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Considerations on the sidelines of the second principle of the Rome Declaration: The challenge of the One Health concept on the health of the future

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Abstract.
BACKGROUND: The COVID-19 pandemic represented a global earthquake that made the review of health policies aimed at strengthening common governance necessary.
OBJECTIVE: The paper analyses the reasons for which the One Health approach has become fundamental in the control of pandemic phenomena, by arguing the necessity to place it at the basis not only of health policies but also of intersectoral policies.
METHODS: The documents of the world organizations published before and after the pandemic were analyzed and studied in order to unpack the close relationship between new lifestyles and the increase of health risks.
RESULTS: It emerged that the One Health approach is a paradigm that has been advanced for more than 30 years, but due to the inadequacy of local and world health policies, this approach was never translated into concrete actions to protect health, feeding problems at the cause of the COVID-19 pandemic.
CONCLUSIONS: Having ascertained that the adoption of a One Health approach can no longer be postponed, this must be insisted on several interconnected sectors that establish the new concept of healthcare which, in addition to being interdisciplinary, necessarily takes on a global perspective.

Keywords: COVID-19, G20, One Health, healthcare

1. Introduction

Undoubtedly, the Sars-COV-2 (COVID-19) pandemic represented a global earthquake that has led and will continue to bring necessary reconsiderations on the styles and daily life of each individual nation.

In fact, it was precisely the devastating impact of a viral epidemic in the developed countries belonging to the G20 that immediately made critically evident gaps in welfare models evident, and placed the whole world facing the need to seriously consider the appeals launched in the recent past regarding universal health coverage, equal access to health services, the relationship between human and environmental health, animal well-being and primary prevention.

From this perspective, the recommendations and principles of coordinated management, which in the past were considered abstract values whose application was always delayed, have become concrete objectives to be achieved. The director general of the World Health Organization (WHO), Tedros Ghebreyesus, said: "The pandemic reminds us of the intimate and delicate relationship between humans and the planet. Any effort to make our world safer is doomed to fail unless we address the critical interface between people and pathogens, and the existential threat of climate change, which is making our Earth less habitable" [1]. While the Virologist Ilaria Capua, Director of the One Health Center of Excellence at the University of Florida, further clarifies the concept: "the only way we have to never relapse is the awareness that we live within a system which people, animals, plants and in general the environment are a part of, and which we are all immersed in. Therefore, there are not only individuals and communities, there is not only the human species to preserve: the health of the planet and all its inhabitants must have equal dignity if we want to create a sustainable, resilient and durable ecosystem. We are all elements of a single system, in which the health of each human, animal or environmental element is strictly interdependent from that of the others" [2].

In practice, it emerges that the only lasting future perspective encompasses all sectors and concerns a single meaning, namely One Health. And, given the relationship between the various components in which none predominates over the others, why not describe it as a circular and integrated system? For this reason, some prefer to refer to a circular health.

The holistic vision of One Health represents a model to protect and promote the health of populations based on the integration of different disciplines. This perspective has solid scientific and historical roots, but there is too often low awareness and is eventually ignored in practice.

Therefore, One Health can be considered at the root of the famous (but rarely implemented) health strategy documents proposed by WHO. They include the 1978 Alma Ata Declaration [3], the 1986 Ottawa Charter, the 2012 Health 2020 [4] and most recently the 2016 Shanghai Declaration [5].

These documents have been officially recognized by the majority of European health ministries, the European Commission and various international organizations. Unfortunately, either out of political will or a lack of ability to manage change in decisions with an impact on development and public health, these WHO recommendations were either disregarded or only partially adopted. In fact, it can be affirmed that at all levels of government, governance for health and development the application of such recommendations is weak, obsolete and underperforming.

