

A global analysis of COVID-19 intra-action reviews

Reflecting on, adjusting and improving country
emergency preparedness and response during a pandemic



World Health
Organization

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**“ The pandemic has taught us that
to stay the course we must sometimes adjust the course.
We can only improve if – as the DG said –
we know what is working, what is not working,
what we have, and what we’re missing. ”**

Dr Michael J. Ryan
Executive Director,
WHO Health Emergencies Programme
COVID-19 information session, 4 November 2020



Preface

Much has been written and said about what governments should or should not have done during the coronavirus disease (COVID-19) pandemic. This report takes a different approach, by documenting and synthesizing the various government response strategies to the often fast-evolving COVID-19 epidemic waves, and by making this compilation available to all countries and sectors to improve their ongoing and future pandemic response.

In April and May of 2020, several weeks into the COVID-19 pandemic, the World Health Organization (WHO) and its partners started to develop guidance on a new approach that countries can apply, themselves, when responding to a pandemic. This new approach calls for countries to conduct periodic intra-action reviews (IARs), in which they evaluate their national and subnational COVID-19 emergency preparedness and response plan and reflect on this as events unfold, before proceeding to adjust and improve that response.

Shortly after WHO published this guidance in July 2020, the International Health Regulations (2005) Emergency Committee for COVID-19 reinforced the message by issuing temporary recommendations to countries to conduct such IARs as an essential component of the pandemic response.

This analysis of COVID-19 IARs from countries all over the world was compiled to identify the strategies and solutions that countries used during the course of the pandemic, to encourage peer-learning and trigger new ideas to advance the pandemic response. Moreover, in preparing this report, WHO has drawn on many lessons from countries, including how they operationalized the WHO COVID-19 IAR methodology and adapted it to their own specific circumstances. This analysis has allowed WHO to better understand the impact and changes to the COVID-19 responses of countries when they implemented the recommendations and lessons emerging from their own IARs.

WHO would like to express its sincere gratitude to countries for undertaking these IARs, and for their willingness to share their IARs reports and experiences with WHO. In particular, WHO would like to highlight the willingness of countries not just to conduct these reviews, but to actually take the time to reflect on their pandemic response. ■

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Abbreviations

AAR	after-action review
AEFI	adverse events following immunization
COVAX	COVID-19 Vaccines Global Access
COVID-19	coronavirus disease
CPRP	Country Preparedness and Response Plan
DHIS2	District Health Information Software 2
EQA	external quality assessment
GIS	geographic information system
GISRS	Global Influenza Surveillance and Response System
IAR	intra-action review
IHR	International Health Regulations (2005)
ILI	influenza-like illness
IMS	incident management system
IPC	infection prevention and control
IPPPR	Independent Panel for Pandemic Preparedness and Response
IT	information technology
NAPHS	National Action Plan for Health Security
NDVP	National Deployment and Vaccination Plan
NITAG	National Immunization Technical Advisory Group
PCR	polymerase chain reaction
PHEOC	public health emergency operations centre
PIP	Pandemic Influenza Preparedness
PoC	point(s) of contact
PoE	point(s) of entry
PPE	personal protective equipment
RCCE-IM	risk communication, community engagement and infodemic management
SAGE	Strategic Advisory Group of Experts
SARI	severe acute respiratory infection
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
SOPs	standard operating procedures
SPRP	Strategic Preparedness and Response Plan
UN	United Nations
US CDC	United States Centers for Disease Control and Prevention
WASH	water, sanitation and hygiene
WHO	World Health Organization



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**“ An IAR is designed
and conducted by responders and for responders. ”**

National Professional Officer,
WHO Country Office

Executive summary

Introduction

WHO started developing the *Guidance for conducting a country COVID-19 intra-action review (IAR)* in April 2020 when it became clear that the COVID-19 pandemic would be a protracted acute emergency. In conducting an IAR, countries have the opportunity to bring all stakeholders together from different parts of government, the private sector and civil society to collectively reflect on their response, identify best practices, challenges and lessons learned, and recommend both immediate and middle- to long-term actions to continually improve their COVID-19 preparedness and response in real time.

This report aims to outline how governments worldwide not only used existing systems and resources, but also developed innovative new solutions and strategies during the pandemic. This report also examines the views of countries on how the COVID-19 IAR was customized to fit their needs, as well as the value of the IAR process to their COVID-19 response and beyond. Important topics of interest that are rarely or inadequately reviewed during an IAR, such as provision for vulnerable and marginalized populations during the COVID-19 pandemic, are also considered.

Methods

Among the 112 IARs conducted by 71 countries as of 2 March 2022, a total of 83 reports (74.1%) from 57 countries (80.3%) were available for analysis, including 48 national IARs, 12 subnational IARs and 23 IARs that focused exclusively on the COVID-19 vaccination. A total of 2556 best practices, 2366 challenges and 2859 recommendations were extracted from the 83 reports and analysed. Information was aggregated to eliminate details specific to individual countries. Because the IAR process and tools were intentionally designed to be flexible to facilitate country adaptation to their contexts, each review was unique in its scope, structure and content, making the global analysis of COVID-19 IARs challenging. As no two IARs are identical, the findings from individual countries are not comparable. A solutions-focused approach was therefore adopted, and some of the different

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approaches taken by countries to address common challenges during the pandemic are highlighted. Using this approach, themes, key messages and considerations were developed for each of the 13 public health response pillars proposed in the IAR guidance and addendum.

The qualitative data extracted from the IAR reports were supplemented by interviews with 27 key individuals and 29 country consultations via online survey.

Findings

A common challenge reported in IARs was that countries had not anticipated a public health emergency of this magnitude, so they did not have adequate infrastructure, human, material and financial resources or established procedures to manage the emergency, especially at the beginning of the pandemic. Another common challenge was preventing the health care system from collapsing by ensuring that the surge in COVID-19 cases did not overwhelm essential health services. As vaccines became available, countries also had to identify ways to obtain approval for new vaccines and then to administer vaccines at unprecedented speed. The combination of continuously evolving scientific knowledge, frequently updated health guidance and circulating misinformation meant that communicating reliable health information to communities was challenging. This was further aggravated by community concerns and unanswered questions on the impact of the recommended health behaviours and policies.

This global analysis of IARs identified many cross-cutting themes in countries' efforts to overcome this pandemic. These included repurposing existing policies, strategies, plans, standard operating procedures and human resources to rapidly respond to the COVID-19 pandemic. Countries also expanded the use of information technology innovations to increase the efficiency of contact tracing, monitoring vaccine uptake and creating interoperable systems between different sectors. Another major theme was the necessity for countries to bring together all sectors and domestic and external resources to fight the pandemic and the accompanying infodemic, including multisectoral coordination, public-private partnerships, academic collaboration, working with civil society and recruiting volunteers, while also engaging a whole-of-government and whole-of-society approach. This collaborative effort to combat the pandemic was also shown through the rapid scale-up of timely testing by leveraging laboratory capacity from different sectors, especially during the early phase of the pandemic, critical to support diagnosis, surveillance, contact-tracing operations, prevention of onwards transmission and continuity of operations.

It became clear from the analysis that the timing of the IARs was critical: many countries reported that conducting IARs after an epidemic wave of infection and before the next wave was useful, as responders were available to participate and collectively reflect on the response; and some countries reported that the impact of the IAR was enhanced by conducting it immediately before revising a strategic

plan at the national or subnational level, so that new knowledge could be directly integrated and applied.

Bringing stakeholders from different sectors together to engage in a productive dialogue during the pandemic was also emphasized as a direct benefit by those interviewed in this study. It was evident from reviewing the IAR reports and talking to the interviewees that collaboration is crucial, especially during a public health emergency of this magnitude. During an IAR, the power of the collective is amplified by connecting the perspectives of stakeholders from different sectors to collectively identify possible solutions.

Moving forwards, many recommendations to be shared with governments around the globe, based on best practices reported in IARs, were identified, including: increasing investment in health emergency preparedness; continuing the development of tools and processes to enhance the preparedness and response of countries; encouraging real-time data-driven decision-making and policy implementation; ensuring a whole-of-society and whole-of-government dialogue and engagement; promoting collaboration between countries; regularly testing preparedness and response plans; and ensuring that lessons learned are integrated into the National Action Plan for Health Security (NAPHS) to better prepare countries for future health emergencies.

Concluding remarks

The COVID-19 pandemic meant that this interconnected world was reminded of the indiscriminate vulnerability all countries are exposed to from the borderless nature of infectious disease threats. It was evident from the IAR reports that countries developed innovative approaches to address common obstacles, and it was a privilege to bring their learning to the rest of the world. The willingness of countries to share their IAR reports and experiences with WHO is encouraged and appreciated, and the creativity they exhibited during the pandemic acknowledged.

According to the IARs reviewed in this global analysis, several factors proved critical during the COVID-19 emergency preparedness and response process. Early decisive action from senior leadership enabled countries to prepare before the first COVID-19 case was detected in their countries. Speed and efficiency were essential for countries to respond to the rapidly evolving COVID-19 context. The agility to evolve with the pandemic ensured that national and subnational response strategies were continually reviewed and updated on the dynamic situation. Transparent information exchange between multisectoral stakeholders, different levels of government and the private sector, civil society, vulnerable populations and communities ensured all stakeholders were informed and coordinated. Real-time data using the latest technology and innovation supported timely planning and response, including forecasting needs and reallocating resources. All of these actions would not have been possible without the solidarity and joint commitment from all sectors and levels to work together, streamline processes and public communication, and overcome the habit of working independently.

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The scope of the findings and key considerations identified in this report align with the 5Cs (core subsystems) highlighted in the WHO Director-General's proposals to strengthen the Global Architecture for Health Emergency Preparedness, Response and Resilience. Moving forwards, WHO is committed to continue to listen to the needs of countries and absorb feedback on the IAR process. WHO will continue to support Member States in cultivating a culture of continuous improvement through collective and individual learning, both during and after real-world public health emergencies. ■

Chapter 1

Introduction

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**“ The opportunity to reflect,
to develop a plan, to think on the next steps,
and to make sure that we are going in the right
direction is one of the biggest impacts. ”**

Epidemiologist,
WHO Country Office

1

Introduction

1.1 Background

As the world continues to grapple with the coronavirus disease (COVID-19) pandemic, with variants of concern emerging rapidly, scientific knowledge continuously evolving and health guidance constantly being updated, it is critical to periodically pause and reflect. Is this the best possible way to respond to this pandemic? Is this response in line with the most up-to-date situation on the ground? Could feedback from vulnerable populations be used to improve pandemic response guidance? What has been done well? What could be done better? Most importantly, what can be learned from other countries?

With this mindset, the World Health Organization (WHO) developed the *Guidance for conducting a country COVID-19 intra-action review (IAR)*, published on 23 July 2020 (1), to help countries review and adjust their COVID-19 response during the ongoing pandemic (see [Box 1.1](#) for definition). As of 25 November 2022, 136 IARs have been conducted globally and reported to WHO by 78 countries in all six WHO regions, with 49 undertaken in 2020, 69 in 2021 and 18 in 2022 using the WHO IAR methodology in part or in whole. These include national and subnational IARs, IARs that reviewed a combination of different public health response pillars (see [Box 1.2](#) for a list) and IARs that focused solely on the COVID-19 vaccination pillar.

Box 1.1. Definition: country COVID-19 IAR

For the purposes of this global analysis, a country COVID-19 IAR refers to an activity conducted by a country to provide an opportunity to share experiences and collectively analyse the ongoing in-country COVID-19 response by identifying challenges and best practices using the WHO methodology or a similar approach (i.e. the country referred to, and used in part or in whole, the country COVID-19 IAR guidance and tools). An IAR can be conducted at the national or subnational levels, and for single or multiple pillars.

IAR: intra-action review.

There are currently few analyses in the peer-reviewed literature conducted on IAR reports. Indonesia, one of the world's first countries to conduct a COVID-19 IAR in August 2020, has shared their country's experience in combating the COVID-19 pandemic with the global scientific community (2).

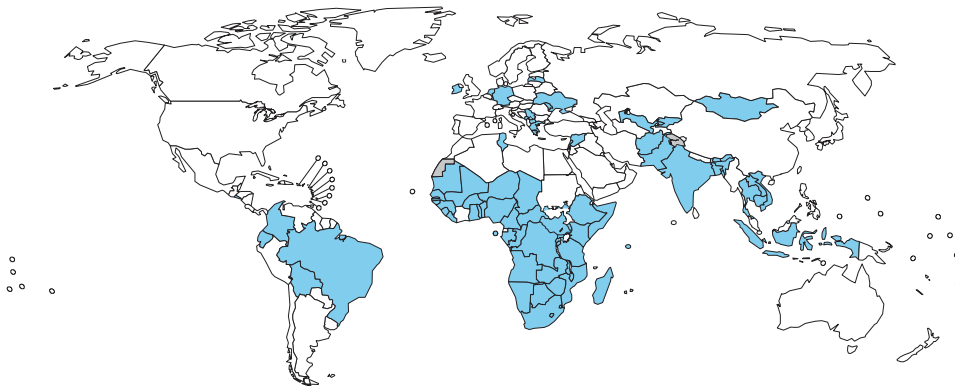
Box 1.2. Public health response pillars proposed in the WHO intra-action review guidance in 2020 and the addendum to the guidance in 2021

1. Country-level coordination, planning and monitoring
2. Risk communication, community engagement and infodemic management
3. Surveillance, case investigation and contact tracing
4. Points of entry
5. National laboratory systems and diagnostics
6. Infection prevention and control
7. Case management and knowledge sharing about innovations and the latest research
8. Operational support and logistics in the management of supply chains and workforce resilience
9. Maintaining essential health services during the COVID-19 outbreak
10. COVID-19 vaccination
11. Vulnerable and marginalized populations
12. National legislation and financing
13. Public health and social measures.

WHO published preliminary findings from the first 20 IAR reports shared with the organization in September 2021, including some of the best practices, lessons learned and new capacities developed by countries (3). Talisuna et al. conducted an aggregated summary of IAR reports from 18 countries in the WHO African Region that was published in May 2022 (4). WHO is aware of other groups examining the findings from publicly available IAR reports.

To our knowledge, the analysis provided in this report is the first to examine IARs conducted around the world through a solution-focused lens. This global analysis consolidates learning from COVID-19 IARs and synthesizes the perceptions and impressions of individuals familiar with conducting IARs in countries. This is in line with the International Health Regulations (IHR) (2005) Emergency Committee's advice to the WHO Secretariat during the fourth meeting on COVID-19 to "*distil and rapidly communicate lessons learned and best practices from the COVID-19 pandemic and national intra-action reviews*" and to conduct "*a meta-analysis of the effectiveness of public health and social measures for COVID-19 response, and lessons learned including from intra-action reviews*" (5). The target audience of this report is national and international policy-makers, public health decision-makers, frontline responders and other key stakeholders involved in the COVID-19 response or emergency preparedness and response work in general. Through global analysis, they can learn from the experiences of countries, and use this information to further improve the IAR process during and beyond the COVID-19 pandemic. Furthermore, changes and impacts triggered by the IARs, both tangible and intangible, can be assessed.

Fig. 1.1. Map of COVID-19 IARs conducted globally, as of 2 March 2022



IAR: intra-action review.

The IAR reports analysed in this global analysis do not represent all countries that have conducted IARs as seen on the map here. Rather, it was based on the voluntary sharing of 83 IAR reports by 57 countries.

To appreciate the lessons and value of IARs for countries, a multi-faceted approach was taken. First, 83 IAR reports from 57 countries as of 2 March 2022 (Fig. 1.1), including 12 subnational IARs and 23 IARs that focused solely on COVID-19 vaccination, were analysed to extract key themes that emerged as best practices and lessons learned. As IAR reports are intended for countries to capture the discussions and recommendations proposed, they tend to omit the details needed to fully appreciate the end-to-end IAR process. A total of 27 semi-structured interviews were therefore also conducted with individuals with deep insight or practical experience in conducting IARs to supplement the IAR reports by capturing the missing nuances and for triangulation. In parallel, 29 country consultations were also conducted via an online survey to better understand the usefulness of these reviews during the current pandemic.

1.2 Public health response pillars

As part of the analysis of the IAR reports, the 13 different public health response pillars (Box 1.2) proposed in the WHO IAR guidance were examined individually. Pillars 1–10 align with the WHO COVID-19 Strategic Preparedness and Response Plan (SPRP) (6), while pillars 11–13 were proposed in the addendum to the IAR guidance (7) following feedback received from countries, technical experts in the WHO regional and headquarter offices and partner agencies. As it takes time for countries to finalize IAR reports after completing an IAR and obtaining the appropriate governmental clearance to share them with WHO, the analysis presented here was from IAR reports available to WHO as of 2 March 2022. However, as more COVID-19 IARs are conducted, and more reports are received, these will be incorporated into future global analyses.

1.3 Aims

This report aims to outline how governments worldwide used not only existing systems and resources, but also developed innovative new solutions and strategies during the pandemic (Box 1.3). The report also examines the views of countries on how the COVID-19 IAR was customized to fit their needs, as well as the value of the IAR process to their COVID-19 response and beyond. Finally, important topics of interest that are rarely or inadequately reviewed during an IAR, such as provision for vulnerable and marginalized populations during the COVID-19 pandemic, are highlighted.

Box 1.3. Using this report as a reference document

The solutions identified and implemented in one country may not be applicable in another country, given each country's unique contexts and settings. This report should therefore be used as a bank of approaches and contextual solutions that arose from creative minds around the world to combat the pandemic. It is hoped that ideas from one country can inspire another country in how to navigate health emergencies moving forwards. Individual strategies taken should not be misinterpreted as formal guidance endorsed or recommended by WHO.

