LEARNING AND IMPROVING FROM THE COVID-19 RESPONSE IN THE WESTERN PACIFIC REGION

Executive summary

More than 600 million cases of coronavirus disease 2019 (COVID-19), the infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), have been confirmed, and nearly 6.5 million deaths have been associated with the virus globally between December 2019 and August 2022. In the World Health Organization (WHO) Western Pacific Region, there have been 84,062,485 cases and 259,790 deaths reported during the same time period. This represents 14% of estimated global cases and 4% of estimated global deaths. Available data suggest that the Western Pacific Region, home to one quarter of the world population, has relatively low morbidity and mortality from coronavirus disease (COVID-19) compared to other WHO regions.

Given that SARS-CoV-2 was a novel infectious virus, initial response measures taken by Member States utilized their experience and understanding of other viral respiratory diseases. As the COVID-19 pandemic progressed, it was necessary to adjust and improve response measures based on experience, lessons identified and the evolving evidence-base associated with the virus.

Since 2016, countries and areas in the Western Pacific Region, in collaboration with WHO and partners, have strengthened their health security systems while responding to a variety of public health emergencies. They have been guided by the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III) and its two earlier iterations, which are strategic frameworks to strengthen core public health capacities and to implement the International Health Regulations (2005).

Over the 16 years of APSED implementation, a learn-and-improve mechanism has underpinned each of the three strategies. This same approach was utilized by Member States during the COVID-19 response. This mechanism relies on strong networks and information sharing between WHO Member States, WHO and partners. Sharing of experiences and lessons identified throughout the COVID-19 pandemic, coupled with an analysis of common health
security challenges, can highlight common solutions and identify targeted areas for improvement that can support long-term system development to ensure the 37 countries and areas of the Western Pacific Region are more resilient against future health threats.

The main areas identified from the learn-and-improve mechanism during the COVID-19 pandemic include:

- **Preparedness plans and response strategies** for health emergencies should consider a country’s capacity and use the two-tier approach (emergency planning and systems readiness) to build systems that support the response. Given that vulnerable populations are disproportionately affected by health emergencies, response plans and interventions need to be targeted and tailored to the various vulnerable populations to reduce morbidity and mortality. Additionally, in order to decrease morbidity and mortality in the Western Pacific Region, most countries used “containment and suppression” strategies rather than “containment and mitigation” strategies.

- Throughout the decision-making process, collaboration across multiple sectors of society and different government levels can result in a more effective response to health emergencies. Member States used different priority approaches to allocate resources and find a balance between public health and economic priorities.

- **Risk assessment and surveillance** methods supported informed decision-making. Member States adapted or restructured multiple sources of existing surveillance for SARS-CoV-2 while also developing additional surveillance methods to detect hidden transmission.

- As Member States shifted from a zero-risk approach\(^1\) to a non-zero-risk approach\(^2\) as knowledge and understanding of SARS-CoV-2 increased, there was an evolution of response measures.

Lessons and experiences identified through the learn-and-improve mechanism during the COVID-19 pandemic are to be incorporated into a new Asia Pacific Health Security Action Framework.

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\(^1\) A strategy that aims for maximum suppression of infections used throughout the world in response to the COVID-19 pandemic to quickly stop transmission of SARS-CoV-2 once detected.

\(^2\) Adoption of an endemic strategy, or sustained management of COVID-19, to ensure health systems can respond appropriately without overwhelming health-care capacity and thereby aid economic recovery. This strategy is based on the local situation, taking into account a variety of indicators, such as vaccinations, along with knowledge gained during COVID-19 pandemic.
1. **Background: Developments and achievements of APSED**

The Asia Pacific region is a diverse and rapidly changing region. It is home to some of the world’s largest populations as well as the smallest, the most urbanized and the most remote. The experience of severe acute respiratory syndrome (SARS) in 2003 was a turning point in how the Asia Pacific region and the world addressed public health emergencies. Important lessons identified from the region at that time were: (i) the importance of investing in public health and core public health capacities; (ii) the importance of preparedness and readiness; and (iii) the need for a collective approach to managing public health emergencies.

The purpose and scope of the International Health Regulations (2005), known as IHR (2005), are “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”. IHR (2005) also requires State Parties to strengthen core surveillance and response capacities at the primary, intermediate and national levels and, at designated international ports, airports and ground crossings. APSED III and its earlier iterations, provided a framework to guide countries and areas in the Asia Pacific region to strengthen core public health capacities needed to detect, assess and respond to public health emergencies and implement (IHR) 2005. The APSED approach includes the following:

- Country focused: places countries, communities and people at the centre and adapts solutions to country contexts.

- All-hazards approach: provides a generic platform to strengthen IHR (2005) core capacities and core public health systems required to manage public health emergencies caused by any type of hazard.

- Step-by-step: adopts a staged approach to develop and enhance health security capacities and systems for public health emergency preparedness.

- Continuous learning for improvement: continuously revises and updates systems and plans based on reviews of experiences and lessons from past events, and revises plans.

- Regional and global public goods: highlights the importance of connecting national surveillance, risk assessment and response systems to regional and international levels.
• Partnership for collective action: emphasizes the importance of partnerships for collective preparedness and response and provides a common platform for stakeholder engagement.

• Forward-looking: acknowledges the importance of looking to the future, including predicting risks and being proactive rather than reactive.

• Financial sustainability: promotes sustainable investments in preparedness.

The relationships between WHO and Member States were built through IHR National Focal Point communication and the APSED Technical Advisory Group (APSED TAG) mechanisms. APSED TAG have met annually since the inception of APSED to guide the collective efforts of Member States, WHO and partners in implementing the obligations of IHR (2005). The annual APSED TAG meetings encourage Member States to review their preparedness and response efforts and move forward with collective solutions to address the challenges in the Region.

The coronavirus disease 2019 (COVID-19) pandemic significantly impacted communities, health systems and economies, as not many countries were adequately prepared for a crisis of the magnitude of the COVID-19 pandemic. There was also a lack of global systems and tools to prepare for and respond to the pandemic.

At the Seventy-fifth World Health Assembly in 2022, Member States reiterated the importance of IHR (2005), the need to strengthen their implementation of and compliance with IHR (2005), and efforts to “modernize” the instrument. Member States agreed that IHR (2005) remains the cornerstone of any global preparedness and response to health emergencies and discussed the need for amendments to make IHR (2005) fit for purpose.

The annual APSED TAG meetings in 2020, 2021 and 2022, provided opportunities to jointly review countries’ COVID-19 experiences and progress and identify regional priorities for the ongoing pandemic response. These APSED TAG meetings also confirmed that the investments made in public health emergency preparedness through APSED III greatly benefitted the COVID-19 response. APSED TAG continues to be a platform to monitor progress in strengthening health security capacities, discuss technical issues, identify common priorities, and make recommendations for the Asia Pacific region.
2. Introduction

2.1 Why we need a learn-and-improve mechanism

Since severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19), is a novel infectious pathogen, the initial response measures taken by Member States in the World Health Organization (WHO) Western Pacific Region were based on their prior experiences and understanding of other diseases. As knowledge and evidence relating to SARS-CoV-2 evolved, Member States continually adjusted their response to adapt.

Coordinated by WHO Regional Office for the Western Pacific Region, Member States used the learn-and-improve mechanism during the COVID-19 pandemic to refine their responses. Common challenges experienced by countries and areas were identified and analysed at the regional level. Effective approaches and mechanisms were then developed and tailored to the specific national and subnational contexts in response to the COVID-19 pandemic (Fig. 1).

2.2 Learn-and-improve concept established by the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III)

Since 2016, the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III) and its two earlier iterations, have provided a framework for countries in the Asia Pacific region to strengthen core public health capacities and implement the revised International Health Regulations (IHR 2005).

Through the 16 years of implementation of the three iterations of APSED, operational concepts and approaches have been established that include: a step-by-step approach; long-term systems building; adaptability to the country context; partnerships for collective action; investment in preparedness; the two-tier approach (emergency planning and systems readiness); and continuous learning for improvement which, during the COVID19 pandemic became known as the learn-and-improve mechanism.

These APSED approaches allowed the learn-and-improve mechanism to be fully utilized during the COVID-19 response.

2.3 Regional learn-and-improve mechanism

The learn-and-improve mechanism is a continual process where the WHO Regional Office for the Western Pacific and WHO country offices work together as one team to respond in an efficient but tailored way to the common challenges that impact multiple countries.
The mechanism relies on strong networks and information sharing between the WHO Regional Office and WHO country offices, and between Member States and WHO country offices. At the Regional Office, common challenges can be identified, analysed and potential solutions developed, and WHO country offices can support Member States to contextualize these solutions and provide guidance on implementation.

Ongoing feedback from countries and areas on the effectiveness of response strategies allows the Regional Office to conduct further analyses to further refine these solutions (Fig. 1). In this way, the learn-and-improve mechanism supports the continual improvement of effective responses to health emergencies.

**Fig. 1. Information sharing through the regional learn-and-improve mechanism**

3. **Outcomes from the learn-and-improve mechanism during the COVID-19 pandemic**

Through the regional learn-and-improve mechanism, key areas emerged as critical to supporting an effective response during the COVID-19 pandemic. The COVID-19 Incident Management Support Team (IMST) at the WHO Regional Office for the Western Pacific has been key in collecting and validating information, conducting risk assessments and sharing information with WHO headquarters, within the Regional Office and with country offices. Regular IMST meetings and individual country consultations have allowed country experiences, including challenges and potential solutions, to be identified and for WHO to provide guidance and technical support to Member States in their response.

In this section, each of the key areas are presented, with the learn-and-improve mechanisms identified for each area described. Country examples for each are then presented.
The key regional learn-and-improve mechanisms have been categorized into the following four main areas: (1) preparedness and response strategy; (2) the decision-making process; (3) risk assessment and surveillance; and (4) the evolution of response measures (Table 1). Each area contains approaches and strategies utilized and refined during the COVID-19 pandemic in the Western Pacific Region and includes country examples.

Table 1. Areas identified through the learn-and-improve regional mechanism

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3.1 Preparedness and response strategy

3.1.1 Two-tier approach

What

The two-tier approach has been a key part of APSED III and its earlier iterations. The first tier – emergency planning – refers to the ongoing response phase that includes planning, responding and continuously adjusting the response. The regional learn-and-improve mechanism has been integral in achieving continual adjustments to response measures throughout the COVID-19 response.

The second tier – system readiness – involves developing the systems and mechanisms, including beyond the health sector, needed to execute the emergency plan. At the regional level, the learn-and-improve mechanism has enabled the consolidation of Member States’ experiences and identified priority areas and strategies that require further strengthening for Member States to be better prepared to respond to the next health threat.

In the Western Pacific Region, both emergency planning and system readiness are emphasized simultaneously in the preparedness and response to health emergencies (Fig. 2).
Why

Having an emergency preparedness and response plan is necessary, but also requires that the systems to implement the preparedness and response plans exist. This is especially the case for countries with limited capacity and special considerations are required to approach health emergency preparedness in resource-limited settings. Moreover, when developing a preparedness plan, the capacity and capability of the system to implement the plans need to be considered. A two-tier approach enables Member States to develop robust and effective preparedness-and-response mechanisms to respond to public health emergencies.

Key points

It is important for countries to have a plan in place to respond to emergencies. However, many countries do not have the capacity to implement these plans in the event of an emergency, especially countries that rely on international partnerships or central/national support. Once a preparedness and response plan is in place, in the event of an emergency, a system is needed to implement this plan. The first tier is emergency planning which employs a continuous cycle of developing, exercising, evaluating and revising the plan. System development, the second tier in the two-tier approach, must translate countries’ preparedness and response plans into readiness for action. This second tier (i) requires actions specific to events; (ii) is based on routine activities; and (iii) involves coordination with the wider health sector and systems beyond health. All stakeholders involved need to reach a consensus on the
preparedness plan and agree their role within it. It is necessary to have key functions, systems, people, resources, tools and facilities in place across the health system, and outside of the health system where relevant, to operationalize plans effectively and efficiently when a public health emergency occurs. Additionally, multisectoral collaboration is needed to plan and respond to public health emergencies.

**Effectiveness**

The two-tier approach has contributed to developing scalable and flexible systems that maximize available resources. Central and local public health responses have been more connected through the two-tier approach with the facilitation of planning and system development at the subnational levels to proactively prepare for health emergencies.

Monitoring and evaluating interventions during COVID-19 at the national and subnational levels has been vital in adjusting response measures according to the context at the national and subnational levels. Additionally, the two-tier approach is applicable during emergency responses to learn from real-time examples and to improve the system. This then contributes to strengthening the system for COVID-19 and future public health emergencies.

