

# Project Brief

**foraus**

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# Protecting the world from future pandemics

Four visions for more equity, capacity and paradigm shift  
among global health systems by 2040



# Table of Contents

Executive Summary	2
1. Introduction	4
2. Equity in distribution of health technologies & products	7
3. More efficient and reactive health system	11
4. Improved health system surveillance	16
5. One Health: Going beyond human health to prevent future pandemics	21
6. Conclusion	27
Editor, Authors and Contributors	32
Endnotes	38

# Executive Summary

This Project Brief proposes four visions and policy plans to protect the world from future pandemics such as COVID-19. More specifically, it calls for the improvement of health systems' capacity, more efficient monitoring of infectious agents, more equitable manufacturing and distribution of pandemic-related countermeasures and asks the international community to address the root causes of pandemics.

COVID-19 not only killed millions and created socio-economic turmoil globally, but it also highlighted significant shortcomings of existing rules regarding pandemic Prevention, Preparedness, and Response (PPR), namely the International Health Regulations (IHR), 2005.

Envisioning future realities in which key challenges related to pandemic PPR were addressed, the authors answered the following question: What measures should the international community adopt to strengthen the prevention of-, as well as preparedness and response to future pandemics by 2040? This Project Brief is the fruit of a participatory process organised by foraus, the Swiss Forum on Foreign Policy, between March and May 2023 bringing together young thinkers and professionals around this important topic to generate innovative policy pathways for pandemic PPR.

To ensure an effective global response to infectious disease outbreaks, **equal access and distribution of safe and effective pandemic-related products** needs to be guaranteed. This can be achieved through an equitable global supply chain and logistics network that is regulated, transparent and governed by international law. Additionally, equitable manufacturing capacity and Research and Development (R&D) for pandemic-related products, particularly in Low- and Middle-Income Countries (LMICs), should be achieved through a global investment framework based on foreign direct investment or development assistance for health.

**Health systems' capacity** to react to the sudden increase of demand of healthcare services during public health emergencies **should be reinforced through the digitalisation and automation of processes**, including the adoption of telemedicine, mobile health,

and health information technologies. To alleviate the shortage of workforce, provide cost-effective and accessible care, and increase patient empowerment, governments should strengthen digital literacy and guarantee equal access to digital health services. To accompany the digitalisation of health systems, a global centre for digital health collaboration should be created in Switzerland to ensure robust infrastructure and regulation around data privacy, data interoperability and safeguards for international data transfer.

Timely information on pathogens of interest and **global health system surveillance capacities need to be strengthened**. Action should be taken with regard to regulation, collaboration, communication, and inducements. Amendments to the IHR should be made to formalise Collaborative Genomics Networks and incentivise Member States to disseminate trustworthy knowledge. Pandemic information should be centralised within the World Health Organisation's (WHO) secretariat and Member States feed a centralised WHO database through dynamic pandemic response units. The IHR should be modified to include pathogens of interest definitions, and the formalisation of Collaborative Genomics Networks. Additionally, they should establish sets of incentives to disseminate trustworthy knowledge, aiming to strengthen countries' healthcare systems' pandemic preparedness infrastructure.

Last but not least, following a One Health approach, a **deep prevention upstream approach that addresses the root cause of the emergence of pathogens with pandemic potential should be taken** by the international community. Consequently, prevention, identification, and containment measures should be reinforced with the goal to preserve biodiversity, empower local communities and change humanity's relationship with wild and farmed animals. Furthermore, integrated surveillance and institutional data sharing should be enabled in order to take measures before a spillover or at the very latest contain an outbreak at the earliest possible stage. ●

# 1. Introduction

On the 5<sup>th</sup> of May 2023, the WHO officially declared the end of the global health emergency status for COVID-19<sup>1</sup>, turning the page of a pandemic which has had an unprecedented impact in the 21<sup>st</sup> century on our economies, populations, and relationship to health, resulting in drastic measures and enormous economic and social costs.

COVID-19 not only killed millions and created socio-economic turmoil globally, but it also highlighted significant shortcomings of existing rules regarding pandemic PPR, namely the IHR (2005). To a large extent, the international community failed to show solidarity and equity in response to the coronavirus disease. Notably regarding research & development, manufacturing and distribution of pandemic-related countermeasures (vaccines, diagnostics and therapeutics) great disparities could be observed and common rules were missing. The crises also revealed health systems' weaknesses with limited health emergency prevention and preparedness systems in place and limited collaborative genomics networks for surveillance

and global sharing of emerging pathogens. Finally, drivers of the (re-) emergence of disease at the human-animal interface were (and still are) insufficiently being addressed.

While COVID-19 has left its mark on people's minds, its appearance is part of a broader trend of increasing pandemic risks. Indeed, in recent decades, two to three new infectious agents have appeared each year, and zoonotic infectious diseases, i.e. those that can be transmitted between humans and animals, have been on the rise since the 1980s<sup>2</sup>. Thus, compared to an average of one pandemic per century before the 20<sup>th</sup> century, humanity has already recorded six since the beginning of the 21<sup>st</sup> century with SARS, H1N1 influenza, MERS-CoV, Zika, Ebola, and COVID-19.