Based on the findings from this analysis, which includes feedback from countries utilizing the IAR, WHO will continue to reflect, innovate and update its existing guidance, tools and processes. WHO is committed to its mission to support countries on their journey for quality improvement of health emergency management and ensure that an IAR can be an efficient, relevant and impactful process for countries, not only for the COVID-19 pandemic but also in preparation for other future public health emergencies. ■

Chapter 2

Methods

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**“ An IAR is designed
as a platform for providing
the dialogue among stakeholders. ”**

National Professional Officer,
WHO Country Office

2

Methods

2.1 Data sources

A mixed-methods approach was adopted in conducting this global analysis of COVID-19 IARs, and three predominant sources of data were used: (1) IAR reports; (2) consultation with key informants via semi-structured interviews; and (3) consultation with health officials in countries via an online survey.

2.1.1 IAR reports

The six WHO regional offices were briefed on this project and their collaboration sought in reaching out to countries to share their IAR reports confidentially or to provide access to links to reports already published in the public domain. Among the 112 IARs conducted by 71 countries as of 2 March 2022, a total of 83 reports (74.1%) from 57 countries (80.3%) were available for analysis (Tables 2.1 and 2.2). These included 48 national IARs, 12 subnational IARs and 23 IARs that focused exclusively on the COVID-19 vaccination pillar. The names of the countries have been omitted and all data have been aggregated to respect the country-owned data and encourage more countries to share their reports with WHO.

2.1.2 Key informant interviews

A semi-structured interview guide was developed in consultation with colleagues at all three WHO levels and included questions on: the key informant's role in the COVID-19 IAR process; how the IAR was implemented; how the recommendations from the IAR were followed up; and the overall impact of the IAR process on the COVID-19 response. A total of 27 individuals familiar with IAR implementation in countries were identified and interviewed based on suggestions from WHO regional and country offices using a mix of convenience sampling and a snowballing approach. The characteristics of the key informants are provided in Table 2.3.

Table 2.1. Characteristics of the 57 countries from which COVID-19 IAR reports had been received and analysed, as of 2 March 2022

Country characteristics	Countries from which an IAR report was analysed (n = 57)		All countries (n = 194)	
	No.	%	No.	%
WHO regions				
African Region	27	47.4	47	24.2
Region of the Americas	3	5.3	35	18.0
South-East Asia Region	6	10.5	11	5.7
European Region	7	12.3	53	27.3
Eastern Mediterranean Region	10	17.5	21	10.8
Western Pacific Region	4	7.0	27	13.9
Human development index				
Very high	5	8.8	64	33.0
High	15	26.3	52	26.8
Medium	17	29.8	37	19.1
Low	18	31.6	33	17.0
Data unavailable	2	3.5	8	4.1
World Bank income group				
High	5	8.8	57	29.4
Upper-middle	10	17.5	54	27.8
Lower-middle	25	43.9	53	27.3
Low	17	29.8	27	13.9
Data unavailable	–	–	3	1.5

IAR: intra-action review.

Note that percent columns may not add up to 100% because of rounding.

The main criteria for the interviewees were that they had been actively involved in the IAR process in one or more of the following ways:

- planning and coordination of one or more IARs;
- providing oversight and guidance on the conduct and facilitation of IARs; and
- facilitating and/or participating in one or more IARs.

Interviews were conducted between 29 October 2021 and 9 December 2021 following the oral consent of all participants, and lasted between 45 minutes and 1 hour. To promote an honest and open discussion during the interviews, interviewees were informed that their identities would be kept confidential and no identifiable information would be shared. They were also advised that they would be given the opportunity to review the report to ensure their views were captured accurately before publication. During the interviews, a designated interviewer and note-taker were present to ensure consistency of the methodology throughout the process.

Table 2.2. Characteristics of the 57 countries from which COVID-19 IAR reports had been received and analysed as of 2 March 2022, compared with all WHO Member States

Country characteristics	Countries from which an IAR report was analysed (n = 57)		All countries (n = 194)	
	No. (%) countries for which information on variable is available	Mean value of variable (95% CI)	No. (%) countries for which information on variable is available	Mean value of variable (95% CI)
Demographic and socioeconomic characteristics				
Median age	56 (98.2)	25.1 years (13.8–36.5)	182 (93.8)	30.0 years (16.4–43.6)
Percentage of population aged > 65 years	55 (96.5)	5.3% (0–11.2)	181 (93.3)	8.5% (0–17.7)
Percentage of population aged > 70 years	56 (98.2)	3.3% (0–7.2)	181 (93.3)	5.4% (0–11.7)
Life expectancy	56 (98.2)	68.1 years (58.5–77.6)	193 (99.5)	72.6 years (61.3–83.8)
Percentage of population that are literate	56 (98.2)	75.5% (44.2–106.9)	190 (97.9)	86.0% (58.8–113.3)
GDP	54 (94.7)	9 246.0 USD/capita (0–27 665.7)	186 (95.9)	18 061.7 USD/capita (0–46 927.9)
Percentage of population below the poverty level	52 (91.2)	22.3% (0–58.6)	163 (84.0)	13.1% (0–43.4)
Access to health care				
No. hospital beds per thousand inhabitants	48 (84.2)	2.0 per thousand inhabitants (0–4.7)	170 (87.6)	3.0 per thousand inhabitants (0–6.7)
Percentage of population covered by some type of health insurance	45 (78.9)	49.1% (0–108.1)	154 (79.4)	63.1% (4.7–121.4)
Universal health care value ^a	55 (96.5)	56.1 (33.8–78.3)	180 (92.8)	64.3 (41.2–87.5)
Health professional density ^b	54 (94.7)	31.6 per 1000 population (0–84.0)	178 (91.8)	61.4 per 1000 population (0–142.2)
Health care access and quality index ^c	56 (98.2)	54.1 (33.5–74.6)	185 (95.4)	63.2 (38.3–88.0)
Investment in health security preparedness				
IHR total score from state party annual reporting	54 (94.7)	60.2% (33.9–86.5)	172 (88.7)	64.8% (36.6–93.0)
Public health expenditure as percentage of GDP	54 (94.7)	5.6% (2.5–8.7)	187 (96.4)	6.6% (2.2–10.9)

CI: confidence interval; GDP: gross domestic product; IAR: intra-action review; IHR: International Health Regulations (2005); USD: United States dollars.

^a Measured on a scale from 0 (worst) to 100 (best), based on the average coverage of essential services including reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access.

^b Estimated using number of physicians (per 1000 population) and number of nursing and midwifery personnel (per 1000 population).

^c Measured on a scale from 0 (worst) to 100 (best), based on a range of health quality and access indicators and risk-standardized death rates.

Table 2.3. Characteristics of key informants interviewed for the global analysis of intra-action reviews, conducted as of 2 March 2022

Characteristics of interviewees	No. (%) of interviewees (n = 27)
WHO regions	
African Region	10 (37.1)
Region of the Americas	1 (3.7)
South-East Asia Region	5 (18.5)
European Region	6 (22.2)
Eastern Mediterranean Region	2 (7.4)
Western Pacific Region	3 (11.1)
Organization/agency	
WHO regional office	7 (25.9)
WHO country office	17 (63.0)
Ministry of health	1 (3.7)
Partner agency	2 (7.4)
Field of expertise	
COVID-19 preparedness and response	11 (40.7)
COVID-19 vaccination programme	8 (29.7)
Monitoring and evaluation	5 (18.5)
Public health	3 (11.1)
Type of role	
Manager	4 (14.8)
Technical expert/advisor	17 (63.0)
Frontline responder/incident management team	1 (3.7)
Country focal point	5 (18.5)

2.1.3 Online survey

An online survey was developed to obtain an overview of how the IAR process was implemented by those familiar with the planning, conduct and follow-up of IARs in countries. Based on the respondents' responses, a total of 7–27 questions could be answered. Among the maximum of 27 questions, three were open-ended questions, nine multiple-choice questions and 15 Likert-scale questions.

The survey was broadly divided into two sections. The first section focused on how the IAR methodology was customized and how effective this approach was (e.g. *Was the WHO IAR methodology effective in identifying best practices, challenges and lessons learned to adjust the COVID-19 response?*). The second section focused on any possible impact on the COVID-19 preparedness and response following an IAR (e.g. *In your region/country, did the IAR process contribute to the revision of the COVID-19 strategic preparedness and response*

plan?). For the Likert scale, respondents were able to score from 0 (fully disagree) to a maximum score of 10 (fully agree). This survey was developed and reviewed by focal points at all three WHO levels (headquarters, regional and country offices), who also helped disseminate results to key individuals involved in the IAR process. Online surveys were sent to regional focal points to share with WHO country offices to further disseminate to their counterparts in ministries of health. Key informants from the semi-structured interviews were also encouraged to share the online survey with key individuals who played an important role in conducting the COVID-19 IAR.

The first survey was issued on 10 November 2021, with 29 surveys completed and received as of 1 December 2021. The characteristics of the survey respondents are shown in [Table 2.4](#).

Table 2.4. Characteristics of participants who responded to the online survey for the global analysis of intra-action reviews, conducted as of 2 March 2022

Characteristics of online survey participants	No. (%) of participants (n = 29)
WHO regions	
African Region	12 (41.4)
Region of the Americas	0 (0.0)
South-East Asia Region	1 (3.4)
Eastern Mediterranean Region	9 (31.1)
Western Pacific Region	1 (3.4)
African Region	6 (20.7)
Organization/agency	
WHO regional/country office	23 (79.4)
Ministry of health	1 (3.4)
Partner agency	5 (17.2)

The main criteria for the survey respondents were as for interviewees (Section 2.1.2 above).

2.2 Data extraction and analysis

Although the IAR final report template was provided as part of the WHO IAR package, the entire IAR process is customizable, including the final report. IAR reports therefore differ in format, content and scope depending on the IAR conducted. Each IAR allows the possibility of reviewing one or more of the public health response pillars to varying levels of complexity. This also means that no two IAR reports are identical and the findings from individual countries cannot, and should not, be compared.

For this reason, a solution-focused approach (Box 2.1) was taken for this global analysis, which deliberately highlighted some of the different strategies adopted by countries to address common challenges during the pandemic. Using this approach, themes, key messages and considerations moving forwards for each of the 13 public health response pillars proposed in the IAR guidance and addendum were developed. For this report, an intervention was not formally classified by WHO as a “good practice”, “best practice” or “innovation”, among other terms that may have been used in this document. Rather, information was presented according to how countries documented their interventions in their IAR reports. It is important to note that any given innovation for one country may be considered standard practice in another country, given the large variation in country contexts. These terms are therefore relative; this report does not intend to qualify or endorse specific interventions, but rather to document the approaches taken by countries.

Box 2.1. Rationale of the analysis approach

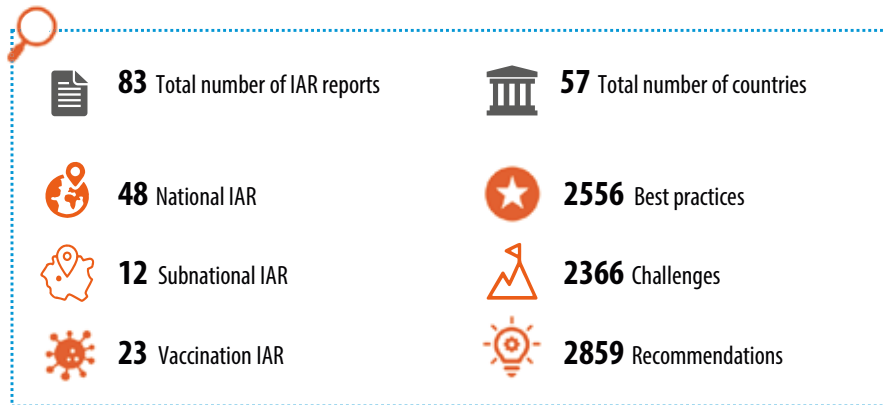
Challenge. The IAR process and tools were intentionally designed to be flexible to facilitate customization by different countries, but this also meant that IAR reports were unique in their scope, structure and content, making the global analysis of COVID-19 IARs more challenging to conduct and interpret. IAR reports are intended for internal use by countries to document the discussions taken place and the prioritized recommendations proposed during the IAR. The reports therefore tended to omit the details of the discussion taken place during the IAR.

Analysis approach. A solution-focused approach was taken to highlight some of the different strategies adopted by countries to address common challenges during the pandemic. Themes, key messages and recommendations were developed for each of the 13 public health response pillars proposed in the IAR guidance and addendum. IAR report data were supplemented with consultations with individuals who were familiar with the IAR process, and with the potential impacts and changes triggered by IARs.

IAR: intra-action review.

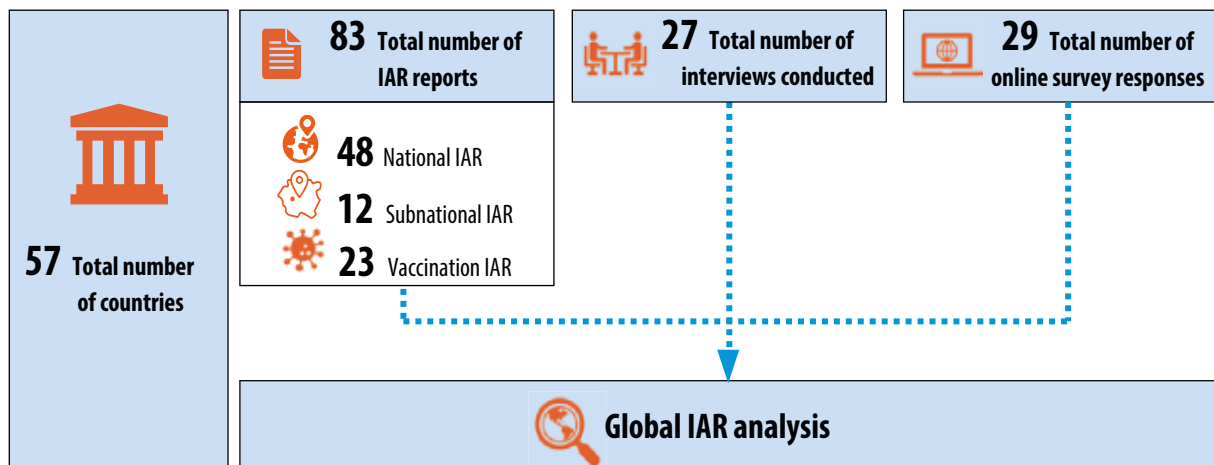
IAR reports are the product of a qualitative process; primary data therefore consisted of extracted phrases and sentences by pillar directly from the IAR reports without further modification. A total of 2556 best practices, 2366 challenges and 2859 recommendations were extracted to a database from the 83 reports by pillars reviewed (Fig. 2.1). Two independent reviewers then identified top recurring themes based on these extracted data. In the event of a disagreement, a third independent analyst reviewed the data to reach a consensus. There was also a varying amount of information available for each pillar as a result of the varying frequency with which any particular pillar was reviewed; the number of themes therefore differs between pillars. To provide context to the themes, a selection of specific examples was identified to demonstrate the approaches taken by countries in navigating the common challenges encountered during the pandemic.

Fig. 2.1. Data extracted from the IAR reports for the global IAR analysis, conducted as of 2 March 2022



Where possible, frequencies and percentages were extracted from these qualitative data. However, themes and data extraction are limited and highly dependent on what was mentioned in the interview and survey and documented in the IAR reports. It is possible that a specific measure was adopted by the country but not discussed or documented in the IAR reports; the frequencies seen throughout the report are therefore only a conservative estimate of the minimum number of countries that reported their adoption of a particular measure. It is likely that additional countries could have adopted similar measures without documenting these in the IAR reports.

Fig. 2.2. Data sources and sample size for the global IAR analysis, conducted as of 2 March 2022



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The data from the IAR reports were supplemented by consultations with 27 key individuals familiar with the IAR process and its implementation in countries via semi-structured interviews, and 29 country consultations via online surveys (Fig. 2.2). Triangulation of these three data sources was conducted wherever possible. However, some ideas mentioned could not be quantified; no frequencies or percentages were therefore shown. Instead, representative quotes were extracted from the interviews and online surveys to help readers form their conclusions about the views expressed through these consultations. All contributors to the interview and survey were anonymized through the report as agreed during the oral consent. These quotes are predominantly presented in Chapter 4 (Findings from interviews and survey).

Finally, it is important to note that the solutions identified in one country may not be applicable to another country, given each country's unique contexts and settings. This report is therefore not a prescribed text for actions to be taken by a country in moving forwards, but rather a bank of ideas on COVID-19 response strategies adopted around the world. For this same reason, this report simply documents what was done and how countries managed this crisis; individual strategies should not be misinterpreted as best practices or guidance endorsed or recommended by WHO. ■

Chapter 3

Findings from analysis of IAR reports

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**“ The final outcome of the IAR
is providing evidence-based information
with the objective of strengthening the
health care system as a whole. ”**

Technical Officer,
WHO Country Office

3

Findings from analysis of IAR reports

Within the first months of the COVID-19 pandemic it became increasingly obvious that it was going to become a protracted crisis, requiring constant adjustment to the COVID-19 preparedness and response strategies of countries. The IAR was therefore developed as a tool during this pandemic for countries to continuously introspect and make course corrections as needed to minimize the health, social and economic impact on the population.

The IAR consisted of 12 tools, such as the concept note template, facilitator guide, note-taking template and final report template. Among these, one critical tool that forms the core of the IAR discussion is the trigger question database, consisting of more than 600 trigger questions over 13 public health response pillars to stimulate in-depth discussions among the key stakeholders about the response. Countries could select one or more proposed pillars to review, and could propose new pillars that are not listed but may be relevant to their context. In addition, countries could also select the most pertinent trigger questions to help stakeholders focus and reflect on aspects of the response that require the most attention.

3.1 Pillar 1: country-level coordination, planning and monitoring

This pillar reviews the operational, tactical and strategic coordination of the response, including the activation and operations of an incident management system (IMS) and a public health emergency operations centre (PHEOC) for decision-making, management and quick intervention. In addition, this pillar reviews the functioning of procedures and platforms for coordination with various health and non-health sectors of government, and national and international partners and stakeholders, including the United Nations (UN), non-governmental organizations, donors and private industry. Ultimately, this pillar reviews whether coordination at all levels enabled rapid information dissemination, resource mobilization and sharing, efficient decision-making and effective distribution of roles and responsibilities.