**Country examples**

**Cambodia** used the two-tier approach evidenced by its continual monitoring, calibrating and implementation of public health and social measures (PHSM) during the pandemic with a whole-of-government and multisectoral command and coordination structure at the national and subnational levels. Cambodia developed provincial preparedness plans for large-scale community transmission of COVID-19, which prioritized strengthening incident management systems at the national and provincial levels, equipping all provinces with emergency operations centres (EOCs) and building local health system surge capacity. A series of provincial intra-action reviews allowed learning and improvement within provinces through a peer-to-peer approach.

In **Viet Nam**, the *National Preparedness and Response Plan for COVID-19* guided ministries and local authorities to continuously review and improve their preparedness-and-response capacity to ensure the system’s readiness to respond to different scenarios throughout the COVID-19 pandemic. Valuable lessons were identified in various reviews and simulation exercises throughout the pandemic response and contributed to continued adjustment and further improvement of the preparedness and response capacity at national and subnational levels.
3.1.2 Protecting vulnerable populations

Why

Vulnerable populations are disproportionately affected by public health emergencies, and they are at higher risk of infection, severe disease and death, as evidenced during the COVID-19 pandemic. The pandemic response aims to minimize morbidity, mortality and social disruption, and therefore protecting the vulnerable needs to be prioritized.

Key elements

In the context of the COVID-19 pandemic, different groups of vulnerable and high-risk populations have been identified. These are at increased vulnerability because of: repeated exposure (e.g. health-care workers), biological factors (e.g. immunocompromised or those with existing comorbidities), condition or setting (e.g. poor socioeconomic or living/working conditions), and unequal access to the health system (e.g. hard-to-reach populations living in remote settings).

Factors that influence the level of disadvantage or vulnerabilities of specific groups include access to health and social services, social determinants of health, stigma and discrimination, and settings in which people live and work. Not addressing the needs of the vulnerable groups threatens the health and well-being of entire societies and exacerbates existing vulnerabilities and inequities. Addressing the differential impact across populations requires long-term efforts to improve the social determinants of health and access to health care through universal health coverage. In the shorter term, it requires integrating equity into preparedness and response strategies and engaging communities with targeted, context-specific interventions.

System

Before vulnerable populations can be supported during health emergencies, they first need to be identified. Surveillance systems should be able to identify and summarize the characteristics and health needs of vulnerable populations. Additional measures are also required to create safe environments and prevent stigma for vulnerable populations. Key features of health systems to support vulnerable populations include:

- political commitment coupled with governance, financing and legislation;
- multi-stakeholder engagement to support intra-sectoral and intersectoral action, cooperation and coordination;
• identification of hard-to-reach populations, monitoring and evaluation of interventions, and continuously learning and improving; and

• health service transformation to reach vulnerable groups, with high-quality, people-centred primary health care and effective community engagement.

Country examples

Cambodia has a significant factory-based workforce of approximately 850,000 garment workers in 200 factories. Factories and the associated living conditions are considered part of the “three Cs” – i.e. closed spaces, crowded places and close-contact settings. As case numbers increased in this population, factories closed and workers were left without an income. With support from WHO, the International Labour Organization (ILO) and partners, the Royal Government of Cambodia took measures to keep factories open by implementing risk-reduction measures in factories. Measures included strengthening early detection and contact tracing, prioritizing vaccines, increasing awareness among workers and managers with locally tailored messages and tools, and introducing financial and supportive policies. Contextualized approaches were utilized to monitor, evaluate and adjust the reach and engagement of interventions, using mixed methods from on-site mobilization to social/digital methods and through factory associations and local authorities.

Similarly, Singapore experienced outbreaks among migrant workers living in dormitories where many workers inhabited single rooms and shared washing facilities. An inter-agency taskforce was formed in April 2020 that investigated all aspects of workers’ well-being. The taskforce deployed on-site medical facilities, mobile medical team and telemedicine services in dormitories to address the needs of the workers, put in place an effective medical care operation, and ensure that Singapore’s dormitories are more resilient against future health threats. A new division within the Ministry of Manpower was developed to continue efforts to make dormitories more resilient and prevent new public health threats in migrant worker populations. Additionally, a new primary health care plan was introduced to provide migrant workers with quality, affordable, and accessible health.

In Papua New Guinea, the National Department of Health, provincial health authorities, Correctional Services and the National Pandemic Control Centre worked together with the International Committee of the Red Cross to develop a COVID-19 prevention and response plan, outbreak control, and infection prevention and control measures to be implemented in correctional facilities.
**Cook Islands** reviewed and updated its population database to include vulnerable populations. This was a joint effort by the Emergency Management Cook Islands Team, Te Marae Ora Ministry of Health and community taskforce teams. The updated database was used to develop a flagging system in which homes where vulnerable people resided were identified and given an orange-coloured flag in preparation and preceding a detected COVID-19 outbreak. Early targeted engagement with these homes occurred prior to an outbreak of COVID-19 and during vaccination rollout.

**Cambodia, the Philippines and Viet Nam** undertook “last-mile” vaccination strategies to reach vulnerable populations and improve booster vaccination uptake among vulnerable groups. Cambodia implemented a catch-up strategy through mobile vaccination at pagodas, schools, markets, factories and companies, and other public spaces. The strategy also carried out outreach vaccinations in remote, hard-to-reach villages to reach vulnerable groups such as older people, pregnant/lactating women and people with disabilities, among others.

In the Philippines, the Department of Health worked with other government agencies, nongovernmental organizations, and civil society to raise awareness and improve vaccination coverage among vulnerable populations. Special vaccination days were conducted for people without housing in coordination with the National Vaccination Operation Centre, WHO and other United Nations agencies. The *National Deployment and Vaccination Plan for COVID-19 Vaccines*, supported by WHO country office, adopted the principle of equity and prioritization of groups with a limited supply of vaccines in early 2021.

### 3.1.3 Using “containment & suppression” rather than “containment & mitigation”

**What**

Before the COVID-19 pandemic, widely employed responses to limit both the extent and rate of infection of an emerging infectious disease was containment³ and mitigation.⁴ If containment were not possible, then countries shift to mitigation, often referred to as “flattening the curve”. During the COVID-19 pandemic, the WHO Regional Office for the Western Pacific, and Western Pacific Member States, generally adopted the containment-and-suppression⁵ approach. This approach was largely successful in limiting transmission and used a combination of public health and social measures (PHSM). As the transmission of

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³ Containment – aiming to minimize the risk of transmission using strategies for early detection of cases and their containment to prevent onward transmission of an infection.

⁴ Mitigation – aiming to slow down transmission to minimize mortality and reduce the burden on health systems while protecting those most at risk of severe disease from infection. Mitigation strategies do not aim to completely stop the spread of infections.

⁵ Suppression – using combinations of public health and social measures (PHSM) to reverse epidemic growth and minimize case numbers to levels that are sufficiently supported by the health system.
SARS-CoV-2 stabilized and vaccine coverage increased, the approach evolved to encompass a longer-term “suppress and live with it” approach.⁶

**Fig. 3. Using containment and suppression rather than containment and mitigation**

**Why**

As SARS-CoV-2 was a novel pathogen, the transmissibility, severity and impact of the virus, as well as the projected burden on health systems, including mortality and morbidity, were largely unknown. Countries and areas that adopted the containment-and-mitigation approach and lifted all PHSM simultaneously when containment was not feasible often had a surge in case numbers and increased burden on health systems. Other countries in the Western Pacific Region took the more measured approach of suppression to minimize the transmission of SARS-CoV-2 by calibrating PHSM in a controlled and staged manner. Monitoring and evaluating the impact of PHSM was key in supporting the response in subsequent surges.

**Key elements**

There are several key elements that countries should consider when shifting their response approach, including availability of information about transmissibility, severity and impact of the virus. Data and information should be continuously collected and analysed to ensure decisions are informed by evidence. Countries can implement the most robust possible interventions to contain the virus and then gradually lift measures aligned with the transmission stage and social impact rather than lifting all measures simultaneously. Countries need to continue monitoring and measuring the effectiveness of interventions using data from multi-source surveillance to calibrate PHSM promptly and implement proportionately.

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⁶ Live with it – sustainable management of transmission with pharmacological intervention, including vaccination and minimal PHSM.
When countries prepare and respond to public health emergencies, this should be done with “no regrets”. Nevertheless, the decision to implement response measures should be carefully considered, including the effectiveness of interventions and potential negative impacts. Countries in the Region have begun to shift their approach from a containment-and-suppression approach to a suppress-and-live-with-it approach as COVID-19 vaccination coverage has increased, and health system capacity recovered.

**Effectiveness**

Most Western Pacific Region Member States adopted a containment-and-suppression approach initially during the COVID-19 pandemic response. Using this approach countries achieved: a manageable number of COVID-19 cases; manageable utilization rates for the health-care system and human resources; a reduction in mortality; and a reduction in social and economic impacts. The Western Pacific Region successfully implemented the containment-and-suppression approach and suppressed transmission well during the early stages of the COVID-19 pandemic (Fig. 4).

**Fig. 4. Epidemic curves of COVID-19 cases by regions in the early stage of the pandemic (data as of the end of June 2020)**

![Epidemic curves of COVID-19 cases by regions in the early stage of the pandemic](image-url)
Country examples

When countries suppressed COVID-19 transmission with minimal social impact from the containment-and-suppression approach, the acceptability of PHSM among the public increased. Many Member States reported that this approach was more acceptable and associated with less social disturbance in the long term.

Initially, the Lao People’s Democratic Republic implemented strong containment measures, such as widespread lockdowns, in response to community transmission. However, as the country achieved high vaccination coverage and the situation evolved, the response approach adapted, including reopening international borders while monitoring the situation closely through regular risk assessments. Similarly, Singapore successfully implemented the containment-and-suppression approach by implementing a bundle of measures to promote the safe management of COVID-19 in settings such as factories, schools and businesses, and promoting individual-based measures, such as mask wearing, distancing and personal hygiene. Decisive and multi-pronged communication strategies with clear and consistent messages were implemented using various channels to reach the public with customized languages.

The Philippines National Action Plan against COVID-19, phases I to IV, evolved from the containment-to-suppression approach. To safely reopen the economy, Phase IV focused on sustaining efforts in decreasing cases, preventing future surges, localizing response operations through a strengthened health system, effectively allocating resources, vaccinating as much of the population as possible, ensuring a steady supply of vaccines through the Philippine National COVID-19 Vaccine Roadmap, and formulating researched-based policies.

In Malaysia, the terms “early and late containment” were used instead of mitigation. Political leaders raised concern about using the term “mitigation” and not wanting to give off the impression that it was the end of the pandemic response. Additionally, the country’s shift in response to late containment targeted the reduction of morbidity and mortality among the population; therefore, mitigation was not an absolute option.
3.2 Decision-making process

3.2.1 Multisectoral decision-making

Why

Multisectoral decision-making involves having all relevant information available and stakeholders making a joint decision by consensus, which results in balanced decisions and response interventions.

Background

COVID-19, as a global public health threat, affects all aspects of society, and is not under the sole responsibility of the national government or the health-care sector. All sectors (e.g. policy, health, economy, industry, transportation, tourism, education and social welfare) have different interests and data sources.

Early in the COVID-19 pandemic, the public health sector had a significant role in the decision-making process of the outbreak response because of rapid increases in cases and deaths. When these numbers decreased, the economic and social sectors pushed for relaxation of stringent and protracted PHSMs, including lockdowns, citing their negative impact on society and the economy. When the economic sector prominently influenced decision-making, economic activity was prioritized, leading to rapid easing of PHSM. As a result, cases and deaths began to increase and decision-making would once again be heavily influenced by the public health sector. This “swinging of decision-making” can cause confusion and frustration for the public and result in reduced trust in national and subnational authorities. We observed if decisions were made without involving all relevant decision-makers, implemented interventions favoured a particular viewpoint (e.g. business, politics, health) based on the situation at that time.

Required systems and actions

All sectors must consider all available information and make joint decisions by consensus. It is better to have a common platform and database where all information can be shared, and different ideas can be considered for policy development, decision-making, and policy evaluation. Using the same data for discussion and decision-making among stakeholders is integral to avoid “swinging decisions”. Once the decision is made, clear messaging to the public is necessary.
National inter-agency steering committees across countries have been established to coordinate, implement and monitor pandemic response. National coordination mechanisms were critical in Malaysia, New Zealand, the Philippines and Viet Nam for multisectoral coordination, decision-making and implementation of the decisions made across the public sectors and the administrative divisions in the countries. In Malaysia, the Philippines and Viet Nam, the coordination mechanisms were chaired by or were under the authority of the head of states and high officials of ministries, thus enabling the highest-level decisions to cascade across the countries.

