



People, politics and the governance of early warning and response for pandemics

*A story from Botswana and South Africa:
the detection of the Omicron variant*

REPORT | November 2022





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EXECUTIVE SUMMARY

Background

The Paris Peace Forum studied the case of the Omicron variant detection in Botswana and South Africa in November 2021, both in-country and internationally, to better understand the incentives and disincentives faced at different stages of early warning & response, of and inform global consultations.

COVID-19 has demonstrated how structures for reporting of disease threats cannot escape politization; in the global response, concerns around sovereignty, electoral processes and global reputation at times trumped adherence to an agreed-upon system of transparency and timely reporting. This pandemic has shown the importance of thinking sharper and more politically about early warning – beyond the technical soundness of systems – to respond adequately to future outbreaks.

Pandemics, although they arise from a health threat, are a function of social, political, and geopolitical dynamics. They reflect the way in which global governance actors, and mechanisms for their interactions, orchestrate the sharing of vital intelligence on new emerging pathogens, health threats, lockdowns and travel bans, the allocation of health technologies and the sharing of intellectual property. They also reflect the way in which national and regional interests calibrate in response to global threats. And crucially, they reflect the interaction between every level of governance, from local to global.

This work focuses on informing efforts to improve early warning and response systems by better navigating political trade-offs between sovereignty, local and national interests and global health security, with a focus on the interactions between local, national, regional and global levels; the role of non-state actors; and the need to overcome the North/South and East/West divides on some of these issues.

Findings

During this case study, we found that current negotiations to reform the global health architecture are at risk due to distrust in the Global South towards solidarity mechanisms, following the failure of the Global North to quickly demonstrate vaccine solidarity during COVID. Interlocutors are primarily looking for independence in future pandemic response beyond simple early warning to ensure that detection triggers an effective response, and are organizing collectively through regional and informal networks to pursue this objective.

The solution lies on the ground. Mission-driven scientists and effective scientific and data-sharing networks independent from political decision-making were crucial to identifying health threats early. Both scientists and authorities remain committed to transparently sharing their work with relevant decision-makers and their colleagues, although their capacities remain stretched and threatened by inadequate compensation for their work, and the risk of brain drain – which put a key part of any functioning early detection system at risk. The effective communication of scientific findings to authorities and the general public is also a decisive but tricky part of early warning and response that requires more attention.

Beyond early warning, actors are now dedicated to building thriving R&D and production ecosystems in the Global South. Interlocutors called for new financing models for pandemic preparedness, including fair benefit-sharing resulting from scientific discovery and contributions to innovation. Finding answers to these demands is foundational to maintaining

the proper incentives to ensuring that data and intelligence on novel threats is shared quickly and efficiently.

Recommendations

Pre-requisite to everything else: Open up global health architecture to rebuild trust between North and South

- The level of trust is currently so low that any Proposal for architecture reviews must **incorporate the Global South's determination to build new national or regional mechanisms** that afford independence and self-reliance to prevent, prepare for and respond to future health threats.
- They also should **ensure a redistribution of power** within governance and decision-making at global institutions emerging or being reformed, including in relation to the pandemic treaty and pandemic fund.

Protect, sustain & enhance scientific networks and cooperation

- Continue to **safeguard scientific independence from political influence**, both nationally and internationally.
- Recognizing the excellence of and key contributions from scientific actors on genomic sequencing in the Global South, **support the emergence of additional scientific centers of excellence** to strengthen pandemic preparedness in the Global South.
- **Strengthen and formalize existing scientific networks**, through South-South cooperation and beyond.

Support effective communication of scientific findings

- Establish and adequately finance communication as a **critical function of scientific institutions** on pandemic preparedness through **in-house expertise**. Develop globally connected communication resources and capacity.
- **Ensure due consideration for diplomatic and scientific situation reports** on scientific findings before taking drastic or restrictive measures when facing a health threat.

Secure new models to finance pandemic preparedness

- Continue to **strengthen or accelerate existing and future multilateral mechanisms** such as the pandemic treaty or the pandemic fund, and ensure that those new instruments are fit for purpose.
- Create **mechanisms that fairly compensate actors in the Global South and scientific community** to sustainably and predictably finance robust pandemic preparedness institutions according to their contribution to EWRS, knowledge and innovation.
- Specifically, **explore mechanisms for the industry to fairly compensate** health/scientific institutions for their research or sequencing data, as a way to ensure fair benefit-sharing for scientific knowledge.

The Paris Peace Forum may contribute to exploring and refining some of these possible models over the coming months.