The pandemic that all countries face is demonstrating the enormous price resulting from weak governance that is ethically and economically unsustainable and unjustifiable. To strengthen governance and practices for sustaining health, development and the reduction of inequities we need two fundamental elements. The first concerns a vision of the future that can influence decision-making in all policies, not just health policies. Here the One Health perspective is both scientifically and strategically fundamental. Clearly, the second element is inherent in the political will and active participation of civil society to implement this vision in daily practice and the Rome Declaration can certainly represent the keystone to this end.

2. The environment and man

That an 'invisible' microorganism has threatened human health is not a new thing: from the epidemic of (probably) smallpox in the Greek encampment at Troy described by Homer in the Iliad, to the black plague in 1348 which wiped out a third of the European population, to the Spanish flu in 1918 which caused at least 50 million deaths worldwide. The black plague that inspired Boccaccio's Decameron is a good example of the interrelation between animals, man and the environment: the protagonist is a bacterium,

Yersinia pestis, which makes rats sick and in turn they is transmitted to humans through a flea causing the plague and affecting above all the most fragile and the poorest populations living in dirty environments or with poor hygienic conditions.

Microbes, as Capua states, become the new links between apparently separate worlds: human health, animal health and the health, or rather the unhealthiness, of the environment. The source of the infection is therefore the non-human animal and it is known that about 75% of emerging infectious diseases affecting humans are of animal origin. The best known zoonoses that occurred in the last forty years are HIV, Ebola, SARS in 2003, Avian influenza, Zika and, most recently, SARS-CoV-2.

FAO, WHO and the World Organization for Animal Health (OIE) have published a guide to support various countries in the fight against these diseases according to the One Health approach [6].

More recently, the WHO has drawn up a Manifesto [7] advancing six prescriptions for the "healthy and green" post-COVID-19 recovery:

(1) Safeguard nature;
(2) Ensure access to clean water;
(3) Ensure a rapid and healthy energy transition;
(4) Promote healthy and sustainable food systems;
(5) Build healthy and livable cities;
(6) Cancel the incentives for fossil fuels.

These recommendations are perfectly in line with the sustainable development goals of the 2030 Agenda [8] and with the foundations of One Health regarding the impact of the environment on human health.

The COVID-19 pandemic represents an even more striking example of the connections between human, animal and ecosystem health and how humans are invading natural habitats that do not belong to them. The One Health model helps us to understand that this pandemic was inevitable, creating the conditions for the virus to pass from animal to man. All human activities that cause biodiversity loss - deforestation, land use changes, agriculture and intensive farming, trade and consumption of wild animals increase wildlife contact and farmed animals and, in turn, between potential pathogens and people [9].

Deforestation appears to be the most important factor in increasing zoonoses globally. A recent WWF Italy report states that 80% of world deforestation is due to the expansion of pastures for meat production and the spread of soybean and coffee monocultures (especially in South America) and oil palm plantations (Indonesia and Malaysia). These are raw materials that are generally destined for export, in particular to China, Europe and the United States. Over the past thirty years, 420 million hectares of land have been deforested, more or less the equivalent of the surface of the entire European Union, and most of which in tropical areas. Approximately 10 million hectares are lost each year due to the conversion of forests to agricultural land [10]. Today, therefore, the development into a pandemic could follow a sequence that can be summarized as follows: (1) deforestation, (2) loss or extermination of predators and unlimited growth of reservoir species, (3) illegal collection and trafficking of this species, (4) wet animal markets, (5) species leap.

3. The future of the One Health concept

Today we recognize this fundamental link between human, pet and wildlife health and the environment and the threat that disease poses to people, their food supplies and their economies. In today's globalized

world, no sector of society or single professional discipline has sufficient knowledge or resources to effectively manage the risks of the emergence or resurgence of infectious diseases. No nation could reverse the patterns of habitat loss and extinction that undermine the health of the world's people and animals. Only by breaking down the barriers between agencies, individuals, specialties and sectors can we use the collective experience and trigger the innovation necessary to anticipate and combat these challenges for the health of people, pets and wildlife and for the integrity of ecosystems. We cannot handle today's emerging infectious disease (EID) threats and tomorrow's problems, including new pandemics, with ineffective antibiotics and solutions to previous problems.

