



Photo: Dr Meru Sheel, Samoa 2018

Health security in the Pacific: expert perspectives to guide health system strengthening

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EXECUTIVE SUMMARY

The COVID-19 pandemic has reiterated the interdependence of health security and health systems, and the need for resilient health systems to prevent large-scale impacts of infectious disease outbreaks and other acute public health events. As the global health community moves towards its ambition to “build back better”, it is important to identify lessons from the COVID-19 pandemic. This includes adopting a health systems approach to determine immediate-, medium- and long-term priorities for initiatives that reinforce health security, which can prevent direct and indirect impacts of acute public health events like outbreaks. Early evidence has supported this approach of reinforcing health security through strengthening health systems but has offered little by way of effective implementable initiatives, especially for the Pacific region.

The report was designed to identify and prioritise health system strengthening initiatives that prevent impacts of health security threats and strengthen the ability to respond to these threats in the Pacific region. We focus on Timor Leste, Papua New Guinea and Pacific Island Countries and Areas, which include the Cook Islands, Fiji, Kiribati, the Republic of the Marshall Islands, the Federated States of Micronesia, Nauru, Niue, Palau, Samoa, Solomon Islands, the Kingdom of Tonga, Tuvalu and Vanuatu.

We examined the literature and explored the perceptions of experts with field experience in the Pacific region to identify and prioritise areas for future health system investments that strengthen health security. Guided in part by lessons learned from the COVID-19 experience and response, we conducted focus group discussions with health sector stakeholders with field experience in the Pacific region and expertise in either health systems or health security. Focus groups included 24 participants, representing 15 research and academic institutions, nongovernment agencies, the World Health Organization, and national governments, as well as independent consultants.

Evidence on effective strategies for implementing health system strengthening for health security is limited. We identified five areas to prioritise in future efforts, particularly noting the investment during the COVID-19 pandemic:

- workforce development
- risk communication
- public health surveillance
- laboratory capacity
- localisation of knowledge, resources and workforce.

Localisation appeared as a cross-cutting theme which should be applied when implementing the other four identified priority areas.

After considering these themes in the context of available evidence, both from within and outside the Pacific region, we developed a series of recommendations for both the immediate and long term, to prioritise health security development through health systems strengthening initiatives.

The key immediate-term recommendations are:

- Localisation should be considered as a universal model for practice and apply to all activities, programs and initiatives. Success of any initiative will be limited without it.
- Conduct a review of the health workforce with a focus on the public health workforce.
- Integrate health data systems to drive decision-making. Invest in strategies that promote data for decision-making, with a focus on using surveillance data, closing feedback loops, and using local data to guide responses.
- Ensure ongoing support to expand laboratory services, including ongoing costs infrastructure, equipment, reagents and new staff.
- Apply social and behavioural economics to design risk communication strategies.
- Prioritise and support catch-up vaccination programs to minimise outbreaks of vaccine-preventable diseases.

These recommendations provide a starting point to define and expand mechanisms for health system strengthening to minimise impact of health security threats during the post-pandemic phase. They can be used for consultation with key stakeholders to prioritise activities and strategies over the immediate and medium to long term. Evaluation of these initiatives will strengthen knowledge on the value of integrating health systems and health security approaches.

INTRODUCTION

The interdependent relationship between health systems and health security is long known. However, it is not well understood and there are few examples of purposively integrating the concepts into practice. The COVID-19 pandemic has highlighted the role of health systems in promoting and strengthening health security. This has prompted a global re-think on how we approach initiatives to promote health security, with a renewed focus on strengthening health systems and considering health security in the context of resilient health systems. As we “build back better”, it is important to identify lessons from the COVID-19 pandemic, including adopting a health systems approach to determine immediate-, medium- and long-term priorities for initiatives that reinforce health security, which can prevent direct and indirect impacts of acute public health events like outbreaks.

OBJECTIVES OF THE REPORT

This report seeks to identify and prioritise health system strengthening initiatives that prevent impacts of health security threats and strengthen the ability to respond to these threats in the Pacific region. For this report, we focus on Timor Leste, Papua New Guinea and Pacific Island Countries and Areas, hereafter collectively referred to as ‘the Region’. Pacific Island Countries and Areas include the Cook Islands, Fiji, Kiribati, the Republic of the Marshall Islands, the Federated States of Micronesia, Nauru, Niue, Palau, Samoa, Solomon Islands, the Kingdom of Tonga, Tuvalu and Vanuatu.

BACKGROUND

The COVID-19 pandemic has encouraged policy-makers, practitioners and researchers to move beyond the implementation of the International Health Regulations 2005 (IHR 2005) (1–4) and reconsider additional approaches to health security through strengthening health systems in alignment with the IHR 2005 (5). This revised approach to health security acknowledges its interdependent relationship with health systems and aspects of health security that were not always directly encompassed by the IHR 2005.

Multiple frameworks and definitions exist for both health systems and health security (6). For this report, we defined health security as “the avoidance and containment of infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale” (1).

We adopted the World Health Organization’s (WHO’s) definition of health systems in the context of health security, as described in the WHO’s 2021 Health Systems for Health Security framework, which suggests:

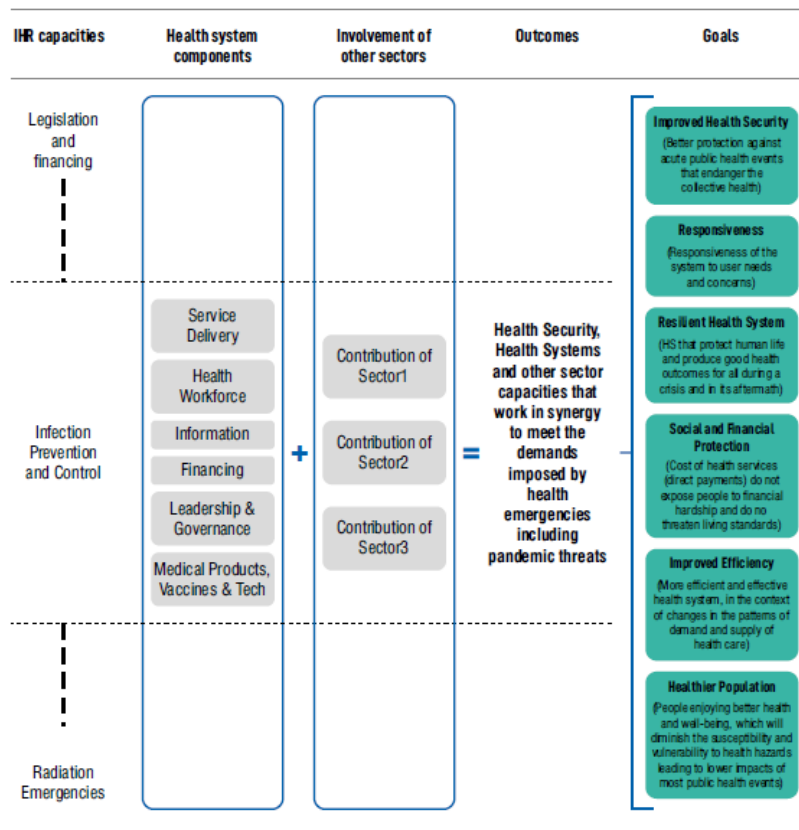
“Health Systems for Health Security (HSforHS) is an approach that harmoniously brings together efforts to strengthen resources and capacities required for implementation of the International Health Regulations, components in health systems and those in other sectors for effective management of health emergencies, while maintaining the continuity of essential health services throughout” (7).