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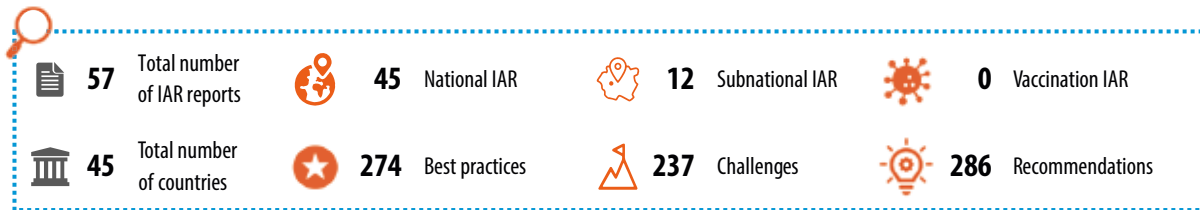
See [Box 3.1](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.1. Summary of key themes

1. Countries that had existing pandemic preparedness and response contingency plans were able to facilitate the rapid activation of the COVID-19 response.
2. Training and simulation exercises facilitated the building of country coordination capacity in preparation for the rapid scale-up needed during the COVID-19 response.
3. The existence and activation of national and subnational emergency operations centres allowed for effective resource utilization, coordinated response and timely information-sharing across all levels.
4. The existence of multisectoral emergency management steering committees at the national and subnational levels clarified roles and responsibilities and facilitated a coordinated COVID-19 response.
5. Continual review and revision of COVID-19 response strategies, plans and control measures by multisectoral stakeholders were critical for adjustments to the response as the outbreak evolved.
6. Continual situational analysis and information sharing at all levels provided real-time data for rapid decision-making, and ensured optimal coordination and management of the COVID-19 response.

Fig. 3.1 provides the number and types of IARs that reviewed pillar 1, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.1 Number of IARs that reviewed pillar 1, and type and volume of qualitative data extracted



3.1.1 How countries navigated challenges

1. Countries that had existing pandemic preparedness and response contingency plans were able to facilitate the rapid activation of the COVID-19 response

All countries are continually exposed to a wide array of public health emergencies unique to their contexts. However, not all are familiar with or prepared to rapidly coordinate a response to a pandemic of this magnitude and nature. In managing this crisis, based on the IAR reports at least one in five countries (12/57 countries; 21.1%) utilized existing systems and procedures to rapidly activate the COVID-19 response, such as:

- leveraging existing coordinating mechanisms for public health emergencies, such as the health cluster committee, the national disaster and relief committee, and the national IHR focal points;
- triggering existing coordination systems or mechanisms rapidly for the COVID-19 response and promptly repurposing existing guidelines and SOPs;
- expediting a coordinated response through existing relationships from previous collaborations between other sectors in past emergencies;
- utilizing existing contingency funds for emergencies or swiftly repurposing budget lines to respond to the COVID-19 outbreak; and
- building on the National Action Plan for Health Security (NAPHS) that had already been developed rather than starting from the beginning.

However, given the highly dynamic nature of the pandemic, frequent review and adaptation of the materials was critical and emerged as a recommendation during the IAR in almost half of the countries (24/57 countries; 42.1%).

2. Training and simulation exercises facilitated the building of country coordination capacity in preparation for the rapid scale-up needed during the COVID-19 response

As the world observed COVID-19 spreading at record speed at the beginning of the pandemic, it was evident that hardly any country would be spared, and COVID-19 would eventually arrive at their borders. It was therefore interesting to note that at least 1 in 10 countries (5/57 countries; 8.8%) noted in their IAR reports that they proactively initiated their emergency preparedness activities before the first COVID-19 case was identified in their country. Some examples of these proactive preparedness activities documented in the IAR include:

- training experts across all public health response pillars at national and subnational levels before the country's first case of COVID-19 was detected;
- utilizing a combination of simulation exercises and training to build capacity and identify potential bottlenecks in anticipation of the COVID-19 outbreak;
- ensuring health systems were prepared ahead of time by establishing COVID-19-designated hospitals in major hubs, rapidly scaling up diagnostic testing by involving both public and private sectors, and strengthening human resource capacity for the efficient handling and management of cases; and
- using scenario-based planning or drills to foresee potential challenges to promote a smooth roll-out of COVID-19 vaccines when available.

It is important to note that countries made definitive efforts to conduct preparatory activities. In hindsight, even more investment into preparedness may have prevented the escalation of the crisis, given the nature of this pandemic.

3. The existence and activation of national and subnational public health emergency operations centres allowed for effective resource utilization, coordinated response and timely information sharing across all levels

A physical PHEOC with a formalized IMS structure is vital for a coordinated response during an emergency. At least one in five countries (11/57 countries; 19.3%) noted in their IAR reports that these systems were already in place, while at least 1 in 10 countries noted that they had the systems but had never activated these in a real emergency (7/57 countries; 12.3%). For countries that already had PHEOCs in place, it was impressive to note the early activation and implementation of measures before detecting the first COVID-19 case. For countries that did not have existing PHEOCs, it was reported that command centres were also rapidly instituted ad hoc to facilitate the coordination of response efforts.

As the health ministry could not manage the pandemic at the central government level alone, some countries took additional measures, including:

- establishing coordination command centres at different ministries and agencies beyond the Ministry of Health; and
- creating command centres at the national level and down to the smallest unit of the jurisdiction.

The activation of the IMS structure at these command centres also allowed a coordinated response that was integrated with the latest COVID-19 epidemiological situation based on real-time surveillance data on the ground. However, among the countries reviewing this pillar, at least one reported that the PHEOC were operational 24 hours 7 days per week, with at least three reporting that daily meetings were conducted.

4. The existence of multisectoral emergency management steering committees at the national and subnational levels clarified roles and responsibilities and facilitated a coordinated COVID-19 response

During a public health emergency, one of the greatest challenges is the tendency for each department or sector to work in silos. The creation of a multisectoral emergency management steering committee or other similar technical and scientific working group was among the key components that facilitated the coordination of response during the pandemic. Countries took additional steps to ensure these committees were as effective as possible, including:

- assigning the highest level of the government, including heads of state, to lead these multisectoral steering committees, demonstrating commitment from the highest level to make expedited evidence-based decisions and ensure rapid mobilization and deployment of resources where they are most needed (also facilitating the timely declaration of the emergency to activate various resources and defined processes to be taken by multiple sectors); and
- involving non-traditional sectors as part of the steering committee, such as the ministries of finance, trade, foreign affairs, interior, transport, defence and communication, in addition to academia, to collectively generate innovative solutions to serve the broad range of population groups.

5. Continual review and revision of COVID-19 response strategies, plans and control measures by multisectoral stakeholders were critical to enable adjustments to the response as the outbreak evolved

During this pandemic, the situation evolved at a speed that meant strategies, plans and COVID-19 mitigation measures needed to be constantly adapted to align with the latest contextual situation and scientific evidence. This was no

easy task, and required multisectoral stakeholders to come together regularly to ensure the alignment of strategy, intervention and messaging to the public. Some of the approaches taken by countries included:

- developing the COVID-19 Country Preparedness and Response Plan (CPRP) especially early in the response;
- establishing a multisectoral committee to develop plans and guidelines rapidly combined with early activation of the IMS to guide operations and resource mobilization; and
- conducting regular meetings between sectors and between national and subnational levels for coordinating their response, ensuring accountability and monitoring indicators.

6. Continual situational analysis and information sharing at all levels provided real-time data for rapid decision-making, and ensured optimal coordination and management of the COVID-19 response

During this pandemic, the rapidly evolving situation required continual situational analysis and risk assessment at all levels of government to mount the most appropriate response. Although regular health cluster and other meetings were used for sharing COVID-19-related information among stakeholders, other countries also reported the importance of other modes of communication, including:

- informal communication channels, such as instant messaging phone apps to maintain continual open communication to provide real-time updates and rapid decision-making as needed on the ground;
- a COVID-19 case monitoring dashboard as a useful tool to follow up on all actions taken following confirmed cases; and
- a web-based adverse event following immunization (AEFI) reporting system following the introduction of COVID-19 vaccines to track AEFI in real time, including their follow-up, clinical management and outcomes.

During the IAR, the importance of ensuring the increased utilization of the COVID-19 Partners Platform (8) was noted to facilitate transparent information sharing, monitoring response plan indicators and identifying areas where external funding might be needed to provide support without delay. It was also emphasized that it was critical to conduct periodic coordination meetings for multiple sectors at the national level and between the national and subnational levels.

3.1.2 Conclusions for pillar 1 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 1.

- Existing national structures, legislation, policies, guidelines and standard operating procedures (SOPs) facilitated the rapid and coordinated response in the early phase of the pandemic.
- Countries built on existing contingency plans or other emergency preparedness and response plans and frameworks, such as the NAPHS and Pandemic Influenza Preparedness (PIP) to develop the COVID-19 CPRP.
- PHEOC with a clear IMS structure at national and subnational levels provided centralized and decentralized command centres to ensure a coordinated response.

With regards to moving forwards, several considerations were identified in the country IARs.

- Evidence-based science should be used to inform decision-making processes to coordinate the preparedness and response to health emergencies considering the evolving context.
- A flexible system and approach to repurposing existing and mobilizing additional resources is required to respond to a health emergency when necessary.
- Operational planning for health emergencies should be continued and include development of a multi-hazard preparedness and response plan, as well as testing and updating these plans accordingly.
- Multisectoral and multilevel collaboration established during the pandemic should be maintained for a coordinated response to future health emergencies.
- Sustainable domestic financing mechanisms are needed to respond to health emergencies to reduce reliance on external funding.

3.2 Pillar 2: risk communication, community engagement and infodemic management

This pillar reviews the functioning of risk communication, community engagement and infodemic management (RCCE-IM) in terms of ensuring effective exchange of real-time information, advice and opinions between experts and people facing threats to their health, as well as trusting relationships between vulnerable communities and emergency responders that enable them to work together to address health-related issues. The pillar also reviews the effectiveness

A global analysis of COVID-19 intra-action reviews

and comprehensiveness of RCCE-IM plans as well as available resources, staff, coordination, and monitoring and evaluation. The standard elements of the RCCE-IM plans may include: listening; identification of concerns; questions; information voids; circulating narratives including misinformation in specific communities; implementation and operational research; generation of infodemic insights and analytics to inform more effective strategies and interventions to promote adherence to recommended guidance; uptake of therapeutics and diagnostics; promotion of healthy behaviour; developing, testing, disseminating and evaluating messages and materials that are tailored to language, culture, education and other relevant needs; community engagement to build trust to co-develop and adapt public health guidance and measures; capacity-building; training; coordination; working with global networks and the media; monitoring and evaluation; budget; and timeline. This pillar aims to identify areas for strengthening transparency and trust in managing questions, concerns, information voids, circulating narratives and misinformation in the public and in specific populations of focus, and building resilience of communities against the infodemic and misinformation.



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See [Box 3.2](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.2. Summary of key themes

1. Previous experiences in communicating with the public during epidemics and emergencies informed early communications strategies at the beginning of the COVID-19 pandemic response.
2. The establishment of the RCCE-IM task force contributed to the development of strategies that supported unified and consistent messages, and more optimal use of resources.
3. A whole-of-society approach and engagement allowed the development of context-appropriate RCCE-IM strategy, activities, materials and dissemination methods accessible to all.
4. Broad and frequent communication via various platforms, and engaging trusted individuals in the community, were critical in addressing information voids, building trust and combating misinformation and disinformation.
5. Understanding the impacts, needs and concerns of communities and vulnerable populations through field research, social listening, and infodemic or rumour monitoring was crucial in planning and adjusting RCCE-IM strategies.
6. Engaging community members was a key strategy in building trust and promoting community acceptance of public health and social measures.

RCCE-IM: risk communication, community engagement and infodemic management.

Fig. 3.2 provides the number and types of IARs that reviewed pillar 2, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.2. Number of IARs that reviewed pillar 2, and type and volume of qualitative data extracted



3.2.1 How countries navigated challenges

1. Previous experiences in communicating with the public during epidemics and emergencies informed early communications strategies at the beginning of the COVID-19 pandemic response

Countries leveraged previous experience with epidemics to facilitate rapid activation of RCCE-IM activities during the COVID-19 response. However, even those countries with many pre-existing RCCE-IM mechanisms and systems, such as a pre-existing national response plan and a task force at national and subnational levels, experienced challenges given the nature of this completely novel pathogen. To combat this, countries used different approaches, including:

- leveraging field experience accumulated from previous public health emergencies adapted with the rapid emergence of new evidence; and
- designating a media spokesperson and creating a media centre, information hotline and official websites in attempts to provide timely, accurate and consistent messaging from the government.

2. The establishment of the RCCE-IM taskforce contributed to the development of strategies that supported unified and consistent messages, and more optimal use of resources

Multisectoral collaboration across all levels was critical for achieving a coordinated approach to ensure all information was consolidated and disseminated to the general public with a unified message. Among the 36 countries that reviewed this pillar, at least one in six (6/36 countries; 16.7%) noted in their IAR report close collaborations with different ministries and agencies and the forging of private–public partnerships. These close working relationships allowed the joint planning and development of communication materials, activities, messaging and dissemination approaches, especially when community and civil society were involved. Creating a formal RCCE-IM working group that met periodically (whether weekly, monthly or quarterly) was also critical to regularly review and revise the RCCE-IM workplan, communication content and dissemination strategies throughout the pandemic. Among the 36 countries that reviewed this pillar, at least one country reported a formal multisectoral RCCE-IM working group developed for COVID-19 and at least three countries reported that regular meetings were held. In contrast, others conducted meetings as needed given the rapidly changing COVID-19 situation.

3. A whole-of-society approach and engagement allowed the development of context-appropriate RCCE-IM strategy, activities, materials and dissemination methods accessible to all

Engaging with the local community with a whole-of-society approach was essential to ensure activities, communication content and dissemination strategies were context-specific and appropriate to different population groups (e.g. minority/vulnerable populations and different age groups). Additional approaches employed by countries that reviewed this pillar during their IAR included:

- designating a COVID-19 focal point among the high-risk population in schools, prisons, large enterprises and long-term care facilities;
- encouraging community participation and feedback in the planning, development and dissemination of communication materials (at least five countries reported that communication content or dissemination strategies were informed by the communities themselves through various means, e.g. the monitoring of rumours, media and social media, implementing two-way communication and feedback using toll-free COVID-19 hotlines, and conducting community surveys);
- adapting communication content for minority populations by translating these into local languages and dialects;
- adopting an inclusive communication strategy to ensure that the needs of people living with disabilities were not overlooked in the pandemic (at least one country reported that communication contents were translated into sign languages); and
- implementing innovative measures for difficult-to-reach populations with no electricity or internet access, such as conducting door-to-door campaigns and using loudspeakers on police cars.

4. Broad and frequent communication via various platforms, and engaging trusted individuals in the community, were critical in addressing information voids, building trust and combating misinformation and disinformation

Some governmental health authorities developed multiple platforms for information dissemination to ensure that the vast majority of the community were informed of the latest epidemiological situation, important decisions and rationale. Some examples included a COVID-19 situation dashboard, regular press briefings, dedicated COVID-19 information webpages and video messages/public service announcements on official government websites, messaging aired on radios and text messages to mobile phone users. Among the different approaches taken by countries, a high-level leadership commitment was seen,

such as the presidential task team established by one government to promote a sense of trust and security. To address information voids, misinformation and disinformation, many measures were reported in the IARs, including:

- having theatrical teams or popular artists visit different regions to promote COVID-19 awareness;
- engaging social media influencers as champions of implemented public health and social measures;
- deploying artificial intelligence to provide real-time information and response to social media queries;
- airing sensitization videos on national television channels during peak viewing times; and
- utilizing surveillance data to identify high-priority areas to focus on for countering rumours, misconceptions and myths among the community.

To supplement these efforts against the infodemic that accompanied the pandemic, governments also established dedicated teams to identify and counter false and misleading information on the internet, working closely with partners to address misinformation and establish rumour management committees at the district level.

5. Understanding the impacts, needs and concerns of communities and vulnerable populations through field research, social listening, and infodemic or rumour monitoring was crucial in planning and adjusting RCCE-IM strategies

Proactively listening and seeking to understand community concerns and feedback is essential in cultivating trust and mutual understanding, fundamental to promoting positive behaviour change. This feedback can also help guide the design of diagnostic and human-centred infodemic interventions. Among the 36 countries that reviewed this pillar, different approaches were taken to understand not only community perspectives but also the perception of health care and other frontline workers, including:

- conducting field research, including periodic qualitative and quantitative studies and knowledge, attitudes and practices surveys, or other surveys to understand public perception and concerns to tailor public health messages accordingly;
- using data from field research to guide the planning and implementation of RCCE-IM interventions, the revision of national and subnational plans, and the development of evidence-based communication materials;
- exploring perceptions from health care workers and other frontline workers to ensure knowledge gaps are adequately identified and addressed; and

- establishing social science analysis teams to integrate epidemiological data with other social science and behavioural data to better understand the impact of the pandemic on the community and how to make necessary adjustments to RCCE-IM activities.

6. Engaging community members was a key strategy in building trust and promoting community acceptance of public health and social measures

Engaging community members is essential since communities understand their local contexts and needs best. These engagements were of various kinds, including:

- ensuring that the media effectively engages the community by using a participatory approach to promote effective messaging;
- involving community leaders and municipalities in establishing COVID-19 community isolation centres to ensure a swift response;
- raising awareness at the grassroots level by community leaders, artists and influencers to mitigate social stigma against COVID-19;
- recruiting community volunteers and youth volunteers to conduct door-to-door sensitization; and
- collaborating with religious leaders, traditional healers, elders and chiefs to garner trust among the community.

Other community initiatives reported included community-run hospital beds, medical staff and food box distribution, with support and training by municipalities and non-profit organizations.