Drawing from the experiences made since early 2020, and in the context of the high risk of future infectious disease crises, the international community agreed to draft and negotiate a WHO convention, agreement or other international instrument on pandemic prevention, preparedness and response. Member States are currently discussing the so-called Zero Draft<sup>3</sup> and aim to submit a final version to the 77<sup>th</sup> World Health Assembly (WHA) in spring 2024 under WHO Constitution .

### **Global lab project: context and methodology**

While negotiations are moving ahead, foraus organised the participatory process “Global lab: Protecting the world from future infectious diseases crises” between March and May 2023 bringing together more than 40 young thinkers and professionals around the important topic of pandemic PPR and generating innovative policy pathways. At the heart of this process was a one-day workshop organised in Geneva in March in the form of an interactive exchange between a cohort of students and professionals from the WHO, the International Federation of Pharmaceutical Manufacturers and Associations (IFPMA), the Global Health Centre, Four Paws, and Medicus Mundi International. During the workshops foraus' policy crowdsourcing methodology, Policy Kitchen was used. The bold question asked to participants was: What measures should the international community adopt to strengthen the prevention of-, as well as preparedness and response to future pandemics by 2040?

This Project Brief is the fruit of these discussions held around pandemic PPR and presents four visions written by 22 students and researchers from the University of Geneva and the Graduate Institute to improve health system capacity, monitor infectious agents more efficiently, ensure more equitable manufacturing and distribution of pandemic-related countermeasures such as vaccines and address root causes of pandemics. The focus is put on three main action areas: equity, health system capacity and prevention using participatory foresight and backcasting methodologies. After identifying the main challenges in these areas, the authors develop visions of hypothetical realities in 2040 in which these challenges were addressed and propose policy plans with measures to be taken in 2024, 2026, and 2030 to reach the 2040 visions. The main policy recommendations that should be implemented by the global state community with the support of the private sector, academia and civil society organisations, and under the guidance of the WHO and other relevant international organisations, are detailed in the conclusion in chapter six.

Before diving into the following chapters, two important comments need to be made. First, pathogen and benefit sharing is undoubtedly an important challenge to address in the ongoing negotiations of a new pandemic legal instrument. Yet, it was not included in this Project Brief as it would deserve a publication for itself and has been greatly discussed in the literature already. Second, none of the issues identified across different sections of this Project Brief are mutually exclusive. There are multiple interactions between health systems' capacity-building, surveillance, and equitable access to medical countermeasures. A degree of issue compartmentalisation is exercised to provide realistic, feasible policy recommendations that can feed into the larger interactions between the aforementioned areas. ●

## 2. Equity in distribution of health technologies & products

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A transnational health crisis, pandemic or otherwise, tests the international community and all its actors. With the outbreak of the COVID-19 pandemic, the world saw the detrimental effect of different state responses. Historical inequities between developed and developing nations resurfaced boldly.

Notably, despite previous calls to coordinate health crises responses at the multilateral level, the COVID-19 pandemic further highlighted gaps in countries' collaboration and assistance, which aimed primarily to protect national interests.<sup>4</sup> Equitable access to health technologies, such as medical countermeasures, was affected by ruptures in international trade flows in three key areas: (i) supply chains and logistics networks, (ii) deep regional inequalities in R&D, and (iii) disparities in local manufacturing capacity. Chapter two of this Project Brief examines these three areas in detail.

The equal access and distribution of safe and effective pandemic-related products, such as Personal Protective Equipment (PPE),



vaccines, therapeutics, and diagnostics, is critical to effectively respond to disease outbreaks. Ensuring fair distribution and equitable access by every state is crucial to combat the adverse effects of disease outbreaks. Given that “no country is self-sufficient in the research, development, and production of all countermeasures”<sup>5</sup>, expanding access to and distribution of medical countermeasures is in the interest of all countries.

### **Absence of a functional global Supply Chain and Logistics Network**

There are two major reasons driving deficient global supply chain and logistics networks, leading to protracted health crises:

- A. The lack of agreement on the type and size of products needed for robust pandemic PPR. This includes the lack of agreement on costs, logistics for strategic stockpiles, and regular epidemiologic risk assessment. The extent to which these would be needed varies largely on the characteristics of each individual disease, however, states can agree to an initial standard that will make them better placed to tackle emerging health threats than the current ad hoc system.
- B. Limited regional and multilateral purchasing mechanisms and limited transparency in the cost and pricing of elements along the supply chain.

Notably, present global arrangements governing access and distribution of medical countermeasures are based on informal norms and goodwill rather than binding commitments at the international level. As described by Suerie Moon et al., existing international frameworks “are thin, gap-ridden or simply non-existent”<sup>6</sup>.

Additionally, the impact of funding medical countermeasures for their global equitable access and distribution should not be understated. For instance, linking medical conditions with R&D funding allows investors to have a say in the development, production, and subsequent distribution of such health products. Thus, they may influence the geographical distribution, quantity, and price of the final products. Possible investor demands can include: requiring product developers and distributors to ensure affordable pricing for certain markets (notably, for those most affected by the health crises);

requiring addressing gaps for adequate supply volume and timeline commitments; requiring addressing the right of a purchaser to make a pooled procurement of medical product to other countries in need.<sup>7</sup> These stipulations can all be included in “funding-procurement agreements” (including pooled procurement, such as COVAX/CEPI<sup>8</sup>).