This definition is consistent with the WHO’s six building blocks of health systems – service delivery, health workforce, health information systems, access to essential medicines and technologies, financing and leadership/governance – and connects program areas such maternal and child health, sexual and reproductive health, and noncommunicable diseases (8).

The *HSforHS* framework (Figure 1) extends beyond IHR 2005 implementation, and incorporates the dynamic role of factors inside and outside of the health system; for example, in WASH (Water, Sanitation and Hygiene) programs, responsibility sits within environment-focused government departments, yet access to clean water is an essential part of infection prevention and control and prevention of outbreaks. A subsequent position paper from WHO makes recommendations for health system transformation and recovery from the COVID-19 pandemic (9), for example, maintenance of

essential services during an outbreak. However, the recommendations presented are not context specific and provide governance-type interventions.

Figure 1: Building health systems for health security capacities to meet the demands imposed by health emergencies, Health Systems for Health Security framework, 2021 (7)



The 2021 report by the Independent Panel for Pandemic Preparedness and Response adopted a comprehensive and systematic approach to examining the international response to the COVID-19 pandemic. The panel identified failures at each step of the response and proposed a series of recommendations at an international level. Multiple recommendations targeted international coordination mechanisms, but there were also recommendations on effective national coordination and investment in preparedness. These recommendations suggest the need to consider foundational health system restructures in the context of preparedness and health security (10).

At a national level, Lal et al (2021) (11) examined different national responses to COVID-19. They compared responses that centred on health-security-specific initiatives (for example, emergency response operations and availability of testing kits) and responses that focused on health system strengthening (for example, primary health care). The study found that integrated approaches, in which health security capacities were embedded as part of health system strengthening, were the most effective, and are the clear next step forward. The study highlighted the importance of integrating health systems and health security, increased financing, and a focus on resilience and equity (11). While this evidence provides an incentive to consider health system strengthening initiatives to develop health security, more research is needed on which aspects to prioritise and how these may apply in different country contexts, including in the Pacific region.

Health security and health system interactions in the Region

Evidence and practical examples of health system strengthening through health security development (or vice versa) in the Region are limited, and not many initiatives have been evaluated. A 2019 report on health security (the State of the Region 2019 report), commissioned by the Indo-Pacific Centre for Health Security, identified some areas for health system strengthening to promote health security that align with the *HSforHS* framework (1,7); these are presented in Table 1. The report reiterated the role of incorporating a One Health approach to avoid fragmentation of measures designed to improve health security (1). Overall, the report recommended strengthening health security in the Indo-Pacific region by improving capacity to detect and respond to outbreaks of zoonotic diseases, increasing antimicrobial stewardship activities, improving laboratory capacity, maintaining immunisation coverage and implementing workforce initiatives that can facilitate a deployable highly skilled workforce during emergencies. The report also recommended improving real-time surveillance and information management systems, both by design and day-to-day application, as well as integration across sectors and between countries (1).

Table 1: Identified health system strengthening components that contribute to health security in the Indo-Pacific region, 2019 (1)

Aspect of health security	Prevent	Detect	Respond
Relevant health system strengthening components	<ul style="list-style-type: none"> • National legislation • Policy and financing • Antimicrobial resistance • Biosecurity and biosafety • Immunisation • Points of entry • Zoonotic diseases 	<ul style="list-style-type: none"> • National laboratory systems • Real-time surveillance • Workplace development 	<ul style="list-style-type: none"> • Preparedness (ie through national preparedness and response plans) • Emergency response (ie through establishing emergency response centres) • Linking public health and security authorities • Risk communication

More recently, a report led by the University of New South Wales (UNSW) on health system strengthening in selected Asia-Pacific countries (Cambodia, Fiji, Indonesia, Lao, Papua New Guinea, Solomon Islands and Vietnam) identified key challenges and recommendations for the Asia-Pacific region (12). While not limited to health security, the report suggested in-depth opportunities for health system strengthening initiatives within the Asia-Pacific region. The recommendations of most interest for health security related to human resources for health, health service delivery and health information systems. Specifically these recommendations advocated for improving the quantity and quality of the workforce with targeted strategies for rural and primary health care workforces; improving the quality of community health services; increasing preventive and population health interventions; long-term investment in health information systems infrastructure and workforce; strengthening data quality and data culture; and increasing private sector health information reporting compliance (12).

Collectively, this evidence provides sufficient impetus to encourage us to propose and design approaches to viewing health security through a health system lens. As we emerge from the acute phase of the COVID-19 pandemic response, there will be several opportunities to strengthen health

systems which must not be missed. There is a need to translate the *HSforHS* concept into context-specific initiatives that can be taken forward to promote health security and improve health system resilience.

Regional context

Health systems of countries within the Region, and specifically the small island developing states of the Pacific, present some unique challenges. These include the need to deliver health services to small geographically dispersed populations spread across atolls and island groups with limited transport links and connectivity options (13); the increasing burden of noncommunicable diseases, especially diabetes and obesity, requiring long-term management and costly treatment (14); chronic workforce shortages; weak governance arrangements; and supply chain and logistical issues associated with island nations and limited information systems (15).

Strong border controls implemented during the COVID-19 pandemic limited the direct impact of COVID-19 morbidity and mortality in the Region in 2020 and early 2021. However, the emergence of the Delta variant of SARS-CoV-2 stretched the health system in countries like Fiji, Papua New Guinea and Timor Leste. The remaining Pacific Island Countries and Areas are some of the few countries in the world that, as of December 2021, had not reported any local transmission of SARS-CoV-2 (16,17). However, the Pacific Island Countries and Areas had already experienced multiple indirect effects of COVID-19, including fiscal losses from border closures and disruption to tourism; issues of food security; increased reports of mental health issues including anxiety and depression; disruption of routine health services, particularly routine immunisation and maternal child health; and disruption to workforce learning and development (18,19). With the emergence of the Omicron variant of SARS-CoV-2, the introduction of the virus in Kiribati, Solomon Islands, Samoa and Tonga in January 2022 is already demonstrating the limited capacity of the health system to respond to the accelerated increase in the number of COVID-19 cases. The impact on routine health services is likely going to increase in 2022 as countries in the Region tackle COVID-19.

As we emerge out of the acute phase of the COVID-19 pandemic response, there is a unique opportunity for governments in the Region and partners to work together and continue to learn, adapt and communicate to find solutions to health security through strengthening health systems.