Overall, the pandemic challenged countries to comprehensively respond to the infodemic and its associated effect on individuals, communities and the health system. Infodemic management practice has rapidly advanced, with countries consistently reporting the importance of enhancing their capacities to track and address the infodemic and health misinformation during the pandemic. Going forwards, having an infodemic management workforce and evidence-based interventions will be key to improving preparedness planning and strategies, and enhancing community acceptance of healthy behavioural changes.

3.2.2 Conclusions for pillar 2 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 2.

- A whole-of-society approach where RCCE-IM is strongly linked to health systems is a key strategy for health authorities to promote information-sharing with communities, building trust and promoting adherence to health guidance.

A global analysis of COVID-19 intra-action reviews

- Monitoring and addressing infodemics can enhance confidence in COVID-19 vaccines, maintain trust, promote adherence to public health guidance and social measures, promote the uptake of therapeutics and diagnostics, and support healthy behaviour.
- The rapid spread of information across borders through the digital information environment, including social media and internet platforms, fuelled confusion, questions and concerns as well as the incidence of misinformation about the COVID-19 pandemic and its response by local health authorities; future investment and innovation in infodemic monitoring, diagnostics, interventions and prevention strategies is therefore essential.
- Investment in preparedness is a worthwhile endeavour, as seen in this pandemic where the PIP framework prepared countries to respond to the COVID-19 pandemic.

With regards to moving forwards, several considerations were identified in the country IARs.

- The close collaboration established between multisectoral stakeholders during the COVID-19 response must be systematized to ensure a coordinated and unified position from the government for concurrent and future public health crises.
- Investment to develop more effective digital strategies utilizing a health workforce that consists of digital natives, both to promote the amplification of credible accurate information and to reduce the spread and harm of infodemic-related narratives, is necessary.
- The trust of communities in health systems must be built by improving routine health services and delivering on promises made regarding the quality of health care and the ability of the government to protect population health during health emergencies.
- Where possible, communities and vulnerable populations should be involved in the diagnosis, design and implementation of health guidance in emergencies so that guidance and communication strategies are tailored to people's needs in spaces where they work, play, pray, live, learn and gather.
- Investment should be made in policies, technologies and health service delivery strategies to listen to the vulnerable and help them exercise their right to health information that is meaningful to them, at the right time, by messengers and on channels they trust.

- Infodemic management capacities should be included in preparedness and emergency planning, particularly in incident management support team structures with links to RCCE-IM and health service delivery.

3.3 Pillar 3: surveillance, case investigation and contact tracing

This pillar reviews the functioning of the surveillance and early warning systems to enable the timely collection, analysis and interpretation of signals; to diffuse information to decision-makers; and to trigger an appropriate response. In addition, this pillar reviews the operations of the rapid response team, including the activation, composition and training required to effectively conduct case investigation, contact tracing and contact monitoring. Finally, this pillar also reviews other technological innovations used to supplement contact tracing during the COVID-19 response.



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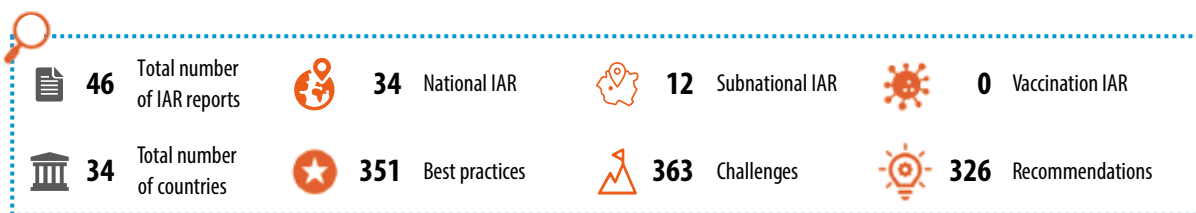
See [Box 3.3](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.3. Summary of key themes

1. Countries familiar with previous epidemics were able to leverage prior experience in their COVID-19 response.
2. Countries with existing surveillance systems for respiratory illnesses were able to repurpose these for COVID-19.
3. The expansion of access to timely testing with rapid turnaround times was necessary to support case detection and contact-tracing operations, preventing onwards disease transmission in the community.
4. Innovative information technology (IT) solutions and digital tools reshaped surveillance systems and increased the efficiency of contact tracing.
5. Surge capacity was mobilized through the community to support contact tracing and surveillance efforts to relieve the overwhelmed system.
6. A decentralized response was critical during the widespread outbreak of the magnitude seen.

Fig. 3.3 provides the number and types of IARs that reviewed pillar 3, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.3. Number of IARs that reviewed pillar 3, and type and volume of qualitative data extracted



3.3.1 How countries navigated challenges

1. Countries familiar with previous epidemics were able to leverage prior experience in their COVID-19 response

Based on the IAR reports, countries could be broadly classified into two categories: those who reported prior experience in dealing with infectious disease outbreaks versus those who had less experience and were less prepared for this pandemic. It was evident that countries with previous experience in responding to epidemics had a significant advantage during the COVID-19 outbreak in their countries,

given that many systems, structures and the workforce for surveillance activities were already in place. Among the 34 countries that reviewed this pillar, countries with previous outbreak experience leveraged their prior experience in this pandemic by:

- utilizing the field epidemiology training programmes that they had had in place for many years, meaning they had large cohorts of graduate and current trainees who could swiftly apply their knowledge, experience and skillset to respond to the COVID-19 outbreak;
- deploying community health volunteers and other frontline staff who were already trained and experienced from previous major epidemics (e.g. Ebola virus disease and other severe acute respiratory syndrome outbreaks) to support and boost the COVID-19 response, especially in forming rapid response teams at the community level for surveillance and contact-tracing activities; and
- using pre-established clinical committees to rapidly facilitate the development of SOPs and guidelines for COVID-19.

However, it is important to note that even countries with less experience in epidemics were able to observe and learn from the experience of peer countries and apply good practices to their own context.

2. Countries with existing surveillance systems for respiratory illnesses were able to repurpose these for COVID-19

At the beginning of the outbreak, many countries experienced suboptimal COVID-19 surveillance at the various health care system levels. Existing surveillance systems were not fully leveraged, and COVID-19 mortality surveillance and community surveillance lagged behind. Among the IAR reports analysed, some countries reported that they had applied ad hoc surveillance systems. In contrast, others were caught off guard by the COVID-19 outbreak and found it hard to coordinate and integrate all the different sources of surveillance data. However, over time, countries were able to build upon existing surveillance systems for COVID-19, by:

- repurposing their existing surveillance systems for detecting COVID-19, such as the Integrated Disease Surveillance and Response;
- leveraging existing syndromic surveillance from the WHO Global Influenza Programme to expand influenza-like illness (ILI) and severe acute respiratory infections (SARI) sentinel surveillance to detect COVID-19; and
- utilizing public–private collaboration to support the expansion of ILI/SARI sentinel surveillance sites to detect COVID-19.

However, some countries still reported varying levels of challenge in integrating the detection of COVID-19 into the ILI/SARI sentinel surveillance system at all sites.

3. The expansion of access to timely testing with rapid turnaround times was necessary to support case detection and contact-tracing operations, preventing onwards disease transmission in the community

Once COVID-19 cases are detected in a country, it was critical for countries to rapidly detect, isolate and trace all contacts of confirmed cases to prevent cases from becoming clusters and clusters from turning into outbreaks. This highlights the importance of countries providing easily accessible diagnostic testing with rapid turnaround times. To achieve this, many innovative solutions were developed to make testing free and accessible to all. Some highlights observed included:

- establishing and expanding the number of influenza clinics and mobile influenza clinics to boost community surveillance;
- enhancing access to testing, and protecting the existing health care systems from becoming overwhelmed with demand for testing and preventing them from becoming COVID-19 hotspots; and
- developing periodic reviews of surveillance guidelines and protocols to ensure a standardized approach to surveillance to promote increased compliance with testing among the community, especially for travellers at points of entry (PoE).

4. Innovative IT solutions and digital tools reshaped surveillance systems and increased the efficiency of contact tracing

As COVID-19 cases rapidly increased exponentially and spiralled into a pandemic, it was critical to improve the efficiency of the case detection and contact-tracing systems to prevent the rapid onwards disease transmission. As reported in the IARs, community members and different sectors came together and revamped and digitized the landscape of surveillance and contact tracing not only for the COVID-19 pandemic but also for future epidemics and pandemics. IT solutions and digital tools reported in the IARs included:

- using electronic bracelets and mobile applications that utilized geographic information system (GIS) and other technologies to monitor confirmed cases and facilitate contact tracing;
- expanding and increasingly utilizing existing tools that many countries were already familiar with, such as the District Health Information Software 2 (DHIS2), to incorporate COVID-19 surveillance; and
- conducting seroprevalence surveys in combination with GIS to ensure accurate mapping of the COVID-19 situation and to help understand the

true prevalence of COVID-19 infection to account for underreporting, especially given the possibility of asymptomatic cases.

5. Surge capacity was mobilized through the community to support contact tracing and surveillance efforts to relieve the overwhelmed system

However, even in countries with experience of epidemics and an existing workforce to conduct outbreak investigation and contact tracing, the volume and rate of increase of COVID-19 cases quickly overwhelmed the system. Some countries reported that although rapid response teams were available at the national and subnational levels they were not fully operational, which delayed response efforts. Other countries did not have trained epidemiologists to conduct the field investigation necessary in this pandemic. Countries addressed the need for surge capacity by:

- mobilizing different sectors, including the army, police force and other law enforcement bodies, to bring together different skills, expertise and experience to manage the crisis;
- recruiting, mobilizing and training community members such as public health and medical students and community volunteers, and repurposing existing health care staff;
- activating the surge capacity from field epidemiology training programme graduates and trainees to form rapid response teams and conduct contact tracing; and
- enhancing the efficient use of limited human resources by revising SOPs and increasing the numbers of rapid response teams by reducing their size, with a clear chain of command.

These actions demonstrate the flexible and innovative strategies taken by countries to overcome their limited human resources and scale up their workforce to respond to the COVID-19 outbreaks in their countries.

6. A decentralized response was critical during the widespread outbreak of the magnitude seen

It was evident in many countries that an outbreak of this magnitude and level of spread could not be managed effectively at the national level alone. Countries reported that a centralized surveillance system and data analysis created challenges for evidence-based decision-making and hindered response at the subnational level (lack of data for action at the ground level). To overcome this, many countries reported the importance of decentralizing all aspects of the response by:

- decentralizing diagnostic testing, installing local call centres, and conducting local training for case management, surveillance and infection prevention and control; and

- requesting partners to help engage the community and influential leaders who know their contexts best to ensure primary health care facilities and village health workers were well equipped and trained to manage local cases and clusters.

This kind of local engagement was also important for addressing community concerns and reducing resistance to contact-tracing efforts and public health and social measures. However, for decentralized systems to work, some countries also highlighted the importance of effective coordination and communication to minimize duplication of efforts at different levels, further delaying public health interventions and response. In addition, consistency in subnational data systems is also critical to facilitate effective communication and coordination.

3.3.2 Conclusions for pillar 3 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 3.

- Repurposing existing surveillance infrastructures was critical in the early stages of the COVID-19 response.
- Decentralization of the COVID-19 response was essential as awareness of the local contexts enhanced the efficiency of the response.
- The rapid and massive deployment of diagnostic testing capacity, accessible to all populations, increased the sensitivity of the surveillance system in detecting COVID-19 cases.

With regards to moving forwards, several considerations were identified in the country IARs.

- A baseline capacity at the country level is needed for disease surveillance to ensure it can be rapidly scaled up and repurposed for future epidemics of unknown causes.
- Community-based surveillance should be strengthened and local health authorities empowered to collect, analyse and use local data to inform evidence-based decision-making.
- Consistency in case definitions used at the subnational, national and global levels is essential for comparability of data captured.
- Innovative IT solutions and digital tools should be scaled up for disease surveillance and to facilitate real-time contact tracing.
- Strong integrated surveillance and early warning systems for acute respiratory illness should be maintained to ensure the detection of emerging and re-emerging pathogens beyond severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, the strain of coronavirus that causes COVID-19).

3.4 Pillar 4: points of entry

This pillar reviews the functioning of IHR (2005) core capacities and public health measures implemented at designated PoE, including international airports, ports and ground crossings to prevent the global spread of infectious diseases including COVID-19. In addition, this pillar reviews any established or improvised bilateral or multilateral agreements with neighbouring countries; public health emergency contingency plans; guidelines and SOPs for COVID-19 surveillance; the coordination of rapid information exchange with public health authorities and conveyance operators; workforce training and equipment; infection prevention and control (IPC) measures implemented; and appropriate isolation/quarantine facilities at PoE, including the provision of safe transportation of suspected COVID-19 cases to designated medical facilities.



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See [Box 3.4](#) for a summary of the key themes explored when reviewing this pillar.

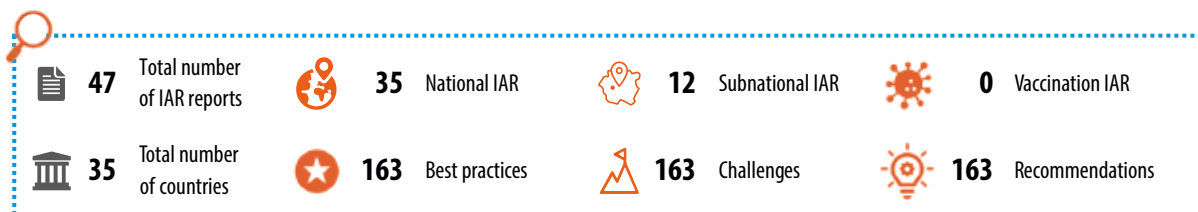
Box 3.4. Summary of key themes

1. The agility of countries ensured the repurposing, developing and revising of COVID-19 guidelines and measures at PoE, using a risk-based, evidence-informed and context-specific approach in line with international guidance and standards.
2. Coordination mechanisms and bilateral or multilateral agreements established cross-border were central to the effective management of imported and exported COVID-19 cases.
3. The development of coordination mechanisms between transport operators, PoE and public health authorities supported the efficient and real-time tracking of imported cases.
4. The provision of accurate and updated information to travellers, and collection of their health and contact information, were key to effective screening, monitoring and contact tracing.
5. A supportive environment for PoE staff was important for the safety of staff and travellers, including the provision of personal protective equipment (PPE), a dedicated health screening area and safe transportation to designated facilities.
6. The implementation of mechanisms to improve access to COVID-19 information and resources for refugee and migrant communities was critical but suboptimal.

PoE: point(s) of entry.

Fig. 3.4 provides the number and types of IARs that reviewed pillar 4, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.4. Number of IARs that reviewed pillar 4, and type and volume of qualitative data extracted



3.4.1 How countries navigated challenges

1. The agility of countries ensured the repurposing, developing and revising of COVID-19 guidelines and measures at PoE, using a risk-based, evidence-informed and context-specific approach in line with international guidance and standards

Countries were in a conundrum during the COVID-19 pandemic. Despite relying heavily on international trade and travel for their economy in the current globalized world, it became critical to establish measures to prevent or reduce the importation, exportation and further transmission of the SARS-CoV-2 virus, including new variants of concerns. Prevention of imported cases was particularly important for countries with limited or no community transmission within their borders, compounded by the scarcity of countermeasures. The 35 countries that reviewed the PoE pillar in their IARs demonstrated flexibility in adapting their guidelines and measures as the situation evolved, by:

- conducting simulation exercises or some form of training to test and enhance the detection, management and transfer of suspected cases at PoE;
- implementing strict sanitary SOPs and continuously reviewing these using a risk-based approach as the pandemic evolved to prevent COVID-19 transmission among crews working on conveyances;
- working together with different sectors, including the Ministry of Labour, to ensure strict protocols were followed to reduce the potential for imported cases, especially in countries with many expatriate or foreign workers;
- developing a special pathway with sanitary measures and precautions to allow international teams to safely and rapidly enter a country experiencing a concurrent public health emergency that required international teams to support the recovery response during the COVID-19 pandemic; and
- re-evaluating and updating contingency plans and SOPs at PoE for continuously detecting, investigating, managing and referring suspected cases as the pandemic developed.

2. Coordination mechanisms and bilateral or multilateral agreements established cross-border were central to the effective management of imported and exported COVID-19 cases

A few months into the pandemic, it became apparent that managing the highly transmissible SARS-CoV-2 cross-borders was no easy task and required close coordination and collaboration between countries. It was important to note

that among the IAR reports reviewed, some countries indicated that they already had existing cross-border agreements with neighbouring countries, enabling joint responses. However, some countries also highlighted how the COVID-19 pandemic became the catalyst to create more joint initiatives and rapid information-sharing mechanisms between countries to fight the pandemic collectively. Examples of such joint initiatives include:

- enforcing laws to limit and manage unauthorized movement across borders during the pandemic;
- conducting joint responses by border agencies of different countries;
- establishing cross-border committees and initiatives to focus on and address the issue;
- holding joint border operations meetings between country representatives; and
- actively coordinating with neighbouring countries through bilateral and multilateral measures, limiting the number of passengers on conveyances and providing alternative routes when possible.

The IAR reports also noted that establishing the Airport Health Accreditation programme in line with international standards initiated by Airport Council International and the International Civil Aviation Organization rapidly helped to improve the standards of sanitary protocols for COVID-19 in airports. Finally, it is important to note that, regardless of the systems implemented at designated PoE, the porous nature of land crossings (especially for countries with a large stretch of land borders) and the social and cultural ties between cross-border communities still posed significant challenges in managing imported and exported cases.