### **Unequal distribution of R&D capacities of pandemic-related products, limited knowledge-sharing mechanisms, and transparency on R&D spending**

COVID-19 also exposed inequitable access to medical countermeasures. Local R&D capacities should be equitably initiated, amplified, and sustained over time through a rights-based and climate-wise global health approach. R&D entails multiple aspects such as sources of funds, access to Potential Pandemic Pathogens (PPPs) genomics, lab and storage capacities, knowledge-sharing<sup>9</sup> and intellectual property rights. The latter should be interpreted in light of certain “flexibilities” and safeguards to protect public health and promote access to medicines for all, such as the ones provided by the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement)<sup>10</sup>.

Continuous R&D investments have led to advances such as using medical Artificial Intelligence (AI) software for speedy disease surveillance and detection. Future knowledge-sharing resulting from R&D investments shall include timely information responses to outbreaks of any size to ensure pandemic preparedness and response. It shall also include benefit-sharing linked directly or indirectly to the concerned PPPs genomics access. Significant infrastructure developed since the COVID-19 pandemic for rapid data sharing has maximised the ability to restrain outbreaks in a timely manner.

### **Unequal global distribution of manufacturing capacity of pandemic-related products**

The COVID-19 pandemic has exposed the unequal global distribution of manufacturing capacity for pandemic-related products, particularly in LMICs. The uneven access to essential medical supplies, including personal protective equipment, diagnostic tests, and vaccines, has resulted in devastating consequences for the latter.

The lack of adequate manufacturing capacities in LMICs has led to an unhealthy dependence on the Global North. This disparity is made worse by having entire regions without any manufacturing capacity for pandemic-related products while conversely having numerous factories concentrated in other regions. This ultimately leads to a scarcity of essential medical supplies and exacerbates the pandemic's impact on vulnerable populations once a pandemic ensues.<sup>11</sup>

In light of the challenges presented above, the following vision addressing them is proposed for 2040.

#### Vision for 2040

It is 2040, and the world has an equitable Global Supply Chain and Logistics Network that is regulated, transparent, and governed by international law. States recognised the benefits of global cooperation and tight collaboration for a more efficient pandemic preparedness and response. Additionally, mankind has achieved equitable manufacturing capacity and R&D for pandemic-related products in all regions, particularly in LMICs.

This could be achieved through an R&D investment framework based on foreign direct investment or development assistance for health, building sustainable manufacturing capacity through regional corporations and globally funded mechanisms supported by agencies such as the World Bank, and promoting concrete international collaboration through global and international institutions, targeted towards the Global South.

#### Policy Plan

##### In 2024:

- Further invest in surveillance and monitoring tools to evaluate pandemic potential and resource allocation more efficiently.
- Promote R&D to encourage medical innovation that will support disease detection and spread.

##### In 2026:

- Support regional capacity building to encourage decentralisation of the production and supply chain of medical countermeasures.

##### In 2030:

- Establish a universal procurement and distribution platform.
- Agree upon a legal framework that will govern the above-mentioned platform. ●

# 3. More efficient and reactive health systems

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## How digitalisation will redefine health system capacity

Healthcare workforce capacity during public health emergencies can be overwhelmed by the sudden increased demand of healthcare services. For example, during the COVID-19 crisis in Switzerland, redeployment of hospital resources and decrease in the hospitalisation rate of non-COVID-19 patients were observed, as well as a decline in the quality of care<sup>12</sup>.

Digital health services could alleviate the burden of healthcare systems and the shortage of workforce, as they provide cost-effective and accessible care, increasing patient's empowerment and self-management. Specially on public health emergencies, they are necessary for surveillance, early detection, preparedness and response<sup>13</sup>. The use of digital technologies during an outbreak could prevent infection spread through telemedicine, predict future outbreaks for optimal healthcare resource management, vaccine development or data-driven measures and ordinances<sup>14</sup>.

For all of the above, digital transformation of healthcare is a growing demand in OECD countries, such that the proportion of Primary Care Practices (PCPs) adopting Electronic Medical Records (EMRs) has increased over time. In 2021, the average of PCPs using EMRs was 100% in 15 countries and 93% in 24 countries. Patient interaction with their health data via digital tools (internet portals, apps) was noted in 16 countries, while half also offered telehealth services, such as teleconsultation and remote monitoring<sup>15</sup>. Switzerland has been slow to digitalise healthcare compared to other European countries, ranking 14<sup>th</sup> out of 17 in the 2018 Digital Health Index conducted by the Bertelsmann Stiftung<sup>16</sup>. At the same time, the country is home to 900 healthcare startups and its population has high coverage of broadband internet, which could help modernise healthcare at low costs, without negatively impacting payers or providers<sup>17</sup>.