Viet Nam reconfirmed the importance of multisectoral decision-making, as joint consensus-based decisions resulted in balanced decisions and response interventions. Malaysia noted another advantage of the mechanism – ministries remain the robust backbone of the mechanism with technocrats to support the response through the National Security Council (NSC). The NSC was mandated by the Prime Minister to lead the pandemic response on matters of policy formulation, coordination and implementation. Although Malaysia had three prime ministers since the COVID-19 pandemic began, the preparedness and response structures have remained stable. New Zealand adapted its influenza pandemic plan for COVID-19 to frame the public health response and clarify the roles and responsibilities among multisectoral stakeholders.

In the Philippines, the policy-making body, Inter-Agency Task Force for Management of Emerging Infectious Disease (IATF), created its implementing arm, the National Task Force against COVID-19, to operationalize and implement its strategy of prevention, detection, isolation, treatment and reintegration by mobilizing both public and private sector for the response. The National Deployment and Vaccination Plan is also based on multisectoral collaboration, using the whole-government, whole-of-nation and whole-of-society approaches. For example, private sector representatives were invited to be part of the National Vaccination Operation Centre. Private hospitals, churches and businesses were assessed and prepared as vaccination sites. Medical and professional societies and organizations were invited to volunteer as members of vaccination teams, vaccination sites were hosted at malls and fast-food restaurant chains promoted advertisements about vaccination.

The Lao People’s Democratic Republic and the Republic of Korea reiterated the importance of multisectoral decision-making in specific interventions. In the Lao People’s Democratic Republic, multisectoral decision-making was particularly needed in considering border measures. Coordination was built among public health, civil aviation, foreign affairs,
land borders, local authorities, military and police. In the Republic of Korea, the Korea Disease Control and Prevention Agency (KDCA) streamlined a quality assurance process for COVID-19 testing based on multisectoral cooperation, including academia, manufacturers and civil experts. In some countries, infectious disease experts had a major large presence in their advisory/expert committees.

Other countries, such as Singapore, used a whole-of-government mechanism and a common platform during peacetime to coordinate inter-ministry/inter-agency response to public health events. Singapore’s Multi-Ministry Taskforce was set up to coordinate the whole-of-government effort to manage the COVID-19 pandemic prior to reports of the first confirmed case in the country. This resulted in both health and economic experts working together, and there was no extreme “swinging of decision-making”.

3.2.2 Subnational-level leadership

Why

Pandemics require national and subnational levels to respond simultaneously; both must prepare and coordinate to achieve an efficient response. With the initial zero-risk approach, subnational levels needed to adopt the same policy as the national government for effective and efficient resource allocation and to learn and improve together in a consistent approach. When countries shifted to the non-zero risk approach, subnational levels tailored their policies and actions contextualized to their subnational level, with support from the national level when needed.

Background

Effective outbreak preparedness and response involves ensuring systems and plans are in place at the subnational level, taking a multisectoral approach. During the COVID-19 pandemic, each level of subnational government (e.g. province, district and village) made decisions in some decentralized countries. As a result, evidence-informed pandemic response interventions at the subnational and local levels were successful, while other response decisions appeared to be more influenced by popularism or politics.

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7 A strategy that aims for maximum suppression of infections. This has been used throughout the world in response to the COVID-19 pandemic to quickly stop transmission of SARS-CoV-2 once detected.
8 Adoption of an endemic strategy, or sustained management of COVID-19, to ensure health systems can respond appropriately without overwhelming health-care capacity and thereby aid economic recovery. This strategy is based on the local situation, taking into account a variety of indicators, such as vaccination, along with knowledge gained during COVID-19 pandemic.
Autonomy of decision-making at the national and subnational levels depends on the legislation and granted authority of each country. When authority and responsibility are unclear during a health crisis, crisis management is not easy and incoherent decisions can arise between national and subnational leaders. Moreover, the division of functions between national and subnational leaders may change according to the outbreak. Successful pandemic preparedness and response depends on subnational leaders utilizing their access to localized information (timelier and more detailed) to develop policies that are tailored to local disease trends, healthcare resources and local communities.

In other instances, local response decisions were not based on data or a robust assessment of the pandemic situation. Instead, these decisions appeared to be less evidence informed and more influenced by popularism or politics (e.g. different decisions made on PHSM or the reopening of schools even within the same country).

**Required systems and actions**

Collaboration between national and subnational governments is necessary to increase surge capacity when preparing for growing cases (e.g. coordination is required when transferring/sharing resources among different subnational areas/regions). Furthermore, considerations are needed for the division of functions and to encourage cooperation between national and subnational levels during a health crisis especially in a decentralized system.

**Country examples**

Many Member States in the Western Pacific Region, including Cambodia, Mongolia, the Republic of Korea and Viet Nam, have regularly met with central and provincial governments to share their lessons and improve responses.

**Cambodia** established a whole-of-government command structure, including the Standing Committee of the National Committee to Combat COVID-19, the Inter-Ministerial Committee to Combat COVID-19, and 10 subcommittees assigned to planning and response functions. Provinces aimed to replicate and adapt these structures at scale to coordinate and command the response to COVID-19 under the direct leadership of provincial governors and technical lead of provincial health departments. Each national and subnational subcommittee regularly meets to review overall strategy, review and update technical guidelines, and monitor implementation. This multisectoral command structure at different levels was established utilizing institutionalized capacity and systems and can be adapted to advance national and subnational system readiness.
In **Cook Islands**, coordination at a subnational level resulted in Rarotonga (the main island) and the Island Council of Aitutaki, a main outer island travel destination located beside Rarotonga, forming “One Bubble”, operating under the same rules.

Training was conducted in the **Lao People’s Democratic Republic** to strengthen provincial emergency operations centres. As a result, provinces demonstrated subnational leadership by adapting national notices to the local context, including PHSM, vaccination rollout and community engagement activities.

**Mongolia** has nine districts and 21 provinces, all with different structures, and the support and leadership of the governors were a great boon for the Ministry of Health and the overall response. Field Epidemiology Training Programme graduates were also instrumental in leading the response. Further support is required to empower the graduate and other experts at the subnational level to be better connected and supported to build their capacity.

**Japan**’s subnational governors coordinated to have one voice and requested support from the national government to consider common challenges at the subnational level. They also asked for the national guidance to allow tailored approaches at the subnational level to fulfil subnational responsibilities.

IATF in the **Philippines** mandated all subnational and local government units (LGUs) to establish subnational and local IATF to ensure the consistent and smooth implementation of policies across the levels of government. The subnational IATFs were encouraged to issue ordinances based on national policies to contextualize their local epidemiological situations. The National Vaccine Operation Center (NVOC) collaborated with the Department of Interior and Local Government to establish the Local Vaccination Operation Center (LVOC) for all LGUs for COVID-19 vaccination. LVOC is led by the mayor or city/municipal health officer. The subnational office of the Department of Health meets all LVOCs in its geographical location weekly to discuss accomplishments, gaps and implementation challenges.

The **Republic of Korea** holds daily joint meetings with all ministers and all provincial- and district-level governors chaired by the Prime Minister.

**Viet Nam**’s Multisectoral Steering Committees were established from the national level to the commune level and outlined the roles and responsibilities of each sector. In addition, the Provincial People’s Committees, other provincial non-health sectors, departments and local health facilities have also been mobilized in the national response plan. At the subnational level, local steering committees on COVID-19 prevention and control were also established from the pandemic’s beginning, covering the commune, district and provincial levels. The local steering
committees have conducted regular outbreak-level assessments to inform the calibration of PHSM and be accountable for the public health decision-making in outbreak response in their respective localities.

3.2.3 Balancing public health and the economy

Why

Strengthening health systems, communities and socioeconomic approaches (e.g. food supply, financial business support) increases social acceptance and effectiveness of PHSM. These approaches can avoid the implementation of more stringent interventions (e.g. lockdown) and reduce damage to society and the economy.

Key points

Response to health emergencies can cause strain on public health and economic sectors. Investing in health system strengthening is key: (1) to mitigate disruptions in the health system, which results in less impact on the economy; (2) to avoid resurgence of preventable diseases even beyond the pandemic; (3) to build a resilient health system; and (4) to promote more inclusive and fairer societies.

Countries need to strengthen support from the non-health sector when strong response measures are implemented, for example compensation to businesses that are closed and providing food supplies to those in quarantine or isolation. This can increase the feasibility and social acceptance of these measures which may shorten the period of stringent-measure implementation.

Required systems and actions

Given that the level of social acceptance of PHSM has changed over the course of the pandemic, health system strengthening and socioeconomic approaches need to be resilient and flexible to adapt to the situation, leading to greater feasibility and effectiveness. A resilient health system can be achieved by building mechanisms to scale up and reallocate various functions and capacities into the health system design.

Countries are encouraged to define and deliver benefits packages for health and social services for those who are in quarantine or isolation during public health emergencies, supported by appropriate financing policies. Countries should strengthen ways to ensure that the unreached are reached with services and information.
Country examples

Through multisectoral coordination, Member States addressed the challenges in introducing and maintaining a balance of public health interventions and minimizing the economic impact. In the Philippines, the Department of Trade and Industry secretary is a core member of IATF, and the secretary of the National Economic and Development Authority serves as the Recovery Cluster lead of the National Task Force against COVID-19. Implementation of PHSM is dependent on parameters set for the alert level that has been discussed and agreed upon by IATF members and which has been considered in terms of both public health and economic impact. The Vaccine Cluster under the National Task Force against COVID-19 is composed of different national agencies, including the Department of Finance and the National Economic and Development Authority, which provide an economic perspective on vaccine procurement, negotiation and implementation.

The Government of Viet Nam has emphasized the balance between public health and the economy during the COVID-19 response since 2021. Classification of outbreak levels announced in October 2021 were linked to respective public health measures and socioeconomic activities that were adjusted over time. This was followed by the Economy Recovery Plan post-COVID-19 from the Ministry of Planning and Investment in 2021. In March 2022, the Government issued a new resolution to ensure the country’s socioeconomic reopening and move towards “sustained management of COVID-19”.

In the Lao People’s Democratic Republic, the Ministry of Health worked closely with the tourism sector in the decision-making process concerning PHSM. This included the use of hotels and guesthouses as quarantine and isolation facilities. To balance public health interventions and economic activities, Malaysia started to open international borders, and settings slowly relaxed PHSM use with early and frequent monitoring.

Cooperation between the public and private sectors on laboratories and hospitals increased capacities for testing and clinical management of cases. In addition, public–private partnerships for digital solutions and innovations increased access to care.

3.3 Risk assessment and surveillance

3.3.1 Testing strategies

What

Testing for COVID-19 can be considered to have two objectives: (1) public health surveillance, screening and interventions; and (2) individual diagnosis, treatment and isolation.
Why

Initially, the same testing strategy was thought to be sufficient to address both objectives; however, this was difficult to achieve in practice, especially for countries with limited testing capacity.

Key elements

Testing for SARS-CoV-2 is a helpful diagnostic tool for individuals and is a key pillar in the control of COVID-19 at the population level. Testing enables cases of COVID-19 to be identified early, is a critical component of case and contact management, and informs PHSM, which ultimately protects the most vulnerable populations by minimizing the risk of infection, hospitalization and death from COVID-19.

Given the volume of cases seen in the pandemic, testing all individuals for diagnostic purposes may strain human and other resources. At various points throughout the pandemic, some countries surpassed their testing capacity and could not meet the aims of their testing strategy. Balancing resources with testing capacity and public health objectives is therefore essential. In some instances, positive cases identified through individual-based testing strategies were unlikely to represent the whole population.

Testing for public health purposes, if not well coordinated, can lead to testing resources being diverted from high-risk groups. For example, when “hot spots” are reported and a large number of people in a specific geographic area are instructed to get tested, close contacts of confirmed cases or symptomatic people may not be able to access testing in a timely manner.

Testing strategies changed with the shift in approach from the zero-risk approach to the non-zero-risk approach. During the zero-risk approach, the public health objective for testing was to use public health screening to make decisions on PHSM. In many Member States, test results were used to guide which catchment areas and what level of measures should be implemented. During the non-zero-risk approach phase, rather than a requirement, testing became voluntary and aimed to assist individuals to make their own, informed decision. Additionally, changes in the funding mechanism during the non-zero-risk period disincentivized testing. Some countries prioritized testing for at-risk or vulnerable groups (e.g. health-care workers, high-risk groups, incoming travellers).