INTRODUCTION

Another report on pandemic preparedness?

Pandemics, although they arise from a health threat, are a function of social, political, and geopolitical dynamics. They reflect the way in which global governance actors, and mechanisms for their interactions, orchestrate the sharing of vital intelligence on new emerging pathogens, health threats, lockdowns and travel bans, the allocation of health technologies and the sharing of intellectual property. They also reflect the way in which national and regional interests calibrate in response to global threats. And crucially, they reflect the interaction between the every level of governance, from local to global.

COVID-19 has demonstrated how structures for reporting of disease threats cannot escape politicization; in the global response, concerns around sovereignty, electoral processes and global reputation at times trumped adherence to an agreed-upon system of transparency and timely reporting. Delays in initial notification of the virus in China in December 2019, and late identification of key characteristics of the virus such as its airborne transmission were decisive in transforming an epidemic into a pandemic¹. **This pandemic has shown the importance of thinking sharper and more politically about early warning – beyond the technical soundness of systems – to respond adequately to future outbreaks.** With the risk of zoonotic spillover increasing², aggravated by climate change³, functioning early warning and response is decisive to avoiding a new pandemic from the health threats that are likely to emerge in the next 20 years.

This work focuses on informing efforts to **improve early warning and response systems by better navigating political trade-offs between sovereignty, local and national interests and global health security**, with a focus on the interactions between local, national, regional and global levels; the role of non-state actors; and the need to overcome the North/South and East/West divides on some of these issues. To better understand the incentives and disincentives faced at different stages of the decision-making process, and inform global consultations, the Paris Peace Forum studied **the case of the Omicron variant detection in Botswana and South Africa in November 2021**, both in-country and internationally.

During the Summer of 2022, the Paris Peace Forum team travelled to South Africa and Botswana to meet with top-level scientists, health officials, diplomatic missions, civil society and private sector representatives to study the discovery of the Omicron variant in November 2021. The aim of the visit was to develop a case study to inform global consultations on the political determinants of health, precisely on the conditions to govern adequately early warning and response.

“People inside systems”

Beyond white papers, action plans and strategic reviews, individuals reflect how institutions function and are driven, sometimes through informal networks of knowledge and information sharing. When faced with a pandemic, mission-driven scientists, civil servants and activists did their best to fight a pathogen threat, often with limited financial and human capacities. Though

¹ The Independent Panel for Pandemic Preparedness and Response, “Covid-19: Make it the last pandemic”, 2021. p. 21 “The earliest possible recognition of a novel pathogen is critical to containing it. The emergence of COVID-19 was characterized by a mix of some early and rapid action, but also by delay, hesitation, and denial, with the net result that an outbreak became an epidemic and an epidemic spread to pandemic proportions”.

² Nature, “[Want to prevent pandemics? Stop spillovers](#)”, 12/05/2022.

³ Nature, “[Climate change is making hundreds of diseases much worse](#)”, 12/08/2022.

critical for readiness for the next pathogen threat, those actors' already limited ability to weigh in on and lead current reform and preparedness efforts is further threatened by the prevalent multi-crisis.

While the global community considers early warning and response a global public good⁴, this ideal is not materialized in actual systems, which is causing skepticism in the Global South. Many health officials and practitioners in the Global South understand pandemic preparedness as an end-to-end system with the ultimate goal to save lives. In their view, **functioning early warning & response also requires having enough vaccines or treatments to fight a virus in due time**, without which detecting a health threat early is not sufficient.

Our interlocutors all aspired to more independence in future pandemic responses, by building health ecosystems from R&D to production. They called for **benefit-sharing of scientific data, and to incentivize scientific discovery coming from the Global South through new financing models**. Moreover, **the interest in the Global South for global initiatives is fading, because of the failure of existing solidarity mechanisms to bridge the equity gap**, and this wish for health sovereignty should be taken seriously to connect global initiatives to the local, national and regional level. This trust deficit is a threat for global health cooperation, and the Global North should repair this breach.

Power, networks, communication, benefit-sharing

Beyond the sovereignty paradox⁵ - threats' national and global implications on the one hand, and the pre-eminence of national interests and domestic politics on the other, **States and individuals seemed willing to report early when an outbreak occurs**. However, existing rules and mechanisms for reporting are not always applied and may not be sufficient to fight an outbreak. In fact, informal networks and mission-driven individuals seem to have been more reactive than formal mechanisms during key milestones of the Covid pandemic. In this respect, we found that scientific independence should be preserved while extending and formalizing existing networks. Once a threat is identified, messaging around this threat proves critical for appropriate response, and communication of scientific findings should be supported.

