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Policy Brief

**BUILDING BACK BETTER:
ADDRESSING THE LABORATORY
READINESS FOR BIODEFENCE
AND GLOBAL HEALTH
SECURITY**

Task Force 6

Global Health Security and Covid 19

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Abstract

The laboratory handling of infectious agents is the cornerstone in the efforts to contain the current pandemic and future emerging infections. Therefore, the need to leverage the laboratories' capacity, connectivity and long-term security for the acquired, stored material all have become critical issues globally. This policy brief proposes a coordinated view towards defining the healthcare systems' laboratory readiness for biodefence and global health security through the lens of national and international infrastructures for infectious diseases surveillance and infectious agents capture; including long-term storage in dedicated facilities (repositories/biobanks) and the potential distribution together with associated clinical and biochemical data.

Challenges

The global effects of coronavirus disease 2019 (COVID-19) pandemic are evident as it continues to greatly impact international social, political, economic, and healthcare aspects. The toll of this pandemic has already been quantified from different perspectives: human lives and suffering, psychosocial impact, and economic slowdown. All these constitute strong reasons to translate and share experiences into actionable lessons, not simply to prevent similar future crises, but rather to improve the whole spectrum of population health and healthcare delivery (1). Addressing the growing threat of infectious disease outbreaks requires pathogen and disease reporting, biological sample collection, storage and surveillance systems that are fit for purpose. These all need to be integrated as components of an early warning system for impending threats to human health, and be informed of wider threats using a One Health approach.

Globally, reporting of outbreaks is governed by the International Health Regulations (IHR) of 2005 (2) which are recognized as a means of international cooperation for early detection and containment of infectious diseases. Adopted by all World Health Organization (WHO) member states, they are legally binding. Yet when the particular implementation of surveillance-related activities for infectious pathogens are considered, there is a wide variation in laboratory practice within countries, as well as between different surveillance systems. For example, influenza and other respiratory viruses' surveillance can be documented as part of the WHO Global Influenza Surveillance and Response System (GISRS) (3), the antimicrobial resistance of bacterial and fungal pathogens can be documented as part of the WHO Global Antimicrobial Resistance and Use Surveillance System (GLASS) (4). Furthermore, the laboratory handling of infectious agents, constituting the cornerstone in the efforts to contain the current and emerging infections, is subject to a number of international and national standards and regulations (5). Lastly, the collection and storage of infectious diseases material is governed by a separate set of standards and best practices (6).

The pandemic revealed the capacity and resilience levels of healthcare systems to high impact shocks. However, it also brought to light the wide disparity in healthcare systems' responses to the pandemic, underpinned by the disparities in laboratory capacity and practices, along with their reactivity, access to information, and overall laboratory readiness for bio defence. This has raised concerns regarding the levels of biosecurity

attainment as well as the gaps and learning opportunities. To achieve the Sustainable Development Goal 3 of “ensuring healthy lives and promote well-being for all at all ages”, working towards the goal of no-one being left behind, it is necessary to increase the laboratory preparedness and biodefence capabilities of health systems. Such strengthening-directly relating to global health security- must be inscribed into the global view of the G20 forum, where sound health assessment practices can inform effective policymaking at scale, producing positive health outcomes for all, a key objective of G20 action.

Recommendations

Building back better laboratories readiness

Laboratory readiness is a key tenet for rapid response to an emerging disease with potential to become a pandemic. Fast planning of a strategic response, based on robust foundations, is essential for a timely laboratory preparedness. Collaboration at regional and country level, among public health agencies, national authorities and national public health laboratories is critical for the laboratory's preparedness and appropriate response during the pandemic phase.

Therefore, the need to leverage the laboratories' capacity, connectivity and long-term security for the collected and perhaps stored material have become critical issues globally. Several countries were able to conduct successful COVID-19 countermeasures through adequate laboratory response, e.g., in Saudi Arabia, where its laboratory response was rooted in the previous infectious disease responses (for SARS-CoV-1 in 2003 and H1N1 Influenza pandemic in 2009), resulting to an integrated surveillance systems and scalable laboratory response, thus enabling a testing capacity as needed (7). Similarly, Indonesia produced a successful cross-sectoral collaboration among previously siloed national and sub-national government institutions, international development agencies, and private sector stakeholders. This collaboration managed to scale-up the COVID-19 referral laboratory network from one Ministry of Health NIHRD laboratory in the capital to 685 laboratories across 34 provinces within the first 12 months of the pandemic (8).