The type of test used for specific populations is important, as well as keeping in mind the limitations of each test type, particularly if used for screening purposes. Some countries initially only used polymerase chain reaction (PCR) tests for diagnosis and surveillance to
confirm cases, but later used antigen rapid diagnostic tests (AgRDTs) for both diagnosis and surveillance. The diagnostic testing accuracies (e.g. sensitivity, specificity, proportion of false-negative and false-positive results) for each type of test needs to be considered when developing a testing strategy. The implications of false negatives for AgRDT, especially home tests, that generate a false sense of security also need to be considered.

**Effectiveness/country examples**

Member States have had varying approaches to testing strategies based on capacities, objectives and priorities. **China** has an extensive testing capacity and has been able to use mass testing to identify areas to implement stronger PHSM to maintain a “dynamic COVID-zero” approach while balancing the public health and economic impacts. Other Member States have used more targeted testing strategies. **Cook Islands** used epidemiological modelling analysis to develop a testing strategy that only tested people with symptoms. In **Fiji**, testing has been used to screen those admitted to hospitals, with all inpatient admissions being tested for SARS-CoV-2 and treated accordingly. **The Lao People’s Democratic Republic** conducted additional testing in high-risk exposure groups, including health-care workers, point-of-entry workers and quarantine facility staff, to support early detection.

The testing policy in **Malaysia** shifted from the laborious PCR test to a more convenient, economical AgRDT. With their shift to the sustained management of COVID-19, the **National COVID-19 Testing Strategy** has been developed as a guide to protect Keluarga Malaysia against COVID-19 and reopen the economy and social sectors safely. **Singapore** used targeted testing strategies. These began with using asymptomatic testing using PCR in dormitories and high-risk work settings in August 2020 to facilitate early detection and containment of transmission in the community. Similar strategies were continued to be used and were called “rostered routine testing” (RRT) using AgRDTs as part of a multi-layered strategy to prevent COVID-19 transmission in specific settings. Initially, RRT was used in workplaces and dormitories to protect migrant workers and minimize work disruptions and later was used for other target populations and settings such as teachers, students, workplaces and health-care workers. In February 2022, testing was streamlined and RRT focused on settings catering to vulnerable groups, but it was dropped after achieving high vaccination and booster coverage in March 2022.

Many Member States increased their testing capacities to meet the demand for testing. With increased community transmission in the country, **the Lao People’s Democratic Republic** adjusted testing strategies based on transmission stage assessments and laboratory capacity. **The Philippines** has increased its testing capacity since February 2020, when there
were three testing laboratories, to 362 RT-PCR and cartridge-based COVID-19 laboratories licensed by the Department of Health as of September 2022. The Republic of Korea rapidly increased testing capacity and strengthened surveillance for COVID-19 early in the pandemic because of their previous experience with the Middle East Respiratory Syndrome coronavirus (MERS-CoV) outbreak in 2015. The Korea Disease Control and Prevention Agency quickly developed a testing method to identify SARS-CoV-2 and shared it with the private sector to mass produce testing kits, made possible by their established Emergency Use Authorization system. Innovative methods, such as drive- and walk-through testing booths, were also used to increase access to testing.

Some countries, such as the Philippines, adjusted their testing strategy over time. At the onset of the pandemic, targeted testing was implemented for all identified suspect cases, close contacts and travellers, and negative results were needed before discharge from hospital admissions. As new data emerged, the Department of Health revised testing guidelines to no longer require testing to discharge confirmed cases. After vaccination began, the country’s testing was further adjusted to increase the use of RT-PCR in instances where the result of testing would affect clinical management and included those at risk of developing severe disease, and the use of rapid antigen testing (both professionally assisted and self-testing) in other situations. The Department of Health also implemented zoning of laboratory facilities whereby regions/cities were assigned to a designated referral testing centre. This ensured that testing demand matched existing capacities and reduced testing backlogs, resulting in efficient coordination across testing centres.

Other Member States took a combined approach to testing for COVID-19 and integrated testing with other respiratory pathogens. The Lao People’s Democratic Republic has integrated COVID-19 surveillance into existing influenza surveillance systems since 2020. Additionally, in 2022, a self-reporting form was developed for people who self-tested using AgRDT.

3.3.2 Red-line analysis

What

The red line is the point where the number of cases requiring critical care will exceed or surpass the health system’s capacity (Fig. 5). Red-line analysis is a method of monitoring the red line using available multi-source surveillance data and supporting multi-sectoral decision-making. Health-care needs are assessed and projected based on timely and reliable multi-source information, including epidemiological and hospital capacity data.
Fig. 5. The red line and its use for decision-making surrounding PHSM and health-care capacity changes

Why

Increased demand for health-care services stresses the health system and results in adverse patient outcomes, including increased morbidity and mortality. Red-line analysis uses multi-source information at the national and subnational levels for timely decision-making to prevent strain on the health system. Decision-makers have used the red line as a point of reference for decision-making to balance public health needs and societal impacts.

Key elements

Many health systems, including those in high-resource countries, were overwhelmed by increased health-care demand throughout the COVID-19 pandemic. Without essential health services and resources, including oxygen and critical-care support, patients have poorer outcomes. A United States Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report projected that the non-linear nature of the curve of intensive care unit (ICU) occupancy percentage and the number of deaths shows that negative effects increase exponentially as the system becomes more stressed. When health-care capacity, especially critical-care capacity, crosses a certain threshold, the availability and quality of care is compromised, resulting in higher mortality and morbidity. Additionally, high-quality health care depends not only on available beds, but also on a capable workforce, medical supplies and equipment to support the services.

The red line is not static and can change over time; adjustments can be made to avoid reaching the red line. For example, this can be achieved by mobilizing surge plans to increase the number of hospitals and critical care beds, and using measures to suppress transmission,
including the growing stringency of PHSM, focusing efforts on increasing vaccine uptake and other prevention strategies.

Red line analysis supports timely and proactive decision-making to prevent health systems from being overwhelmed, including resource allocation. While ICU and hospital-bed use are important indicators, they are not the sole contributing factors of stress to the health system and public health needs. The use of multi-source data is needed to make timely decisions. These data need to be collected and analysed at the subnational level and in local contexts. The red line provides a tangible interpretation of data and brings multiple sectors and stakeholders together to show the forecasted impact on health systems.

System

Even before the emergence of SARS-CoV-2, the strain on the health system had been linked to adverse outcomes, such as: increased medical errors; reduced quality of care; delays in treatment; medication errors; longer patient stays; poorer outcomes; and increased mortality. Studies have shown that during the early stages of the pandemic, reduced capacity of ICU and hospital beds were associated with an increased number of excess deaths in the following two weeks. Pandemic-driven hospital occupancy is not a direct cause of excess deaths, high ICU bed occupancy is a marker of broader issues that can contribute to excess deaths, such as curtailed services, stressed operations and public reluctance to seek services. This indicates the importance of monitoring health-care capacity before severe strain to reduce morbidity and mortality.

To conduct red line analyses, access to multi-source surveillance data are required, including hospital information, and the capacity to analyse and assess these data. Methods to strengthen the collection of necessary data through the building and/or strengthening of health information systems to provide health-care capacity can strengthen the accuracy and usefulness of red-line analysis.

The use of red-line analysis evolved throughout the pandemic during the change from the zero-risk approach to the non-zero risk approach. During the zero-risk approach phase, the red-line analysis demonstrated the need to increase the role of isolation facilities and implement stringent PHSM to protect health systems and health-care workers. During the non-zero risk approach phase, the red-line analysis was used to justify calibrating PHSM to ensure that health-care capacity was not exceeded and to allow social and economic activities to resume.
The understanding of the red line evolved through learning experiences during the COVID-19 pandemic. Initially, it was thought that the red line was a horizontal line that indicated when the capacity limit is reached based on a number of available needs; however, it was discovered that once this point is reached, it is too late as the health system is already strained. The shift to the red line being vertical occurred, when it became clear that some countries could significantly increase bed capacity in response to bed occupancy indicators. This new vertical red line indicated a date/point in time when the limit would be reached and could be used as a better indicator for the prevention and adjustment of public health and social measures before the health system is strained (Fig. 5).

Projections from red-line analyses have been used to inform policies for many methods of decision-making, such as: i) percentage of COVID-19 bed allocation based on COVID-19 surge status; ii) health-care utilization rates in the Alert Level System; iii) resource projections on the need for oxygen supply and human resources for health; iv) activation of step-down facilities; and v) strengthening of eHealth and hospital referral systems.

Some countries and areas found it easier to rapidly increase the number of critical care beds to increase health-care capacity while others needed to build this into longer-term capacity building. Health-care capacity varies considerably on a national and subnational level. For example, if a subnational area only has a limited number of critical care beds, it can become quickly overwhelmed with only a few cases and require the support of surrounding areas.

In areas with less capacity, it was found that hospital beds or critical care beds were not the best indicator to use to represent health-care strain for their country or subnational context. Some Member States, such as Cambodia and the Lao People’s Democratic Republic used the number of ventilators or oxygen usage as their red line. Malaysia used multiple methods of risk assessments to understand the situation of COVID-19. Since the early phase of the pandemic, a matrix format called the Heightened Alert System was used and conducted weekly to provide early indications on the increase in transmission of COVID-19 and when the health system attained limited capacity. This system used thresholds and colour codes to assess the capacity of health systems with 12 indicators under seven domains – four domains reflecting the COVID-19 situation (e.g. case severity, COVID-19 deaths, transmission rate, and vaccination coverage), and three domains encapsulating the capacity for response (e.g. based on hospital facility, laboratory and human resources). While having beds available is important, ensuring sufficient workforce to care for patients is also critical.
The Lao People’s Democratic Republic recognized health-care workforce capacity as an important indicator in their red-line analyses. These were limiting factors in surge response and were used to inform preparedness efforts needed to increase health-care capacity during surges in community transmission. Malaysia changed quarantine and isolation policies for health-care workers to return to work earlier to maintain health-care capacity. In Viet Nam, there was a bottleneck effect during COVID-19 peaks due to a lack of trained health-care workers to provide care for critical patients at the subnational level (e.g. lack of ICU nurses). Following national guidelines, ICU beds were only counted as available if they had enough health-care workforce to support them. Policy changes like the aforementioned catered to maintaining human resources in the health systems.

Malaysia was able to expand its health system capacity in multiple ways. Initially, the country managed the health system capacity with dedicated hospitals for COVID-19, then moved to hybrid hospitals, and later expanded COVID-19 beds to private hospitals. Some patients from public hospitals were also transferred to private hospitals. The country bore the health-care costs for COVID-19 incurred from private hospitals. Additionally, the Army established field hospitals and isolation facilities that were used. Calibration of PHSM was also used as the least costly intervention to prevent overwhelming the health systems.

The Philippines established its Department of Health Data Collect Bed Tracker System, which measures health-care utilization from public and private hospitals and infirmaries throughout the country. With these data, the red-line analysis of hospital occupancy trends was conducted, specifically ICU bed occupancy, because of the country’s limited number of ICU beds and the fact that this metric reflects the proportion of severe COVID-19 cases admitted to hospitals. The first analysis was conducted in the National Capital Region in early 2021. Projections of dates when the red line would be reached allowed decision-makers to ultimately implement the expansion of COVID-19 dedicated beds (Fig. 6). This analysis was later applied throughout the country in mid-2021. From late 2021 to early 2022, bed occupancy projections and red-line analyses were used to reiterate policies concerning surges in health facilities, such as bed expansion, activation of step-down facilities, oxygen supply augmentation, and advisories for home quarantine and isolation.
3.3.3 Multi-source surveillance

Why

Public health surveillance is the continuous, systematic collection, analysis and interpretation of health-related data for decision-making. It is essential that decision-makers have a reliable and clear picture of how health is distributed in a population and what factors contribute to or reduce health, so that effective, evidence-informed decisions can be made. Public health surveillance systems have strengths and limitations in their ability to provide data for decision-making; however, no single system provides a complete picture of the situation. Using multiple surveillance sources in combination, known as multi-source surveillance (Fig. 7), provides a complete picture of the health of a population, increases the confidence with which decisions can be made and thereby improves public health decision-making.
Multisource surveillance was utilized in the WHO Western Pacific Region prior to the COVID-19 pandemic as part of the epidemic analysis for response decision-making (ERD) process. The ERD process begins with identifying specific public health questions that need to be answered and then working backwards to identify patterns in the information collected from multiple sources. The need for multi-source information means ERD applies to specific decision points. During the early (alert) phase of an outbreak, too little information may be available, and there may be too many response options. As time passes and more information becomes available, fewer options become justifiable.

