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Strengthening preparedness against global health threats: A paradigm shift based on One Health approaches

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ABSTRACT

The implementation of preparedness strategies to prevent and mitigate the impact of global health threats poses several challenges. It should promptly identify cross-cutting drivers of pandemic threats, assess context-specific risks, engage multiple stakeholders, and translate complex data from multiple sources into accessible information for action. This requires a coordinated, multidisciplinary and multisectoral effort engaging systems that, most of the time, work in isolation.

The One Health (OH) approach promotes the collaboration and communication among different disciplines and sectors, and could be applied across the preparedness phases at national and international level.

We discuss here gaps and needs in preparedness strategies, which can benefit from the OH approach, and a set of actionable recommendations, as shared with the G20–2021 with a dedicated Policy Brief.

The discussion adds to the current debate about OH operationalization and promotes a paradigm shift towards coordinated prevention and preparedness strategies for early assessment and management of global health threats.

1. Introduction

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), responsible for the dramatic COVID-19 pandemic [1,2], shows clearly that global health threats are due to multifarious causes, complex determinants and drivers. Moreover, the impact caused by the pandemic is said to be syndemic, since it involves a multitude of factors (such as socio-economic, cultural and environmental) affecting communities on a global scale [3–5].

The evidence that emerges strongly suggests the need to develop and implement multidisciplinary, multi-sector and multi-actor preparedness strategies to address this complexity and reduce fragmentation of strategies in the implementation of procedures and plans required to anticipate and contain a health emergency [6].

The zoonotic origin of most emerging pathogens and the crucial role played by humans in the over-exploitation of the environment, suggest intercepting possible drivers of global health threats at the human-animal-environmental interface and reducing their possible impact

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with strong prevention actions. The identification of drivers of potential threats before they affect societies requires assessing context-specific risks with the support of multiple stakeholders, and translating complex data from multiple sources into accessible information for action [7].

To support this aim the One Health approach, as defined by the WHO, represents a valid scientific strategy "to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes" [8].

Adopting and integrating the OH approach into plans and policies, both at national and international level, requires a radical change of strategy in terms of governance, capacity building, training and research to overcome the current fragmentation and barriers and to allow the required interaction, collaboration and coordination across sectors and disciplines.

The Group of Twenty (G20) is the international forum that brings together the world's major economies. The forum has met every year since 1999 and the G20_2021 thematic was focused on People-Planet-Prosperity [9].

The Think20 (T20) is the official engagement group of the G20, bringing together leading think-tanks and research centers worldwide. It serves as the 'ideas bank' of the G20 and aims at providing research-based policy recommendations to the G20 leaders [10].

With the aim of providing concrete recommendations to the G20_2021 to enhance the integration of the OH approaches in preparedness strategies, we delivered through the T20 the Policy Brief (PB) titled "One health-based conceptual frameworks for comprehensive and coordinated prevention and preparedness plans addressing global health threats" [11].

We discuss here the evidence reported in the PB on the unmet strategic needs that are presently hampering the implementation of efficient pandemic preparedness strategies and how these could be addressed through a OH approach.

2. Rationale for integrating one health approaches in preparedness strategies

WHO defines emergency preparedness as "the knowledge and capacities and organizational systems developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impact of likely, imminent, emerging, or current emergencies" [12].

The One Health High Level Expert Panel established in 2021, defines OH as "…. An approach (which) mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development" [13].

The integration of OH approaches in preparedness strategies could support the consolidation of those preparedness pillars (Fig. 1) which rely on the coordinated action of multiple sectors and disciplines [14,15].

2.1. Early detection of health threats

Health threats refer to events and situations which can cause or threaten to cause a public health emergency with serious and lasting impact on the public health and/or other aspects of human and animal wellbeing and their environment. Health threats like outbreaks of infectious agents have a cumulative societal cost that can be reduced by the early detection of possible threats [16,17].

Although the concept of anticipating possible threats has for a long time been an integral part of the definition of preparedness, the strategies developed showed that preparedness is mainly intended as a means to make the response to threats more efficient. This, however, underestimates its equally fundamental role in triggering more timely actions aimed at preventing or, should this not be possible, detecting possible warning signals earlier on [7,12,18,19].

The COVID-19 pandemic has highlighted how preparedness

Fig. 1. Pillars of preparedness enhanced by multisectorial & multidisciplinary approaches at the human-animal-environment interface.

strategies failed to consider all the necessary elements to counter this evolving health threat [20,21].

Prevention and preparedness strategies should consider the benefit of relying on integrated surveillance and OH risk-based approaches for key public health risks associated with emerging zoonoses and other threats. [22].