While there is immense potential, the implementation of digital health services still faces challenges that should be addressed by decision-makers. Future public health strategies should focus on digital literacy and equal access to digital health services, also known as “techquity”. In addition, the ethical, legal and regulatory basis for the application of digital technologies and the public disclosure of clinical data should be in conformity with the EU General Data Protection Regulation, as data security and transparency, international data operability and transfer are a rising concern for research practices and medical products’ safety and efficacy trials<sup>18</sup>.

In light of the potential of digitalisation for health systems’ ability to manage health emergencies more effectively, the following vision is proposed for 2040.

### Vision for 2040

It is 2040 and digitalisation is a key component of the international community's pandemic PPR scheme enabling targeted intervention and alleviation to health systems in case of large-scale disease outbreaks. The use of digital tools and technologies is prevalent within the healthcare system capacity-building, workforce, and training. More generally, the usage of digital technologies and tools is mandatory within healthcare processes. Three main elements have

enabled this positive change:

1. Digitalisation and automation of processes, including the adoption of telemedicine, mobile health, and health information technologies.
2. The creation of a financially secured global digital health centre in Switzerland.
3. Robust regulations for the infrastructure used - through policy-making that is driven by science.

## 1. Digitalisation and automation of processes will lead to the transformation of the healthcare workforce

Automation will reduce initial health contacts, regular checkups, and clinical visits through technological solutions that connect with out-of-hospital settings, cloud-based technology to support access to information from any location. It will also be critical as decision support technology using predictive analytics and AI in clinical settings, telemedicine, wearable devices, medical hotlines as well as personalised and preventive care. Digital health literacy will be part of basic education to foster public trust in digital health technologies<sup>1920</sup>. A successful shift from sickcare to hybrid healthcare prioritising promotion of preventive and patient-centred health while addressing social factors for well-being will have been achieved.

Automation will drive health care equity and Universal Health Coverage (UHC) will be linked to digital healthcare. UHC will cover prevention and personal care in addition to treatment.

## 2. Establishment of a global digital health centre in Switzerland

Currently, Switzerland has several fronts in the global digitalisation arena with concentrations of the private sector (e.g. Google, IBM, META, etc.) and academia working on automation and robotics technologies (e.g. ETHZ, EPFL). Geneva with numerous international organisations, NGOs, civil society organisations and the AI for Health initiative focuses on policy-making. Together with Switzerland's long-standing tradition of neutrality, we envision the establishment of a

well-coordinated, cross-sectoral, and globally leading centre for digital health collaboration.

### **3. Robust regulations for infrastructure used - through policy-making that is driven by science**

Switzerland will host and support strong science-policy and science-diplomacy organisations<sup>21</sup>, infrastructures, orchestrated research, and strategy, including private-public collaborations as a standard in care delivery. In time-sensitive national health care crises, faster, centralised decision-making is needed and an emergency strategy with a science-informed centralised approach to protect at-risk groups, suppress viral spread and apply flexibly stringent measures that adapt to time sensitive developments could take into account the long-term evolution of a crisis, improve public acceptance and outcome.<sup>22</sup>

## **Policy Plan**

### **In 2024:**

- Foster multilateral collaboration: Build enforcement capacity, minimise digital health monopolies, foster digital collaboration, counter misinformation with best science communication.
- Invest in development of digital health technologies and practices, such as digital health literacy, telemedicine and remote monitoring apps, to lay the foundation for more extensive health system integration.
- Strengthen regulations at national and regional levels for the use of digital health infrastructure, concentrating on data protection, privacy, and fair access based on good practices and assessments made as part of the European Health Data Space currently being negotiated within the European Union<sup>23</sup>.
- Along with automation, mobilise the social workforce, using social prescribing and community care support initiatives.
- Secure Human Rights through data literacy, risk assessments & event responsiveness, and bridge the “digital divide” by engaging international organisations, non-governmental organisations (NGOs), civil society organisations (CSOs), and other initiatives such as AI for Health.

**In 2026:**

- Reinforce public-private collaborations on supply chain management and ethical digital health practices, stressing the accountability of Swiss tech giants and financial institutions.
- Extend and deepen international partnerships to maintain ongoing support for LMICs, with a focus on capacity building and long-term resilience.
- Evaluate the efficacy of educational programs and training endeavours, implementing necessary changes to secure a proficient and flexible healthcare workforce.

**In 2030:**

- Create a digital health centre by collaborating existing academic and private sector institutions and international organisations, NGOs, and CSOs, to jointly forecast the demand and supply of health services using data that emerged prior to 2030;
- Provide continuous funding and technical support for digital literacy and education of health professionals and the public related to health technologies developed by the Swiss government and the international community in Geneva.
- Promote these effective technologies and regulatory policies in LMICs through Official Development Assistance (ODA). ●



# 4. Improved health system surveillance capacity

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## **Sharing and caring: the construction of collaborative genomics networks**

Surveillance is a pivotal element of a successful PPR strategy, as it provides timely information for decision-makers to avert possible negative impacts on population's well being. Yet, despite the advances and the learnings from the recent COVID-19 pandemic, there is still ground for improvement. This chapter identifies four areas of action to enhance health system surveillance capacities: regulation, collaboration, communication, and inducements. After a brief revision of each element, a set of goals and recommendations is laid out for decision-makers to consider. Let us dive into each element:

**Regulation:** Current international regulations, among which the newly proposed Zero Draft for a Treaty or a Convention on Pandemic Preparedness, have significant gaps regarding collaborative genomic networks, definitions for dangerous pathogens, information sharing,

among others. At a local level, the operationalization of regulations regarding flow of goods and people (transportation, handling, inspection) remain burdensome for fast pandemic response.

