
- Food poisoning and/or food chain contamination
- Human-animal-ecosystem interface (HAEI) or zoonotic diseases (i.e., directly and indirectly associated with emerging, and re-emerging infectious diseases (EIDs), e.g., the current pandemic of COVID-19)

Additionally, there are numerous facts indicating that changing global and ecological determinants, interwoven with health threats, arise from complexities under existing anthropogenic dominations and disruptions of planetary health. These disruptions have harmfully led to vulnerabilities to global transitional health risks, especially from the mediating effects of the Anthropocene, which reflect the multiplicity of accumulative changes as indicated in the changing trends of planetary boundaries. Scientific facts point out that several global ecological processes are rapidly disrupting the global climate and eco-environments.

This accelerating biosphere degradation is causing a variety of novel ecological patterns and processes to emerge as anthropogenic biomes, which further affect a range of the biosphere's life-supporting systems. It is therefore important to recognize the possible consequential impacts of these arising interwoven health threats, which could reverberate across generations. These impacts include:

- a. An increasing burden of emerging and re-emerging infectious diseases (EIDs), subtly inducing and permitting global pandemics.
- b. Pyramidal effects threatening sustainable health developments across generations.
- c. Mediated health threats arising from ecological and global determinants.

All these consequential impacts constitute significant and drastic public health trajectories across present and future generations, especially due to the high possibilities of mediating effects adding to the existential level of transitional health risks. It is crucial to describe the differing impacts and patterns of global public health risks in relation to a web of dynamics arising from varying levels and trends of changes under this age of eco-environmental and climate-mediated health risks in the Anthropocene. Nature exemplifies a profound web of dynamical interactions among these interrelationships, which could further lead to an unprecedented predicament of global public health crises, as shown in Figure 1-1.

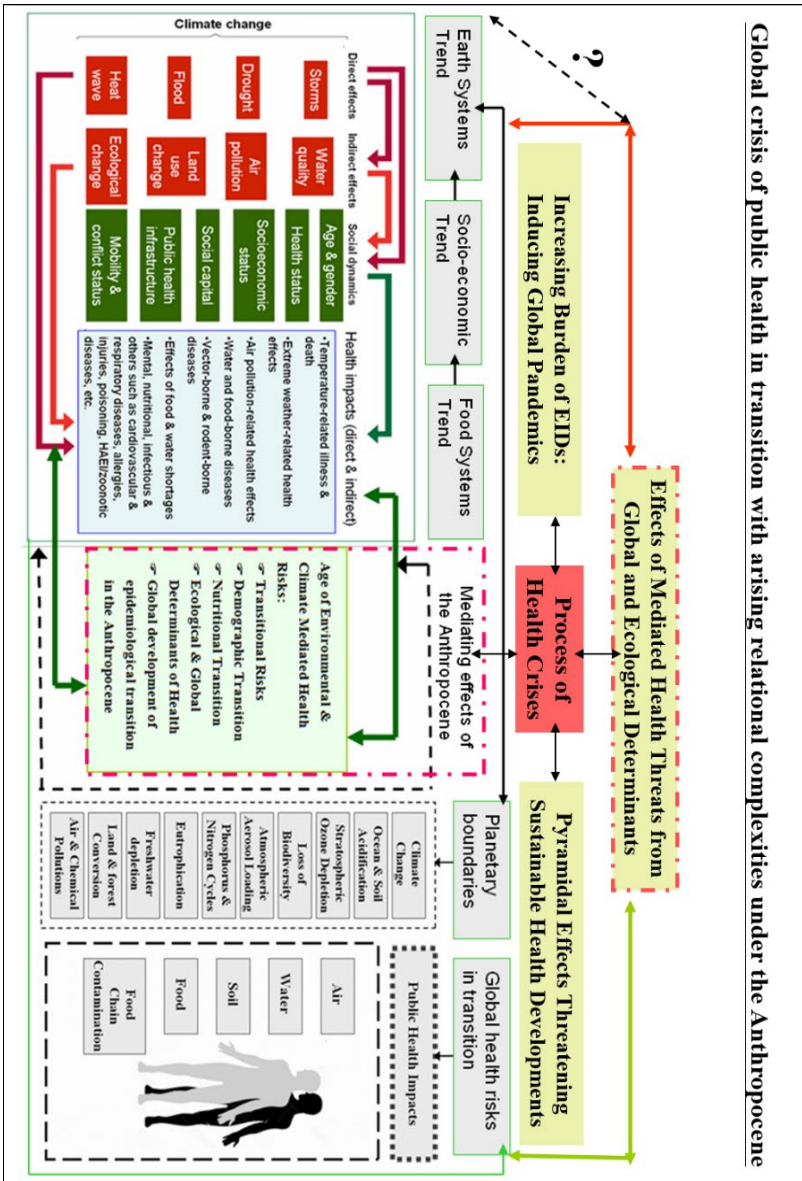


Figure 1-1: Global Crisis of Public Health in Transition with Arising Relational Complexities under the Anthropocene.

This Figure summarizes the possible mediating effects in this age of eco-environmental and climate crisis, which are now and will continue to affect global public health in transition. It illustrates a dogma of ecological and conceptual facts and notions, along with systems thinking, in relation to the actual and potential consequential adversities arising from the dynamical webs of interactions. As the relational complexity of the biosphere's life-supporting ecological and physical Earth systems would be continually affected by the effects of mediated health threats arising from global and ecological determinants. This further reinforces that our global health systems and planetary health systems are closely intertwined with this postulated "Process of Health Crises". Specifically, this actual and potential "Process of health crises" could be further triggered by the mediating effects of the Anthropocene from: (a) Food Systems trends, (b) Socio-economic trends, and (c) Earth Systems trends, which in turn produce further adversities on (d) the trends of Planetary boundaries, as well as the existing (e) degree of climate change. For instance, any further exceeding aggravation of climate change could pose a risk of a "Hothouse Earth" pathway if the Earth System approaches a planetary threshold, which might not be reversible (Steffen et al., 2018).