2.2. Monitoring multiple and interconnected drivers

The concept of drivers is used in different fields, including economics, social sciences, technology, health and environmental sciences. Drivers are defined as issues that shape the development of a society, organization, industry, research area, technology, etc. They may act as facilitators or modifiers of effect on the onset of emerging risks. Namely, drivers can either amplify or attenuate the magnitude or frequency of risks arising from various sources [23].

Many of the upstream drivers of health threats, whether the potential threat is a zoonosis, a neglected tropical disease or antimicrobial resistance (AMR) [24–27] lie outside the human health sector (e.g. animal health, land use, loss of biodiversity, climate change, urbanisation, conflicts) and are multifactorial.

In many cases drivers can produce signals that could be assessed and monitored to anticipate threat emergence, to strengthen public health intelligence [28]. Understanding and addressing these threats requires the establishment of a comprehensive detection system with specific inter-sectorial data collection and analysis, allowing context specific risk analysis with ad hoc metrics and multisectoral indicators [29].

2.3. Ensuring prompt access and sharing of information, data and technologies transparently

Systematically collecting integrated data and information at the human-animal-environment interface should be followed by the effective access and use of data by all the relevant stakeholders as a critical building block of national preparedness [30,31].

Although the WHO recognises that the International Health Regulations (IHR) have improved the detection of threats and the sharing of information [21], the COVID-19 pandemic showed us that further efforts are needed. A recent European Commission Communication [32], has highlighted that effective data sharing for coordinated analysis is also hampered by the crucial lack of indicators to detect and respond to new infectious diseases of unknown origins.

Integrated multisectoral databases based on OH approach are being recommended in the international relevant guidance for zoonosis and AMR prevention and preparedness plans [33,34].

Integrated risk assessment, implemented with the concomitant participation of all the relevant sectors involved in the surveillance of a given threats, are recommended to enhancing cross-sectoral collaboration and improving data collection and data-sharing across different sectors [35,36].

2.4. Considering the multiplicity of the actors, stakeholders, disciplines and related interests involved

To ensure the establishment of a sustainable OH preparedness system aimed at addressing global health threats a “whole of society” vision is fundamental [29,37]. As per WHO definition “whole of government and whole of society approaches are grounded in strategies that enhance joined-up government, improved coordination and the integration and diffusion of responsibility for health throughout government and society.” [38].

However, tools for active and comprehensive stakeholder engagement need to be refined and tested considering also the conflicting interests that may arise. This point is exemplified by the implementation of biosecurity measures in live animal markets or intensive animal farms, where drastic measures (such as closing markets, increasing in the spacing between animals in farms) might lead to a loss of income for vendors and small-scale famers [17,39]. A delicate balance will need to be found between the need to reach consensus among the involved stakeholders and formulate sustainable strategies.

2.5. Enhancing local sustainability and contrasting exacerbation of social inequalities

Prevention and preparedness strategies should be sustainable and aimed at contrasting exacerbation of social and health inequalities also relying on community engagement [40,41]. Implemented actions should be calibrated to the local system with context-specific risk assessment and include capacity building when required (e.g. strengthening of weak surveillance systems or social and economic protection for those who need to convert to new income activities) to reduce the impact on the services and communities in case of any threat [42,43].

3. Actionable recommendations

Adopting and implementing OH approaches in prevention and preparedness strategies have been consistently advocated on the basis of its strategic benefits considering that the emergence of infectious diseases and pandemic threats is influenced by multiple factors (including behavioural, environmental, social and economic ones) and that OH could address all these factors thanks to its multidisciplinary approach [16,19,44–49].

In order to enhance the operationalization of OH preparedness strategies we suggest here two key areas that need to be addressed to facilitate and accelerate this process.

The first area refers to the mainstreaming of OH approaches in preparedness and prevention plans, making OH an integral part of the national, regional and international strategy aimed at countering the evolving of potential threats to global health rather than a distinct One Health action plan addressing specific sectors like zoonosis or AMR [37,50]. We propose the implementation of a One Health-based Conceptual Framework to promote the integration of OH with identified priorities for action (Appendix 2 in [11]). On the basis of specific indicators, the national surveillance system should identify local potential drivers for possible threats to health and monitor them. As discussed, these drivers may involve various sectors beside health and therefore a multidisciplinary and multisectorial surveillance system should be considered. The information and data collected, analysed with a One Health approach, support the elaboration and updating of prevention and preparedness plans and provide evidence for appropriate decisions and related actions (Fig. 2).

The need of assessing the risk of drivers potentially involved in the development of threats and of promptly detecting threats of unknown origins, should motivate the identification of metrics and indicators which allow the multidisciplinary of the OH approach being operational, monitored and evaluated.