Overall, **early warning and response is not only about following rules to report and fight an outbreak. Its effectiveness mainly depends on balance of power, scientific networks, communication of scientific findings, and benefit-sharing from scientific findings**.

A story from Botswana and South Africa: the detection of the Omicron variant

We asked some of the key actors involved about their takeaways from the discovery and response to the Omicron variant of the SARS Corona Virus-2 (SARS-CoV-2). Here is the story coming out of their testimonies. This document adds a voice to calls for global equity, but more crucially it brings forward perspectives and lessons learnt from actors in the Global South at the forefront of the pandemic response.

⁴ International Task Force on Global Public Goods, 2006. *Meeting Global Challenges: International Cooperation in the National Interest*. Final report. Stockholm, Sweden. P. 5 "To illustrate the importance of generating greater provision of global public goods, we have focused on six whose provision is critical: preventing the emergence and spread of infectious disease; tackling climate change; enhancing international financial stability; strengthening the international trading system; achieving peace and security, which underlies and is essential to all the others; and the cross-cutting issue of knowledge.

⁵ Namely the tension between the need of transparency when facing an outbreak, taking into consideration obligations under international law.

In mid-November 2021, scientists in Botswana and South Africa sequenced a COVID variant which exhibited the same kind of mutations in many patients and a stark degree of mutation from any known circulation variants, including the most virulent at the time: Delta. The number of mutations and degree of difference between the as-yet unnamed variant (which would become known as Omicron) and Delta signaled the former's potential to escape immunity. Delta had 150 subvariants, but none was as different from the main strain, whereas Omicron had 50 mutations.

"Unusual lineage"

Scientists in both countries followed strict protocol, checking their laboratories processes to confirm the validity of their data, and then sharing their findings with their respective Ministries of Health (MoH) to launch contact tracing. One of them shared scientific data in an email to the MoH entitled "*Unusual lineage*". Without further reaction from the Ministry of Health, they published the sequence in an open database ([GISAID](#)) to classify their discovery.

There are differing versions about what happened next at the international level. It is agreed that shortly thereafter, scientists based in the UK declared their concerns with the unusual lineage. Some claim this was based on their data mining of the GISAID database, others, that it was a reaction to a scientific meeting preceding a press conference that these scientists had attended. Whatever the case, Botswana and South Africa are now duly credited with the discovery of Omicron, and a key lesson is that **strong transnational scientific networks allowed quick global identification of the threat**. Public authorities and scientists were willing to share scientific information as quickly as possible, as one of our interviewees detailed: "*Our politicians have always been on the right side, and we as scientists have a long tradition of sharing*".

In a few days, Botswana and South Africa suffered from the international community reactions and travel bans. **At the national level, the blame was laid on scientists. The message around the scientific finding was not transmitted adequately**, as it appeared that Omicron was not as lethal as Delta. Situation reports provided by both scientists and diplomatic missions on the relative danger of Omicron (mild virulence, natural immunity of the population, previous medical knowledge) were not reflected in the reaction of the global community.

This has contributed to a general feeling of discontent that could in future affect the rapidity with which information and analyses are shared with the international community. Moreover, scientists were not supported and prepared for communication with the media, and management of media misrepresentation: "*it was all over the news, I wasn't ready for this, and it made me very sad [...] there was miscommunication, some said the variant came from an HIV patient*". Omicron was by the time of detection probably already circulating all around the globe, and closing borders did not change the spread of this new variant. The WHO and the global science community rallied around their colleagues from Botswana and South Africa, alerting the world to the critical importance of sharing information for pandemic management. It was only after a few days that the narrative changed and scientists were depicted as heroes warning the world: "*It was like a rollercoaster, the President came, we were on the front page of the Boston Globe*".

The story doesn't end there. Our inquiry into the Omicron detection revealed a lot more than just its significance with respect to early warning and response. **The intuition of a tension between transparency and sovereignty when reporting viral threat was proven wrong for Botswana and South Africa**: all our interviewees' said information was shared efficiently for the Omicron variant, and every scientist, and both governments were firm in their continued commitment to sharing data in case of a new threat. **All our interlocutors connected their**

discovery to issues related to the relation between the Global North and the Global South, and fair benefit-sharing of innovation.