This policy brief proposes a coordinated view towards defining the healthcare systems' laboratory readiness for biodefence and global health security through the lens of national and international infrastructures. The policy brief follows the experiences and learning from the COVID-19 pandemic, utilising exemplars from the G20 countries, as well as from Low- and Middle-Income Countries, where such infrastructure might be sub-optimal or entirely absent. To this end, we recommend that G20 members consider the following five-point action plan:

1) Demonstrate **digital health leadership**, as the very best of combining modern technologies, medicine, science, and innovation with data and public health, to benefit the health and well-being of humanity. Digital health has been essential to national responses to the COVID-19 pandemic and has boosted the use and acceptance of technological solutions by patients, clinicians, and policy makers. In 2020, the G20 digital health summit concluded with the “Riyadh Digital Health Declaration,” which established nine key recommendations, core principles, and priorities for leveraging digital technologies to combat the current and future impact of the COVID-19 pandemic (9). Two key challenges have been identified as presenting digital health leadership gaps: firstly, addressing readiness through technology-related challenges by advancing data-sharing and encouraging and facilitating low- and middle-income countries to adopt advanced technologies. Secondly, developing integrated tools that would allow for monitoring, surveillance, detection and prevention, particularly at large events.

2) Demonstrate **regional leadership** and empower regional organizations so that they can play a more active and proactive role in designing and rolling out coordinated laboratory action in the health sector, with special emphasis on mechanisms that foster readiness of the overall health systems vis-à-vis epidemics and pandemics. The partnership among countries is essential for obtaining faster results in COVID-19 treatment and vaccine clinical trials and the WHO has been consistently supporting global partnerships through its Solidarity Fund, COVID-19 Supply Chain System, and Solidarity Trial (10). Thus, laboratory readiness frameworks can develop regionally, for example within ASEAN member countries or ECOWAS member countries in Asia and Africa respectively.

3) Invest in **scaling-up capacity for data sharing** within regions and internationally. Public health data sharing was one of the reasons that the Severe Acute Respiratory Syndrome (SARS) did not become an established disease following its emergence in 2002 (11). Data sharing has become a critical component of laboratory readiness as part of the COVID-19 response (12). Sharing information is crucial in the response to diseases, especially when these are new diseases and there are still many unknowns, e.g., their incubation period; how they are transmitted, etc. Strengthening data-sharing capacity should not be reserved to specific institutes or laboratories, but also public and private universities, national and international platforms.

4) Establish **inter-disciplinary coordination**, within affected areas. Laboratory readiness is intertwined with many other aspects of health systems resilience towards the pandemic. Good coordination has proven critical, given the socioeconomic and health dimensions of the current pandemic. Specifically, learning from previous disease outbreaks, Singapore established a multi-ministry taskforce to centrally coordinate a whole-of-government response before it had any confirmed cases (13). The creation of the National COVID-19 Taskforce in Indonesia was similarly important in driving an effective laboratory response (8). This has been mirrored in many countries globally, including Tunisia, Egypt, the UK, and many others.

5) Recognize the **multiple roles of laboratory professionals** as laboratory data-providers, data-users and decision makers. In this age of continuous connection and digitization, the laboratory responses require a strong and unified outlook, driven by well-informed and appropriately trained laboratory professionals. Furthermore, the availability of the required staff numbers has been critical in the effective pandemic response – and the education of laboratory professionals has been identified as a potential key bottleneck in laboratory readiness. At the same time, the safety and well-being of staff became another significant aspect of laboratory readiness, to be considered as an integral part within a laboratory system that is (becoming) increasingly connected globally.

Grasping the opportunity for a 21st century laboratory readiness framework

Healthcare is highly complex, supporting an environment that requires a broad range of professionals to undertake a series of connected tasks and processes. Thus, the need arises for assessing laboratory readiness for biodefence and global health security in relation to the complex operations undertaken during the pandemic. We recommend the establishment of a work package that will review these lessons learned from the current pandemic, assess key laboratory readiness aspects and propose new and/or updated frameworks.