**Collaboration:** Currently, there is a need to improve prevention, preparedness, and response to upcoming pandemics through collaborative genomic networks such as the Global Initiative on Sharing Asian Influenza Data (GISAID) or the International Nucleotide Sequence Database Collaboration (INSDC).<sup>24</sup> There is a lack of cooperation between parties of these networks worldwide. Contributing to this are the facts that there are low incentives for the creation and sustainment of such networks, as well as for the dissemination of knowledge without incurring in malpractice or criminal offence.

**Communication:** There is a lack of communication between countries around genomic data sharing of infectious diseases. Albeit its efforts of routine risk assessment, WHO needs to do more to efficiently deliver pathogen information to countries<sup>25</sup>. This results in delay of rescue time and development of prevention methods. Moreover, although there is a growing need in monitoring the mutation of SARS-Cov-2 variants within countries themselves, communication between official parties (hospitals and government agencies) is still deficient. Additionally, data sharing options currently range from open access databases without any restrictions (US GenBank and European Nucleotide Archive) to databases with restricted access, like the Global Initiative on Sharing Asian Influenza Data<sup>26</sup>. Restrictions are usually caused by existing issues in different legal systems as well as ethical concerns that vary between countries. Hence, communication of genomic sequencing between countries is challenging. Furthermore, calls for diversity in genomics have motivated new global research collaborations across institutions with highly imbalanced resources. The discordance between the greatly acknowledged benefits of diversity in genomic studies versus the lack of partnerships between high-income and LMICs is a great issue<sup>27</sup>.

**Inducements:** Financial and professional incentives are oftentimes cited as a source of weakness in healthcare systems capacities.

During the COVID-19 pandemic, only 37% of countries shared the variants of concerns they had identified with 25% of these countries sharing less than 25% of the genome sequence<sup>28</sup>. Two of the main issues identified were the following: 1) there is no correct incentive for sharing the information if you are a scientist; and 2) there is low participation of researchers in the final applications of their research.

In light of the challenges presented above, the following vision addressing them is proposed for 2040.

#### Vision for 2040

It is 2040 and the IHR (2005) have been modified to centralise pandemic information within the WHO secretariat and countries count with dynamic pandemic response units that feed a centralised WHO database. The IHR have been modified to include pandemic, pathogens of

interest definitions, the formalisation of Collaborative Genomics Networks, and sets of incentives to disseminate trustworthy knowledge, aiming to strengthen countries' healthcare systems pandemic preparedness infrastructure.

### 1. Regulation:

- Momentum should be seized to promote the definition and expansion of “pathogens of interest”, “pandemic”, and “pandemic tools” in the IHR (2005) or associated regulatory initiatives such as the Zero Draft for a Pandemic Preparedness Treaty or Convention. Pathogens of interest should at least include diseases with high spread risk, like respiratory conditions.
- IHR or associated regulatory initiatives should provide governance to information sharing, with a hub established and run by WHO, linking with individual agencies at a country level. Responsibilities of both the WHO secretariat and the units at country level should be clearly established by the IHR.
- Country-level regulations should be adjusted to comply with IHR's modifications for speedier processes regarding transportation and handling of physical pathogenic samples.

### 2. Collaboration:

- Perform actions including: fostering global partnerships, creating cooperative research networks, improving data sharing, increasing capacity, and fostering openness and trust.

- International collaboration should help coordinate efforts to strengthen Collaborative Genomics Networks. Their creation will allow researchers to share genomic data and research findings that can lead to the development of more effective vaccines and treatments for infectious diseases<sup>29</sup>.
- The tracking of infectious disease transmission and the development of targeted responses can both benefit from improved data sharing and coordination between public health organisations and research institutions<sup>30</sup>.

### 3. Communication:

- Internationally, setting up a system where the information about the most dangerous pathogens is shared. Scientists will get recognition for their work without it being subjected to individual country constraints or private funding.
- The legal framework between countries should be made flexible enough to quickly respond to situations of emergency.

### 4. Inducements:

- Alongside improved international collaboration, investing in genomics surveillance is critical to preventing and preparing for future pandemics and providing incentives to researchers can facilitate this process.
- Academic institutions should promote data sharing by providing promotions and tenures to researchers. Moreover, academic recognition and other professional rewards can be seen as meaningful encouragement for scientists.
- Financial benefits by prioritising funding and grants for researchers can equally provide incentives to researchers to share relevant data.
- Intellectual property frameworks can be redesigned to allow for open-access policies for research related to pandemic surveillance and preparedness.

## Policy Plan

### 2024:

- At a national level, policy should be focused on creating the dichotomy of normality-emergency drawing on lessons from COVID-19 to establish which processes could be made more flexible without compromising the quality, safety or efficacy of final products. Work should carry on regarding modifications of IHR and the establishment of either a Convention or a Treaty for Pandemic Preparedness.