LESSONS LEARNED

A trust deficit threatens global health cooperation

When facing the Covid pandemic, some countries in the Global South, such as South Africa and Botswana did well on the scientific response, based on scientific expertise and existing technical capacities (see below). **Our interviewees understood their role as going far beyond early warning and saw a global failure in vaccine solidarity that affected their success:** *“We did three waves without any vaccines. When you don’t get vaccines during a year and a half, the population don’t want it, it’s all about what we assume to be the risk”.*

On the relation between the Global North and the Global South, their feeling goes beyond simple distrust. We found **considerable skepticism regarding multilateral institutions’ ability to deliver equitable access to health technologies, and to appropriately stimulate, recognize, and reward contributions from science in a fair way.** This skepticism is linked to previous experiences with global solidarity mechanisms, especially the lack of and delayed access to vaccines and medical countermeasures during the Covid pandemic. *“They are all singing the same song about breaking the cycle of panic and neglect, but vaccine solidarity was nothing more than a sympathetic gesture from the Global North [...] Words were not linked with actions”.* Our interlocutors were very vocal on what they described as *“profit-driven donations”*, namely contractual obligations to buy doses after an initial gift, and all called for strategic partnerships.

“You don’t need someone to teach you the shape of the spoon, but how to make the spoon”.

As a result, **Global South interlocutors are primarily looking for independence in future pandemic response** and are committed to building their own health ecosystems from R&D to production of medical countermeasures. **Political decision-makers are stepping in** and the rhetoric is changing: *“we shouldn’t be seen as recipients of aid, but as recipients of capacity building tools to help ourselves”.*

The Covid pandemic was described as a wake-up call for Botswana: *“when we figured out that we will not get them right on time from solidarity mechanisms, we pulled resources from everywhere, including large construction projects and now have a vaccination rate of 60% double-dose, equivalent to Germany”.*

The perceived gap between words and actions from the Global North is **limiting interest among respondents towards current negotiations for a pandemic treaty or fund on pandemic preparedness. Priorities are shifting towards regional institutions,** although actors remain open to opportunities to benefit from multilateral solidarity mechanisms.

Mission-driven scientists and effective scientific and data-sharing networks

Building on the Omicron detection in South Africa and Botswana, we found that early identification of a health threat was possibly only thanks to the quality work of scientists and scientific networks. While not diminishing the decisive role of States in information sharing, **scientists are at the heart of early warning and response. Their independence from political decision-making is decisive** to raise awareness about health threats in a timely manner. Domestic context and political considerations need not be blocking points when reporting a

health threat, provided scientists have a degree of protection from direct political influence. Open channels of communication with regional and global institutions (Africa CDC, WHO) help overcome constraints on information sharing.

“Of course I am an activist, I have been an activist for the last 25 years”

Scientists are at the heart of early warning and response systems not only because of their function, but because of their commitment to the general interest: *“our work is translational: how to help better manage patients? How to share our results to public health officials to allow them to act at the policy level? How to negotiate affordable access to medical products/therapeutics?”*.

Scientists benefit from their knowledge and lessons learned from other diseases. Their expertise allow them to react adequately and to inform political decision-making. **All research facilities credited the existing capacities related to HIV as critical to make a rapid pivot for COVID**, namely surveillance capacity through bioinformatics to monitor the spread of the virus and understand how it is changing. Building on existing capacities and their experience from Covid, **they are now developing new technology and knowledge for other infectious diseases** which are becoming endemic or reemerging as a consequence of climate change, as well as beyond a specific disease-approach. They also credit past experience with HIV with the potential to design response that takes account of stigma and discrimination, and allows individuals and communities to feel safe in reporting unusual disease, contributing to surveillance and seeking treatment.

Among scientists, **one gap identified was on the One Health perspective**: interviewees surfaced the lack of integration between animal and human health, and the resulting lack of visibility to understand the drivers of zoonotic diseases. They criticized hotspots maps and called for a more integrated approach based on data beyond modeling.

On the initial response to the Omicron variant, we found robust and active mechanisms for data sharing between scientific networks, also contributing to mutual reinforcement of capacity and information exchange. **Mission-driven scientists remain committed to transparently sharing their work with relevant national authorities and their colleagues through appropriate networks and databases**, such as through GISAID in the case of Omicron.