METHODS

During September–October 2021, we conducted a rapid and targeted literature review using the search terms “health systems” AND “health security” in PubMed. Sources from the grey literature were also identified through global searches and recommendations from key stakeholders. A snowballing approach was applied for topics that needed deeper exploration. Additional formative publications were included based on researchers’ knowledge of the field. We then used this information to design the second phase of the study, in which we conducted focus groups with key informants working in public health, health systems, health security and/or international development in the Region.

Using study researchers’ networks, we contacted 39 individuals who were experts in the field or had experience working in the Region. Participants represented research and academic institutions, nongovernment organisations (NGOs), United Nations agencies and government, as well as independent consultants. A list of all organisations represented is presented in Annex 1.

Focus group discussions (FGDs) were conducted in November 2021. Prior to each session, participants were provided with an information sheet, for consent purposes, and a participant guide containing important context and definitions (Annex 2). Each participant was required to provide their oral informed consent at the beginning of the session before proceeding. We used a semi-structured facilitation guide to support each session (Annex 3). This guide was developed based on key gaps identified in the literature and proposed the following themes for consideration: surveillance,

laboratory capacity, health workforce, immunisation, primary health care/community health, risk communication and antimicrobial resistance. Open questions were also added to explore possible additional themes, and explored topics such as key strengths, challenges, strategies to mitigate or avoid identified challenges, priorities, and approaches to implementation.

The FGD sessions were conducted using video conferencing. Both study authors were present for all FGDs. MS facilitated the FGDs. NR used a notetaking method to document the discussion from each session; these notes were then verified against the recording before it was deleted. Content analysis was undertaken to identify key themes and agreement was reached by consensus.

ETHICS

This study was approved by the Science and Medical Chair of the ANU Human Research Ethics Committee, 26 October 2021, Protocol 2021/656.

FUNDING

The study was commissioned by the Australia Council for International Development. The funding body did not play any role in study design and analyses.

FINDINGS

We conducted four FGDs with researchers, practitioners and policy-makers working in public health, health systems, health security and international development. Of 39 invited experts, 24 participants (62% response rate) from 15 different organisations (see Annex 1) attended the FGDs. For most of those that did not participate, the reason was scheduling conflicts. All participants had experience in the countries of interest, primarily Fiji and Papua New Guinea, with different levels of professional and field experience ranging from 3 years to 35 years. The first three FGDs used the same facilitation guide. The guide was updated for the last FGD because data saturation on key challenges was reached and we wanted to explore further priorities for action in response to previously identified challenges.

Through content analysis of the FGD notes, we identified five main areas to target in health system strengthening initiatives that will contribute to promoting health security in the Region:

- Workforce development
- Risk communication
- Public health surveillance
- Laboratory capacity
- Localisation of resources and workforce.

The summary of these issues below weaves in both outcomes from FGDs and evidence from the literature.

Workforce development

Workforce is critical for the functioning of all health systems. Workforce shortages existed in countries of the Region even before the COVID-19 pandemic, particularly compared with Australia, New Zealand and parts of Asia. The pandemic further highlighted shortages of doctors, nurses and public health professionals, and has made the issue more visible and acute. The impact of workforce shortages in the Region is profound, as health workers including newly trained graduates were unable to return home due to strict border closures and limited connectivity. The requirements to quarantine and isolate due to increased exposures also resulted in increased workloads on an already stretched workforce. In addition to workforce shortages, other impacts on the health workforce were multidimensional and varied, including stigma and discrimination against health care workers, violence towards health care staff and facilities, lack of personal protective equipment, strike actions, and changes in general working conditions, such as privatisation of services, which exacerbated the

impact of COVID-19 (20). A September 2021 analysis found a global population-based estimate of 115,493 deaths due to COVID-19 among health care workers (21), a number that is likely to have long-term ramifications for the existing workforce shortages.

The issues above were reflected in FGD findings. Workforce shortages emerged as a dominant theme across all discussion groups, and were considered by most participants to be the key component of the health system that needed to be strengthened in the Region. All groups were clear that the workforce available in the Pacific region is limited and investments were needed to focus on training new health care professionals and consolidating the available workforce. In addition to training new health professionals, it was also seen as important to strengthen their ongoing capability and capacity.

“Workforce capacity building is constantly neglected in the Pacific. We know from the research and the data that there just isn’t enough population or people to be able to get the numbers that we need in terms of health care professionals.” FGD#2

“... the workforce capacity is not sufficient for day-to-day operations let alone surge capacity ... Need to address support for existing health professionals.” FGD#2

Consideration of skill mix or task shifting were proposed as ideas to manage health workforce shortages. This includes supporting those health care workers with a broad skillset, in geographically isolated areas, to service the full needs of their community, and providing continuing professional development options.

“... major opportunity was primary health care strengthening and a recognition that most frontline care does not require physicians.” FGD#2

“The concept of task shifting, building up capacity at the community level, that’s where we’ve seen success.” FGD#2

“The more eager and hyper-segmented our assistance becomes, the more it runs counter to sensible health workforce development ... From a health security perspective and what workforce means, it actually means a generalised health care workforce with some public health capacities.” FGD#4

It was noted repeatedly that the “fly in, fly out” model from Australia was not working in its current structure (for example, AUSMAT [Australian Medical Assistance Teams] as a deploying mechanism). In three of the four FGDs, participants expressed strong opinions on the need to move away from this model or reserve it for very specific circumstances. In one FGD, experts suggested that the model could be strengthened to deepen its impact and provide greater capacity for public health response rather than emergency medicine. All participants agreed that there was a place and an opportunity for public health emergency surge capacity to be deployed from Australia but also within the Pacific region.

“Countries like Australia have interest in fly in style but should never replace national rapid response. Sometimes necessary where there’s an acute surge. Coupled with long-term capacity building.” FGD#3

“We already had the view pre pandemic that there was a case for deepening the pool and broadening the pool of deployable public health expertise.” FGD#4

A recent example of building regional response capacity is the development of the Pacific Emergency Medical Team (EMT) Initiative, comprising development of national EMTs in Fiji, Samoa, Solomon Islands, Tonga and Vanuatu. The initiative leveraged national health workforces, regulatory frameworks and pharmaceutical supply chains, with international technical and financial support, to respond in the Region (17). This example was shared by FGD participants as an example of localisation at the regional level. Under certain circumstances, supporting localised regional response teams can enable rapid surge capacity, and preventive, screening and curative treatment of affected populations.

Additionally, some FGD participants noted the overlap between building capacity and digital capability. Travel restrictions during the COVID-19 pandemic have enhanced the use of digital tools and increased reliance on internet connections. This was the only means during the pandemic to connect NGO partners with relevant staff in-country. While there is still a need for face-to-face meetings, trainings and partnerships, especially in the context of emergencies, participants agreed that there is an opportunity to embrace digital solutions that are locally led on the ground. Investments in digital infrastructure have the potential to continue this momentum, promote autonomy and develop national workforce.