As the COVID-19 pandemic has progressed and different public health questions have arisen, public health surveillance of SARS-CoV-2 has progressed from first using available information, assessing information needs and gaps, and where needed, including additional data sources into existing systems. For example, in the early stages of the COVID-19 pandemic, event-based surveillance (EBS) systems were particularly important in the early identification of cases and deaths, as well as situational awareness, and, therefore, in public health decision-making. More recently, assessing the stage of transmission and calibrating PHSM at subnational and national levels have required additional data sources such as seroprevalence surveys and environmental surveillance.
For Member States, strengthening multi-source surveillance and ERD in the context of COVID-19 involved improving access to information and understanding the strengths and limitations of existing information sources. Member States were required to invest in developing systems to incorporate novel surveillance sources and more real-time data, as well as the capacity to analyse and report on these data and to better link data, decision-making and actions across levels of government and different sectors. This process also required investment in human resources. Member States need to develop a skilled public health workforce and to coordinate with other partners from private and public spheres to access and use additional data sources as part of multi-source surveillance.

**Effectiveness/examples**

There are several examples of Member States strengthening multi-source surveillance to facilitate evidence-informed decision-making during the COVID-19 pandemic. For example, in the Lao People’s Democratic Republic, multi-source surveillance was used to assess decreasing cases reported in Savannakhet Province toward the end of 2021. Testing data (level and coverage), health-care occupancy (COVID-19 and ICU beds), sentinel surveillance – e.g. severe acute respiratory infections (SARI) and influenza-like illness (ILI) – and EBS (no reports of clusters or deaths in the community) were used to confirm that lower case numbers in Savannakhet Province likely reflected a true decline in transmission. The same analysis could then be applied to other provinces in the Lao People’s Democratic Republic. Multi-source surveillance required close intersectoral collaboration for information sharing and discussion. The outcomes of these assessments were reported to central and provincial EOCs to inform national and subnational responses.

In Fiji, testing data and case reporting were relied on during the earlier stages of the pandemic. In a stepwise approach, Fiji incorporated multiple surveillance sources, including COVID-19 death data derived from death registration, genomic surveillance in partnership with Australia, community-based surveillance, hospitalization data through a monitoring system, and point-of-entry surveillance. These surveillance data were used in subnational risk assessments, guiding calibration of PHSM, informing resource allocation in health-care settings, and increasing public compliance with the response.

Malaysia used the existing indicator-based surveillance, including ILI and SARI surveillance systems, for COVID-19 cases, patient admission and post-operation surveillance. Surveillance system data were reported from hospitals, health centres and communities. During
the pandemic, Malaysia established an interlinked network of surveillance data gathered from end-users (e.g. population and health-care personnel) and real-time from multiple sources (e.g. MySejahtera, eCOVID). Additionally, the vast majority of surveillance data in Malaysia has been publicly available via COVIDNOW, an interactive dashboard providing daily data on testing, cases, hospital utilization, mortality, vaccination status and Github.

The Republic of Korea used available indicators, including ICU occupancy, hospitalizations, number and trend of cases and deaths, vaccine coverage rate by age group and other indicators, to assess the transmission risk at the subnational level for calibration of their response measures.

Viet Nam appreciated the value of the multisource surveillance system, which would facilitate a better understanding of the outbreak situation on the ground. It has also helped inform decisions about transiting from acute pandemic response to sustained management of COVID-19 since March 2022. The country’s multisource surveillance effort used the official surveillance reporting system for COVID-19, SARI sentinel surveillance in selected sites for a certain period, severe viral pneumonia (SVP) surveillance, and parts of the indicator-based surveillance (IBS) system and event-based surveillance (EBS) in the communities and hospitals.

The Philippines strengthened its multisource surveillance system throughout the COVID-19 pandemic. The number and range of data sources used to guide decision-making were increased, and the timeliness of data used in these systems was improved through the development and integration of novel information technology platforms. There is ongoing work in the Philippines to strengthen multi-source surveillance with an emphasis on surveillance systems that are agile and interoperable, ultimately contributing to sustainable multisource surveillance beyond the acute phase of the pandemic. Examples include adding epidemic-prone disease case surveillance, implemented in selected hospital sentinel sites, and event-based surveillance and response under the umbrella of the national Philippine Integrated Disease Surveillance and Response guidelines.

### 3.3.4 Additional surveillance

**Why**

Given that SARS-CoV-2 can be transmitted in the absence of or prior to the appearance of symptoms, relying on case-based surveillance will result in under-reporting and an underestimation of transmission. Additional surveillance sources are needed for a more
complete picture of the epidemiological situation and a nuanced understanding of transmission for better decision-making (Fig. 8).

**Fig. 8. Measuring the “visible and invisible transmission” of SARS-CoV-2**

![Diagram showing officially reported cases and invisible transmission]

**Key elements**

People with mild disease or asymptomatic infection may be less likely to test and isolate, contributing to undetected transmission. Reliance on testing data to estimate transmission may contribute to a biased assessment of the situation, as symptomatic cases over-represented. Changes to testing strategies, including less reliance on population-level testing and increased use of AgRDT and case and contact management, may further contribute to transmission not being captured through case-based surveillance.

Additional surveillance, including alternative or unconventional sources of data, such as environmental surveillance, can overcome limitations of case-based surveillance testing and contribute to improved estimates of transmission.

**System**

New sources for COVID-19 surveillance were incorporated into existing surveillance systems. Sources included adaptation of surveillance systems used for monitoring other pathogens, the use of traditionally non-health sector data and the development of new surveillance systems. These new sources of surveillance information led to improved ERD and better decision-making.

**Effectiveness/examples**

Some examples of additional surveillance utilized during the COVID-19 pandemic are routine screening or testing of specific populations, environmental surveillance, seroprevalence surveillance, absenteeism from school or work, and return traveller or point-of-entry surveillance.
Some countries have used the routing screening of target populations, such as teachers, students, health-care workers, airline travellers, people scheduling inpatient services, private companies and migrant workers. Singapore used rostered routine testing (RRT) with AgRDT on target populations, such as teachers, students, workplaces and health-care workers as another method of surveillance method. Papua New Guinea conducted regular testing on health-care workers with AgRDTs. In Fiji and the Lao People’s Democratic Republic, point-of-entry workers were tested routinely, along with health-care workers and quarantine staff. Australia, New Zealand and Singapore all used additional methods of environmental surveillance by the use of wastewater surveillance in the general population.

Malaysia has further expanded its surveillance to include environmental sampling, including sewage water and indoor air sampling, to act as an early warning system to assess infection occurrence and trends and their correlation to epidemiological measures. Viet Nam specifically conducted wastewater surveillance in several hospitals and quarantine facilities in 2020 and 2021. China conducted additional testing on imported frozen food items to assess the importation of SARS-CoV-2 in these items. Additionally, Australia has been conducting seroprevalence surveillance and has been doing seroprevalence studies to assess the true proportion of the population that has been infected with SARS-CoV-2.

3.3.5 All-cause mortality

All-cause mortality (ACM) is the total number of recorded deaths in a population, regardless of the cause (Fig. 9). Tracking ACM during the pandemic and comparing it with expected ACM from pre-pandemic data provides an estimate of mortality directly or indirectly related to the COVID-19 pandemic (i.e. the impact of the pandemic). Unfortunately, death data often have a time lag, and therefore ACM data should be part of the multi-source surveillance system, and not used on its own to assess the effectiveness of interventions or make public health decisions.
Fig. 9. All-cause mortality

Cross-sectional collaboration on CRVS* system strengthening and multiple death reporting system integration and interoperability.

Community involvement on improving the completeness, especially deaths occurring outside of health-care settings.

Capacity building on both national and subnational levels to improve timeliness of reporting

* civil registration and vital statistics

Why

Defining and quantifying COVID-19 deaths is difficult, especially in resource-limited settings. Countries have counted COVID-19 deaths in different ways (e.g. hospitalized only, those with a diagnosis of COVID-19, or those where COVID-19 is determined to be the primary cause of death), and there may be difficulties recording and accessing death data. ACM data and excess deaths due to COVID-19 can better capture the total impact of the pandemic on deaths than the reported number of COVID-19 deaths alone and support public health decision-making.

Key elements

Excess mortality is defined as the difference between the total number of deaths that have occurred and the number of deaths that would have been expected in the absence of the pandemic (i.e. a no-COVID-19 scenario). Identifying deaths from COVID-19 is difficult, especially in low-resource settings. Many countries have limited capacity for COVID-19 testing at national and subnational levels and, therefore, no capability to track the spread of COVID-19. Even where cases are adequately detected, some deaths may not be reported promptly or even at all. Also, reporting of cause of death may be inaccurate.

The two statistics – confirmed deaths due to COVID-19 and excess mortality – can be related in ways that are not straightforward since they give perspectives on different questions. A pandemic may result in increased deaths from other causes for several reasons such as interruption of health-care systems, changes in care-seeking behaviour, less available
funding, fewer personnel, and treatment for other diseases such as HIV/AIDS, malaria and tuberculosis. Additionally, a pandemic may also result in fewer deaths from other causes. Mobility restrictions during a pandemic might lead to fewer deaths from road accidents, PHSM (such as mask-wearing) to stop the COVID-19 transmission may have affected the spread of other pathogens (e.g. seasonal influenza and other respiratory pathogens) and might have led to fewer deaths. Excess mortality includes not only those who have died from COVID-19, but also those from all other causes – and these numbers may also be changing due to the overall pandemic conditions. Both metrics, confirmed deaths due to COVID-19 and excess mortality, are needed to understand the total impact of the pandemic on deaths.

Civil registration and vital statistics (CRVS) system for all births and deaths registration are normally led by the non-health sector. However, multiple death reporting systems across different sectors may exist in the same country, resulting in death information that is not integrated nor consistent. There are delays in reporting between the death occurring and being certified. Incompleteness of reporting, especially for deaths outside hospitals, has been a global challenge as well as in the Region.

System/actions

**System strengthening through cross-sectional collaboration:** Continue to improve death reporting through cross-sectional collaboration to strengthen existing systems, and CRVS system or multiple death reporting system integration to provide timely, complete and high-quality all-cause of death data for better decision making.

**Community involvement:** Explore flexible innovative approaches based on the situation in each country, context and reality in the field to improve death registration and report to fulfil data gap in short time, such as using funeral death data.

**Capacity-building for all levels of health information workforce:** It is important to build capacity for both a national and a subnational health information workforce to be able to track all-cause death to identify unusual death trends and act in a timely manner and minimize the lag of reporting up to national level.

*Effectiveness/country examples*

Based on the in-depth communication and online calculator tool developed by the WHO Regional Office for the Western Pacific during the pandemic, at least 14 countries and areas in the Western Pacific Region (Australia, Cambodia, China, Fiji, French Polynesia, Japan, Kiribati, the Lao People’s Democratic Republic, Malaysia, Mongolia, New Zealand, the
Philippines, Republic of Korea, and Singapore) are capable of tracking ACM and excess mortality in a timely manner at both the national and subnational levels. Throughout the COVID-19 pandemic, Member States began to pay more attention to health information system strengthening, including the CRVS system through cross-sectional collaboration, with CRVS system assessment and multisectoral consultations ongoing in some Member States.

The Department of Health in the Philippines and the Philippines Statistical Authority collaborated on CRVS system assessment to identify key bottlenecks and potential solutions for timely and high-quality data. Additionally, the Philippines also explored use of funeral death data and local knowledge (e.g. use and increase in size of cemeteries) to fill in the gaps of routine CRVS system.

The Lao People’s Democratic Republic Ministry of Health and the Ministry of Home Affairs collaborated to pilot how to use a network of village leaders to improve death reporting from the community considering the high proportion of deaths occurring outside of hospitals.

The Ministry of Health and Medical Services in Fiji and the Fiji Statistical Bureau worked together with WHO support to improve the capacity of staff on data and methods selection, data interpretation to detect potential system gap and service interruptions by using WHO tools. Similar actions were also taken in French Polynesia, Kiribati and Mongolia.

In Mongolia, deaths were being attributed to COVID-19 at the beginning of the pandemic, but it was later found that many of those often had comorbidities and had died of another primary cause. Because of Mongolia’s relatively small population, the Ministry of Health was able to establish a team to review and classify each potential COVID-19 death. While this improved accuracy of death reporting, it delayed public announcement and caused discontent among the general population, so the process was decentralized, and reporting became quicker. These data were found to be an important factor in influencing decision-making.