3. The development of coordination mechanisms between transport operators, PoE and public health authorities supported the efficient and real-time tracking of imported cases

The world before COVID-19 had not been previously challenged to implement coordination mechanisms for an infectious disease pandemic of this scale. This meant that PoE in many countries were not fully prepared for a public health emergency, and may not have had all the required infrastructure and technical knowledge needed to conduct public health activities during this pandemic. In addition, in at least five countries there was a lack of a PoE strategy and operational framework for multisectoral coordination during these emergencies. With the necessity to monitor, coordinate and communicate between sectors rapidly during the pandemic, countries put in place new measures at PoE, such as:

- digitizing surveillance data from PoE to ensure rapid communication of the information to all concerned parties, such as the coordinating teams at PoE, ministries of health and designated health care facilities;

- facilitating cross-sectoral communication by creating multisectoral technical groups or operational teams at PoE that consisted of different parties, such as the crisis management team, emergency response team, private airlines and shipping companies, immigration offices and the security forces;
- establishing rapid communication channels and instant messaging groups to allow the rapid exchange of information to facilitate coordination;
- implementing an integrated approach to incorporate passenger screening, risk communication, IPC and water, sanitation and hygiene services (WASH) at designated PoE, unofficial border crossings and refugee camps; and
- establishing a satellite emergency operations centre at major PoE, such as international airports, to better coordinate between different sectors.

4. The provision of accurate and updated information for travellers, and collection of their health and contact information, were key to effective screening, monitoring and contact tracing

Given the large movement of travellers across domestic and international borders, it was imperative for countries to develop accurate tracking systems. This need was to ensure not only that travellers were well informed but also that their health and contact information was being collected for contact-tracing efforts. Some of the approaches taken included:

- developing information on COVID-19 risk and prevention measures and making it easily accessible to travellers, including using digital communication platforms;
- implementing syndromic surveillance at PoE, consisting of developing and using health declaration forms and implementing temperature screening and testing capability to ensure the early detection and management of imported cases at PoE;
- communicating and enforcing mandatory quarantine measures for incoming travellers at home or competent authority-designated facilities;
- using electronic health alert cards for travellers at PoE; and
- tracking travellers' locations using mobile phones to ensure compliance with quarantine measures.

However, there remained ongoing challenges encountered and reported in the IARs, such as the provision of false information on the health declaration forms, delays in informing travellers of confirmed cases on conveyances (especially when no electronic systems were available) and the inadequate use of the data even when electronic systems were implemented.

5. A supportive environment for PoE staff was important for the safety of staff and travellers, including the provision of PPE, a dedicated health screening area and safe transportation to designated facilities

Without an enabling environment, it was impossible for PoE staff to carry out their activities safely or to ensure the safety of travellers, which can turn PoE into hotspots for disease propagation. In the IAR reports, countries mentioned several key elements that were critical to ensuring a supportive environment for PoE staff:

- identifying gaps and needs at PoE: some countries reported conducting preparedness activities, including simulation exercises to test existing systems at PoE;
- providing financial, material and human resources based on needs identified at PoE to ensure sufficient equipment, resources and measures at PoE;
- providing training and follow-up training of PoE staff, critical to ensure that IPC measures were followed (when PPE is used correctly and reporting tools are accurately utilized, testing can be done safely and suspected and confirmed cases can be safely transported to designated facilities); and
- implementing other measures to ensure the safety of PoE staff and alleviate their concerns, such as providing clear and consistent messaging and organizing meetings with trade unions, rearranging shifts to minimize the mixing of staff, repurposing existing staff to address staff shortages, providing sufficient PPE supplies, and ensuring clear SOPs and systems are in place for PoE staff.

Despite all efforts, given the scale of the pandemic and the rapid increase in cases, countries reported inadequate PPE supplies and limited accommodation and transport for staff working at PoE, which can be challenging and demotivating.

6. The implementation of mechanisms to improve access to COVID-19 information and resources for refugee and migrant communities was critical but suboptimal

Irregular and unpredictable cross-border movements, fear of deportation and language barriers can make migrant communities particularly vulnerable during a pandemic. This means governments need to work closely with appropriate agencies and the migrant community to ensure communication materials are translated into local languages and made readily accessible. Based on the IAR reports, at least one country also provided coverage of health care costs for confirmed cases among the migrant community. However, according to the IAR reports, this area was generally noted as suboptimal, with a need for governments to consider these populations as part of a comprehensive COVID-19 response and recovery plan.

3.4.2 Conclusions for pillar 4 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 4.

- The COVID-19 pandemic served as a catalyst to foster cross-border communication and coordination to fight the pandemic collectively.
- Country investments in PoE during the pandemic further developed and revamped capacities, including infrastructure, which can be leveraged to respond to future public health emergencies.
- The COVID-19 pandemic highlighted the need for international and national policies and interventions at PoE to protect the refugee and migrant populations.
- Enforcing public health and social measures at PoE was critical to ensuring that they did not become a hotspot for disease transmission during the pandemic.

With regards to moving forwards, several considerations were identified in the country IARs.

- PoE capacities should be strengthened for future pandemics via the use of international instruments and treaties on pandemic prevention, preparedness, detection and response.
- Multi-disciplinary rapid response teams should be instituted to investigate and contain possible public health threats at PoE and points of contact (PoC).
- Systems introduced at PoE during the COVID-19 pandemic should be developed to further enhance traveller screening, monitoring and contact-tracing capacities.

3.5 Pillar 5: national laboratory systems and diagnostics

This pillar reviews the functioning of the national laboratory system to provide timely confirmation of COVID-19 cases in the country, including the collection and safe transportation of specimens to national and international reference laboratories, as necessary. In addition, this pillar reviews the diagnostic tools – both polymerase chain reaction (PCR) and point-of-care tests – developed and used by a country during the COVID-19 outbreak and how these impacted the response and control efforts. Finally, this pillar reviews the sharing of specimens with laboratory networks for phylogenetic analysis of the SARS-CoV-2 genome, as well as the monitoring, detecting and sharing of sequences and information on variants of concerns with the international community.



See [Box 3.5](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.5. Summary of key themes

1. A central mechanism to coordinate laboratory activities promoted streamlined information exchange, procurement of supplies and harmonization of COVID-19 testing procedures.
2. Collaboration between public, private and academic laboratories was established to increase COVID-19 testing capacity and turnaround time.
3. Rapid resource mobilization and innovative strategies were adopted to manage the high volume of specimens by ensuring the availability of trained human resources, reagents and testing equipment.
4. Swift development of guidelines, SOPs, training packages and external quality assessment (EQA) systems enabled decentralized diagnostic testing to meet the high demand.
5. Clear national guidance and SOPs on the safe collection and transportation of specimens to accredited laboratories were critical to ensuring rapid test turnaround times during the pandemic.
6. Using IT systems to track samples from collection to the delivery of test results enhanced the efficiency of using laboratory results to facilitate epidemiological investigations.
7. Leveraging existing laboratory networks, resources and experiences from influenza preparedness and response benefited the COVID-19 response.

SOPs: standard operating procedures.

Fig. 3.5 provides the number and types of IARs that reviewed pillar 5, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.5. Number of IARs that reviewed pillar 5, and type and volume of qualitative data extracted



3.5.1 How countries navigated challenges

1. A central mechanism to coordinate laboratory activities promoted streamlined information exchange, procurement of supplies and harmonization of COVID-19 testing procedures

Given the rapid expansion of laboratories designated as providing COVID-19 testing, it was immediately evident that a system breakdown would be likely without a central mechanism to coordinate these activities and streamline the information. Countries used various tactics to ensure a central coordination mechanism, including:

- adopting a national testing strategy to harmonize testing procedures, and regularly updating these to align with domestic and global best practices;
- establishing a centralized coordination system to manage the growing laboratory network within countries;
- creating a communication channel or platform for regular information exchange and experience sharing between laboratories;
- instituting a centralized and dedicated procurement system for laboratory equipment, supplies and reagents to ensure the continuity of COVID-19 testing during a surge in cases; and
- mandating a central reporting requirement for COVID-19 surveillance and bio-banking from both public and private laboratories to streamline data for real-time situation updates.

2. Collaboration between public, private and academic laboratories was established to increase COVID-19 testing capacity and turnaround time

Public health laboratories were severely strained during this pandemic. It was therefore necessary to ensure additional laboratories that may not usually be diagnostic in nature, including academic and non-health laboratories, were also leveraged to support the response. This rapid expansion of laboratories designated for COVID-19 testing required effective coordination and close collaboration. To ensure this was achieved, countries took the following approaches:

- engaging and supporting the set-up of private laboratories to build a strong network of public and private laboratories for COVID-19 testing to cope with the high demand;
- expediting the process for the accreditation and licensing of private laboratories for COVID-19 testing, including decentralizing the accreditation process through network laboratories instead of relying on only the national reference laboratory;
- utilizing the WHO COVID-19 laboratory assessment checklist to perform baseline laboratory assessments to engage additional laboratories for COVID-19 testing; and
- developing domestic real-time PCR assays and sequencing protocol with the support of academic laboratories to expedite COVID-19 testing capacity.

3. Rapid resource mobilization and innovative strategies were adopted to manage the high volume of specimens by ensuring the availability of trained human resources, reagents and testing equipment

The pandemic pushed many countries beyond their comfort zone, requiring that they rapidly strategize ways to mobilize resources and develop innovative approaches to manage the volume of COVID-19 testing required. Countries took different strategies to overcome this immense challenge, including:

- expanding testing capacities through sample automation and the use of molecular diagnostic platforms;
- decentralizing COVID-19 testing to laboratories and test facilities across the country to improve access and reduce the pressure on the public health laboratory system;
- deploying mobile testing to further expand access to testing for rural communities and screening travellers at border crossings;
- boosting testing capacity by providing continuous virtual and on-the-job training for laboratory staff and volunteers;

- consolidating a register or roster of laboratory technicians who can perform real-time PCR testing in the occurrence of a surge in cases; and
- repurposing existing laboratory equipment, supplies, reagents and human resources from other ministries and academia to support COVID-19 testing.

However, given the high global demand during this pandemic, a common challenge faced by countries was the shortage of laboratory supplies used for molecular diagnostic platforms.

4. Swift development of guidelines, SOPs, training packages and EQA systems enabled decentralized diagnostic testing to meet the high demands

The exponential rise in the number of suspected cases in many countries meant that diagnostic testing needed to be ramped up at a pace never seen before. It was often impossible to test the high volume of specimens from multiple hotspots at the national level alone. Diagnostic testing needed to be decentralized to ensure a rapid test turnaround time to prevent clusters from becoming outbreaks. Countries took different measures to achieve this, including:

- leveraging existing plans, guidance and SOPs for other infectious diseases to rapidly develop national guidelines for COVID-19 testing, SOPs and testing algorithms, and disseminating them to COVID-19 testing facilities and laboratories;
- establishing an EQA system and accreditation system to standardize processes in existing and new laboratories designated for COVID-19 testing;
- utilizing strategic partnerships with non-health sectors to decentralize and expand COVID-19 testing to cope with the number of specimens, especially during a surge in cases;
- developing the technical competency of laboratory technicians through different means such as virtual and onsite training, and online webinars on the latest testing technology and updates to national protocols; and
- establishing a call centre or hotline for consultation with laboratory experts for continued training and support for laboratory technicians conducting COVID-19 testing.

5. Clear national guidance and SOPs on the safe collection and transportation of specimens to accredited laboratories were critical to ensuring rapid test turnaround times during the pandemic

Before the pandemic, not all countries had the guidance, SOPs and trained personnel to deal with highly infectious pathogens. Given that SARS-CoV-2 was also a new pathogen, additional safety precautions, new testing algorithms and staff training

were necessary to ensure accurate and timely results, while maintaining biosafety and biosecurity measures. In the IAR reports, measures taken included:

- leveraging materials developed for influenza to rapidly develop clear national guidance and SOPs for specimen collection and transportation, shipping samples both domestically and internationally to reference laboratories in line with International Air Transport Association regulations and standards;
- engaging partner support for technical, material and human resources to build, enhance and streamline laboratory testing capacity and transportation processes; and
- developing a specimen prioritization system such as colour-coding to ensure rapid turnaround time for critical cases.

6. Using IT systems to track samples from collection to the delivery of test results enhanced the efficiency of using laboratory results to facilitate epidemiological investigations

With the huge surge in the need for COVID-19 diagnostic testing during various pandemic phases, countries needed to develop a more efficient way of managing the volume of specimens to link to and support timely epidemiological investigations. Countries utilized IT systems to allow procedures such as timely data sharing and rapid communication of test results by:

- developing an electronic laboratory database or interface to manage laboratory data, including patient details at the point of collection, enabling the dissemination of test results between laboratories and patients; and
- implementing a direct communication system to rapidly disseminate test results to patients and health care workers via text (short message service) and email.

Despite the innovative IT systems developed, countries highlighted challenges with these systems as they were not always used consistently, especially by new staff and during a surge in cases.

7. Leveraging existing laboratory networks, resources and experiences from influenza preparedness and response benefited COVID-19 response

The PIP framework had been investing heavily in the capacity of countries to prepare, detect and respond to respiratory pathogens for nearly a decade when the COVID-19 pandemic was first declared. Countries reported that many of the existing elements of PIP were able to be leveraged during the COVID-19 response, by:

- adapting influenza surveillance and testing platforms for COVID-19 testing, including repurposing existing ILI/SARI surveillance to detect SARS-CoV-2;

- leveraging existing genomic sequencing capacity for influenza to monitor genetic drift in SARS-CoV-2;
- establishing COVID-19 testing capacities rapidly by building on existing trained laboratory staff, testing protocols and equipment for influenza surveillance;
- implementing quality management systems and instituting a national EQA scheme already in place for influenza surveillance to expedite the process for COVID-19 testing; and
- building upon the virus sharing platform and agreements from influenza surveillance for COVID-19.

Countries also noted that actions taken following the recommendations from other international instruments such as the Joint External Evaluation had strengthened the national laboratory system, which better prepared countries to respond to the COVID-19 pandemic.

3.5.2 Conclusions for pillar 5 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 5.

- COVID-19 highlighted the importance of real-time information sharing through IT systems among laboratories at the national and subnational levels in facilitating response coordination from evidence-based decision-making to timely implementation of isolation measures during the COVID-19 response.
- Coordination and collaboration between public and private laboratories to rapidly scale up testing capacity at the country level during the pandemic constituted a strong foundation for the COVID-19 surveillance system.
- Building and expanding genomic sequencing capacities in countries are critical for detecting, monitoring and responding to the emergence of new variants in this pandemic and beyond.
- Developing robust quality assessment and accreditation systems at the country level permitted the decentralization of testing capacities.

With regards to moving forwards, several considerations were identified in the country IARs.

- The availability and use of diagnostic kits, including rapid antigen tests and the deployment of mobile laboratories at the community level, should be promoted (especially in remote areas) to strengthen community-based surveillance for infectious diseases.
- The national public–private laboratory network should be strengthened, including rapid information exchange to maintain an early warning system for disease outbreaks.

- Sustainable laboratory procurement and supply systems must be built to avoid disruption to laboratory functionalities, particularly during disease outbreaks.
- National human resource capacity for laboratory testing should be maintained through regular training and simulation exercises to test preparedness and response plans, as well as the ability to rapidly scale up resources in the event of an infectious disease outbreak.

3.6 Pillar 6: infection prevention and control

This pillar reviews IPC measures implemented in diverse settings with suspected or confirmed COVID-19 cases, particularly if community spread is already present, including but not limited to health care facilities, workplaces, public transportation, entertainment facilities, airlines, cruise vessels and other locations where people may gather in close proximity (e.g. long-term care facilities, camps and camp-like settings, informal settlements, low-income housing, dormitories for students and migrant workers, and prisons). In addition, this pillar reviews whether there is adequate water and sanitation infrastructure for health care facilities in community settings.



See [Box 3.6](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.6. Summary of key themes

1. Adaptation of legal frameworks in consultation with IPC committees was the first step in developing a comprehensive IPC strategy that could be enforced during the pandemic.
2. Formalizing the IPC accreditation processes and creating accountability systems helped ensure minimum IPC standards were followed in health care facilities.
3. Monitoring, risk assessment and evaluations ensured a targeted and tailored approach to providing support to health care facilities and improving compliance with IPC standards.
4. Procuring IPC supplies from various sources, including the national stockpile and donors, and repurposing local manufacturing capacity, countered the global IPC supply shortage.
5. Provision of WASH services in health care facilities and public spaces with clear communication messaging promoted individual awareness and adherence to IPC measures.
6. Innovative strategies such as telemedicine, reduction of non-essential medical visits and delivery of medicine to patients reduced the likelihood of COVID-19 transmission during the pandemic.

IPC: infection prevention and control; WASH: water, sanitation and hygiene.

Fig. 3.6 provides the number and types of IARs that reviewed pillar 6, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.6. Number of IARs that reviewed pillar 6, and type and volume of qualitative data extracted



3.6.1 How countries navigated challenges

1. Adaptation of legal frameworks in consultation with IPC committees was the first step in developing a comprehensive IPC strategy that could be enforced during the pandemic

Ensuring that an IPC infrastructure and measures were implemented successfully in health care facilities at all levels required a coordinated and comprehensive approach, consisting of engaging IPC committees to review and adapt existing legal frameworks and customize the national IPC strategic plan to the pandemic context. Countries were at different levels of preparedness with regards to their IPC plan: some reported that a national IPC plan was already available, while others noted that their plan was adapted to the COVID-19 context based on the epidemiological situation or emerging scientific evidence. Some countries already had an existing national commission or institution to prevent and control nosocomial infections, while others had less formalized systems. Some of the actions taken by countries included:

- establishing IPC committees at health care facilities at all levels, from national to subnational and local levels, ensuring the standardization of IPC measures in health facilities;
- holding regular meetings and sharing information between IPC committees at different levels, allowing rapid feedback, gap identification and timely decision-making to guide the IPC strategy during the pandemic; and
- issuing pandemic-specific legal frameworks and decrees, such as: guidance to minimize community transmission through funeral practices; management of medical waste in health care facilities; and use of GIS to ensure compliance of quarantined individuals using their mobile devices.