“What we’ve learnt is there’s a need to invest in online facilities, in terms of primary health care training or advanced surgical training for experienced practitioners ... there’s a real need to look at ways that the Australian government invests in that sort of online capacity. Infrastructure training, modules, digital platforms.” FGD#2

The FGD findings align with recent literature that recommends investing in strengthening the capacity of the health workforce of the Pacific, specifically community health workers (1,12). In 2019, WHO reported the latest available data on density of doctors per 10,000 population by country. Densities for countries in the Region – 8.6 for Fiji (2015), 5.4 for Tonga (2013), 3.5 for Samoa (2016), 0.66 for Papua New Guinea (2019) and 7.7 for Timor Leste (2019) – were much lower than for Australia (37.6; 2018) and New Zealand (34.2; 2018) (22).

The majority of doctors in the Region are concentrated in tertiary hospitals, with colleges unable to train and deploy sufficient numbers of clinicians (23). Only two institutions in the Region (one in Fiji and one in Papua New Guinea) provide post-graduate training. The distribution of the workforce is also unequal, with many outer islands having no permanent medical staff at health facilities for many years (23). Health districts are frequently inadequately staffed (24). Beyond clinical care, these challenges were previously found to also be a barrier to public health surveillance (25).

Definition of and data on numbers of public health workers, such as epidemiologists and community health workers, does not always exist in the Region. Further, there are limited training options and career pathways for those working in public health roles. The COVID-19 pandemic has highlighted the need for an extensive nonclinical workforce for a whole-of-society response.

There is some evidence on the use of digital tools and innovation for health workforce development. Digital health interventions can support the development of health workers by providing training and supervision, and facilitating communication. Evidence from low- and middle-income countries demonstrates that implementing digital tools is an effective approach in small-scale interventions and pilots (26). However, how best to guide design or implementation on a larger scale is unclear, as the evidence quality in support of such programs is variable and cannot be readily generalised (26–28). This means a cautious and deliberate approach to digitally based systems and workforce development initiatives is needed, to ensure all external, system-level, institutional, ethical, safety and individual factors are incorporated by design prior to implementation (27,28).

Risk communication

Risk communication was identified as a priority area in the State of the Region 2019 report on health security (1). The COVID-19 pandemic has demonstrated it as a key gap in our framing of the public health system, and highlighted the importance and novelty of framing promotion of health security through a health system strengthening lens. While not always perceived as a health system element, one may view risk communication as an expanded dimension of health promotion. While important in the context of health security, risk communication adopts principles of health promotion to encourage and build confidence in preventive health behaviour (29).

Risk communication during outbreaks, acute public health events and vaccination campaigns is essential to promote trust in public health recommendations. Several lessons around the importance

of effective risk communication arose from the 2009 H1N1 “swine flu” pandemic, but came to the forefront during the West Africa Ebola outbreak (2016), the Pacific measles outbreak in Samoa (2019) and also the COVID-19 pandemic (30–33).

Risk communication emerged as a strong theme in two of the four FGDs, especially among those working within or closely with NGO partners, or who had strong connections with those working “on the ground” in the Region. Repeatedly, the concerns raised around risk communication were discussed in the context of vaccination, largely prompted by issues around the rollout of COVID-19 vaccination programs – a widely known challenge in Papua New Guinea. Prior examples of the 2018 polio outbreak in Papua New Guinea, and measles outbreaks in Papua New Guinea (2018) and Samoa (2019–2020) were raised by FGD participants as examples where communication hurdles had been experienced. Interestingly, risk communication was not raised as an issue by those affiliated with government agencies and, when prompted, their concerns were more around governance and finance.

“This extends beyond the general public to the communication of advice that’s being given to government including the level of urgency applied to that advice.” FGD#1

Any resources available to promote evidence-based messaging were viewed positively, but most FGD participants agreed that these were only useful to countries and communities if there were resources on the ground that could contextualise (for local language and culturally) such resources to the specific setting.

“Risk communication is an important part of any response. Just communication resources that have been produced elsewhere are rarely appropriate for the current country. Need capacity in place to identify need to rapidly adapt. They can then have resources made locally appropriate, field tested and rolled out.” FGD#3

When discussing possible initiatives that improve risk communication, the platforms used for communication and issues around counter-messaging misinformation were both highlighted.

“Restoring funding to the ABC [Australian Broadcasting Corporation] Pacific Australia network ... There are many communities where radio is still the lifeline to the outside world. Having access to that network again, they would be able to hear very informed, clear public health information.” FGD#1

“Facebook [is the] only source of information in PNG [Papua New Guinea] at the moment and it is full of rumour and misinformation. Our programs are on Facebook trying to provide information but not using artificial intelligence. It’s very challenging to counter misinformation.” FGD#1

The emergence of social media as a platform for wide-scale and rapid information sharing was useful and advantageous for rapidly disseminating information and encouraging community participation, but was accompanied by the emergence of the misinformation “infodemic” (34,35). Increasingly, public health systems must build mechanisms to tackle misinformation in real time, through engagement of local communities and government stakeholders.

A recent rapid scoping review sought to synthesise evidence on the different modes of health risk communication to the public from the H1N1 and COVID-19 pandemics (36). The review identified an overall lack of experimental studies examining the link between self-protective behaviours and the use of social media by health authorities. The authors recommended that more studies are needed across the fields of both health risk communication and media studies. Similar outcomes were reported from the first ever global “infodemiology” conference, organised by WHO. Participants advocated for public health authorities to develop, validate, implement and adapt tools and interventions for managing infodemics in acute public health events in ways that are appropriate for their countries and context (29,37).

Public health surveillance

Capacity to detect infectious disease cases and events is an essential function of health systems, and critical for early detection of outbreaks and responding to health security threats. Capacity for detection includes surveillance, health information systems, laboratory diagnostic capability, and epidemiological expertise to transform surveillance data into useful, actionable intelligence to support decisions and policies (1). However, weak surveillance systems, inconsistent case definitions, and lack of awareness among clinicians and public health officials contribute to underreporting and delayed public health response. Public health surveillance must incorporate human health, animal health, antimicrobial resistance and genomic surveillance.

Issues around surveillance were consistently raised across all FGDs. However, there were mixed perceptions as to what degree surveillance should be prioritised in the forward agenda for the Region. One of the main surveillance-related concerns raised by FGD participants was in the context of data use for informed decision-making and operational research, both of which require a trained technical workforce, strong data governance, and tools for data collection, analysis and dissemination (38).

“There was a lost opportunity or intent in the capacity and capability for research in line with the pandemic, and the crisis going on to give us real-time data that is good for policy and decision-making.” FGD#3

“There’s information that gets gathered, but countries being able to really make use of that and use it to drive their priorities. It’s a long-term project.” FGD#4

Another component of surveillance that was discussed in the FGDs was the lack of data on vulnerable populations.

“It all starts with data, so having that disaggregated disability, gender, age, disaggregated data in the very beginning and how much that could help the response because responses are so urgent and immediate.” FGD#1

“Only now have time [to] consider [the] pattern of distribution.” FGD#4

A few FGD participants raised the issue of expanded digital technologies and electronic apps being used for surveillance, monitoring disease trends and case detection; however, the data did not always lead to public health action or aid decision-making, a critical component of surveillance. Ideas to improve use of surveillance data were discussed briefly. One idea suggested was the role of advocacy or operational research champions. Another was an extension of the ideas raised under workforce development, where the focus is on ensuring the appropriate people inside and outside the health sector are familiar with the tools and processes ahead of an outbreak situation, as part of preparedness.