“The rising tide lifts all boats”

Some respondents were also deeply committed to building informal South-South scientific networks, in Africa and beyond⁶, as part of an effort to ensure that infectious disease science becomes led by the Global South. For example, Professor Tulio de Oliveira (Stellenbosch University) is developing a South African network on genomic surveillance with more than 500 scientists, and committing significant resources to transferring scientific knowledge. He is focusing on early identification and categorization of pathogens, which he feels is the key to more effective pandemic preparedness. **Global South scientists’ efforts to strengthen capacities and share expertise also serves to better understand viruses while keeping “data credit”, and not to rely on Global North institutions to go beyond the first phase of sequencing**

⁶ Science, “An advocate for Africa”, 06/10/2022. “De Oliveira was also set on training Africans and reversing the scientific brain drain that he saw drawing top young African talent to train in rich-world laboratories—from which many didn’t return. To date, he has trained scientists from 39 African countries, he says. Over the past decade, he estimates he and Richard Lessells, an infectious disease physician at UKZN, have also trained “easily between 5000 to 10,000 medical doctors and nurses” to use pathogen sequencing to understand outbreaks and apply targeted treatment” [...] He envisions multiple campuses in several African countries, delivering hundreds of opportunities for budding local scientists and forcing the world to contend with Africa as a scientific power. ‘My dream is to show the world that the global South—Africa, Latin America, and Southeast Asia—are the best place in the world to identify new pathogens and control them”.

a **virus**. Despite this commitment and potential, these networks remain fragile as they rely on the goodwill of a limited number of individuals with restricted resources. Moreover, the risk of brain-drain is strong as the best scientists risk getting tired of this lack of resources and be tempted to accept more attractive offers.

Effective communication of scientific findings: a critical and challenging part of pandemic response

Beside simple data sharing, communication of scientific findings to authorities and the general public is a decisive part of early warning and response, with whole-of-society implications that respondents' testimonies clearly illustrated. Rapid communication of pathogen data relies on sound understanding by authorities, as we saw with the "unusual lineage" story. A lack of scientific understanding by the latter can otherwise contribute to either under-evaluating or overreacting to a health threat.

"People just want to know what's going on"

Given trust deficits towards science among segments of the general public, messaging of scientific findings must be carefully crafted to effectively improve and legitimize early response. Our interlocutors felt strongly that the general population had no fundamental issue with information-sharing of scientific data. However, disinformation, lack of trust in science, or simply bad messaging could cause terrible damage to a fight against a virus through vaccine hesitancy or even reluctance to take any precautionary measures: *"some people pictured BA.5 as a hazardous variant, but it was not as bad as they thought because of natural immunity"*.

Despite this, most scientists do not have appropriate resources to communicate with the general public about pandemic threats. They largely lack both appropriate training and access to support and expertise. Some of them trained themselves to share scientific results to both authorities and the public, and often developed direct contacts at the highest political level either nationally or internationally: *"We helped them with the message, but sometimes it's not enough when you are caught inside a storm"*. The multifaceted effects of pandemics expose scientists to personal and professional risks if associated with media coverage of a health threat: *"some of us almost lost their job"*.

Effective early warning relies on capacities and resources for future response

As detailed above, interlocutors did not dissociate capacities for early warning from those for response to a health threat, because there was limited interest in working on early warning without assurances that this would ultimately contribute to saving lives. In this respect, respondents were committed to help build thriving R&D and production ecosystems in the Global South based on the perceived lack of international equity during COVID. They consistently shared their **will to build preparedness and response capacities to be as independent as possible** in the event of a next pandemic.

They emphasized the crying need for national, regional and global investments for medium- and long-term capacities, as it is difficult to predict the value of scientific innovation long in advance of its potential practical application, as was the case for HIV investments in the COVID response. The need for political engagement through long-term investments was repeatedly expressed, linked with a reluctance to rely solely on existing or future solidarity mechanisms.

Nascent initiatives such as VacTask⁷, or the African Medicine Agency are being launched, and could offer answers to this need should they prove successful.

The community of scientist is keenly aware of the importance of politics and its impact on access to health technologies within and among countries. But beyond public investment, interviewees were also aware of the complexity of vaccine manufacturing.

“Some countries have nationalist reactions like ‘we don’t need the rest of the world, we will develop our own technology’, which is unrealistic. First-generation Covid vaccines have been developed by large international groups, helped by long-term R&D public/private investments [...] No one could develop a vaccine only from government money only during a pandemic”

Unequal access and distribution of resources during the COVID pandemic was cited as a major reason for lack of trust in existing health financial investment mechanisms and approaches for the continent. Specifically, **interviewees were very vocal on the need for fair benefit-sharing resulting from scientific discovery and contributions to innovation**. They asked for alternative financing mechanisms able to address unequal capacities and to compensate all actors.