2. Formalizing the IPC accreditation processes and creating accountability systems helped ensure minimum IPC standards were followed in health care facilities

During the pandemic, it was more critical than ever to ensure minimum IPC standards were followed in health care facilities to prevent onwards disease transmission. An IPC accreditation process was necessary to achieve this. Among the accreditation criteria required by different countries in the IAR reports reviewed, one country required, at a minimum, to establish an IPC team in the health facilities. Others also needed clear guidance and SOPs for safe medical waste management. One country also reported an innovative approach by having a peer-accountability system to promote IPC compliance. Based on the IAR reports, at least one country also involved IPC experts and employed

assessment systems such as the *Rapid hospital readiness checklist for COVID-19* (9) and *Risk assessment and management of health-care workers in the context of COVID-19* (10) to identify health care facilities that had the capacity to treat and manage COVID-19 patients while following strict IPC procedures.

3. Monitoring, risk assessment and evaluation ensured a targeted and tailored approach to providing support to health care facilities and improving compliance with IPC standards

As the pandemic evolved, it was apparent that different health care facilities had varying capacities and risk levels. It was therefore critical to ensure that regular monitoring, risk assessment and evaluations were conducted so that countries could develop a tailored approach appropriate to identified needs in public and private health care facilities to promote adherence to IPC standards. Countries achieved this by:

- integrating rapid assessment and supportive supervision to monitor the implementation and compliance of IPC measures at health care and quarantine facilities into the national COVID-19 response, allowing gaps to be immediately addressed;
- deploying various tools to conduct assessments and evaluations to identify resource needs and knowledge gaps, including domestically developed tools as well as international instruments (e.g. *Continuity of essential health services: facility assessment tool* (11); IPC scorecards; and knowledge, attitude and practices surveys), to ensure provision of support was targeted, whether it was additional training needs or resource allocation; and
- utilizing existing infection surveillance associated with health care to monitor the progress of IPC programmes and measures at health care facilities.

Based on the findings of this monitoring, risk assessment and evaluation, various means of support, including different training modalities, were provided to increase the overall awareness and adoption of COVID-19 preventive measures, including:

- face-to-face and virtual training, refresher training, training of trainers and webinars at all levels, in line with national WASH and IPC guidelines and SOPs, supported by various partners in health care facilities, PoE and other critical PoC;
- ensuring all staff are trained in COVID-19 preventive measures before starting their roles; and
- beyond training, providing counselling services to frontline staff in some countries to reduce their psychological stress.

4. Procuring IPC supplies from various sources, including the national stockpile and donors, and repurposing local manufacturing capacity, countered the global IPC supply shortage

IPC supplies were scarce at the beginning of the pandemic, given that most countries had not anticipated a pandemic of this scale spreading at such a rapid pace. This meant countries identified various sources to quickly strengthen their IPC supplies to protect their communities from COVID-19. Some approaches taken by countries mentioned in the IAR reports included:

- establishing new and strengthening existing local manufacturers for hand sanitizers, PPE and other supplies to fill the global supply shortage;
- regular monitoring of hotspots and rapid redistribution of IPC supplies from national and subnational stockpiles to health care facilities with COVID-19 cases;
- establishing a centralized IPC supply request mechanism to coordinate the appropriate distribution of IPC supplies to health care facilities most in need, based on findings from rapid assessments and regular supportive supervision;
- rapidly repurposing existing isolation facilities and PPE for high-risk pathogens (where available) for COVID-19 cases; and
- revising existing legislation to allow for decentralized procurement of IPC supplies to circumvent the lengthy procurement procedures and administrative processes.

5. Provision of WASH services in health care facilities and public spaces with clear communication messaging promoted individual awareness and adherence to IPC measures

There was never a more critical time than during the pandemic to ensure that health care staff and communities were aware of the risks and preventative measures that could be taken, and to provide them with the tools they needed to protect themselves against COVID-19. This required an enabling environment in which countries took various approaches, including:

- establishing WASH facilities, including safe water, hand-washing stations, hand sanitizers and toilets in public spaces where people congregate, such as places of worship, schools, workplaces and airports (among others);
- employing and prioritizing environmental cleaning and disinfection practices at health care facilities and public spaces;

- communicating regularly and clearly to health care workers and community members on hand hygiene, proper use of PPE, disinfection of common spaces and waste disposal to minimize cross-contamination; and
- separating high-risk waste from regular waste at health care and quarantine facilities.

Based on the IAR reports, multi-departmental collaborations involving the occupational safety and health departments were created to ensure IPC measures were adopted in workplace settings and to monitor compliance. Finally, it is important to note that in rural villages and communities (i.e. low-resource settings), many countries also instigated the installation of additional hand-washing stations and toilets with the support of donors and partners.

6. Innovative strategies such as telemedicine, reduction of non-essential medical visits and delivery of medicine to patients reduced the likelihood of COVID-19 transmission during the pandemic

One major challenge experienced almost unanimously by all countries was how to minimize nosocomial infections, especially with the surge in COVID-19 patients at health care facilities. These interventions also needed to be balanced with ensuring uninterrupted essential health care services to the community, especially during lockdowns and travel measures implemented by different countries. Countries tackled this challenge in different ways, including:

- supplying medical prescriptions to patients directly at home to minimize exposure from visiting health care facilities and pharmacies;
- expanding telemedicine by establishing hotlines to provide online consultations to prevent in-person contact where possible, mobilizing physicians from medical universities for surge capacity;
- consolidating all COVID-19 cases, regardless of severity, into designated COVID-19 hospitals to minimize the risk of disease transmission in the community and among non-COVID-19 patients;
- developing electronic health declaration forms at health care facilities to reduce cross-contamination through pens and paper as potential fomites; and
- instituting effective hospital triage and case management mechanisms to minimize the mixing of COVID-19 and non-COVID-19 patients.

3.6.2 Conclusions for pillar 6 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 6.

- Ensuring and enforcing minimum IPC measures, standards and compliance played a large role in the response strategy to limit SARS-CoV-2 virus transmission in health care facilities and communities.
- Countries used evidence from risk-based monitoring and assessments to adapt their IPC strategies and plans as the COVID-19 outbreak evolved.
- Repurposing and creating new local infrastructures and capacities was important to address the shortage of IPC supplies, especially during the early phase of the pandemic.
- Maintaining WASH/IPC interventions was challenging in low-resource and vulnerable community settings such as refugee camps.

With regards to moving forwards, several considerations were identified in the country IARs.

- Regular risk-based monitoring and assessment approaches to prepare health care facilities using existing tools (e.g. *Continuity of essential health services: facility assessment tool (11)*) should be promoted.
- IPC/WASH systems should be strengthened at health care and community facilities to better manage infectious diseases, especially in low-resource settings.
- Technological solutions, including telemedicine, should be leveraged to limit nosocomial disease transmission during outbreaks by minimizing non-essential visits to health care facilities, protecting vulnerable populations.

3.7 Pillar 7: case management and knowledge sharing about innovations and the latest research

This pillar reviews actions taken to manage and care for COVID-19 cases, as well as to share clinical information including treatment protocols for COVID-19 cases. In addition, this pillar reviews how clinicians were involved during the COVID-19 outbreak response, including being connected to the latest innovations, participating in national or international clinical trials, and conducting other research to identify effective treatment protocols for COVID-19 patients with different demographics and underlying conditions.



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See [Box 3.7](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.7. Summary of key themes

1. Continual development, adaptation and dissemination of national standards for clinical management guidelines of COVID-19 cases ensured that the latest evidence was incorporated to improve patient outcomes.
2. Rapid mobilization of surge capacity via multiple sources enhanced the health care workforce capacity to respond to the COVID-19 pandemic.
3. Timely and continuous training, including simulation-based clinical training, enhanced the skills of health care workers in providing optimal care for COVID-19 cases.
4. Rapid international knowledge exchange through various platforms facilitated a collaborative approach to optimizing clinical management of COVID-19 cases around the globe.
5. Health care infrastructures were rapidly adapted to cater to the COVID-19 context to minimize nosocomial COVID-19 transmission and optimize positive health outcomes for COVID-19 patients.

[Fig. 3.7](#) provides the number and types of IARs that reviewed pillar 7, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.7. Number of IARs that reviewed pillar 7, and type and volume of qualitative data extracted



3.7.1 How countries navigated challenges

1. Continual development, adaptation and dissemination of national standards for clinical management guidelines of COVID-19 cases ensured that the latest evidence was incorporated to improve patient outcomes

As COVID-19 was a new disease for which minimal clinical data were available, it was critical for national case management guidelines to be rapidly developed to standardize patient care for optimal clinical outcomes across health care facilities. The national guidelines needed to be continually reviewed and updated based on the latest evidence accumulated globally over time. The updated national guidelines then needed to be communicated and disseminated to health care staff at all levels of the health care system. Countries took several approaches to ensure this was maintained throughout the pandemic for optimal patient outcomes, including:

- establishing a national committee or technical working group for COVID-19 clinical management, in consultation with partners and academia, to rapidly develop and adapt the national clinical management guidelines for COVID-19 as a living document in line with international guidelines;
- holding regular COVID-19 clinical management committee or working group meetings for information sharing, feedback, identification of needs and gaps and rapid decision-making to continually adapt the national clinical management guidelines for COVID-19, and ensure timely governmental clearance and publication of the updated guidelines;
- as the number of COVID-19 cases increased, guiding health care staff in managing COVID-19 patients using telemedicine;
- adapting clinical management guidelines based on age and risk factors using the latest scientific evidence to promote positive health outcomes for COVID-19 patients; and
- launching community programmes to monitor and care for COVID-19 patients with co-morbidities and other characteristics that placed them at higher risk.

2. Rapid mobilization of surge capacity via multiple sources enhanced the health care workforce capacity to respond to the COVID-19 pandemic

With the increase in the number of COVID-19 cases that rapidly inundated the health care staff and their capacity to manage the caseload, it was critical to swiftly mobilize surge capacity. Countries took various innovative approaches to mobilize resources, including:

- repurposing and transferring medical staff to health care facilities in hotspots;
- increasing human resource capacity by engaging and training medical residents, students, private health care providers and other volunteers;
- engaging health practitioners of alternative medicines such as Ayurveda, yoga and naturopathy, Unani, Siddha and homoeopathy to manage mild cases;
- introducing community management systems for mild cases to reduce caseload in health care facilities; and
- receiving support from partner organizations such as WHO and the United States Centers for Disease Control and Prevention (CDC) to recruit temporary staff to manage the increased caseload.

3. Timely and continuous training, including simulation-based clinical training, enhanced the skills of health care workers in providing optimal care for COVID-19 cases

As the data for the clinical manifestation and the prognosis in response to supportive care or experimental treatments for COVID-19 cases continued to evolve, health care staff managing COVID-19 cases needed to continually update their knowledge and improve their clinical skills. Countries adopted different learning and training modalities for this cause, including:

- establishing a case management team to provide timely and continuous virtual and onsite training to frontline health care workers at public and private health care facilities;
- providing online training modules, SOPs and a roster of experts who health care workers could continue to learn and consult with;
- utilizing online telementoring sessions to discuss the management of unusual cases and receive expert guidance; and
- conducting simulation-based clinical training and follow-up training at COVID-19-designated health care facilities and intensive care units using the national COVID-19 clinical management guidelines.

In the IAR reports, countries emphasized that training health care workers early in the pandemic was a critical element in the COVID-19 response. However, it was also noted that implementing the national COVID-19 clinical management guideline was much more challenging in primary and secondary than in tertiary health care facilities, and required additional onsite or virtual mentoring.

4. Rapid international knowledge exchange through various platforms facilitated a collaborative approach to optimizing the clinical management of COVID-19 cases around the globe

During the pandemic, clinical experiences around the globe needed to be consolidated and leveraged to optimize care for COVID-19 cases, especially given there were so many unknowns about this new disease. This was facilitated by the rapid development of COVID-19 clinical management free online courses by WHO (12–15) and others in the first months of the pandemic, which countries reported allowed them to quickly train a large cohort of health care workers across all levels of the health care system. Based on the IAR reports, countries also engaged in continuous experience exchange with other country experts on topics ranging from the use of PPE to patient treatment, either through an online clinical working group or via physical visits from experts.

5. Health care infrastructures were rapidly adapted to cater for the COVID-19 context to minimize nosocomial COVID-19 transmission and optimize positive health outcomes for COVID-19 patients

During the pandemic, countries needed to expand and adapt their health care infrastructure at an unprecedented pace to cater for the COVID-19 caseload. This was important to optimize health outcomes for COVID-19 cases and prevent the potential collapse of the health care system. Countries both built and adapted existing infrastructures to ensure efficient triage, safe transfer and clinical management of patients. The different approaches taken by countries include:

- building new and adapting existing health care facilities to create COVID-19-designated hospitals, emergency treatment centres and isolation facilities at national and subnational levels to increase the number of hospital beds;
- separating COVID-19 patients from non-COVID-19 patients during triage and case management in different wards or facilities to minimize nosocomial transmission;
- ensuring the safe transfer of suspected and confirmed cases to designated health care facilities via dedicated COVID-19 ambulances and transportation;
- providing mobile medical care through mobile medical vans equipped with health care staff, laboratory and medical facilities, and medications; and

- establishing a central logistic and procurement system to manage and coordinate medical supplies and equipment to better allocate limited resources such as oxygen concentrators for patients in the most critical condition throughout the country.

3.7.2 Conclusions for pillar 7 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 7.

- Developing and maintaining national guidelines as a living document helped countries to adapt and update case management strategies as the COVID-19 pandemic evolved.
- The rapid knowledge and resource transfer and exchange among countries helped to optimize and standardize consistent case management practices.

With regards to moving forwards, several considerations were identified in the country IARs.

- It is necessary to increase the capacity of low-resource countries to procure and maintain critical medical supplies such as oxygen in preparation for acute respiratory disease outbreaks.
- A regularly updated multidisciplinary roster of experts should be maintained at the national level to manage emerging or re-emerging acute respiratory disease outbreaks.
- The triage system at health care facilities, especially in local communities, should be strengthened to improve case management workflow.

3.8 Pillar 8: operational support and logistics in the management of supply chains and workforce resilience

This pillar reviews the availability, distribution and dissemination of national and subnational stockpiles for a timely and effective response, as well as the procedures for national and international procurement, including customs arrangements and service contracting. This pillar also reviews the capacity for timely increases in human, material and financial resources, the safe deployment of human resources, and the efficiency for scaling up and redirecting the necessary workforce to the most needed regions in the country. Finally, this pillar also considers the monitoring of the physical and psychological health and well-being of the workforce involved in the COVID-19 response and the provision of appropriate support to them.



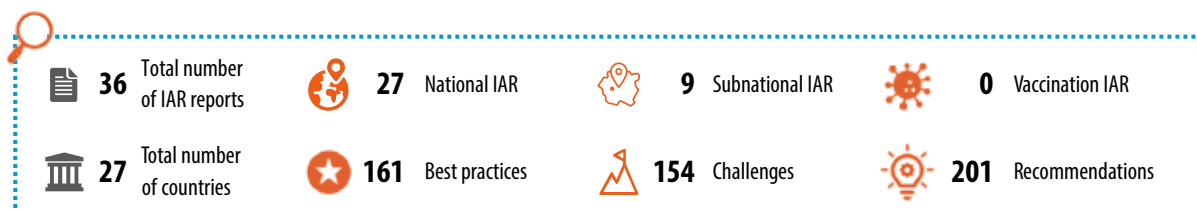
See [Box 3.8](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.8. Summary of key themes

1. Early activation of emergency funds, repurposing existing budget lines and launching a dedicated COVID-19 fund allowed the rapid mobilization of resources and supplies for the COVID-19 response.
2. Establishment of logistics, finance and planning committees, as well as multisectoral coordination mechanisms, reduced bureaucracy and enabled rapid logistic operations for the COVID-19 response.
3. Centralized procurement systems and warehouses helped monitor needs and the procurement and allocation of resources for the COVID-19 response.
4. Innovative electronic tools and platforms allowed real-time monitoring and timely reallocation of essential COVID-19 response supplies during the pandemic.
5. Collaboration with the private sector and partners ensured multi-sourced financial, material and logistics support to manage the supply chain and distribute priority COVID-19 response items.
6. Identification and training of critical staff enhanced readiness for COVID-19 response deployment in case surge capacity was needed.

[Fig. 3.8](#) provides the number and types of IARs that reviewed pillar 8, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.8. Number of IARs that reviewed pillar 8, and type and volume of qualitative data extracted



3.8.1 How countries navigated challenges

1. Early activation of emergency funds, repurposing existing budget lines and launching a dedicated COVID-19 fund allowed the rapid mobilization of resources and supplies for the COVID-19 response

As the world became engulfed by the COVID-19 pandemic, one of the most critical elements in the response was the rapid mobilization of funds for this crisis. Governments around the world took different approaches, including:

- conducting needs assessments and creating a COVID-19 response logistic master list to identify priorities and gaps for human, material and financial resources;
- activating the national or subnational emergency reserve fund, or creating a dedicated fund to respond to COVID-19;
- securing funds to supplement funding gaps from international partners, donors and projects such as The Global Fund; and
- reallocating funds from other projects or budget lines for the COVID-19 response.

However, it was also noted in the IAR reports that in countries with emergency funds there was sometimes ambiguity regarding whether these funds could be used for COVID-19, which created confusion and delay in timely procurement and resource mobilization for the response.

2. Establishment of logistics, finance and planning committees, as well as multisectoral coordination mechanisms, reduced bureaucracy and enabled rapid logistic operations for the COVID-19 response

Multisectoral coordination between ministries, donors and partners for COVID-19 operations and logistics was critical to efficiently managing this rapidly evolving public health emergency. Prolonged customs clearances and other processes can further delay the delivery of critical equipment and

supplies. Some countries reported that good coordination could minimize or eliminate the lengthy bureaucratic administrative processes to ensure faster importation of COVID-19 response items and licencing of local manufacturers. Countries established various committees and working groups, and engaged senior leadership for logistic coordination, by:

- designating a member of the senior leadership, such as the health secretary, as the head of logistics for medical supplies to improve coordination, collaboration and rapid decision-making for timely procurement and distribution of PPE, diagnostic testing kits and medical supplies;
- establishing a procurement committee to monitor budget allocation and spending for COVID-19 response items in close collaboration with other teams, such as the market research team;
- developing and rapidly approving new policies or regulations, or relaxing existing regulations, to expedite the licensing, local production and/or importation of critical COVID-19 response items, such as through exemption of customs duties and taxes for these essential items;
- forming a multisectoral logistics, finance and planning coordination committee and a rapid communication channel to coordinate logistics and operations between different sectors, to ensure critical resources could be swiftly redirected to COVID-19 hotspots; and
- monitoring and regular reporting of stock levels of critical medical supplies such as PPEs and disinfectants from health care facilities to the central or regional coordination level, to allow rapid decision-making to replenish and redirect supplies in a timely manner.