“We need to support identification of local champions for advocacy research. These are the people that can work with the data. Identify operational research priorities ... They tend to work in public health but not in government. Senior and central. Tends to be academics at mid-level institutions. These champions can promote critical thinking and drive local responses [as] trusted technical partners.” FGD#2

“Teams will come in with surveillance tools which can be great for a short time, but they’re not really building national capacity, so having the tools and the people trained on those tools ahead of time is very important to be able to exercise those capacities with tabletop exercises, simulations, and having the people not just from health.” FGD#3

The need to prioritise surveillance initiatives broadly aligns with the current literature; however, like the data presented here, the recommendations tend to be nuanced. The UNSW review of the health system needs in the Asia-Pacific region prioritised data quality and data culture aspects of surveillance (12). These included regular feedback to subnational levels of the health system about the quality of

data being collected, and how data are being used to guide decision-making. Multiple studies have reported that regular feedback to the subnational and health centre level is currently lacking in most countries due to a lack of human resources available to provide this feedback, and a lack of established mechanisms to efficiently disseminate it (12,25). While the State of the Region 2019 report on health security advocated more specifically for real-time surveillance, focusing on system integration across different levels of the health system and greater use of data for decision-making are also needed.

Improving data use through a network of “champions” is one measure advocated by Measure Evaluation (an NGO affiliated with USAID) in their extensive work on data demand and use (39,40). Champions are usually motivated employees who receive targeted training to support and advocate data use activities within their districts (39). However, the effectiveness of this strategy remains unclear. In practice, the needs of individual systems, and the application of those systems in different communities, will vary across the Pacific.

Another approach raised in the literature, though not directly identified through the FGDs, is the use of health-facility-based event-based surveillance. Previously championed and implemented in some of the Pacific island nations, this approach holds potential for early detection of health security threats in settings with limited resources, and closely models principles of community-based and syndromic surveillance (25,41).

Focusing on localisation (discussed below) to understand the surveillance needs in each unique setting, but with regional inter-operability, can ensure surveillance initiatives are better targeted and effectively implemented.

Laboratory capacity

Good-quality laboratory services are a critical part of all health systems. Laboratory testing for infectious disease pathogens is essential for disease diagnosis, management and surveillance of these diseases.

Concerns around capacity of national laboratories and their staff did not emerge as a strong theme in the FGDs. However, it was raised as a priority in one FGD among those participants based in the Pacific and received enough attention in the other FGDs to warrant its inclusion as a priority area for consideration. Most participants felt that strengthening laboratories, the capacity of the workforce and their networks had historically received little attention, and before the COVID-19 pandemic had largely been neglected. However, as a result of investments in laboratories that were made in response to the pandemic, laboratory facilities in the Pacific have improved dramatically. The participants did raise concerns though about the sustainability of these investments.

“Lab strengthening ... neglected for a long while.” FGD#4

“Laboratory systems have improved ahead of pace but covering the cost of consumables is an ongoing factor.” FGD#3

“One of the key issues with the emergency response was introducing new things rather improving existing things. For example, lab capacity was improved with surge in supplies of GeneXpert machines to support COVID-19 testing, but the systems in place have not been able to budget for their ongoing costs.” FGD#3

Concerns around the capacity of national laboratories and their staff is not an unexpected outcome and was previously identified as a priority area in the State of the Region 2019 report on health security (1). The recent health system strengthening review by UNSW did not focus on laboratory strengthening as a health system component, but highlighted the need for expansion of health infrastructure (12).

Strengthening laboratory capacity in the Region offers another example of the value of aligning health security and health system perspectives. Although work was already underway to strengthen

laboratory capacity in the Region, a review of the 2019–2020 Pacific measles outbreak found that shipment of specimens from the Pacific islands to Australia led to delays in detection and response to outbreaks in some contexts, and presented an opportunity to strengthen the response to future outbreaks (32). Pandemic preparedness and response in the Region has accelerated laboratory strengthening in the Region, with establishment of mobile molecular laboratories, establishment of RT-PCR testing equipment (GeneXpert) and provision of virtual training (42). In Papua New Guinea, laboratories with GeneXpert machines for tuberculosis (TB) diagnosis were repurposed for COVID-19 testing.

While the FGD participants did not identify examples from Timor Leste, the recent expansion of the STRONG-TL program implemented by the Menzies School of Health Research and the Timorese Government focuses on capacity for clinical and laboratory-based communicable disease surveillance, including for antimicrobial resistance. The COVID-19 pandemic saw the expansion of existing programs to include in-country COVID-19 testing (43).

The pandemic has highlighted the need for genomic surveillance to monitor variants of SARS-CoV-2. There is no capacity for genomic surveillance of infectious disease pathogens in the Region, and countries rely on collaboration and services from Australia and New Zealand. Having greater genomic surveillance capacity and pipeline in the Region can strengthen the ability to respond to outbreaks such as COVID-19, sexually transmitted infections and food-borne pathogens.

Another example of increasing laboratory capacity in the Region is the Pacific Region Infectious Disease Association (PRIDA), an Australian-based network that offers training on advanced testing capacity, infection control and antimicrobial stewardship in Solomon Islands, Timor Leste and Papua New Guinea. To serve the needs of these countries during the pandemic, PRIDA expanded formal education opportunities to include virtual opportunities (44). The PRIDA training program is an example of an NGO aiming to meet the current need for workforce strengthening in the Region. However, these programs rely on funding and partnerships through other larger organisations and quite often in-kind support.

Moving forward, sustainable funding for ongoing costs of laboratory infrastructure, equipment maintenance and workforce training (testing and data analysis), along with expansion and integration of laboratory surveillance for other health security threats such as TB, malaria, vaccine-preventable diseases and emerging infectious diseases, will be important considerations.

Localisation

Localisation in the context of global health and development have found new impetus in the COVID-19 pandemic.

This theme emerged consistently across all FGDs as a model of practice and in the context of implementation, and as such, can be considered as a cross-cutting theme that applies to all other identified priorities. Although no FGD was able to identify a specific example, it was clear that partnerships and coordination with local community organisations were perceived as essential to the success of any initiative, but not always effective.

“Tailoring response and development strategies to countries – usually one size fits all applied to Pacific but each country has its own specific context that we need to take into account, so it is better to tailor.” FGD#1

“Local empowerment ... Institutional linkages are one [of] the most effective mechanisms ... Partnerships between academic institutions are peripheral, NGOs vary but it’s not them either, it’s community organisations.” FGD#4

Extending on the above concept of engagement with community-level organisations, some participants highlighted further the nuances of collaborating with local organisations. They

emphasised that the ideal partnership is one that is purpose built to accommodate the intended outcome.