Instead, there must be an adaptive, forward-looking and multidisciplinary approach to the challenges that lie ahead, namely a One Health approach.

Traditionally, human health has been handled for the most part separately from animal health as if they were two different containers. The vast majority of countries have ministries of health as large government agencies that provide a range of public health and clinical services, including infectious disease management. Treated in healthcare facilities, such as hospitals, diagnostic laboratories and research institutes.

Animal health, on the other hand, is traditionally managed in the vast majority by the ministries of agriculture and there are few countries, including Italy, which have always included it under the competence of the Ministry of Health. Recently, however, all countries are understanding the errors of setting and the management of agriculture itself has been integrated into environmental management, including that of wildlife, with particular attention to the development and sustainability of the ecosystem. Therefore, livestock and agriculture, in general, are decreasing priority areas for governments, with environmental and health management becoming significantly more important for those areas.

Infectious diseases play a fundamental role in the concept of One Health. The emergence and spread of epidemic risk EIDs has become an important international event of concern, not least because of the significant economic impact of the outbreaks [11]. The term "EID" has become synonymous with new (recently recognized, previously unknown) infectious diseases (such as SARS, which appeared suddenly and unexpectedly in 2003) or with known infections that are increasing in incidence, increasing geographic scope (such as dengue viruses that cause dengue fever and dengue hemorrhagic fever), or by expanding their host range (such as H5N1 avian flu). The evidence clearly points to an increased risk of EIDs for humans, animals and the environment. Most of these diseases are cross-border in nature (not respecting state or nation borders) and require both national and international approaches for their effective management [12].

With regard to the risks from food contaminated by pathogenic microorganisms, these have been known for many years and have always intervened, with excellent results, directly from the farm by applying processes for detecting infectious agents and chemical contamination related to food production processes.

However, the growing impact of foodborne pathogens such as Escherichia coli or Salmonella sp., together with the challenges of risk management, have led to a connected approach to the entire production chain. Knowing the risks of these food-borne foods pathogens for humans and the need to immediately manage them in animals (or plants), the problem should have been treated using a One Health approach.

However, the question of antibiotic resistance has created more polarization rather than unity. For a number of years, an extensive debate has taken place among human and animal health experts regarding the topic of increasing microbial resistance. Driven by the significant value of antibiotics as growth promoters in intensive livestock production systems, it took time to recognize the underlying problems, effectively delaying the One Health attitude in this field.

Many factors, mostly associated with human activities, contribute to the development of epidemic diseases. Such factors include increased travel and movement of people, especially by air, increased international trade in live animals and fresh animal products, changes in land use and agricultural production, new developments in technology that provide greater sensitivity in detecting new diseases and spreading exotic vectors to colonize new habitats and thus make new areas receptive to the spread of exotic infections.

The biggest challenge for the 21st century could be climate change, which will have effects on disease patterns and on the onset of not yet characterized diseases, through its effects on the ecology of hosts, vectors and pathogens; and the need to provide food and safe water to a growing world population.

Three important factors in the onset of the disease have been recognized in the past two decades:

(1) With the huge increase in air travel, the world has truly become a vast global village with the potential for rapid intercontinental disease transmission;
(2) The consequences of climate change include severe ecological disturbances with consequent movements of and changed relationships between people, wildlife and disease vectors;
(3) Most of the newly emerging diseases are zoonotic and originate in wildlife or pets.

These factors have led to the recognition that the most effective way to detect and respond to EIDs takes place through a One Health approach. One Health as a concept for the management of risks from infectious diseases has achieved good media coverage in the EU and for the World Health Organization (WHO). It has been recognized in these authorities that effective global surveillance is essential for the early detection of EIDs and that this can best be achieved on a global basis by an alliance of networks established by the WHO, the Food and Agriculture Organization (FAO) and the World Organization for Animals Health (Office International des Épizooties, or OIE), which provide early diagnosis to allow timely response to EIDs. However, there is still a large gap globally surveillance, namely the surveillance of wildlife diseases; nowhere is this done in any depth or detail, and most outbreaks in wildlife are only occasionally detected.