### 2026:

- Creation of Collaborative Genomics Networks through professional development incentives to capture financing sources from capital markets.

### 2030:

- Consolidation of existing Collaborative Genomic Networks to enshrine data sharing efforts and mechanisms in global pandemic PPR efforts. ●

# 5. One Health: Going beyond human health to prevent future pandemics

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## **Recognizing the Inherent Links Between Human, Animal, and Environmental Health for a Sustainable Future**

The number of re-emerging infections and new infections originating in animals (i.e. zoonoses) have increased. About 60% of globally reported emerging infectious diseases are transmitted from wild and domesticated animals. In the last three decades over 30 new human pathogens have been detected, of which 75% originated in animals<sup>31</sup>. This calls for improved surveillance to quickly detect as well as strengthened diagnostic capacities to identify emerging pathogens. Humans have changed their behaviour: the way we live, encroaching into forest populations or areas where animals reside, creates pressure on local ecosystems. Changes in land such as the building of dams as well as changes in food and agriculture systems further stress ecosystems and create new opportunities for diseases to emerge and spread. Our existing surveillance systems are either heavily biased towards human health or too fragmented in between

sectors, thus neglecting almost entirely the dynamics of pathogens in the animal and environment sector. Our perception of prevention has been exclusively anchored around preventing the spread of diseases, rather than preventing the spillover from animals to humans, causing our response to emerging zoonosis too late to prevent outbreaks and pandemics<sup>32</sup>.

In light of the above-mentioned challenges posed by a human health-centred approach to pandemic surveillance and prevention, the following vision addressing them is proposed for 2040.

#### Vision for 2040

It is 2040 and One Health<sup>33</sup> has been integrated into our normative regime as a guiding principle, as our understanding of health transcends its current human-centric bias. As a result, our global, regional, and local mechanisms will prevent pandemics through a deep prevention upstream approach that addresses the root cause of the emergence of pathogens with pandemic potential. Consequently,

prevention, identification, and containment measures are reinforced with our desire to preserve biodiversity, empower local communities, change our relationship with wild and farmed animals, and enable integrated surveillance, and institutional data sharing in order to take measures before a spillover or at the very latest contain an outbreak at the earliest possible stage.

#### Community involvement and indigenous wisdom

Continued land use changes increase pressure on existing ecosystems making them more vulnerable and increasing the risk of the transmission of emerging disease in animals to humans. The way we use land is one of the biggest threats for biodiversity loss. This concerns the conversion of land covers such as forests or other natural habitats for agricultural and urban uses. As agricultural expansion continues, we must reconsider the ways in which we grow and consume to reduce pressure on ecosystems<sup>34</sup>.

One of the key ways to prevent biodiversity loss as well as the re-emergence of disease at human-animal-environment interface can be through the application of Traditional Knowledge by Indigenous Peoples. Traditional Knowledge refers to innovation, knowledge, and practices of Indigenous Peoples that's been developed through centuries of experience<sup>35</sup>. As original custodians of the land, Indigenous Peoples are the cornerstone of biodiversity and conservation<sup>36</sup> and,

in fact, conserve about 80% of the world's biodiversity<sup>37</sup>. Indigenous values are already embedded within the One Health approach but are often overlooked<sup>38</sup>. By incorporating Traditional Knowledge with Western science we can address fundamental challenges including sustainable food production, ways to adapt to climate change and stewardship in sustaining thriving habitats<sup>39</sup>. Some of these sustainable practices include the move to permaculture, agroforestry and soil fertility management<sup>40</sup>. It's important to note that the application of these efforts need to be adapted geographically in collaboration with the communities who know their particular region best as Indigenous Peoples are not a monolith and each community's practices vary from one another. Community engagement can further drive these changes through knowledge sharing within local communities such as through food security workshops that enable community members to mobilise and put these approaches into practice<sup>41</sup>. By ensuring Indigenous peoples and local communities that come into daily contact with animals and pathogens are included in decision-making processes we can transform our relationship with our environment and create systemic change. In this process, we must also ensure that Indigenous Peoples also benefit from sharing their knowledge and practices, both in monetary and non-monetary forms<sup>42</sup>.

### **Surveillance**

Collaborations at the intersection of human-animal-environment interfaces are predicted to increase due to COVID-19, thus it is important to ensure alignment of these collaborations towards addressing gaps identified in our pandemic PPR, including gaps in surveillance systems. A de-compartmentalised surveillance system based on the One Health approach is essential for early detection of pathogens with pandemic potential, especially emerging and re-emerging pathogens from the animal sector<sup>43</sup>. Most importantly, the geographical mismatch between One Health hotspots and One Health surveillance and laboratory networks needs to be addressed<sup>44</sup>. Resources for surveillance of pathogens with pandemic potential are disproportionately available in high-income countries<sup>45</sup>. Local capacity to detect and report the spillover of pathogens at their source is crucial in response-effectiveness and outbreak prevention,



indicating the importance for national capacity building for trained workforce, laboratory equipment, community engagement, and sustainable financing, supported by a global collaboration for sharing data, samples, and expertise<sup>46</sup>. With the idea of deep prevention, a One Health surveillance and laboratory network would enable a learning of potential drivers of outbreaks in animals and thereby prevent spillover from happening in the first place, or detect pathogen spillover at an early pre-outbreak stage in order to contain it<sup>47</sup>, thus shifting the paradigm from reactive to proactive prevention<sup>48</sup>.