“Depends on issues – sometimes need more complex relationship. Much more nuanced. As local as possible in first instance but may need tailored support depending on what you’re looking at.” FGD#1

“We need to consider who are the critical stakeholders in the Pacific. Our organisation has had success collaborating with faith leaders. This approach uses what’s already trusted faith networks and civil society.” FGD#1

The FGD participants also suggested some reasons as to why implemented initiatives in the Region have failed in the past. These centred on an absence of engagement with the right stakeholder locally, or a structural mechanism that limits the opportunities for such arrangements to exist.

“There is a problem with over-piloting. Attempts to scale tend to fail because they are not developed with [the] right partners from the outset.” FGD#2

“Lack of DFAT [Department of Foreign Affairs and Trade] ability to allocate funding directly with local partners, because [of] their own lack of capacity to manage funding streams, therefore they need to use consultancy firms to deliver their aid program. It takes time to trickle down to a local partner.” FGD#1

The important role of engaging with local civil society was repeatedly highlighted in the FGDs, but no specific recommendations were presented in the recent State of the Region 2019 report on health security or the UNSW report on health system strengthening (1,12). As well as being a moral imperative, evidence suggests that community engagement more broadly is an effective way to attain positive health outcomes. It is the evidence on how to approach that engagement that is lacking (45,46).

An important consideration to effectively engage local organisations is the role of decolonisation. A colonial history in the Region means that systems of dominance and power are deeply ingrained into the systems within which we work today, and, realistically, any effort for collaboration needs to take measures to counter the impact of such systems (47). For example, one barrier to establishing effective working partnerships between Australia and countries in the Region is that such partnerships can create power differentials that mirror colonial relationships. A best practice implementation approach to de-colonise partnerships remains ill-defined (47,48). However, some approaches for moving forward have been proposed in the literature. One approach is for global health practitioners from high-income countries to immerse themselves in the communities they serve, for situations and settings where it is identified by the community that assistance is needed, to minimise power differentials and allow close communication between all parties, especially around establishing frameworks to resolve ethical challenges (48). In addition to local NGO partnerships, there is a greater need to leverage academic institution partnership to guide local research and context-specific evidence-based decision-making (47). The imperative is even greater in the Region, where there are only a few education and research institutions; enhancing their leadership in the Region will help mitigate future knowledge and workforce shortages. Moving forward will require models that enable more collaborative framing that resists mainstream use of “local” actors within a “traditional” system (49).

Other emergent topics

While our primary aim was to use FGDs to prioritise key health system strengthening initiatives that promote health security in the Region, there were additional interesting topics and themes that emerged and merit consideration:

- Disruption in routine immunisation during the COVID-19 pandemic highlighted difficulties in maintaining progress of immunisation programs other than for COVID-19.

“Difficulties have emerged for the broader expanded program on immunisation. While we see a rapid acceleration of our first and then second dose coverage [of COVID-19 vaccines] across the Pacific, data shows routine immunisation coverage, measles and rubella coverage for example, may have slipped as low as 50% coverage in a number of countries.” FGD#3

These disruptions to immunisation have been observed globally (50). Global estimates suggest 23 million children aged under 1 year did not receive basic vaccines in 2020 (51). A modelling study estimated a 7% drop in global coverage of the third-dose diphtheria-tetanus-pertussis (DTP3) vaccine and first-dose measles-containing vaccine (MCV1) in 2020 (52). While some regions re-instated immunisation programs and conducted supplementary immunisation campaigns, it is likely that these disruptions will continue over the coming years, as happened in 2021.

- Wellbeing of populations and the health workforce was negatively impacted by COVID-19 measures.

“Generally wellbeing is not addressed well in the health security preparations when the pandemic is quite lengthy. For example, health workforce and general population through lockdowns.” FGD#3

Emerging evidence has highlighted the stress and distress for the clinical and public health workforce through the COVID-19 pandemic. Implementation of practices that eliminate, reduce and manage factors that cause or contribute to public health workers’ poor mental health might improve mental health outcomes during emergencies (29,53,54).

- Maintaining primary health care and community services during crises is vital but difficult.

“Evidence shows more people died from maternal causes than Ebola [2014 outbreak in West Africa]. When there is a crisis, we should be allocating funding to what’s causing the most death and disability accordingly rather than focusing on what’s the ‘new thing’.” FGD#1

Recent Pulse Surveys coordinated by WHO reported almost every country (90%) experienced disruption to routine services to some extent, with greater disruptions being reported in low- and middle-income countries than in high-income countries. On average, countries reported disruptions to half of the tracer health services on which they reported (55). These disruptions affected both preventive and curative services that are delivered in primary care settings.

- One regional expert noted the contribution of and learnings on infection prevention and control measures in the Pacific, especially in the context of Fiji.

“So if this pandemic was a measure of how good a system was intended, IPC [infection prevention and control], it exposed the system and we really need to do a lot of work in this area.” FGD#3

- While gender and disability did not appear as themes in the FGDs, some participants highlighted gaps in data on gender and people with disability. One participant highlighted that the pandemic for the first time saw the inclusion of people with disabilities at “decision-making tables”

“Both the Australian Humanitarian Partnership and Pacific Disaster Ready, set up in PNG [Papua New Guinea], Solomon Islands, Fiji and Timor Leste, are examples that have improved capacity among local disability organisations to advocate for disability inclusion. In terms of COVID-19, this means more people at the table in planning the response [that consider disability inclusion].” FGD#1

- A few FGD participants emphasised the importance of involving the non-health sector, governance, financing and leadership in the pandemic response, because many decisions related to the health sector require input from other sectors; however, the coordination to achieve this can be challenging. Some participants also felt that longer-term engagement and funding strategies were needed.

STRENGTHS AND LIMITATIONS

The use of FGDs with diverse stakeholders from Australia and the Region, with demonstrated expertise, skills and engagement, helped identify health system and health security challenges and how to address them. It allowed for participants to explore the context within which they are working and identify collective solutions by “piggybacking” on other participants (56).

Our report has some limitations. Firstly, due to time and resource constraints, a complete literature review could not be conducted, which may have resulted in some publication bias. However, the report incorporates findings from recent reviews and sourced literature from subject matter experts which will minimise any information gaps. Secondly, the rapidly evolving situation of the COVID-19 pandemic and country responses meant that the expert opinions were based on the situation at a point in time. Any change in views as a result of recent changes in the dynamic of the pandemic and response activities could not be captured. Thirdly, as with qualitative research, the findings from FGDs cannot be generalised to other settings outside of the countries in the Region. Furthermore, country experts and participants were clear that these findings could not be generalised even for all countries within the Region, but provide an expert opinion. Any plans and strategies must consider country partnerships. In some FGDs, some participants’ opinions may be biased or incomplete due to the presence of other members in the discussion; however, all participants were given the option to share additional views, if any, with study researchers confidentially. Additionally, the findings reported here represent a collective view and not every individual perspective could be listed. Fourthly, the scope of our report was limited to the perspectives of health experts, which meant the role of sectors outside health were not considered. Finally, as content area experts, study researchers acknowledge the role of reflexivity in qualitative research (prior experiences, assumptions and beliefs) which may have influenced the research process (57).