The scientific success of the Omicron variant discovery did not lead to any compensation, partly because of grants terms requiring scientific institutions to submit their findings in open-source. Their data were used to build second-generation vaccines, but *“we will not make a single dollar from this discovery”*. Scientists are calling for “data credit”, and were very vocal on existing practices regarding data collection: *“some funders ask us to send our samples so they can analyze them, and to send them our best students [...] That’s what they do, they are coming to countries, freezing the best samples and taking them back, that’s not how you build scientific capacities”*.

Being compensated for their scientific finding is not a profit-driven wish, but is rather considered essential to ensure sufficient funding for scientific institutions: *“our national health institute is giving us a grant that is keeping us going, but we can’t build a proper team, and we often have to wait 2 or 3 months for an enzyme”*.

Scientists are starting to look at regulatory instruments to make their institutions profit from their work and strengthen capacities. However, they often face complex environments where public support, but also lawyers and business consultants are needed to take a product to market: *“we need to package intellectual capital and learn a new language to commercialize products from our findings”*. Intellectual property regimes are seen as a blocking point hindering innovation: *“we need freedom to operate without risking every minute to infringe a patent. It’s blocking private investment”*. They are willing to cooperate with institutions in the Global North on this point: *“the experience on tech transfer and licensing is in the Global North, and this is where we should genuinely partner with them”*.

⁷ Designed to support African governments dedicated to build integrated bio-detection and surveillance platform on the African continent, in collaboration with the Africa CDC and WHO Hub for Pandemic and Epidemic Intelligence

RECOMMENDATIONS

Open up global health architecture to rebuild trust between North and South

- **Actions speak louder than words.** Even though the need for engagement is oft cited, we found cannot underestimate the devastating effects of gaps between political statements and concrete actions. The lack of trust in multilateral mechanisms is causing a limited appetite in the Global South to engage in global health initiatives. This will persist until action is taken by the Global North and international organizations to **repair this breach of trust**, through mutual assurance mechanisms and concrete efforts towards better benefit-sharing and resource allocation.
- **Reforming the global health architecture**
 - Proposals for architecture reviews must **incorporate the Global South's determination to build new national or regional mechanisms** that afford independence and self-reliance to prevent, prepare for and respond to future health threats. This includes the need for an overall procurement strategy supportive of regional manufacturing, linked with recent findings from the ACT-accelerator⁸ evaluation.
 - They also should **ensure a redistribution of power** within governance and decision-making at global institutions emerging or being reformed, including in relation to the pandemic treaty and pandemic fund.
 - Any broader effort looking at health security such as a global health threats council should be jointly led by the Global North and the Global South, and be based in the Global South for genuine redistribution of power.
 - The Paris Peace Forum could explore with its partners the opportunity to launch a workstream on North/South relations in global health initiatives.

Protect, sustain & enhance scientific networks and cooperation

- Continue to **protect scientific independence from political influence**, both nationally and internationally.
 - Different global governance models to strengthen scientists' ability to collaborate safely across borders could for instance include the international association of NPHI (national public health institutes) or an "IPCC of pandemic preparedness" to provide independent scientific knowledge on pandemic preparedness.
- Recognizing the excellence of and key contributions from scientific actors on genomic sequencing in the Global South, **support the emergence of additional scientific centers of excellence** to strengthen pandemic preparedness in the Global South.
 - Build on existing initiatives at every level such as the Pathogen Genomics Initiative to strengthen existing capacities and invest to develop additional centers of excellence serving as regional hubs.
 - Integrate a One Health perspective on the prevention and reporting side to work at the interface of animal and human health.

⁸ Health Policy Watch, "[COVAX, the Global COVID-19 Vaccine Platform, was 'Too Ambitious'](#)", 14/10/2022. "Interestingly, the review's main criticism of COVAX is that its global scope as the key vaccine-purchasing agent for the world was "too ambitious" and that a "more targeted approach" would have been more useful. This observation is based on the failure of high-income countries to go through COVAX to buy its vaccines, meaning that COVAX was "unable to play the market shaping role it first envisioned".

- Also, **incentivize data sharing to overcome structural fragility** and avoid discouragement which may lead to brain drain (see part 4).
- **Strengthen and formalize existing scientific networks**, through South-South cooperation and beyond.
 - Institutionalize existing informal scientific networks through a consultation process of scientists involved.
 - While considering the importance of regional networks, link existing and future networks to the global level through the International Pathogen Surveillance Network led by the WHO Hub for Pandemic and Epidemic Intelligence.