The purpose that the signatories of the Rome declaration have set themselves is precisely the expansion of the concept of One Health to the greatest number of institutions and nations in such a way as to meet the effective application and hope for success.

4. The urgency of a new way of thinking and acting for health

The interconnections between animal health and human health are historically established, but the important turning point that must be made, as stated by Calvin Schwabe, one of the creators of the modern One Health movement, “There are no dividing lines between animal and human medicine, nor should there be. There is no paradigm difference between human and veterinary medicine. Both sciences share a common body of knowledge in anatomy, physiology, pathology, origins of diseases in all species”.

Although a major boost for One Health is emerging from the veterinary community, One Health’s value goes far beyond the collaboration between veterinarians and doctors. Importantly, “over the past decade, the concept of One Health has expanded beyond an examination of the human-animal health interface to understand the health and sustainability of global ecosystems”.

Although it is an old concept, the need for One Health approaches is more important than ever. Given that over 60% of emerging infectious disease events are caused by the transmission of an infectious

agent from animals (zoonoses), of which 75% originate from wildlife, adopting a systematic One Health approach has great potential for reducing global health threats from infectious diseases.

The One Health approach should advance healthcare for the 21st century and accelerate biomedical research, improving public health effectiveness, rapidly broaden the scientific knowledge base and improve medical education and clinic.

Despite the obvious benefits, the obstacles to achieving a comprehensive One Health approach are clearly very high. Education, research, diagnostics, surveillance and funding for human medicine, veterinary medicine and environmental health often exist as siloed environments and a new rethinking should also bring forward a change in the way of conceiving the formation itself. In fact, it is hoped that medical students will also be trained on non-human diseases and veterinarians will also be trained on human ones.

The environment is often not even considered in introductory microbiology courses. These barriers must be overcome if the benefits of the second point of the Rome Declaration are to be realized.

Fortunately, some academic medical centers are beginning to address this challenge by providing the necessary interdisciplinary educational opportunities that form the foundation of a One Health approach, including consideration of the environment and its implications for health.

Implementing this approach is a challenge that should lead to addressing infectious diseases with new tools starting from different concepts, without the need to start with patients to respond to an outbreak, but with the need to intervene in an upstream process.

An effective and successful One Health approach will ease the prevention of disease outbreaks before they are recognized as a problem by the public; but it will also require constant informative effort towards political authorities in order to increase their awareness.

From this point, it is possible to simoultanously understand the phenomenon of antimicrobial resistance, in fact nothing exemplifies the concept of One Health better than the fact that many aspects of human, animal and plant health and function depend on the presence of bacteria and their metabolic products which are precursors of diseases, sources of diseases treatment and the origins of the genetic determinants of resistance to these treatments.

The introduction of penicillin in the mid-1940s heralded the era of antibiotics, both in terms of adoption and production, and since that time, antibiotics have become the foundation for the treatment of infectious diseases. The development of the industry and the number of antibiotic products have expanded very rapidly and today it is known that antibiotic resistance is widespread, and is accepted as a consequence of the use of antibiotics.

The threat of antibiotic resistance is recognized with continuing urgency but decreasing resolution, and the problem is still growing; a return to a pre-antibiotic state is not just a bad dream. As Joshua Lederberg [13] said “In this conflict there is no guarantee that humans will be the survivors”. To this end, certain actions should (must?) be taken, but are difficult to implement given our dependence on antibiotics and related drugs.

Also for this reason, the One Health model applied to the post-COVID-19 recovery goes beyond the purely biomedical conception of health (prevention, treatment, rehabilitation, including effective drugs and protective vaccines), and emphasizes that human health cannot be separated from animal health and from all the factors that make life on our planet possible [14].