3.3.6 Genomic surveillance system

What

Genomic surveillance is a critical public health surveillance tool that can be utilized to better inform response decisions as part of multi-source surveillance in Member States. A comprehensive surveillance system should coordinate laboratory, epidemiological and clinical information.
Why

During the COVID-19 pandemic, genomic surveillance has enabled countries to detect, monitor and assess variants of concern (VOC)/variants of interest (VOI) and to tailor public health responses depending on information collected and analysed on the transmissibility, severity and impact of these variants.

Key elements

The emergence of SARS-CoV-2 VOC/VOI has highlighted the critical role of genomic surveillance as a source of information to inform public health risk assessments and decision-making. At the national and subnational level, genomic sequencing data can be used to detect new variants of SARS-CoV-2 that can provide information on potential changes in the characteristics of the virus that might affect its transmissibility, disease severity and impact, including its ability to evade vaccine and/or infection-acquired immunity.

Genomic surveillance should be part of an integrated surveillance system that further supports response to COVID-19 and prepares for future emerging infectious diseases of epidemic and pandemic potential. It is critical that public health genomic surveillance is coordinated with laboratory, epidemiological and clinical information to facilitate multi-source surveillance assessments of transmissibility, severity and impact of variants.

Laboratory capacity for genomic sequencing should be strengthened within a country-specific surveillance system; alternatively, in resource-limited settings, sample referral mechanisms should be established and strengthened. Strengthening capacities requires commitment from policy-makers and decision-makers in ensuring sustainable investment into system development and the necessary resources, including training of epidemiologists, clinicians and laboratory staff.

System

The Western Pacific Region Emerging Molecular Pathogen Characterization Technologies (EMPaCT) Network has developed a seven-step approach to develop a sustainable in-country genomic surveillance system for Member States (Fig. 10).

Steps 1–3 focus on the detection, monitoring and characterization of known VOC/VOI. Steps 4–6 build on the preceding steps to enable the surveillance system to detect and assess new VOC. The first six steps provide the foundation to support Step 7, a comprehensive surveillance system that can detect, characterize and respond not only to SARS-CoV-2 but also to future emerging infectious disease pathogens. The system utilizes multi-source information
including from clinical, epidemiological and laboratory settings to support data-driven situational analyses and decision-making.

**Fig. 10. Emerging Molecular Pathogen Characterization Technologies (EMPaCT) Surveillance Network, seven-step approach**

*Country examples*

Multiple Member States in the Western Pacific Region have used detection of a SARS-CoV-2 VOC to announce adjustments to PHSM, anticipate surges in cases, increase hospital capacity and increase messaging around vaccination.

Additionally, some Member States have developed single nucleotide polymorphism real-time PCR capacities to complement whole genome sequencing capacity. This is a step-by-step approach to building genomic surveillance systems. Capacity-building and surveillance system integration are ongoing in Member States in the Western Pacific Region, and this is a continuing process that will need to continue to be strengthened and expanded upon.

**Malaysia** has strengthened its use of genomic surveillance throughout the pandemic. Samples are collected for genomic sequencing at international points of entry, mass outbreaks and from individuals who are brought in dead in order to determine the circulating variant. In late 2020, the **Philippines** established genome surveillance capacities to identify SARS-CoV-2 variants, utilizing the Philippines Genome Centre and the Reference Institute of Tropical Medicine to conduct samples sourced nationally and the Department of Health Epidemiology Bureau to guide sampling and lead analysis and reporting. Since 2020, the genomic surveillance in the Philippines has expanded, and currently, four laboratories across
three Philippine regions have capacity to sequence SARS-CoV-2. The genomic surveillance in the Philippines contributes to both the local and global response, with sequences uploaded to the GISAID platform of the Global Influenza Surveillance and Response System. A recent review of data uploaded to GISAID found that, of 118 countries reviewed, the Philippines had the highest quality score for completeness of meta data in uploaded sequences.

3.4 Evolution of response measures

3.4.1 Changing approach to contact tracing

What

Contact tracing is essential to identify at-risk people and break transmission chains. During the COVID-19 pandemic, contact tracing methods shifted from conventional methods that rely on human workers to interview identified cases and communicate with each potential contact, to retrospective contact tracing and setting-based contact tracing.

Why

Contact tracing changed due to a need for more effective and practical interventions, especially as the number of cases rapidly increased. Other factors included the social acceptance of contact tracing and PHSM measures, and the emergence of digital contact tracing technologies.

Key elements/system

Conventional contact tracing: At the beginning of the pandemic, conventional contact tracing was used for COVID-19, but public health authorities quickly found that the system needed the capacity to surge and required collaboration from multiple sectors. As a result, contact tracing was broken into separate functions and outsourced to different groups. For example, health authorities drew on contact tracers from the wider health workforce, non-health sectors and private business, and contact tracers with local and cultural knowledge, which were invaluable. In some countries, automatization, mobile applications and other technological innovations were also able to help facilitate and expedite contact tracing efforts. This enabled contact tracing to expand and contract as needed.

Retrospective contact tracing: The focus of contact tracing also changed from prioritizing prospective contacts to retrospective contacts (finding people or a cluster in a common setting). This allowed public health authorities to identify sources of infection and routes of spread, and it enabled control strategies to be applied more effectively. Where it was
not feasible to identify and trace all contacts, prioritization for follow-up was given to contacts at a higher risk of infection based on their degree of exposure, to then to contacts at a higher risk of developing severe COVID-19, and finally to contacts in high-risk settings.

Retrospective setting tracing: A further change in the contact tracing approach was a focus on settings associated with a cluster of cases and examining the conditions that created the cluster. Prioritizing the identification of settings allowed public health authorities to implement targeted PHSM and risk communication and community engagement (RCCE) and thereby more effectively control the outbreak.

Fig. 11. Contract tracing strategies during the COVID-19 pandemic

Source: adapted from Government of Japan

Effectiveness/country examples

Contact tracing evolved to be modular and more targeted. It utilized a surge workforce that was not limited to health professionals and took advantage of technology. This meant that the contact tracing system could expand and contract according to the course of the pandemic and direct resources where they would be most effective.

For example, Japan developed a cluster-investigation approach based on the premise that a chain of clusters is at the core of the COVID-19 pandemic. The approach uses retrospective contact tracing to identify common sources of infection and hot spots, high-risk settings, or super-spreading events. Once identified, mitigation measures can be applied to these settings to prevent future infections.

In Malaysia, contact tracing methods had been improved upon throughout the pandemic. Previously, there was high reliance on check ins and check outs, utilizing the MySejahtera app, in order to conduct temporal assessments for close contact tracing. More
recently, the system has been enhanced to implement a real-time proximity assessment using Bluetooth technology in the MySejahtera Trace. Tracing methods and strategies continue to be adjusted and improved upon using innovative technologies and advancements.

**Mongolia** changed from a centralized model to a decentralized model, and from tracing every case to tracing clusters and high-risk contacts. The centralized model was associated with delays in contact tracing and response measures. In order to delegate contact tracing to the nine districts and 21 provinces in Mongolia, the Mongolian Government utilized approximately 500 Red Cross volunteers. Together with the Red Cross, they delivered training through several workshops. Cluster tracing was conducted by local authorities in educational facilities, healthcare facilities and among high-risk people. There was also a focus on contact tracing at points of entry by local authorities. The Government worked closely with the police and military to trace contacts that were difficult to find and conducted several studies on different types of outbreaks, including clusters, imported cases and specific settings, which helped to inform contact tracing strategy and response.

In **the Philippines**, contact tracing efforts started with a paper-based reporting system. In selected localities, especially those with more mature information, communication and technology systems, public health authorities could maximize the use of digital tools in speeding up the notification of close contacts and bypassing manual encoding to facilitate streamlined reporting, monitoring management and analysis.

The **Republic of Korea** supplemented manual contact tracing efforts with digital methods, including electronic health records, records of credit card transactions, mobile phone-based global positioning system data and closed-circuit television. This helped to triangulate patient claims objectively and address limitations in memory recall in patient interviews.

**Singapore** used manual and digital contact tracing methods to address limitations of memory recall and reduce the time taken to identify and quarantine close contacts. Digital methods include using the TraceTogether contact tracing technology that employs Bluetooth technology to facilitate community-driven contact tracing. With the assistance of digital contact tracing methods, Singapore could reduce the time of identification and quarantine of close contacts from four days to less than 1.5 days. Later, contact tracing was more focused on sensitive clusters among vulnerable populations with the responsibility of less-sensitive infection cases to inform households and close contacts. More recently, contact tracing was stood down, and individuals were encouraged to be proactive with the personal and collective responsibility of notifying their close contacts if they are infected. However, contact tracing mechanisms in Singapore can be reactivated when the need arises.
At the beginning of the pandemic, Viet Nam applied a zero-COVID approach to conducting aggressive contact tracing, involving multiple players and forces, then gradually shifted its strategy as the outbreak evolved. In the early stage of the pandemic, when Viet Nam’s contact tracing approach followed contacts up to fourth-generation contacts of a confirmed COVID-19-positive case, it was found to be effective in preventing transmission and made Viet Nam one of the countries with a successful response to the pandemic in 2020. When the country had community transmission, the aggressive contact tracing approach was not a feasible strategy for the extensive time and resources required. Then, contact tracing was modified to focus on at-risk groups and settings, such as immediate close contacts and people with symptoms or underlying conditions in hospitals and homes for older people.

3.4.2 Evolution of Public Health and Social Measures (PHSM)

Why

PHSM are a key tool for controlling COVID-19. As the strategy for responding to the pandemic has changed from the zero-risk approach to the non-zero-risk approach, PHSM have shifted from a government-led to a settings-based approach for different purposes.

Key elements/system

Zero-risk approach: As part of the zero-risk approach, PHSM tended to be strong, government-led measures applied simultaneously as a package of stringent PHSM, the so-called “blanket” approach. Financial and other supportive policies were introduced by governments to increase social acceptance of PHSM. Communication to build and maintain trust in governments to facilitate adherence was also required. Under the zero-risk approach, close monitoring of PHSM was required and the lifting of measures was achieved gradually.

Non-zero risk approach: PHSM employed under the non-zero risk approach placed responsibility on setting owners such as schools, factories, private businesses and individuals, rather than on national governments, to determine adherence to various measures. Tailored measures and staged approaches were adopted to adjust the implementation of PHSM and to balance public health objectives with socioeconomic costs. Over time, governments provided fewer financial and other supportive policies to ensure implementation of PHSM. To keep up adherence to PHSM, strategic communication messages emphasized shared responsibilities among individuals and setting owners to reduce risks. Governments no longer advised the public “to do it all” but rather to self-assess and mitigate risks. Adjusting measures at the subnational and local levels remained a continual process.
Effectiveness/country examples

Implementation of PHSM needs to be evidence informed, context specific, stepwise, continuously calibrated and delivered in along with clear and decisive communication to ensure that decision-makers have the support of communities.

In 2020, Cambodia implemented population-based measures, including entry restrictions, mask wearing and facility quarantine, which successfully delayed importation and community transmission of COVID-19. The following year, the country experienced community transmission. Risk-mitigation measures were implemented across sectors and businesses, shifting ownership from government to the private sector which was successful in reducing opportunities for exposure. As the country transitioned to sustained management of COVID-19 in 2022, PHSM shifted to advising the public to assess the risk of infection for themselves and to judge what measures they should use. This less socially and economically limiting approach has been more acceptable to the general public.

As part of the implementation of PHSM, China enacted several policies to protect people’s livelihood and to ensure the availability of basic public services during the pandemic response. For example, essential commodities were provided to those quarantined at home, subsidies were given to industries and enterprises significantly affected by the epidemic, and efforts were made to reduce the burden on companies by keeping payrolls stable and creating more jobs.

Mongolia moved from the zero-risk approach to the non-zero risk approach earlier than other countries in the Region as they identified that they wanted to support the economy and
people’s well-being in addition to their health. To do this Mongolia switched from nation-wide implementation of PHSM, lockdowns and major financial incentives such as paying for household electricity and water during the zero-risk approach, to a more tailored approach, based on local transmission assessment and different alert levels, during the non-zero risk approach. For example, during the non-zero risk approach, the Government identified different educational regimens (e.g. physical classes, home-based learning and hybrid learning) and used early, targeted vaccination policies and other supportive measures (e.g. workshops and training) to help ensure students were able to continue their education. The mining sector is important economically, so the Government worked with private companies and local authorities to deliver vaccination and infection prevention and control and mobile PCR labs.