Support effective communication of scientific findings

- Establish and adequately finance communication as a **critical function of scientific institutions** on pandemic preparedness through **in-house expertise**.
- Governments should **commit to protecting scientists** in the event of identification of a health threat.
- **Develop globally connected communication resources and capacity**.
 - Use country offices of regional and global institutions to connect actors at the subnational, regional and global level on messaging related to a health threat from a bottom-up perspective.
- **Ensure due consideration for diplomatic and scientific situation reports** on scientific findings before taking drastic or restrictive measures when facing a health threat.
- The Paris Peace Forum could consider leveraging its contacts with media and tech/social media actors to help further develop and bring forth some of these recommendations.

Secure new models to finance pandemic preparedness

- Continue to **strengthen or accelerate existing and future multilateral mechanisms** such as the pandemic treaty or the pandemic fund, and ensure that those new instruments are fit for purpose.
 - A pandemic treaty should ensure that early identification of pathogens effectively contributes to early response to a health threat globally, including with fair benefit-sharing for scientific data.
 - Learn from the Nagoya Protocol⁹ to develop specific incentives on benefit sharing. The Protocol has been criticized for being too complex and mixing biodiversity challenges and data sharing of pathogens. However, it provides a first internationally-agreed document on benefit-sharing for scientific data. Discussions in the context of COP15 may be relevant here.

⁹ United Nations, *Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity*, 2011. Annex: monetary and non-monetary benefits. "1. Monetary benefits may include, but not be limited to: (a) Access fees/fee per sample collected or otherwise acquired; [...] (e) Licence fees in case of commercialization; [...] (g) Salaries and preferential terms where mutually agreed; (h) Research funding; (i) Joint ventures; (j) Joint ownership of relevant intellectual property rights".

- Create **mechanisms that fairly compensate actors in the Global South and scientific community** to sustainably finance robust pandemic preparedness institutions according to their contribution to EWRS, knowledge and innovation.
- Specifically, **explore mechanisms that provide predictable funding, independent from grants or political decisions that are subject to change, and from a large basis of contributors.**
 - A **“FIFA model”** could be an interesting starting point beyond the health sector.
 - This solidarity mechanism is based on the following principle: clubs which trained successful players receive a solidarity contribution when these are purchased throughout their career¹⁰.
 - Such a mechanism could apply to benefit-sharing from scientific innovation by integrating a specific clause in a contract when developing a medical product or even integrate strategic goals of companies through ESG criteria.
 - It could take the form of license fees, joint ownership of intellectual property and even joint product development, or capacity strengthening through technology transfer, and unrestricted research funding.
 - Explore the opportunity of **fair compensation from the industry’s profits** to ensure fair benefit-sharing for scientific knowledge (research or sequencing data) generated by health/scientific institutions, either based on mechanisms similar to the solidarity contribution on airline tickets to finance UNITAID or windfall taxes on super-profits.
 - Build on the lessons learned from previous models such as the “Pandemic Emergency Financing Facility” to work on innovative insurance models.
 - The Paris Peace Forum may contribute to exploring and refining some of these possible models over the coming months.

¹⁰ FIFA, “Regulations on the Status and Transfer of Players”, March 2022. Annex 5, article 21: “If a professional moves during the course of a contract, 5% of any compensation paid within the scope of this transfer, not including training compensation paid to his former club, shall be deducted from the total amount of this compensation and distributed by the new club as a solidarity contribution to the club(s) involved in his training and education over the years”.

ANNEX 1 – DEFINITIONS AND INSTITUTIONAL FRAMEWORKS

Early warning refers to a specific part of surveillance, aiming at identifying a threat as early as possible to lessen its impact and allow a response at scale¹¹. **A functioning early warning system includes prevention, surveillance, detection and sensors to detect a threat, and the entire subsequent reporting decision chain** which will trigger a response once threats are detected. The surveillance components of early warning look at prevention, monitoring, reporting and tracking, while early response includes the national, regional and global coordination and connection to broader health and security systems. Capacities to characterize pathogens through genomic sequencing technology are decisive to identify a threat early. Scientific support and input to decision-making at every level are key components of early warning systems. However, the concept of early warning could be extended to response to enable full integration of every element of the chain of events, from local detection, national and regional reporting, to global response. We therefore propose to consider early warning and response systems (EWRS) through an integrated approach with the goal of mitigating an emerging threat from its detection to the first response, as a warning without appropriate response does not fulfil the role of EWRS.