Consequently, this would compel further relational complexity on the levels of transitional health risks under such mediating Anthropocene effects, potentially imposing a vicious cycle in the process of global public health crisis. Therefore, all these actual and potential related impacts and cascading effects have become increasingly significant to the current global public health in sustainability transition under this new epoch of the Anthropocene. In this regard, it is essential to find ways to construe such transitional risks associated with this relational causality. In the broadest sense of those possible dynamic webs of complexities that are inextricably intertwined with arising global and ecological determinants at this age of environmental and climate-mediated health risks under the Anthropocene. Henceforth, the prescribed symbol of "?" as indicated at the upper corner in the Figure 1-1, which further raises an inquiry concerning how we could gain the necessary human understanding of those scientific and epistemic connections about the arising web of relational complexities, as which would constitute a rather possible drastic health trajectories adding to the postulated "Process of health crises" under such enormous unprecedented Anthropocene effects *per se*.

## Increasing Burden of EIDs: Inducing Global Pandemics

Historically, we have experienced numerous global pandemics over centuries. All these global pandemics have ravaged humanity throughout its existence, as the historical timeline has shown some of recorded history's most deadly pandemics as humans spread across the world. For instance, the 1918 influenza caused a huge loss of life, infecting around 500 million people globally and killing at least 50 million and perhaps as many as 100 million of them (Dartnell, 2023, p. 126). The rapid spread of emergent health threats, including those global pandemics, argues that we need to openly tackle the links between human health, animal health, and the environment, as also reflected in the current COVID-19 pandemic (Pieri, 2021). And perhaps, that's what the pandemic touched in all of us, and the result is an absolute necessity for anyone hoping to gain a sense of where we stand today (Castrillón and Marchevsky, 2021). The guiding conception of the present deliberations is geared towards considering how all these emerging and re-emerging infectious diseases (EIDs) have reconfigured our understanding of the interwoven health threats that have occurred throughout history. As Benjamin's message in a bottle stated:

*“Nothing that has ever happened should be regarded as lost for history. To be sure, only a redeemed mankind receives the fullness of its past—which is to say, only for a redeemed mankind has its past become citable in all its moments.” (Castrillón and Marchevsky, 2021).*

Going back to 1826, Mary Shelley wrote a book called “The Last Man,” a sci-fi novel that describes the last man alive on Earth after a rapacious plague accompanies sudden and ill-fated climate change. That story sounded the alarm of a pandemic of unprecedented magnitude and interminable armed conflicts at the time of the late 21st century, caused by a new mysterious disease that quickly swept across the world, ultimately resulting in the near extinction of all humanity.

*It seems that echoing to Byron's apocalyptic poem “Darkness” (1816):  
“Seasonless, herbless, treeless, manless, lifeless – A lump of death – a chaos of  
hard clay.”*

(as quoted by Murphy, 2020)

Ironically, Mary Shelley's *The Last Man* (1826) has the most to say to us in our present moment of crisis and global pandemic (Murphy, 2020).

Our world has been transformed into a new reality under the current COVID-19 pandemic, which has disrupted the routine of billions of people and caused an unprecedented public health emergency (Qi, 2021). Seemingly, the challenge we encounter with the excessive darkness of the Earth as an alien world—this COVID-19 pandemic crisis that has torn a giant hole in our daily lives—is being tied down. Has our world been actualized for the risk of this global pandemic? This is a challenging time over the course of a year or much longer for reaching that view of “darkness” over the planet. As Gouveia (2022) has described, the organism enters deep states of “existential” anxiety, and quoted:

*“The threat of the Coronavirus presents us with a double threat—collapse of our subjectivity as due to the risk of our body being infected and collapse of our inter-subjectivity as by social isolation of our self from others. The double threat of both subjectivity and inter-subjectivity provides a depth dimension to our emotions including our fears and anxieties resulting in existential fear.” (Scalabrini et al., 2020, p. 53; as quoted in Gouveia, 2022, p. 206).*

*“Not a soul has been spared or left indifferent by this strange virus that saw the light over a year ago and has since cast a net of darkness over the planet.”*

*(Ramadan and Osman, 2021 p. xv)*

This COVID-19 pandemic has long been, and still is, seen primarily as a health crisis, especially since the virus knows no national borders and makes no distinction between rich and poor, powerful, and powerless (Schweiger, 2022). The word “pandemic” now evokes immediate and visceral reactions, closely resembling the word “panic” (Doherty, 2013). COVID-19 is now one of a defining global crisis, disrupting and transforming the world with profound consequences, particularly focusing on the role of the health sector. During this challenging period of the COVID-19 pandemic, many healthcare systems were on the brink of collapse. While the significance and advancements of biomedical paradigms cannot be overlooked, it is crucial to acknowledge health and medical equity in the face of the emergence and re-emergence of a wide variety of infectious diseases, as seen in this historical continuity. This is especially relevant when referring to the historical timeline of infectious diseases that have been a constant companion, ranging from the Antonine Plague to the current COVID-19, as shown in Figure 1-2 (LePan, 2022).