Furthermore, this work package will reaffirm the support to the WHO, as well as established and nascent regional efforts to address health issues. The WHO provides crucial technical support to regional organizations and their member states, so furthering its activities will be important. At the same time, regional organizations have also shown their ability to directly develop health projects during the COVID-19 pandemic. Supporting different types of integration of laboratory readiness to regional efforts will be crucial,

particularly during health crises. This contextually-driven approach will entail a wider acceptability for the laboratory readiness for biodefence global transformation, as it will be an inclusive process and not an externally mandated one.

The main challenge of developing a resilient and global laboratory readiness ecosystem, remains the huge disparity of laboratory capacities among different countries, including among those of the G20. However, government should consider laboratory readiness as a national biosecurity issue. By adopting and working towards a coordinated view of the healthcare systems' laboratory readiness for biodefence and global health security, such aspects should harmonize and support a better integrated response for future pandemic threats.

References

- Jazieh AR & Kozlakidis Z. (2020). Healthcare Transformation in the Post-Coronavirus Pandemic Era. *Frontiers in medicine*, 7, 429.
- World Health Assembly (2005). Revision of the International Health Regulations, WHA58.3. Geneva: World Health Organization
- World Health Organization. (2020). Maintaining surveillance of influenza and monitoring SARS-CoV-2: adapting Global Influenza Surveillance and Response System (GISRS) and sentinel systems during the COVID-19 pandemic: interim guidance, 8 November 2020 (No. WHO/2019-nCoV/Adapting_GISRS/2020.1). World Health Organization.
- World Health Organization. (2020). Global antimicrobial resistance surveillance system (GLASS) report: early implementation 2020.
- Laxminarayan, R., Van Boeckel, T., Frost, I., Kariuki, S., Khan, E. A., Limmathurotsakul, D., ... & Zhu, Y. G. (2020). The Lancet Infectious Diseases Commission on antimicrobial resistance: 6 years later. *The Lancet Infectious Diseases*, 20(4), e51-e60.
- Roux, J., Zeghidi, M., Villar, S., & Kozlakidis, Z. (2021). Biosafety and biobanking: current understanding and knowledge gaps. *Biosafety and Health*, 3(05), 244-248.
- Algaissi, A. A., Alharbi, N. K., Hassanain, M., & Hashem, A. M. (2020). Preparedness and response to COVID-19 in Saudi Arabia: Building on MERS experience. *Journal of infection and public health*, 13(6), 834-838.
- Aisyah DN, et al. Laboratory Readiness and Response for SARS-Cov-2 in Indonesia. *Frontiers in public health* (2021): 969.
- Al Knawy B, et al. The Riyadh Declaration: the role of digital health in fighting pandemics. *The Lancet*. 2020 Nov 14;396(10262):1537-9.
- WHO Solidarity Trial Consortium. (2021). Repurposed antiviral drugs for Covid-19—interim WHO solidarity trial results. *New England journal of medicine*, 384(6), 497-511.
- Curley, M., & Thomas, N. (2004). Human security and public health in Southeast Asia: the SARS outbreak. *Australian Journal of International Affairs*, 58(1), 17-32.

Cosgriff, C. V., Ebner, D. K., & Celi, L. A. (2020). Data sharing in the era of COVID-19. *The Lancet Digital Health*, 2(5), e224.

Lee, V. J., Chiew, C. J., & Khong, W. X. (2020). Interrupting transmission of COVID-19: lessons from containment efforts in Singapore. *Journal of travel medicine*, 27(3), taaa039. Deloitte: Digital Transformation and Health Care Delivery Model Convergence, <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-digital-transformation.pdf>, assessed on August 19, 2022.

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Raymond TP Lin

Dr Raymond Lin studied medicine at the National University of Singapore, and specialised in medical microbiology, obtaining the Fellowship of the Royal College of Pathologists of Australasia in 1994. He spent a year at the London School of Hygiene and Tropical Medicine where he obtained an MSc with Distinction in 1991. Dr Lin started as a medical microbiologist at the Singapore General Hospital, then moved to KK Women's and Children's Hospital and later to the National University

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