The need for a global early warning system to link with the local, national and regional levels is emphasized in every important report produced during and after the COVID-19 pandemic: the Independent Panel for Pandemic Preparedness and Response (IPPPR) highlights the need for “an improved system for surveillance and alert at a speed that can combat viruses like SARS-CoV-2, and authority given to the World Health Organization (WHO) to publish information and to dispatch expert missions immediately”, the G20 High-Level Independent Panel (HLIP) calls for a “global genomic and epidemiological surveillance” around the WHO, connected to national and regional public-health entities, and numerous other proposals and calls for a global early warning system have emerged from non-governmental actors.

A robust global or regional early warning and response system should have the capacity to adapt to a variety of situations and governance conditions, and maintain a high level of sensitivity to new threats through strong national preparedness mechanisms as one of our interviewees put it:

“Three things are needed for a strong surveillance system: a network of scientists inside the country; trust between scientists and government (the government always get to know first, they don’t like surprises); good public communication of science to face misinformation”.

¹¹ Waidyanatha, Nuwan (2010), Towards a typology of integrated functional Early Warning Systems, IJCIS.

The stages of early warning are detailed in the international health regulations (IHR), which are legally binding rules voted by member-states of the World Health Organization aiming to “prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade”¹². The IHR were firstly adopted by the World Health Assembly in 1969, and were most recently revised in 2005 following the SARS outbreak between 2002 and 2004.

They lay out steps to be taken by member-states and the WHO with respect to notification/verification¹³ when an outbreak occurs, and give power to the Director-General of the WHO to declare a public health emergency of international concern (PHEIC)¹⁴. The IHR also detail the scope of the response and capacity strengthening that every member-state should attain, as well as how WHO should cooperate with other international organizations¹⁵. Early notification of a health threat relies heavily on data sharing, as genetic sequencing is decisive to identify and characterize a virus. The Convention on Biological Diversity (1992) rules benefit-sharing coming from genetic resources¹⁶, and determines state sovereignty over genetic material¹⁷. This convention has been completed by the Nagoya Protocol on Access and Benefit- Sharing (2010), detailing access and benefits sharing (ABS) mechanisms to ensure fair benefit-sharing from using genetic sequencing data.

¹² WHO, International Health Regulation (Third Edition), 2005. Article 2

¹³ Ibid. Article 6: “Each State Party shall notify WHO, by the most efficient means of communication available, by way of the National IHR Focal Point, and within 24 hours of assessment of public health information, of all events which may constitute a public health emergency of international concern”; Article 9; Article 10.

¹⁴ Ibid. Article 12.1: “The Director-General shall determine, on the basis of the information received, in particular from the State Party within whose territory an event is occurring, whether an event constitutes a public health emergency of international concern in accordance with the criteria and the procedure set out in these Regulations”.

¹⁵ Ibid. Article 13, Article 14.

¹⁶ United Nations, Convention on Biological Diversity, 1992. Article 2: “Genetic material” means any material of plant, animal, microbial or other origin containing functional units of heredity. “Genetic resources” means genetic material of actual or potential value.

¹⁷ Ibid. Article 15.1: “Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation”.

ANNEX 2 – ACKNOWLEDGEMENT AND LIST OF INTERVIEWED ORGANIZATIONS

The Paris Peace Forum thanks those who gave their time and shared insights on early warning & response, both during consultations at the global level and through the case study in Botswana and South Africa. A special thanks to the team of Market Access Africa, especially Spring Gombe, who helped us building our global health program and carrying this piece of work.

- Bill & Melinda Gates Foundation
- Botswana–Harvard AIDS Institute Partnership
- Centre for the AIDS Programme of Research in South Africa (CAPRISA)
- Columbia University
- Department of Health, South Africa
- Department of Trade & Industry, South Africa
- French Embassy in South Africa
- Ministry of Health, Botswana
- Global Information and Early Warning System on Food and Agriculture, Food and Agriculture Organization of the United Nations
- Global Preparedness Monitoring Board
- Hertie School of Governance
- High Level Advisory Board on Effective Multilateralism
- Institut Pasteur Dakar
- Progressive Health Forum
- Milken Institute
- One Health High-Level Expert Panel (OHHLEP)
- Preventing Zoonotic Disease Emergence (PREZODE)
- Quadripartite One Health
- Resolve to Save Lives
- Rockefeller Foundation
- Sentinel
- SoRMAS
- South African Medical Research Council
- Stellenbosch University
- University of Cape Town
- WHO Hub for Pandemic and Epidemic Intelligence
- Wits Health Consortium
- World Organization on Animal Health

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*A story from Botswana and South Africa:
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