The containment bias of the IHR (2005) could be addressed through extension of existing deep prevention approaches in self-reporting instruments such as WHO Benchmarks and the Joint External Evaluation (JEE)<sup>49</sup>. These tools need to evolve beyond voluntary modalities and become mandatory periodic exercises subject to external expert and peer reviews. Moreover, a potential pandemic treaty could propose strong language on the One Health approach, including deep prevention. Integration of toolsets in animal, environmental and human health sectors, specially across existing relevant instruments like the Convention on Biological Diversity (CBD), and and harmonising existing “One Health” assessment tools could realise the deep prevention concept<sup>50</sup>.

### **Institutional data-sharing**

Looking forward to 2040, institutional data-sharing has to become a focal point of preventing and containing the spread of infectious diseases. According to scholars, a multi-stakeholders data-sharing agreement encompassing private and public actors’ resources should enable researchers to overcome the barriers of accessing relevant data from for-profit firms<sup>51</sup>. Regarding the interplay between human and animal health, intra-institutional exchanges have to be promoted within the UN agencies to ensure that the sectoral compartmentalisation of UN agencies does not jeopardise efforts to bridge human and animal data usage. Informational ties with regional “national collaborative One Health coordinating mechanisms” such as those already deployed in Kenya and Vietnam<sup>52</sup> are to be generalised, as they directly address specific human-animal interfaces at a local level. The international financing of those mechanisms could be granted in exchange for the implementation of strict open-data policies.

## Policy Plan

### In 2024:

- Enshrine global political commitment by Member States and their relevant ministries with support from the Quadripartite to establishment of inter-sectoral One Health surveillance systems and laboratory networks through the pandemic instrument and the IHR.
- UNEP Member States and other non-state actors continue their work on drafting and, once in place, implementing the Post-2020 Global Biodiversity Framework with focusing on creating financing and accountability mechanisms to achieve the framework's targets<sup>53</sup>.
- Promote intra-institutional exchanges within UN agencies to bridge human and animal data usage and avoid sectoral compartmentalisation.
- Engagement with Indigenous communities globally to recognise their knowledge and efforts while also collaborating with Traditional Knowledge keepers to share their practices with the larger global community to address global challenges.

### In 2026:

- The Swiss government through the Swiss Development Cooperation (SDC) and other relevant ministries as well as UNEP provide technical and financial support to stimulate community initiatives in sustainable land management abroad while also focusing on sustainable land management in Switzerland to better balance use of remaining land resources<sup>54</sup>.
- Organise and plan for training and capacity-building of One Health workforce, including laboratory technicians, One Health epidemiologists, and scientists at national level.
- Establish national collaborative One Health coordinating mechanisms, similar to those in Kenya and Vietnam, to address specific human-animal interfaces at the local level.
- Begin implementing Indigenous practices to ensure sustainable food systems, conservation of biodiversity and in turn combating the effect of climate change.

**In 2030:**

- Local and regional governments work on the restoration of degraded and disused farmland to support the protection and restoration of critical ecosystems such as forests and wetlands<sup>55</sup>.
- Ensure laboratory capacity building, information and sample sharing, data collection and dissemination at local and national levels, through strengthening existing global collaborators and creating new ones.
- Develop a global multi-stakeholder agreement for institutional data-sharing to prevent and contain the spread of infectious diseases. ●

# 6. Conclusion

The world needs more efficient pandemic PPR rules based on principles of solidarity and equity that critically assess traditional public health approaches, and leverage the potential of collaboration and emerging technologies. This Project Brief provides four visions and policy plans to protect the world from future pandemics through more equity, capacity, and paradigm shift among global health systems by 2040. Main recommendations resulting from the four chapter's visions and policy plans are detailed in the box below.

The recommendations made by the authors highlight that the international community needs to tackle the issues at stake through a comprehensive and cross-sectoral strategy involving all parties to prepare our health systems to be more resilient and ready to operate effectively in case of future pandemic outbreaks. The private sector should notably be involved further regarding pandemic-related countermeasures and equitable research, development, manufacturing, and distribution of them. Together with academic

institutions and Member States, global health system surveillance capacities need to be strengthened and better coordinated under the auspices of the WHO Secretariat to ensure timely information sharing and rapid reaction on a global scale. Health systems need to be reinforced as COVID-19 highlighted weaknesses in case of health emergencies both in Global North and South settings. Digitalisation of health processes and systems at large has the potential to play a significant role in this regard if safeguards are being enforced regarding data protection, infrastructure is built up by public authorities and data literacy supported. Finally, to protect the world against future pandemics, root causes need to be addressed imperatively by going beyond the traditional human health approach. In this regard, a paradigm shift is unavoidable and red lines might have to be crossed in the medium term to reconsider the way humanity acts toward non-human animals and ecosystems with regard to animal farming and deforestation practices.