IMPLICATIONS/RECOMMENDATIONS

This study serves as a primer to identify priority areas for health system strengthening and health security. Below we present some opportunities for consideration (see Table 2). These opportunities can be used for consultation with key stakeholders to prioritise activities and strategies over the immediate and medium to long term.

Table 2: Recommendations for priority health system strengthening initiatives for health security in the Region

Priority area	Immediate to medium term	Long term
	<p>Localisation should be considered as a universal model for practice and apply to all activities, programs and initiatives, acknowledging the significance of decolonisation. Success of any initiative will be limited without it.</p> <ul style="list-style-type: none"> • Identify unique approaches for each country. Traditional project-based funding prevents long-term strengthening. This can be minimised by having a minimum level of health security engagement for each setting. • Increase learning from and visibility of local health leaders with lived experience. One way to do so is to promote diverse representation on selection and advisory committees in Australia. • Prioritise local partnerships for implementation. Where possible, integrate with and fund local and community-based organisations, including academic institutions in the Region. • Enable longer-term and stable financing (5–10 years) to promote localisation, move beyond project-based outcomes and lead to sustainable health system strengthening. 	
Workforce development	<ul style="list-style-type: none"> • Conduct a review of the health workforce with a focus on the public health workforce, to understand the quantity and quality of workforce engaged in the COVID-19 pandemic. The review should prioritise identifying what roles were filled, what staff were doing, how they acquired the skills and who missed out. Doing so will allow consolidation of the workforce and identify surge mechanisms for the future as part of the review. • Coordinate mechanisms for knowledge exchange/transfer across formal and informal Australian networks. This will allow for fostering of longer-term partnerships and strengthen formal pathways. 	<ul style="list-style-type: none"> • Prepare long-term strategic health workforce plans. • The plans should be based on international best practice for supporting in-country implementation, with support from appropriate teaching organisations. Local and regional teaching organisations should be used where feasible. Plans should include all cadres of health workers from clinical, public health and non-health sectors.
Evidence-informed decision-making and knowledge translation	<ul style="list-style-type: none"> • Invest in strategies that promote use of data for decision-making, with a focus on using surveillance data, closing feedback loops and using local data to guide responses. • Use local evidence and support local research through local and regional academic and research institutions. 	<ul style="list-style-type: none"> • Create regional-based knowledge translation hubs, such as subregional technical advisory groups for different areas, to allow cross-pollination in a culturally appropriate manner.

<p>Digital tools and health information systems for monitoring and surveillance</p>	<ul style="list-style-type: none"> • Strengthening digital health systems and teams should be a priority in the Region. It will require leadership at regional, national and subnational level, in the form of strategies and designated digital health teams. • Integrate health data systems to drive decision-making. • Provide ongoing professional development on digital tools and health information systems. 	<ul style="list-style-type: none"> • Invest in digital health infrastructure and governance.
<p>Sustaining advancements in laboratory testing and surveillance</p>	<ul style="list-style-type: none"> • Deliver training and mentoring to new laboratory staff who have been engaged during the COVID-19 pandemic. • Enable and support ongoing costs of infrastructure, equipment, reagents and new staff. 	<ul style="list-style-type: none"> • Expand laboratory capacity to test for other pathogens. • Prepare for regional genomic surveillance opportunities, potentially in places like Fiji, to serve as a subregional accredited testing laboratory.
<p>Risk communication</p>	<ul style="list-style-type: none"> • Apply social and behavioural economics to design risk communication strategies. • Build and integrate formal networks of community mobilisers trained in risk communication who can adapt and use culturally appropriate tools. This should be done through NGO partners at the subnational level. 	<ul style="list-style-type: none"> • Apply social and behavioural economics to risk communication strategies. • Build local capacity in the principles of health promotion, risk communication, management of misinformation and anthropology through local institutions, civil societies and NGOs. This will be increasingly important in the era of misinformation.
<p>Routine health services</p>	<ul style="list-style-type: none"> • Conduct a review to identify potential health system improvements and opportunities for system integration in routine and life-course immunisation. • Restore all routine health services, including preventive and treatment services in primary health care, and support catch-up vaccination programs to minimise outbreaks of vaccine-preventable diseases. 	<ul style="list-style-type: none"> • Incorporate maintaining routine health services into planning. This includes integrating infrastructure and training for treatment and curative services across primary and tertiary care. • Develop strategies and operational plans to maintain routine health services during future acute public health events, to prevent further service disruptions. • Establish core staff for routine services.

CONCLUSION

There is significant momentum across the health and non-health sectors, and within government and nongovernment agencies, to embrace the integration of health system strengthening and health security concepts. However, there is little evidence of effective strategies for implementation on the ground. Our findings provide a starting point, to translate these ideas into priorities for implementation. These priorities include workforce development, risk communication, surveillance and laboratory capacity, with the cross-cutting theme of localisation. Evidence-based strategies to tackle each of these priorities individually were not examined, but our findings reinforced that any approaches should be implemented with a greater focus on local organisations. In the next phase of health system strengthening and health security planning, evaluation of the initiatives implemented will strengthen our knowledge on the value of integrating health system strengthening and health security.

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CONFLICTS OF INTEREST

The authors have none to declare.

ANNEX 1 – LIST OF ORGANISATIONAL AFFILIATIONS OF PARTICIPANTS

- Australian Global Health Alliance
- Australian Government Department of Foreign Affairs and Trade
- Australian Red Cross
- Burnet Institute (Australia)
- CBM International
- College of Medicine, Nursing and Health Sciences, Suva, Fiji
- The Fred Hollows Foundation
- The George Institute for Global Health (Australia)
- Interplast Australia & New Zealand
- Marie Stopes International
- National Centre for Immunisation Research and Surveillance (Australia)
- Pacific Community (SPC)
- Royal Australasian College of Surgeons
- World Health Organization Country Office, Papua New Guinea
- World Vision Australia