The current pandemic has taught us that since health is ONE - that of humans, animals and the environment, the factors to reduce the risk of new pandemics are the same as those needed to protect biodiversity: stop deforestation and land use for agriculture and intensive farming, elimination of wet markets and limitation of wildlife trade. One Health also requires the involvement of every social sphere

and therefore the cooperation of many intelligences and skills, the activation of new behaviors from different areas of society itself (local communities, citizens, political decision-makers), breaking down the disciplinary boundaries between physical sciences and life sciences and between the different scales of intervention (regions, nations, continents) since the virus knows no borders.

5. Synergy as a founding value of the Rome Declaration

As stated above, this multisectoral conceptual framework must be followed up with new innovative practices and with a coherence and political will that has been lacking in the past. One Health requires a new way of thinking and acting for individual, collective and global health; it must be understood as a relevant and innovative strategy in all sectors that benefit from the collaboration between different disciplines - doctors, veterinarians, environmental scientists, economists, and also sociologists and psychologists. But to do this, it is necessary, as a first step, to break down the boundaries between the various sectors of science and induce experts from different disciplinary sectors to work together. This means improving the levels of coordination, cooperation and integration of the measures to be taken to promote development and protect and improve collective health. Therefore, alongside the integration of different disciplines, it is necessary to invest - and place "more health" - in every social sphere: from agriculture to science, from education to politics, from information to economics. This includes collaboration with the social sciences and humanities, the physical sciences and the life sciences. As we now live in the era of big data and artificial intelligence (AI), there are considerable untapped opportunities to take advantage of offered by this rapidly expanding field.

Artificial intelligence is increasingly projecting itself towards a better defined Alternative Intelligence: a new operational concept that highlights the collaborative intelligence between machine and human. A study has found that AI has so far been applied in at least four fields of the health system in the fight against COVID-19: diagnosis, therapy, decision-making in the clinical area and public health. It could potentially be applied in four other areas: surveillance, combination with big data, reorganization of interventions and medical-surgical services, and management of patients with COVID-19. The study concludes that in the face of increasing pressure on limited health resources, the use of AI-driven techniques used in prevention, diagnosis, monitoring, therapy and vaccine research, and public health decision-making processes, can help improve the efficiency and effectiveness of efforts to combat this (and future) pandemic. Efforts that could otherwise be overwhelmed by the large number of patients.

The second step concerns the rejuvenation of educational paths to allow future generations to assimilate this new integrated model. The third refers to training courses in general. Training in this field is essential to ensure that current policymakers are fully aware that their choice on human health, animal and plant health, and environmental health affects others. Here, a new science is being born, full of "consequences" and new opportunities to maximize the impact on sustainable development and health.

In conclusion, the challenge is to put One Health into practice through true governance for the protection and promotion of health, no longer myopically confined only to human health. In this process of change, the involvement of civil society is indispensable. One Health represents an essential approach for integrated management in the field of public health. In fact, it addresses the needs of the most vulnerable populations on the basis of the intimate relationship between their health, animal health and the environment in which they live. In other words, One Health considers and understands the wide range of socio-economic and environmental determinants. These determinants characterize the possibilities of protecting and promoting health and reducing the inequities that exist in this area.

To this end, the ultimate goal of the G20 is to create a culture for health by involving society more in its various articulations (associations, voluntary work, but also business and private) to put the person and the community at the center. After all, health is universal and remains a common good. More than 2000 years ago, the philosopher Aristotle stated: "the doctor heals, nature makes well", One Health should become the mainstream approach in public health to be supported by interdisciplinary research, intersectoral policies and effective health and development governance at all levels of decision-making. In light of the lessons we are learning from the COVID-19 pandemic, adopting a One Health perspective is a necessity and an opportunity that cannot be postponed anymore.

Conflict of interest

None to report.

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