3. Centralized procurement systems and warehouses helped monitor needs and the procurement and allocation of resources for the COVID-19 response

It was important during the pandemic to consolidate efforts and minimize parallel systems for better efficiency. As the pandemic rapidly evolved and few countries had sophisticated forecasting systems to help estimate future procurement needs, it was critical to have centralized systems at the national and subnational levels to facilitate the monitoring and reallocation of stock. Countries noted the use of several strategies in their IAR reports, including:

- establishing a centralized procurement and funds system to facilitate monitoring of needs at the national level, international procurement of priority COVID-19 response supplies and the management of donor funds;
- creating centralized warehouse or storage facilities at the national level to effectively manage and coordinate inventories from different sources and redirect them to COVID-19 hotspots; and

- expanding capacities of existing warehouses, including catering for temperature and humidity control to create centralized storage facilities at the subnational level to speed up the allocation of resources locally when required.

4. Innovative electronic tools and platforms allowed real-time monitoring and timely reallocation of essential COVID-19 response supplies during the pandemic

During the COVID-19 pandemic, many countries leveraged electronic tools and platforms to improve the visibility of current stock levels and those in the pipeline, as well as to streamline the logistic distribution of essential COVID-19 commodities. Countries noted the use of various simple and complex innovative systems in their IAR reports, including:

- developing and sharing a single live inventory management spreadsheet so that focal points from all health care facilities could enter the stock level of their supplies (e.g. PPE and disinfectant) for planning, monitoring and rapid reallocation of supplies as needed;
- building a repository of essential COVID-19 response items, including their technical specification, to facilitate timely procurement;
- implementing a real-time COVID-19 logistics monitoring dashboard or information management system, including the delivery, receipt and real-time monitoring of stock levels, to be used for logistic planning and coordination;
- using innovative tools such as GIS and essential COVID-19 supply forecasting tools to monitor and plan for potential supply needs; and
- creating an electronic platform to monitor logistics activities and facilitate information sharing between different logistics and coordination team members, including discussing distribution plans and support needs.

However, in some IAR reports it was also noted that, despite the data collected, a specialist was required (but often non-existent) to analyse trends and properly interpret these data for decision-making.

5. Collaboration with the private sector and partners ensured multi-sourced financial, material and logistics support to manage the supply chain and distribute priority COVID-19 response items

In many countries, the financial, material and logistical needs required to respond to a pandemic of this scale meant that extensive coordination with the private

sector and partners was critical to securing sufficient COVID-19 response items. These engagement and coordination approaches included:

- establishing agreements and contracts to collaborate with the private sector to provide material and logistics support for the COVID-19 response;
- managing a centralized system of ambulances, drivers, vehicle services and fuel supplies to ensure a well-coordinated transportation system for the COVID-19 response;
- boosting logistic capacity through collaboration with the military and civil society;
- monitoring oxygen supplies in government and private health care facilities to reallocate supplies as the need arises; and
- engaging private hotels to provide accommodation to health care staff treating COVID-19 patients.

One major challenge noted in many of the IAR reports was pandemic fatigue among all stakeholders, from the private sector, partners, volunteers and governmental sectors to civil society, exacerbated by the successive waves and the duration of the pandemic.

6. Identification and training of critical staff enhanced readiness for COVID-19 response deployment in case surge capacity was needed

The scale of response needed for the COVID-19 pandemic outstripped the workforce available in many countries. Countries highlighted that the insufficient number of trained health care workers and other frontline responders was one of the major challenges during the operational response to COVID-19. Countries addressed this by preparing the workforce ahead of time in various ways, including:

- identifying and training health care staff in regions not yet affected by COVID-19 by reallocating them to COVID-19 response efforts and preparing them to manage the potential spread to their regions;
- being prepared to scale up the health care workforce by training medical students and civil society volunteers for rapid deployment when required;
- recruiting additional health care staff on temporary contracts to enhance the human resource capacity for COVID-19 response;
- involving experts from the private sector and academia in the COVID-19 response; and
- engaging trainees and graduates from field epidemiology training programmes to support the COVID-19 response.

3.8.2 Conclusions for pillar 8 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 8.

- Countries scaled up existing national logistics and supply chain systems, especially for critical medical supplies, to address the needs of the COVID-19 response.
- The shortage of medical supplies and PPE was addressed by promoting local manufacturing and production.
- Innovative IT solutions were used, including the COVID-19 Partners Platform (8) supply portal for processing and receiving globally sourced critical supplies through the UN COVID-19 supply chain system.
- Countries used digital platforms for real-time monitoring of stocks and supplies of COVID-19-related commodities.

With regards to moving forwards, several considerations were identified in the country IARs.

- Sustainable supply chain systems should be built and maintained at the national level to ensure the direct delivery of supplies, equipment and services, especially for people in difficult-to-reach areas.
- National manufacturing and storage capabilities for critical medical supplies should be strengthened in preparation for future public health emergencies.
- Capacities strengthened during the response to improve operational support and logistics, including management of stocks for long-term preparedness and response functions, should be enhanced.
- The workforce built during the pandemic, including resource mapping of surge capacity in preparation for future health emergencies, should be maintained.

3.9 Pillar 9: maintaining essential health services during the COVID-19 outbreak

This pillar reviews the availability and access to essential health services, such as the management and treatment of chronic illnesses, antenatal and midwifery services, and routine vaccination. This pillar also reviews contingency measures implemented to maintain and strengthen these essential health services and to monitor the effectiveness of these temporary measures, as well as the potential impact of the COVID-19 outbreak on other non-COVID-19 conditions.



See [Box 3.9](#) for a summary of the key themes explored when reviewing this pillar.

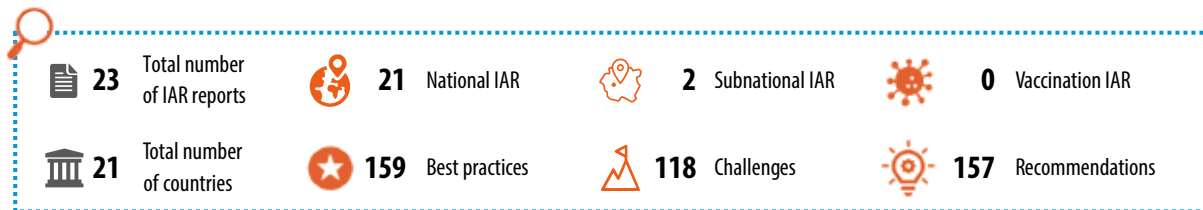
Box 3.9. Summary of key themes

1. Development of guidance, SOPs and monitoring mechanisms facilitated the prioritization of essential and non-essential health services and the key indicators for service restoration.
2. Separation of COVID-19 and non-COVID-19 patients enabled the continuation of non-COVID-19 services while minimizing potential exposure for staff and patients.
3. Maintenance of uninterrupted essential health services was enhanced through public communications, telemedicine and other novel approaches to ensure treatment continuation and compliance.
4. Leveraging public-private partnerships facilitated the provision of essential health services during the pandemic.
5. Recruitment of temporary staff and volunteers, and the provision of psychosocial support, helped to manage staff workload and reduce stress levels and burnout.

SOPs: standard operating procedures.

Fig. 3.9 provides the number and types of IARs that reviewed pillar 9, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.9. Number of IARs that reviewed pillar 9, and type and volume of qualitative data extracted



3.9.1 How countries navigated challenges

1. Development of guidance, SOPs and monitoring mechanisms facilitated the prioritization of essential and non-essential health services and the key indicators for health service restoration

During the COVID-19 pandemic, governments needed to balance the surging COVID-19 cases presenting in health care facilities while maintaining essential health services such as immunization and treatment for populations with chronic health conditions. Part of this meant it was critical to develop a plan to prioritize essential and non-essential health services and define the key monitoring indicators to restore these services. Countries took various approaches to achieve this, including:

- in countries with existing national policies, standards and guidelines for essential health services before the pandemic, making it easier to take prompt action to prioritize and monitor the use of essential health services;
- highlighting in the national guidelines the key role of primary health care in COVID-19 management at the community level and the importance of community mobilization to support COVID-19 prevention and control efforts; and
- disseminating health cluster guidelines for disaster and humanitarian conditions, including rapid health assessments to help prioritize and provide essential health services in these specific settings.

2. Separation of COVID-19 and non-COVID-19 patients enabled the continuation of non-COVID-19 health services while minimizing potential exposure for staff and patients

With the high number of COVID-19 cases presenting in and cared for in health care facilities, it was critical to identify strategies to minimize potential exposure of staff and non-COVID-19 patients to ensure the continuity of non-COVID-19 essential health services. Countries took different approaches, including:

- instituting systems for scheduling clinics and rescheduling medical appointments to minimize the likelihood of cross-contamination between COVID-19 and non-COVID-19 patients at health care facilities;
- separating COVID-19 and non-COVID-19 patients by creating distinctly marked zones such as red, yellow and green zones or housing them in separate wards in inpatient facilities;
- designating existing hospitals as either COVID-19 or non-COVID-19 treatment facilities; and
- building new facilities or repurposing existing facilities to care for COVID-19 patients to prevent the health care system becoming overwhelmed, and to ensure the continuity of essential health services for non-COVID-19 patients.

3. Maintenance of uninterrupted essential health services was enhanced through public communication, telemedicine and other novel approaches to ensure treatment continuation and compliance

The COVID-19 pandemic was accompanied by an infodemic and information overload. Some countries reported apprehension among the community, including concerns regarding hospital conditions and availability of medical services, supplies and medications. Countries took various approaches to ensure service continuation and treatment compliance for patients during the pandemic, including:

- utilizing and promoting teleconsultation where possible, such as mental health support, youth reproductive health services and antenatal care;
- extending prescriptions for patients with chronic conditions and providing medications and supplies via drones to prevent the health care system becoming overwhelmed, while ensuring maintenance of patient care;
- adopting outreach models where possible, such as establishing temporary sites for immunization programmes and providing HIV medication;
- training and providing support for health care staff to provide teleconsultations via virtual platforms and establishing professional

network communication channels for the rapid exchange of information and guidance to health care staff; and

- reviewing and disseminating key messages to communities to raise awareness of the availability of health services, and encouraging utilization and safety precautions as required.

However, despite the advance and utilization of telemedicine during the pandemic, one critical challenge highlighted by countries in their IAR reports was the lack of digital health infrastructure to fully support the uptake of this approach.

4. Leveraging public–private partnerships facilitated the provision of essential health services during the pandemic

There were concerns regarding the maintenance of essential health services during the pandemic, especially for critically ill patients requiring dialysis and radiotherapy, HIV and tuberculosis patients requiring uninterrupted treatments, pregnancy care of women and childhood immunization programmes. Emergency medical services also experienced having to provide care to both the surge in COVID-19 cases and acute patients from other emergencies. Countries reported leveraging public–private partnerships to reduce the strain on the health care system by:

- utilizing existing public–private initiatives to continue and further strengthen the dispensing and distribution of essential medications, including those for chronic conditions;
- initiating agreements and memorandums of understanding with private medical schools and hospitals to provide essential care supported by public funds;
- pooling public and private essential health resources within the country to maximize their use and redistribution based on need;
- arranging private transportation systems to safely bring patients who need high-level care to health care facilities; and
- engaging private medical schools and facilities to support health promotion and rehabilitation services for patients.

However, despite the positive steps taken by some countries to leverage public–private partnerships, some countries noted that the lack of regulations and coordination between the public and private sectors created challenges.

5. Recruitment of temporary staff and volunteers, and the provision of psychosocial support, helped to manage staff workload and reduce stress levels and burnout

The workload increased significantly for many frontline health care staff during the pandemic, which caused concern for the psychological and physical well-being of these critical staff when they were most needed. Many health care staff were also exposed and became infected with SARS-CoV-2, which further reduced the human resource capacity and strained the provision of essential health services. Countries addressed these challenges through a variety of approaches, including:

- repurposing staff to fill the surge capacity at the frontline, such as deploying staff trained on ILIs and SARIs and health care staff from military hospitals;
- mobilizing the health care workforce between primary health care facilities based on needs to reduce the impact of staff shortage;
- hiring additional workforce through increased recruitment and the creation of new and temporary positions to sustain the delivery of essential health services;
- training and utilizing medical students and civil society volunteers and staff to ensure that an adequate workforce can be sustained at health care facilities; and
- providing psychosocial support to health care staff, especially for staff working at the frontline and those directly or indirectly affected by COVID-19, through various formats, including virtual consultation sessions.

3.9.2 Conclusions for pillar 9 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 9.

- Teleconsultation was used as an alternative to outpatient consultations to ensure the continuity of essential medical care.
- The creation of parallel facilities to provide COVID-19 services contributed to reducing the burden on the existing medical infrastructure.
- Psychosocial support services provided to medical personnel helped to manage the burnout caused by the COVID-19 pandemic.

With regards to moving forwards, several considerations were identified in the country IARs.

- A roster of medical personnel should be maintained and updated as a reserve workforce to be deployed during health emergencies.

- Guidance and SOPs to ensure the continuity of essential health services during health emergencies should be developed and maintained.
- Adaptive responses implemented during the response to the pandemic should be incorporated within routine health system operations, such as teleconsultation, e-prescriptions, integrated primary care and remapping of referral pathways.

3.10 Pillar 10: COVID-19 vaccination

This pillar reviews the roll-out of COVID-19 vaccine implementation to identify vaccine delivery challenges needing corrective action and best practices for continual improvement and collective learning. Specific areas for in-depth review include regulatory preparedness; planning, coordination, and service delivery; funding; supply chain and waste management; human resource management and training; vaccine acceptance and demand; vaccine safety; and monitoring and evaluation. The areas covered follow the National Deployment and Vaccination Plan (NDVP) for COVID-19 vaccines (16) and align with the COVID-19 vaccine post-introduction evaluation guidance (17) for longer-term evaluation of the vaccine roll-out.



See [Box 3.10](#) for a summary of the key themes explored when reviewing this pillar.

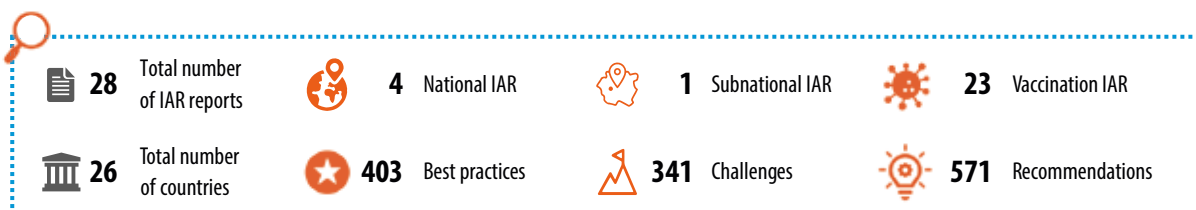
Box 3.10. Summary of key themes

1. Rapid approval of multiple vaccines using existing regulatory processes or WHO’s emergency use authorization facilitated timely vaccine roll-out.
2. Developing the NDVP in a timely manner, translating it into operational micro-plans and mobilizing diverse financing sources ensured the NDVP could be successfully implemented.
3. Scaling up cold-chain storage facilities, equipment and transportation ensured that vaccine quality was not compromised.
4. Decentralization of the National Immunization Technical Advisory Group (NITAG) and existence or establishment of an AEFI committee at subnational levels, among other strategies, facilitated the swift management and investigation of AEFI.
5. Utilizing digital and other innovative solutions facilitated the smooth registration, planning and real-time progress monitoring of vaccination status and AEFI.
6. Engaging senior leadership and other community influencers to endorse and promote vaccination campaigns boosted uptake.
7. Ensuring a whole-of-government and whole-of-society approach facilitated the smooth roll-out of the vaccination campaign from planning, implementation and addressing vaccine hesitancy to waste management.
8. Agility to redistribute vaccines and vaccine supplies to different regions and facilities, especially unused vaccines or vaccines with short expiry dates, minimized vaccine wastage.
9. Adopting innovative and multi-faceted strategies allowed vaccines to be delivered to all population groups, especially vulnerable and difficult-to-reach populations.
10. Capacity-building with training conducted at all levels on vaccine storage, transportation, delivery and safety monitoring ensured smooth vaccine introduction and scale-up.

AEFI: adverse events following immunization; NDVP: National Deployment and Vaccination Plan.

Fig. 3.10 provides the number and types of IARs that reviewed pillar 10, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.10. Number of IARs that reviewed pillar 10, and type and volume of qualitative data extracted



3.10.1 How countries navigated challenges

1. Rapid approval of multiple vaccines using existing regulatory processes or WHO's emergency use authorization facilitated timely vaccine roll-out

In this pandemic, with many vaccine products being developed in record time, countries needed to approve the different vaccine products for use in their countries within very short timeframes. Not all countries have the regulatory body, framework, systems or resources to assess and approve vaccine products. In addition, not all vaccines were suitable candidates for all countries, given the storage conditions required for different vaccines. Governments tackled the approval process in different ways, including:

- fast-tracking the regulatory approval process, especially in relation to vaccine manufacturers' indemnification requirements;
- issuing national emergency use authorization for COVID-19 vaccine use;
- selecting COVID-19 vaccines that met the cold-chain capacity in countries;
- authorizing COVID-19 vaccines using WHO's emergency use listing, especially in countries without the necessary national regulatory structures to rapidly approve vaccine products; and
- facilitating rapid custom clearance of vaccines upon arrival in countries so that vaccines could be distributed to all levels in a timely manner.