ANNEX 2 – PARTICIPANT GUIDE

Priorities for Health Security and Health Systems Strengthening

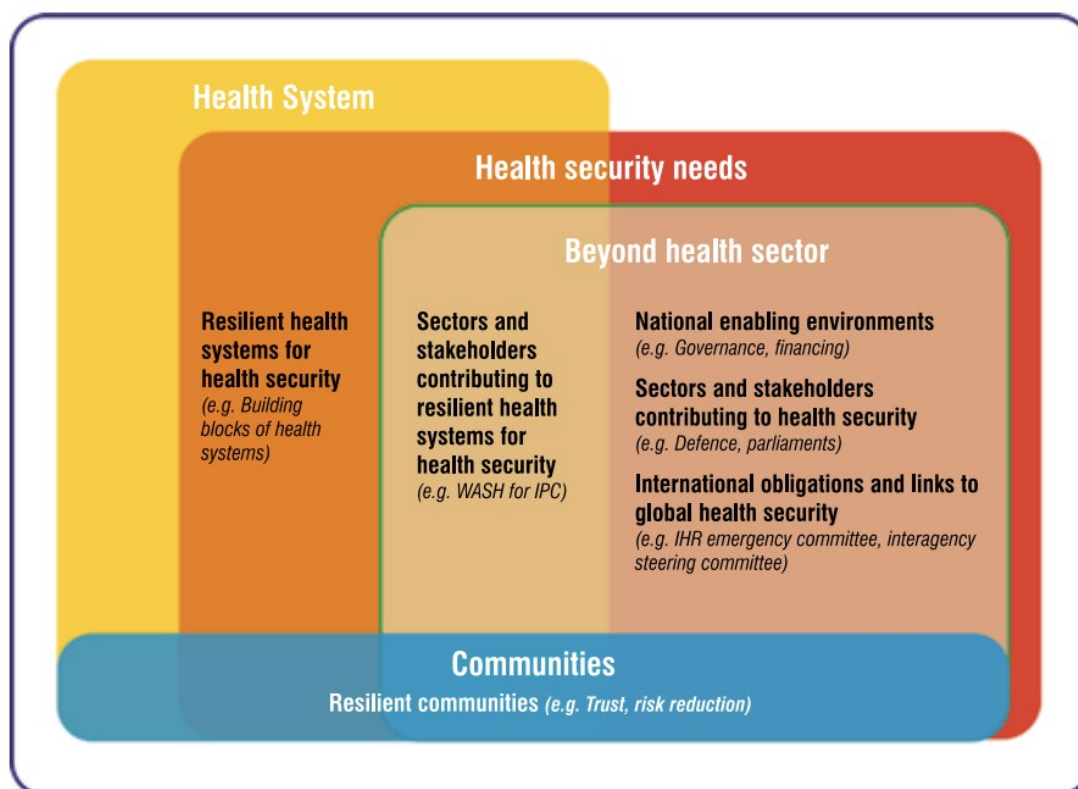
Focus Group Discussion

Participant guide

The purpose of the focus group discussion is to examine the relationship between health security and health systems in the Indo-Pacific region and determine which aspects and specific initiatives should be prioritised for future investments in the short-medium term.

Context

The COVID-19 pandemic has highlighted the role of resilient health systems in health security and outbreak response. The World Health Organization (WHO) recently released a framework to drive renewed efforts for health system strengthening to improve health security, known as “Health Systems for Health Security” (HS for HS). Our discussion will be broadly considered in the context of this framework:



Source: World Health Organization, 2021, p. 7, Health systems for health security: a framework for developing capacities for International Health Regulations, and components in health systems and other sectors that work in synergy to meet the demands imposed by health emergencies, <https://apps.who.int/iris/bitstream/handle/10665/342006/9789240029682-eng.pdf?sequence=1&isAllowed=y>.

The focus countries for our discussion are Timor Leste and Pacific Island Countries (PICs) which includes:

- Cook Islands
- Fiji
- Kiribati
- Republic of Marshall Islands
- Federated States of Micronesia
- Nauru
- Niue
- Palau
- Papua New Guinea
- Samoa
- Solomon Islands
- Tonga
- Tuvalu
- Vanuatu.

Health security will be defined as:

“as the avoidance and containment of infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale” (Indo-Pacific Centre for Health Security, 2019, page ix, Health Security in the Indo-Pacific: State of the Region 2019).

As per the framework “Health Systems for Health Security is an approach that harmoniously brings together efforts to strengthen resources and capacities required for implementation of the International Health Regulations, components in health systems and those in other sectors for effective management of health emergencies, while maintaining the continuity of essential health services throughout.”

In this discussion, we will discuss key areas of health security that can directly benefit strengthening health systems for example Surveillance, Laboratory capacity, Public health workforce, Immunisation, Primary Health Care/Community Health, Risk Communication and community engagement, and Antimicrobial resistance.

Priorities for Health Security and Health Systems Strengthening

Focus Group Discussion Facilitator Guide

Introduction

Thank you all for coming.

My name is Dr Meru Sheel, I am an epidemiologist at the ANU. Along with me is Ms Nicole Rendell, who is working with me on this project.

The focus of today's discussion is to examine the relationship between health security and health systems. We are particularly interested in your views on the key health system challenges facing countries in the Indo-Pacific region, that impact health security – and the Region's ability to detect, avert and respond. Through this process we want to identify what initiatives should be prioritised to mitigate or avoid these challenges or strengthen health systems structures to improve health security initiatives in the region.

Along with Participant Information Sheet, you will have already received a list of our focus countries and working definitions to guide our discussion.

As per the WHO framework "Health Systems for Health Security is an approach that harmoniously brings together efforts to strengthen resources and capacities required for implementation of the International Health Regulations, components in health systems and those in other sectors for effective management of health emergencies, while maintaining the continuity of essential health services throughout."

Today's session will be recorded and the discussion will be documented through notetaking. These notes will then be reviewed and analysed and incorporated into a final report to identify the key priorities for health security in the region. The final report to be submitted to Australian Council for International Development (ACFID). No individuals or identifying information of individuals will be named in the report. You may choose to switch off your video if you prefer.

PRESS RECORD

You will have been sent an information sheet outlining information about your involvement in this discussion. Your participation is voluntary and you can withdraw at any time during the session, without negative consequences, however your contribution up until withdrawal will be retained. Have each of you read the information sheet and agree to participate, noting that the group discussion is being recorded and de-identified quotes from this session may be included as part of reporting?

- Yes from each participant – Continue
- No – Pause discussion to resolve concerns. The participant will again have the choice to leave the discussion by disconnecting from the meeting.

Brief introductions of participants – Please introduce yourself by providing your name, role, organisation and years of experience in health security and/or health systems.

BEGIN DISCUSSION

Guiding questions

1. Based on your experience, from both before and after the COVID-19 pandemic, what do you perceive as the key challenges facing health systems in the Pacific, in terms of health security?

- Have these challenges been exacerbated because of the pandemic, remained the same, or gotten better with the influx of COVID-19 investments?
 - Consider:
 - Surveillance
 - Laboratory capacity
 - Health workforce
 - Immunisation
 - Primary health care/community health
 - Risk communication
 - Antimicrobial resistance.

2. What could be done to strengthen health systems to **avoid** these challenges?

- Consider:
 - Existing resources
 - Health security needs within health systems
 - Health security needs beyond the formal health system (eg community health, animal health, environmental health, water, sanitation and hygiene for infection prevention and control).

3. What could be done to strengthen health systems to **mitigate** these challenges?

- Consider:
 - Existing resources
 - Health security needs within health systems
- Health security needs beyond the formal health system (eg community health, animal health, environmental health, water, sanitation and hygiene for infection prevention and control).

4. In contrast, what do you perceive as the key strengths facing health systems in the Pacific, in terms of health security?

- How can these be enhanced or mobilised to manage or avoid the stated challenges?

5. What do you consider the top priority for strengthening regional health systems for improved health security?

- Where do you see the role of gender and disability inclusion in these priorities?

6. In terms of implementation, who is best placed to implement [prioritised investment identified from discussion] - an NGO, commercial or multilateral organisation?

- Please identify which kind of partner and why

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