Another example is Singapore’s move from the zero-risk to the non-zero risk approach. The four-stage reopening plan saw selected PHSM being relaxed while other PHSM were expanded to permit increased social and economic activities. A common sense of social responsibility was instilled through PHSM such as the distribution of SARS-CoV-2 self-test kits to households to facilitate early case detection.

### 3.4.3 School measures

**What**

During the COVID-19 pandemic there was a shift in approach to school measures, from the closure of physical classrooms and the use of online learning to the partial or full reopening of schools with suppression measures.

**Why**

Earlier in the pandemic many countries in the Region closed schools as school closures were thought to prevent and reduce transmission (Fig.13). However, prolonged school closures during the COVID-19 pandemic have had profound and widespread negative impacts, including lost education and lost future income, as well as impacts on the physical and mental health of children and adolescents. School closures also disproportionately affected disadvantaged children, widening the inequality gap for the future generations. As our understanding of COVID-19 and the negative impacts of prolonged school closures has changed, the focus has moved to keeping schools open through suppression measures.
**Key elements/system**

**Zero-risk approach:** Decisions to close schools were initially based on knowledge of influenza (for which schools are known amplifiers of transmission and result in more severe disease in children under 5 years of age) and on pandemic influenza response planning. At this time, decisions to close schools were typically led by national governments and did not use multisectoral or multi-stakeholder decision-making. Many schools remained closed for prolonged periods of time during the pandemic and reopening strategies were not clear.

The speed with which closure of schools occurred often did not allow sufficient time to transition from physical to online learning. For many countries with long-duration school closures and low rates of internet connectivity at home, students in these countries missed out on both in-person classroom instruction and internet-based learning opportunities.

**Non-zero risk approach:** Evidence has since shown that children and school-settings were not drivers of SARS-CoV-2 transmission and that most children infected with SARS-CoV-2 experience only mild disease. This evidence, combined with proven risk-suppression measures such as mask wearing, ventilation, social distancing, handwashing and vaccination, provided evidence for schools to safely reopen and to stay open.
Furthermore, involving subnational government, multiple sectors including health and education ministries and multiple stakeholders in decision-making have led to better outcomes for schools and students.

Effectiveness/country examples

An example of effective implementation of school measures can be found in **Singapore**. During the COVID-19 pandemic, Singapore implemented staggered and adaptive policies to schools. As case numbers increased in 2020, a blended learning model that involved one day of home-based learning a week was introduced and later converted into full home-based learning. School assemblies, excursions and inter-school activities were suspended, while enhanced cleaning of school premises and limitations on the number of visitors were introduced. To support parents, children and schools, the Singapore Government provided access to electronic devices to students who could not purchase one, kept government childcare centres open, especially important for essential workers, and altered the school holiday period to reduce the number of home-based learning days. Return to school-based learning was accomplished in phases and occurred in complement with supportive measures such as testing, hygiene-based and physical distancing measures by staggering the times students started and finished school to avoid congestion. This enabled Singapore to keep schools open and reduce the negative impacts of any short-term closures.

In **Pacific island countries and areas**, governments worked hard to keep schools open. Each country developed its own guidelines and now these are being brought together with the assistance of WHO and the United Nations Children’s Fund (UNICEF) to further streamline and coordinate the Pacific approach to keeping schools open. As part of this process there will also be efforts to engage more broadly and deeply with communities during the decision-making process.

**The Lao People’s Democratic Republic** developed and implemented a checklist to assess and ensure preparedness of schools for reopening after they were initially closed during the surge of the local COVID-19 outbreak. Decisions on school opening involved close intersectoral coordination between the Ministry of Education and Sports and Ministry of Health.
3.4.4 Decision-making at points of entry

What

The COVID-19 pandemic saw changes in approaches to decision-making around points of entry (POE). Governments moved from implementing full border closures, to country-specific border measures on the risk of importation, to also considering country vulnerability and response capacity.

Why

Points of entry play a critical role in minimizing the importation of communicable diseases and in limiting the spread of disease across international borders. POE measures need to be considered in the context of the nature of the disease, the risk of its importation, and a country’s vulnerabilities and capacity to respond to disease importation effectively (Fig. 14).

Fig. 14. Risk assessment for point of entry measures

Key elements/system

Under IHR (2005), State Parties are requested to maintain effective public health measures and response capacity at designated POE (international airports, ports and ground crossings). During the early stages of the COVID-19 pandemic, many countries decided to close their international borders to gain time for local preparedness. However, it is not
sustainable to keep borders closed for extended periods of time, as countries need to balance socioeconomic development, the rights of citizens, and controlling the pandemic.

A risk assessment for determining POE measures has two levels: (1) the nature of the disease and risk of importation; and (2) the country’s vulnerabilities and capacity to respond to disease importation. Therefore, even with newer variants such as Omicron that are associated with less severe disease, some countries may continue to implement POE measures.

*Effectiveness/country examples*

**Cambodia, the Lao People’s Democratic Republic, and Pacific island countries and areas** considered not only the risk of importation but also their country’s vulnerabilities and capacity to respond to disease importation. Multisectoral coordination was effectively implemented to safely manage large movement of migrant workers returning to countries via land border crossings.

One lesson identified in Cambodia was related to managing the safe return of migrant workers from neighbouring countries through ground crossings. Targeted screening and testing allowed timely isolation and management of cases. Another effective measure was the coordinated management and quarantine of migrant workers between border provinces and other provinces, under the direct coordination of local authorities and lead by the health sector. This coordination facilitated continuity of safe and effective quarantine of this population in their own provinces.

In **Cook Islands**, the decision to reopen international borders involved a multisectoral decision-making process and was based on commissioned modelling and recommendations by the Border Easement Taskforce governing body. International borders reopened on 13 January 2022, at which time 96% of the eligible population had been vaccinated and internal vulnerabilities could be considered to be lower.

The geographical context of **the Lao People’s Democratic Republic** and its numerous land borders with neighbouring countries meant that multisectoral coordination was critical to effectively implement the safe movement of migrant workers across these land borders. The Ministry of Health worked closely with the Ministry of Public Security and the Ministry of Defence.

In **Papua New Guinea**, the Government worked with the military to establish border control posts along the Indonesian border. Here, patrols, temperature checks and testing were
able to be carried out to help prevent the importation of cases across what is traditionally a very porous border.

3.4.5 Adapting health care pathways

Why

During the COVID-19 pandemic, health-care capacity was exceeded due to increased demand on the health system with some patients unable to access timely health care, resulting in potentially avoidable deaths. Health-care pathways needed to adapt to meet health-care needs.

Key elements/system

Zero-risk approach: Earlier in the pandemic, the health-care pathways of many countries consisted of admitting all patients with suspected or confirmed SARS-CoV-2 infection to health-care facilities regardless of disease severity (Fig. 15). As case numbers grew, hospitals quickly exceeded their capacity which posed a risk to the health of COVID-19 and other patients. Countries responded by making agreements with private hospitals, establishing intermediate health-care facilities to expand health-care isolation capacity, and by developing systems to monitor real time hospital and critical care bed occupancy (e.g. red-line analyses). Beyond the need to expand health care infrastructure, countries also identified the need to build capacity in health-care human resources and supplies, including surge capacity.

Non-zero risk approach: During the non-zero risk approach, health-care pathways evolved to include home-based care for COVID-19 patients (Fig. 15). Patients with mild symptoms that were not at high risk of developing severe disease in the community were monitored at home. Home-based care is a proactive, preventive measure that increases the capacity of the health-care system to care for patients that require medical treatment and critical care.

As part of home-based care, technologies were used to monitor patients in the community (e.g. telehealth), supportive policies were created (e.g. infection prevention-and-control guidelines for home-based care/non-health care settings and safe patient transfer) and safeguarding mechanisms were implemented to escalate care when needed (e.g. hotlines, daily phone call from a nurse). This required partnership between primary health, tertiary health, public health and other stakeholders and clear communication with health-care providers and communities.
**Effectiveness/country examples**

**Mongolia** changed the coordination of health services through each wave of the COVID-19 pandemic. During the Alpha VOC wave and the beginning of the Delta VOC wave, all cases were hospitalized. However, to reduce pressure on hospitals, Mongolia established a hospital command and bed management system that was expanded to the subnational level. They admitted patients on waiting lists with severe disease to hospital, monitored disease severity for timely admission to ICUs and discharged patients who did not require critical care in an ICU. They also established temporary ICUs using intermediate-care facilities, utilized private hospitals, set up call centres that provided clinical consultations over the phone, expanded oxygen supplies, established mini-oxygen plants and established a mobile COVID-19 outpatient centre with an X-ray machine. The Mongolian Government also set up clinical advisory groups, ran training at health-care facilities and revised their clinical standards several times. As a result, they had no critical or severe cases on waiting lists, hospitalizations of mild and moderate patients were reduced, utilization of intermediate-care facilities increased, and home deaths decreased.

Another successful example of the change in approach in health-care pathways is **Malaysia**’s COVID-19 Symptom Monitoring System (CoSMoS). CoSMoS had three main functions: a daily automated reminder system for patients to self-check their symptoms; a safe patient risk assessment to guide patients in clinical decision-making; and an active telemonitoring system with real-time phone consultations. CoSMoS was a complementary service to the existing manual home-monitoring system by public health offices and it helped reduce the burden on the health system and provided better self-monitoring at home.
Additionally, there was the use of various modules – for example, outbreak management system module, COVID-19 Assessment Centres Management module and the eCOVID Outbreak Management System module to streamline some of the processes throughout the health system for both inpatient and outpatient medical care. The country also used innovative approaches to strengthen the health-care pathway by increasing ambulance and bed capacity for COVID-19 patients, as well as increasing the number of health-care workers in the health system. When a shortage of ambulances was found to be a bottleneck in the health-care pathway, the Ministry of Transport converted buses into equipped ambulances. Another approach was establishing low-risk admission centres, using existing infrastructure (e.g. hotels) to prevent overwhelming the hospitals. To address the shortages in health-care workers, the Ministry of Human Resources recruited retired health-care workers with temporary appointments to the health workforce. While the response no longer requires these additional health workers due to the lower impact on the health-care system, the National Security Council has stated it will bring back the additional health-care workers when the country faces a surge in COVID-19 cases.

In the Lao People’s Democratic Republic, initially all cases were hospitalized, but with the rapid increase in cases, isolation facilities were set up in all provinces to manage surges in cases. Guidelines for home-based isolation were developed, targeting cases who were at low risk for developing severe outcomes. Viet Nam also reconfigured health-care pathways based on available evidence to meet the demands of caring for COVID-19 patients. At the early stage, all suspected and confirmed COVID-19 cases were admitted/isolated in hospitals. Later, when there was community transmission, home-based recovery was mainly applied to reduce the hospital burden and improve case management quality. Engagement of the whole government and other stakeholders was crucial in making the care pathway fit for the purpose of rapidly increasing surge capacity (i.e. hospital beds, workforce, equipment, referrals), establishing governance arrangements, and enhancing community engagement. Flexible and quick adjustment of care pathways based on the local context helped to stay a step ahead of the pandemic thereby limiting the overwhelming of the health-care system and reducing the number of deaths.

In the Philippines the Department of Health has developed the Unified COVID-19 Algorithms that has provided clear guidance for COVID-19 management (based on severity) from both the community and hospital levels. Also, the Department of Health and WHO have conducted a series of consultations that have identified gaps in the referral system and provided recommendations at the pre-hospital and hospital setting. This includes strengthening screening, triage and timely referral through the One Hospital Command Centre and/or local Emergency Operations Centres, use of home-based care and intermediate health-care facilities
for mild and asymptomatic patients and providing a step-down mechanism to recovering patients – ensuring that the right patients are given the right treatment at the right time.

3.4.6 Strategic communications

Why

COVID-19 and other recent health emergencies have reaffirmed that national authorities and other relevant institutions are essential to promote compliance to government-imposed measures during the zero-risk approach phase and for the individual adoption of positive preventive measures (e.g. PHSM and vaccination).

Application of the Communication for Health (C4H) approach as part of the COVID-19 response in the Western Pacific Region has supported informed decision-making, encouraged appropriate behaviour change and maintenance among populations, and helped to mitigate adverse health outcomes. In addition to the immediate benefits of taking this approach to respond to the current pandemic, the focus on listening to and engaging with communities to understand and address their concerns helps to build longer-term trust and resilience, helping to mitigate the impact of future emergencies.

C4H-based risk communication and community engagement strategies must be informed by behavioural science and evidence and be continuously calibrated to address identified gaps in public understanding, sentiment and actions appropriate to the actual risks as these evolve. Within this, systemic approaches are needed to reach vulnerable populations that are inequitably affected by health threats. The COVID-19 pandemic and other disease outbreaks are known to deepen existing inequalities, hitting the poorest and most vulnerable hardest. Ensuring communication and engagement activities are tailor-made to reach the most vulnerable should be prioritized.