The visions, policy plans and recommendations formulated in this Project Brief do not have the ambition to provide a fully comprehensive set of policy measures to be taken. They should be rather seen as complementary views to the ongoing debates currently held among Member States delegates as part of the IHR revisions and negotiations of a pandemic instrument. Their aim is to constructively contribute to the public debate around pandemic PPR and future global governance schemes. ●

## Policy recommendations to protect the world from future pandemics



### Equity in distribution of health technologies & products

#### 1. R&D:

- Condition use of public resources by pharmaceutical firms to ensure universal equitable and affordable diagnostic and therapeutic access at the global level and guarantee transparency mechanisms around R&D of health technologies and products.
- Support R&D efforts to improve global health surveillance systems and countries' capacities to provide pandemic countermeasures to national health systems.

#### 2. Manufacturing:

- Governments and international organisations should promote international collaboration and technology transfer to enhance manufacturing capacity in LMICs and at the regional level.

#### 3. Distribution and procurement:

- Support global coordination of supply chains by establishing a universal purchasing and distribution platform such as COVAX and through the creation of legal instruments supporting such supply chains.
- Establish an internationally accepted "needs assessment" for emergency health crises which would allow for the evaluation of products needed in case of health emergencies and the subsequent equitable distribution of these.
- Support development of transnational funding-procurement agreements wherein product developers and distributors ensure affordable and differentiated pricing for certain markets (e.g. LMICs) along with a pooled procurement of medical products for countries in drastic need.

#### 4. Data management:

- Foster data sharing between all stakeholders by scaling up existing data sharing platforms and partnerships such as the Quadripartite alliance. Commercial interests should give due consideration and defer to public health emergencies and demands, especially in LMICs.
- Build off of the guidelines in prior international instruments such as the Paris Agreement (2015) and the Stockholm Convention on Persistent Organic Pollutants (2001) to establish an equitable system of technology and data co-development pertaining to pandemic preparedness and response; with special focus on capacity development within front-line countries and LMICs.



### More efficient and reactive health systems

- Invest in development of automation of processes, including digital health technologies and practices such as technological solutions that connect with out-of-hospital settings, cloud-based technology to support access to information from any location, critical decision support technology such as predictive analytics and AI in clinical settings, communications technology, mobile check-in and registration for patients as well as prevention-centred technologies.
- Create a global digital health centre in Switzerland taking the form of a financially secure health technology centre supporting public-private funding partnerships as an important part of technological advances, and promote ecosystems for automation, robotics, digitalization such as the Swiss Health Valley, Digital Switzerland, Switzerland Innovation, Future Health.
- Establish robust regulations for the infrastructure used - through policy-making that is driven by science: review and adapt regulatory frameworks in light of evolving technological advancements; reinforce public-private collaborations on supply chain management and ethical digital health practices, stressing the accountability of the private sector and financial institutions.
- Ensure data security and patient safety through clear and transparent national and international standards and regulations, cybersecurity and defence mechanisms to protect data from cyberattacks, well-managed medical device regulations and innovative technologies through timely and appropriate guidance.
- Commence international collaborations (e.g. via an international treaty) to provide financial, technical, and technological assistance to LMICs, prioritising robust health systems and pandemic preparedness.



### Improved health system surveillance capacity

- Use the traction gained through the COVID-19 pandemic to make the most pertinent amendments to the IHR (2005) and relevant regulations including: definitions for pandemic preparedness, a list of pathogens of interest, the establishment of cleared national units reporting to a centralised WHO secretariat, the formalisation of information sharing mechanisms like Collaborative Genomic Networks, as well as the design and enforcement of inducements for researchers
- Create space for partnerships at all levels (public-private, public-public, North-North, North-South, South-South) to disseminate information through the use of innovative technological tools like blockchain and AI.
- Focus on financing of information sharing mechanisms, data repositories reporting to a centralised unit run by WHO, through a mix of public funds and private capital.
- Design incentives ranging from intellectual recognition (both through public professional acknowledgement as through the use of IP rewards) to financial awards to ensure the sustainability of scientific research and knowledge dissemination.
- Through Collaborative Genomics Networks, Switzerland and the international community can strengthen their collaboration efforts to prevent, prepare for, and respond to future pandemics by implementing these measures.



### One Health: Going beyond human health to prevent future pandemics

- Integrate Indigenous and Traditional knowledge in strategies to pandemic preparedness and prevention and encourage Indigenous and community-led bottom-up initiatives to prevent re-emergence of disease as well as biodiversity loss at national level.
- Investment by Member States of the Quadripartite organisations in research to better understand the linkages between biodiversity loss and the health of the human-animal-environment interface and take measures to tackle the drivers of disease outbreaks and prevent spillover.
- Establish a global multi-stakeholder agreement for institutional data-sharing to prevent the spread of infectious diseases, promote intra-institutional exchanges, and financially support national One Health coordinating mechanisms in exchange for the implementation of strict open-data policies.
- Strengthen surveillance efforts and enable the prevention of spillover and upstream detection & prevention. Countries with the help of the Quadripartite must invest in integrated inter-sectoral surveillance systems, supported by trained professionals, sustainable financing, and sufficient technical and logistical infrastructure.



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# Endnotes

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