The conclusions of FAO’s evaluation of the largest animal health programme in the world on zoonotic diseases and AMR using OH approach, stress the need of setting a One Health Sustainable Development Goal because the lack of such indicators may reduce national commitment to the implementation of One Health [51].

The second area in need of proper action involves governance, operational research, and capacity building to cope with barriers and obstacles which are hampering OH integration.

In line with these needs, we identified specific recommendations which were provided to the G20–2021 with the PB titled “One health-based conceptual frameworks for comprehensive and coordinated prevention and preparedness plans addressing global health threats” [11].

We recommended to the international bodies guidance for specific governance structure across sectors and disciplines at national and international level, to ensure harmonised institutionalisation of One

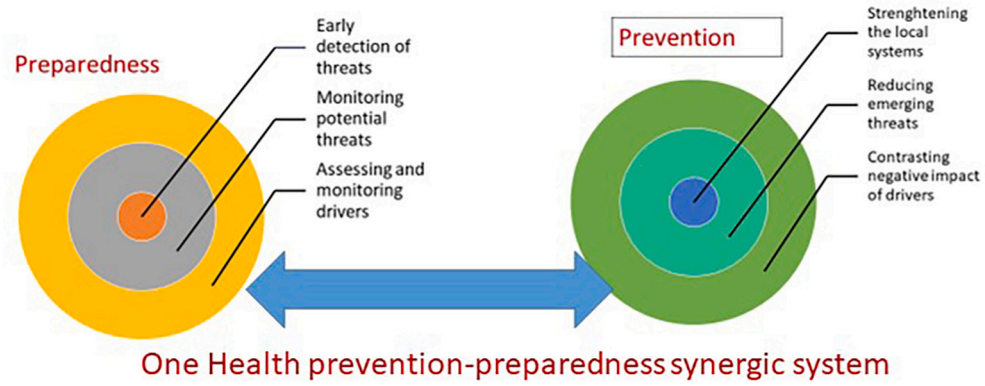

Fig. 2. One Health prevention-preparedness synergic system.

Health strategies (including guidance for setting means for integrated data collection and analysis, risk assessment, and resource allocation).

We recommended also the development, in coordination with the countries that are already implementing One Health strategies, of a cost-effectiveness evaluation framework, with modular options to tailor for local conditions. Ad-hoc operational research, to assess and quantify the added value and sustainability of One Health strategies in the fields of prevention and preparedness should also be considered.

Finally, we stress the urgency to motivate the national governments to devote adequate resources to the development and implementation of trainings on prevention and preparedness with multidisciplinary and multisectoral approaches to enhance awareness of benefits of sharing data and information and capacity of analysing complex set of data to take appropriate actions [52].

4. Conclusions

We are required to make important and urgent decisions on complex situations, and we need to base them on a comprehensive analysis of data and information from multiple areas and sectors that might be relevant to decision-making. OH interoperable databases and data democratization platforms can facilitate the sharing of required information and should be considered as integral part of the proposed prevention-preparedness synergic system. This could also enhance IHR implementation and could therefore be included in the emerging idea of a Pandemic Treaty [53,54].

Sharing with the relevant stakeholders the identified risks for potential pandemics, or other global health threats, facilitates their participation to the dynamic cycle of protecting the environment through a sustainable behaviour, decreasing the risk of potential new threats, and supporting identification of possible drivers of pandemic. In addition, this process will keep all the stakeholders involved informed, active and resilient in case of emergency.

Addressing global health threats through a lens that highlights the complexity of the involved system is what leads to identifying in OH as a viable framework to support global health strategies. Given the wide range of determinants of emergence and impact that operate within globalized yet local contexts, no convenient blueprints can be put on the table to counter current and future global health threats. Rather, local custom-made solutions will need to be found through the engagement and consensus of multiple actors. The T20 final communiqué to G20–2021 [55], the Declaration of the G20 Health Ministers [56] and the G20 Health and Finance Ministers communiqué [57] have considered the recommendations provided with the PB [11]. We hope that this can contribute to further the current debate about OH strategies operationalisation, lead to concrete actions capable of transforming the current OH momentum into long-term commitments and promote paradigmatic shifts in prevailing thinking around preparedness that can translate in more effective global and local strategies supported by equitable sharing of innovation, prevention and response focused technologies.

OH preparedness can enhance our understanding of risk factors of complex global health threats at the human-animal-environment interface. It can also prove a new point of view from which we can hypothesize future potential scenarios and adapt national and regional prevention and preparedness strategies, to counteract the current megatrends that are damaging our entire planet [46,58–61].

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Declaration of Competing Interest

None

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