Key elements

Zero-risk approach: During the zero-risk approach, national authorities required civic participation for COVID-19 whole-of-society measures that had far-reaching economic and social consequences and needed public communication that was strategic to maintain social acceptance. The most effective responses have been characterized by governments communicating transparently with populations about the evolving situation and the reasons for changing response measures and encouraging people to play their part in keeping communities and the vulnerable safe.
Non-zero risk approach: In the non-zero risk approach, the response to COVID-19 shifted to focus on individuals and setting owner’s acceptance and adherence to recommended measures. The implementation was increasingly tailored. National authorities adapted their communication to include information on target audiences’ knowledge, attitudes and behaviours. These data guided the development of messages and interventions that address actual barriers to taking recommended actions.

For strategic communication, it is essential to ensure an inclusive and participatory approach. For example, countries should strengthen community engagement to facilitate a regular and transparent exchange of information, perceptions and opinions with health authorities and various stakeholders and ensure these inform the communications response.

Coordination with partners to adopt C4H-based communication and engagement strategies proved essential to put communities at the centre of the response and be able to influence decisions and behaviours to protect health. As the COVID-19 pandemic evolved, Member States and response partners needed to adjust their approaches to sustain/build trust, acknowledging uncertainty and engaging in timely, two-way communication about what is known and not known, and partnering with trusted voices.

System improvement

Effective risk communication and community engagement (RCCE) and strategic communication are essential before, during and after emergencies to ensure trust in systems and understanding of, and compliance with protective measures. Countries and areas in the Western Pacific Region have built capacity in this area, and the COVID-19 pandemic offered important lessons and opportunities to further strengthen capacities in using a C4H approach. WHO should support countries and areas in the Region to build their capacities further to apply C4H across all stages of public health emergencies and to ensure risk communication and community engagement are integral components of national plans for emergency preparedness, response and recovery.

Strategies should be tailored to include approaches to understand social and cultural contexts and risk perceptions of the community to predict their acceptance of guidance and compliance with recommended measures. To do this, Member States should enhance their capacity to regularly gather and analyse data and evidence from surveys and multi-source listening and community feedback mechanisms and use that information to identify behavioural insights that can help address gaps in public perceptions and barriers to the adoption of recommended behaviours. Such data and analysis should inform the development, testing and
effective dissemination of targeted messages based on the evolving public health situation and the evolving knowledge, attitudes and behaviours of target populations, including the vulnerable, as well as to measure the effectiveness of communication interventions ad to learn and adjust as needed.

Effectiveness/country examples

The COVID-19 pandemic has highlighted the need for measurement, evaluation and learning (MEL) to monitor and assess the effectiveness of risk communication and community engagement interventions and inform adjustments to plans and strategies as the emergency evolves over time. Adopting the C4H approach is still quite new for many countries, and further capacity-building is needed considering the lessons from COVID-19 and other health emergencies and the evolving contexts in which communication takes place. These efforts should be systematic and continuous (rather than one-off training, exercises or campaigns) focused on building a strong workforce.

For example, in Malaysia the Ministry of Health and response partners planned for and used social and behavioural sciences, data collection, analysis and research activities to build trust and enhance uptake of public health social measures and COVID-19 vaccines. Surveys helped the Ministry of Health to understand what people know, what information they need and how they would like to receive it. As a result, the Ministry of Health and response partners developed and disseminated tailored communication materials to target audiences through effective channels and trusted influencers. A multisectoral risk communication and community engagement working group strengthened coordination and helped to identify and fill communication gaps, correct rumours and misinformation and enhanced engagement opportunities with targeted audiences, including vulnerable and at-risk populations.

In the early stages of the pandemic, Cambodia focused on clear, simple instructions about physical distancing, mask wearing and lockdown guidelines to encourage people to keep calm and stay safe. Then communication shifted to adjusting to change and uncertainty. Trust is never more important than in a crisis: Cambodia leadership tried to be earnest and transparent in their approach, being clear about what is known and unknown, listening and engaging with people to build trust and a common social identity. The Prime Minister communicated a clear vision on how the Government would continue to support individuals, families and communities and how the Government plans to rebuild and revive the livelihoods and economy in the country. Social listening and behavioural insights were used to refine and adjust strategies, key messages and tools to address the evolving pandemic situation and community
concerns and to engage and protect vulnerable and at-risk populations. Messages were clear, concise, concrete and consistent and were disseminated through multiple channels.

**The Lao People’s Democratic Republic** used multiple modalities for strategic communication. Risk communication messages were regularly shared through social media, daily and ad hoc press releases, and shared in communities by village authorities through loudspeakers. Surveys were conducted to understand the risk perceptions of the public and helped inform tailoring of key messages. Engagement with communities also played a significant role in communicating with the public, through CONNECT (Community Network Engagement for Essential Healthcare and COVID-19 Responses Through Trust), which aimed to enhance COVID-19 responses and primary health care.

In the **Philippines** the Department of Health has been holding regular media briefings from the start of the pandemic, around two to three times a week. The Department of Health also rolled out national campaigns for PHSM and COVID-19 vaccination, which were cascaded to the subnational level. With support from partners like WHO and UNICEF, the Department of Health also invested in developing the capacity of demand generation teams in RCCE, as well as in community health workers in interpersonal communication for immunization. The Department of Health also convened private sector partners to support a series of National Vaccination Days.

**Singapore** has maintained a consistent approach with the WHO Strategic Communications Framework, outlining the key principles of accessibility, credibility and timeliness to build public trust in the context of health issues. This was done through regular updates and press conferences with the Multi-Ministry Task Force, updates shared across government websites, traditional media channels, social media platforms, and display posters and panels in residential areas, as well as customized and targeted communications to engage a variety of audiences. Overall, the Director of Medical Services at the Ministry of Health was a consistent medical lead at press conferences and able to provide input and clarification on health advisories and COVID-19 developments. Finally, a government feedback unit proactively initiated discussions via virtual or face-to-face dialogues and conducted surveys on COVID-19 policy issues.

### 3.4.7 Managing misinformation

**Why**

Increasing digitalization and use of social media created an opportunity for Member States, WHO and partners to reach many people with evidence-informed messages, listen to
their concerns and engage in two-way communication. However, this increased use of technology also facilitated the proliferation of rumours and misinformation and disinformation.

Like earlier epidemics and pandemics, COVID-19 has been accompanied by uncertainty, scepticism, distrust and fear. This created fertile ground for the spread of misinformation, which has in some instances undermined response efforts and acceptance of/compliance with public health advice. Experts have pointed out that the flow of fake news can be just as dangerous as the spread of the virus itself.

During the COVID-19 pandemic, the sheer volume of information – often with conflicting messages – left many communities confused and unsure of what actions to take. Many countries established systems to monitor and address the spread of rumours and misinformation through social media, with the most effective systems using a combination of online and offline approaches. This is especially important for reaching groups that do not have easy access to the internet and social media channels, including the vulnerable and most marginalized.

**Key elements**

**Zero-risk approach:** During the zero-risk approach, there was an increasing need for national authorities to strengthen their public communication and engage with the public through social media and other digital platforms, especially during lockdowns. There was an unprecedented amount of information and data on COVID-19 that was difficult to manage, control, utilize and spread at a very high speed, leading to new innovations.

**Non-zero-risk approach:** In the non-zero risk approach, activities focused on various setting owners and the individuals, building their digital health literacy to recognize disinformation, rumours and fake news, and how to combat these. This required updated knowledge and skills to effectively counter the misinformation. New practices such as “pre-bunking” help to build knowledge and encourage protective health behaviours in the immediate term, as well as promoting self-efficacy and resilience of individuals and communities longer term. Key elements of addressing rumours and misinformation and disinformation and effective “infodemic” management include:

- scanning, reviewing and verifying evidence and information;
- sharing and explaining what is known, as well as stating what is not known;
- disseminating statements and messages to address misinformation and/or disinformation;
amplifying messages and actions from messengers and influencers that are trusted by individuals and communities that need the information; and

analysing information flows, monitoring the acceptance of public health interventions and reviewing factors affecting behaviours at individual and population levels.

**System improvement**

Member States that have established systems to identify rumours/misinformation and are able to draw on social and behavioural science to design, test, roll out and measure the impact of their interventions are better equipped to detect and respond to rumours and misinformation. During the pandemic, WHO has worked with Member States in the Region to develop and use approaches to manage misinformation, such as:

- multisource listening platforms to monitor rumours and address communities’ concerns and information needs;
- use of scientific approaches, e.g. research and behavioural insights, to understand and quantify misinformation and its impact; and
- efforts to improve health, media and digital literacy to reduce vulnerability, e.g. campaigns to help people to recognize fake news.

Applying the C4H approach, WHO and Member States in the Region can test assumptions, identify problems, create and test evidence-informed solutions, draw on behavioural insights and use an appropriate mix of online/offline interventions. This is essential to understand and quantify the impact of misinformation and promote health literacy, especially among vulnerable populations.

To implement offline interventions, there is a need to strengthen communication and community engagement systems, including coordination and engagement with health-care workers, community members and trusted leaders and organizations (e.g. youth, faith-based, nongovernmental organizations, civil society organizations, other trusted influencers) in the planning and implementation of activities to dispel rumours and misinformation and disinformation.
Effectiveness/country examples

Member States should apply the C4H approach to contribute to better health outcomes in the context of emergencies. Effective management of rumours and misinformation and disinformation and fake news require integration of four types of activities:

1. listening and responding to community concerns and questions
2. promoting understanding/assessment of personal risk and health expert advice
3. building resilience against misinformation
4. engaging and empowering communities to take positive actions.

In Malaysia, information from the many different sources have contributed to rumours, misinformation and disinformation. Community-based volunteers have played critical roles in verifying information from rumour surveillance. Additionally, a law was passed in March 2021, called the Fake News Ordinance, which permitted courts to order the removal of any publication that was deemed to be fake. This would be associated with a fine up to 100 000 Malaysian ringgits, imprisonment for up to three years, or both for persons or companies that create, publish or disseminate fake news about COVID-19 or the Emergency Proclamation that could cause fear or panic to the public.

The Philippines Department of Health, WHO and response partners systematically conducted social-listening activities to keep a pulse on sentiment and detect and respond to rumours and misinformation to enhance uptake of public health social measures and COVID-19 vaccines. Data and evidence were collected and utilized to update plans and strategies and inform messaging and activities to enhance knowledge and promote individual and community resilience, including rumours and disinformation and misinformation and to encourage effective behaviour change. The Department of Health and response partners strengthened two-way communication and engagement with target audiences, including community and faith-based organizations to gain further insights into knowledge, attitudes and behaviours to prevent and respond to rumours and misinformation, support uptake of public health advice and respond to emerging challenges, such as vaccine hesitancy.

In order to combat misinformation, Singapore had a range of responses from public communications which featured respected and well-known experts in the field and legislative levels. The Government additionally passed including the Protection from Online Falsehoods and Manipulation Act which enabled authorities to tackle the spread of misinformation via fact-checking, censorship and criminal charges, where applicable. Additional campaigns, such as the VacciNationSG campaign, raised awareness for COVID-19 vaccines to address
misconceptions and misinformation. This was done using accurate updates from trusted sources, public education through multiple platforms and languages, featuring respected experts, and working with technology companies to ensure authoritative sources were prominently included on platforms.

4. **Translating learning into long-term systems improvement**

Many of the improvements identified in this document can be acted on by countries quickly, using resources already at hand. However, some improvements will require long-term investment and the strengthening of underlying health systems that support these capacities.

To support long-term systems development, the WHO Regional Office for the Western Pacific, in conjunction with the WHO Regional Office for South-East Asia, is currently working with Member States and partners to develop a new bi-regional health security action framework. This action framework will support countries and areas to increase their resilience to public health emergencies by strengthening the capacities and underlying health systems required for preparedness, readiness and response to health security events. The new framework will build upon the achievements of APSED III and its two earlier iterations, which have been used in the Asia Pacific since 2006 as a road map to build the capacities needed to prepare for and respond to public health emergencies, including those required under IHR (2005).

The new health security action framework will provide alignment between ongoing changes to the global architecture surrounding cooperation on health security, and national and regional health security solutions. It will also incorporate the experiences and lessons identified from responses to public health emergencies in the Western Pacific Region since the 2003 outbreak of SARS – including those identified from the COVID-19 response by the learn-and-improve mechanism.