2. Developing the NDVP in a timely manner, translating it into operational micro-plans and mobilizing diverse financing sources ensured the NDVP could be successfully implemented

To successfully roll-out COVID-19 vaccines to all target populations required significant planning, preparation and room for adaptation as unexpected situations arose. The NDVP is the roadmap critical to guide countries to ensure all stages of the process, from the vaccine regulatory approval process, procurement, management of supply chain and promoting vaccine acceptance to safety monitoring, are all planned and considered. Countries needed to develop their NDVP rapidly and translate the plan into concrete action. Countries took the following steps to facilitate the rapid development and implementation of the NDVP:

- working closely with NITAG to develop a well designed and flexible NDVP that could be adjusted to accommodate different vaccine supply scenarios relative to vaccination guidance for higher-risk populations;
- uploading the NDVP to WHO Partners Platform to receive technical, financial and material support and feedback from WHO and other UN agencies, donors and partners;

- defining the structure, roles and responsibilities of the oversight body and key players for coordinating, monitoring and implementing the NDVP;
- developing clear micro-plans, guidelines and SOPs to operationalize the NDVP to ensure all aspects from vaccination service points and vaccination teams to target populations are well defined and clarified for a smooth vaccine roll-out;
- utilizing the same distribution channel as other routine vaccines and integrating COVID-19 vaccination into routine Expanded Programme on Immunization strategies; and
- allocating a domestic budget and mobilizing external funding and support from one or more sources such as COVAX (COVID-19 Vaccines Global Access Initiative), United Nations Children’s Fund (UNICEF), World Bank, GAVI, and the Bill and Melinda Gates Foundation to procure cold-chain equipment, vaccine supplies and stock, and conduct vaccination campaigns according to the NDVP.

3. Scaling up cold-chain storage facilities, equipment and transportation ensured that vaccine quality was not compromised

With the large quantity of vaccine stock needed for the COVID-19 vaccine roll-out and each vaccine product requiring different storage conditions, it was necessary for countries to carefully assess the cold-chain capacity needed to house and safely transport these vaccine products to vaccination sites. This was a major logistical challenge for almost all countries, and was addressed in different ways including:

- coordinating the deployment plan according to the NDVP and communicating the SOPs to supply chain managers at all levels;
- working closely with different sectors to ensure vaccines could be immediately dispatched after arrival in the country;
- securing vaccine transportation to storage and vaccination sites in collaboration with the national police and security teams;
- enhancing the number and conditions of cold-chain facilities, equipment and transportation to ensure sufficient storage and transportation capacity to maintain standard and ultra-cold-chain requirements; and
- regularly assessing adherence to cold-chain requirements during storage, transportation and administration of vaccines, such as through the use of continuous temperature monitoring devices, monitoring of weekly temperature reporting logs from storage sites, conducting supervisory visits and investigation of any unexpected issues.

4. Decentralization of the NITAG and the existence or establishment of an AEFI committee at subnational levels, among other strategies, facilitated the swift management and investigation of AEFI

Given the scale of the immunization campaign to reach all target populations in different regions of the country, the management and coordination required at both the central and regional levels were challenging, especially for the monitoring, management and follow-up of AEFIs. This was particularly important in countries with larger populations or with a high proportion residing in rural and difficult-to-reach areas. Countries managed this in different ways, including:

- establishing a regional Immunization Technical Advisory Group in addition to the NITAG and AEFI committees at the national and subnational levels to help share the workload and respond to AEFIs more swiftly;
- conducting training and refresher training of AEFI committee members on conducting investigations and causality assessments;
- developing electronic reporting software and establishing multiple reporting channels to ensure real-time AEFI surveillance;
- creating a vaccination unit or embedding vaccination experts within the national incident management system; and
- ensuring technical advisory group members from the national and regional levels were readily available, either physically or virtually, to provide real-time technical support to monitor vaccination campaigns, manage AEFIs and provide guidance as issues arise.

5. Utilizing digital and other innovative solutions facilitated the smooth registration, planning and real-time progress monitoring of vaccination status and AEFI

Given the large target population that needed to be vaccinated rapidly, it was necessary for countries to rapidly develop registration and tracking systems that were effective and efficient. Many countries adopted digital tools and platforms in addition to paper-based systems. Some of the innovative approaches taken included:

- using QR codes to verify the vaccination status of individuals;
- affixing holograms on vaccination cards as an authentication mechanism;
- implementing a dedicated COVID-19 vaccination electronic registry, including features such as pre-registration, monitoring of vaccination coverage and AEFIs, and issuance of vaccination certificates;
- utilizing various IT platforms such as DHIS-2, Google Spreadsheet and other dashboards to digitalize the real-time planning, analysis, monitoring

and supervision of vaccine roll-out to identify and prioritize areas with low coverage;

- leveraging social media and chat groups on smartphone applications to coordinate and communicate coverage data to monitor and follow up on the COVID-19 vaccine roll-out; and
- ensuring a paper-based system was available as a back-up system when electronic systems may not have been accessible at certain vaccination sites, such as vaccination registers, tally sheets, summary forms and vaccination cards.

6. Engaging senior leadership and other community influencers to endorse and promote vaccination campaigns boosted uptake

COVID-19 vaccines were developed and approved in record time, which required rapid and widespread health education, sensitization and confidence-boosting to encourage uptake among community members. Countries explored engaging senior leadership and influencers as spokespersons or role models to promote vaccine uptake by:

- boosting the confidence of populations through having the highest level of the government or religious community, such as the prime minister and senior clergy, publicly receiving the first doses of vaccine and publicly addressing community concerns;
- utilizing prominent political, religious and community leaders (e.g. former presidents, ministers, traditional leaders, religious clergy, famed athletes and singers as champion influencers) to advocate for vaccine uptake; and
- using key influencers on multiple platforms to address vaccine hesitancy and promote community acceptance of COVID-19 vaccines.

7. Ensuring a whole-of-government and whole-of-society approach facilitated the smooth roll-out of the vaccination campaign from planning, implementation and addressing vaccine hesitancy to waste management

To implement COVID-19 vaccination on the scale required necessitated the collective efforts of different governmental sectors, private corporations, academia, vaccine experts and the target communities receiving the vaccine. Appropriate management of mis- and disinformation around the COVID-19 vaccines was critical, as both had the potential to create fear and vaccine hesitancy among the community. Countries engaged different sectors of the government and society during the planning and implementation of the vaccine roll-out, including:

- using hotlines and surveys to understand community perceptions and concerns around COVID-19 vaccination to promote acceptance and reduce hesitancy;

- leveraging multisectoral and public–private partnerships in vaccination roll-out and campaigns, including procurement, manufacturing, shipping, logistics, storage, vaccination sites and waste management;
- working closely with both domestic and international partners and donors, as well as bilateral government and the COVAX facility, to ensure adequate vaccine supplies could be procured and redirected to where they were most needed;
- collaborating with different sectors to identify priority groups for vaccination, with the guidance of NITAG to align strategy with the Strategic Advisory Group of Experts (SAGE) immunization guidelines; and
- conducting regular communication by holding regular press briefings and organizing scientific discussions involving different groups, including academics, media professionals and social media influencers, to promote transparency and ensure accurate information is shared in a timely manner.

8. Ability to redistribute vaccines and vaccine supplies to different regions and facilities, especially unused vaccines or vaccines with short expiry dates, minimized vaccine wastage

A major concern experienced by certain countries was linked to the short expiry of the vaccine stock, which meant vaccines had to be rapidly deployed to minimize wastage. Countries took several approaches to address this, including:

- creating a governing body or mechanism to monitor the expiry and releases of batches, and to exercise recall functions when appropriate;
- establishing rapid delivery strategies and effective outreach services to ensure vaccines are utilized before their expiry;
- implementing stock monitoring and continuous communication systems to facilitate the redistribution of extra vaccine doses between different regions and facilities based on stock levels and demand; and
- vaccinating the subsequent priority groups to minimize vaccine wastage when there was insufficient uptake from the main priority groups.

9. Adopting innovative and multi-faceted strategies allowed vaccines to be delivered to all population groups, especially vulnerable and difficult-to-reach populations

One of the toughest challenges for COVID-19 vaccine roll-out was to ensure vaccines reached all eligible groups, especially the vulnerable and difficult-to-reach populations such as communities living in remote areas and individuals without permanent residence. Countries familiar with conducting mass poliomyelitis, measles or influenza vaccination campaigns were able to leverage these experiences. However, as the target population for COVID-19 vaccination

was much broader than in any previous vaccination campaigns, it was necessary to identify novel strategies to deliver vaccines to the population to ensure vaccine equity. Approaches taken by countries included:

- using drones to deliver vaccines to difficult-to-reach populations;
- bringing vaccines to the population through mobile services by deploying vaccination teams or vans to reach locations without fixed vaccination sites;
- ensuring equity by prioritizing resources to support vaccination in provinces with particularly vulnerable populations;
- setting up vaccination sites in diverse locations to reach the vulnerable or populations at risk, such as prisons, military health zones, mining sites, police camps and COVID-19 treatment centres;
- prioritizing population groups based on their level of vulnerability, and ensuring continuity of essential services in addition to the SAGE prioritization roadmap;
- designating a budget for delivering vaccines to vulnerable and difficult-to-reach populations;
- leveraging existing distribution channels already in use for other vaccines;
- utilizing a combination of different mobile and fixed vaccine delivery strategies at target sites such as pharmacies and markets to reach all population groups; and
- deploying single-dose vaccines for mobile and difficult-to-reach populations such as refugees and internally displaced persons.

10. Capacity-building with training conducted at all levels on vaccine storage, transportation, delivery and vaccine safety monitoring ensured smooth vaccine introduction and scale-up

Given that the introduction, deployment and scale-up of the COVID-19 vaccine was a huge endeavour that had to be carried out rapidly, a large pool of trained human resources was required in each country. Many countries did not have adequate human resources available to begin with, further aggravated by high staff turnover as the pandemic continued. Countries ensured that existing and newly recruited staff were trained to sustain a smooth and efficient vaccine roll-out by:

- training all staff and volunteers involved in vaccination activities, such as health care workers engaged in vaccine roll-out, community mobilization

teams, vaccine supply and logistics managers, and AEFI focal points responsible for monitoring vaccine safety;

- training via different modalities depending on the context, including face-to-face and on-the-job training when necessary, and virtual training to reach a wider group of target trainees;
- ensuring refresher and continuous training was available to vaccination staff, including those at call centres and health care workers implementing vaccine roll-out, to ensure they always had the most up-to-date and accurate information; and
- implementing additional mass training and the training of trainers before national vaccination campaigns to ensure vaccination staff were adequately prepared at all levels.

3.10.2 Conclusions for pillar 10 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 10.

- A centralized system to oversee and coordinate COVID-19 vaccination logistics, progress and AEFI at the national level was effective when supported by a decentralized mechanism to monitor, manage and report from the subnational level.
- Reaching all target populations eligible for COVID-19 vaccination required a multi-faceted strategy, including leveraging past experience and plans for deploying other medical countermeasures in emergencies, adopting a whole-of-society approach, trialling innovative technologies, engaging key influencers and being flexible to adjust plans as needed.
- Rapid monitoring and feedback mechanisms to enable vaccine redistribution at the global, regional, national and subnational levels, as well as between facilities, were critical to promote equitable vaccine access and minimize wastage.
- High levels of political engagement, support and attention secured funding and enabled the coordination and cooperation of key multisectoral stakeholders involved in the vaccination process.

With regards to moving forwards, several considerations were identified in the country IARs.

- It is crucial to learn from the COVID-19 vaccine roll-out experience in different communities, including minority groups, to better understand how to adapt vaccination campaign strategies to promote vaccine uptake, especially among vulnerable populations.

- An active listening and feedback culture must be adopted to ensure concerns from the community are heard and adequately addressed to build trust and minimize vaccine hesitancy.
- The COVID-19 vaccine roll-out should be regularly reviewed using different methodologies including, but not limited to, the COVID-19 vaccination IAR and COVID-19 vaccine post-introduction evaluation, and integrate findings and recommendations to adjust the NDVP as needed.
- Lessons learned from COVID-19 vaccine roll-out should be considered in the introduction of other new vaccines, whether for routine immunization or responding to future pandemics or other health emergencies.
- It is important to continue to maintain and test emergency vaccine response plans and stockpiling management systems to ensure preparedness and readiness for future vaccine-preventable health emergencies.
- Investments made in response infrastructure such as cold-chain equipment and human resources should be leveraged to ensure capacities and capabilities for emergency response and to strengthen the overall health system.

Beyond the above analysis of the COVID-19 vaccination pillar, a report commissioned by WHO and conducted by MM Global Health Consulting (18), with an in-depth qualitative analysis of IAR reports in which the COVID-19 vaccination pillar was the sole focus of the review, provides more details on the lessons learned from the COVID-19 vaccine roll-out in different countries.

3.11 Pillar 11: vulnerable and marginalized populations

This pillar reviews how vulnerable and marginalized populations were considered in response plans, decision-making, surveillance and case detection, case management, risk communication activities and beyond. In addition, this pillar reviews the availability of resources, staff and coordination for activities to support vulnerable and marginalized populations, and the effectiveness of reaching, supporting and protecting vulnerable populations. For the purposes of the COVID-19 IAR, vulnerable and marginalized populations are defined as those at risk or high risk of COVID-19 infection, the health impacts of infection, other health issues aggravated by the shift in focus of health care to the COVID-19 response, adverse health effects of COVID-19, public health and social measures, and potential socioeconomic impact. Vulnerable and marginalized populations may experience poorer working and living conditions, barriers to social protection and health care services, weaker safety nets and stigma, and insufficient access to health-related information or health care and essential

services, and may need support in doing so. These individuals may include, but are not limited to, people experiencing homelessness; people in prisons; refugees and internally displaced persons living in camps; migrants; unregistered workers; people living in extreme poverty, with disabilities, in long-term care facilities, in psychiatric institutions or with chronic health conditions; older people; and pregnant ethnic minorities, among others.



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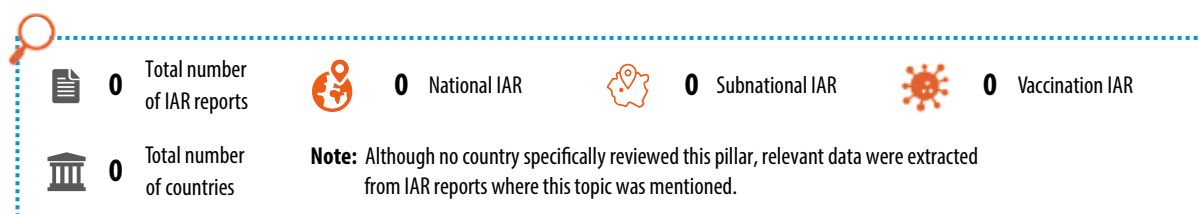
See [Box 3.11](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.11. Summary of key themes

1. Adaptation of COVID-19 information for vulnerable, marginalized and difficult-to-reach populations was important to protect such population groups during the pandemic.
2. Improving access to essential health services and the provision of appropriate COVID-19 isolation facilities would have minimized the impact of COVID-19 on vulnerable populations.

[Fig. 3.11](#) provides the number and types of IARs that reviewed pillar 11, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.11. Number of IARs that reviewed pillar 11, and type and volume of qualitative data extracted



3.11.1 How countries navigated challenges

This public health response pillar was not specifically reviewed in any of the IAR reports received. However, the topic of vulnerable and marginalized populations was a cross-cutting theme that was briefly mentioned in other pillars documented in several IAR reports, especially pillars 1 (national coordination), 2 (risk communication and community engagement), 7 (case management) and 9 (maintaining essential health services).

1. Adaptation of COVID-19 information for vulnerable, marginalized and difficult-to-reach populations was important to protect such population groups during the pandemic

As the COVID-19 pandemic rapidly spread to all population groups across the globe, it was critical that all community members could access timely and accurate information to protect themselves from COVID-19. This can often be challenging as some vulnerable and marginalized populations only understand minority languages, some have special needs and others have specific cultural considerations. Some approaches taken by countries to ensure that public health information and messages reach these populations included:

- translating critical COVID-19 communication material into minority languages, Braille and sign language to ensure an inclusive strategy to protect vulnerable and marginalized populations;
- adjusting communication materials so they were appropriate for the local culture, including consulting the community to identify local cultural considerations; and
- improving access to information by airing communication messaging on TV networks and radio, and conducting door-to-door outreach activities for the difficult-to-reach populations.

However, it was noted in one IAR that it would be helpful if the systematic mapping of community leaders was routinely conducted so they could easily communicate with vulnerable and marginalized populations during crises such as this pandemic.

2. Improving access to essential health services and the provision of appropriate COVID-19 isolation facilities would have minimized the impact of COVID-19 on vulnerable populations

The pandemic exacerbated health inequity where vulnerable populations such as pregnant women and the older population had difficulty accessing essential health services. In some instances, this was because of insufficient provisions to keep these high-risk populations safe when seeking care. There was often inadequate financial support for the vulnerable population directly and indirectly affected by COVID-19, which meant low compliance to self-isolate or follow the public health and social measures as directed. This was further exacerbated in certain contexts where the isolation infrastructure was not designed or adapted for certain vulnerable groups such as pregnant women and children. These challenges collectively contributed to the increased risk for COVID-19- and non-COVID-19-related morbidity and mortality among these population groups.

3.11.2 Conclusions for pillar 11 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 11.

- Additional effort must be made by the local authorities and community leaders to ensure minority populations, individuals with special needs and difficult-to-reach populations are well informed so they can stay safe during the COVID-19 pandemic and other public health emergencies.
- The repurposing of health system resources coupled with public health and social measures to address COVID-19 care led to a protracted disruption of essential health services for vulnerable populations, for preventive and curative treatment, and for follow-up services.

With regards to moving forwards, several considerations were identified in the country IARs.

- It is important to ensure that RCCE-IM strategies and communication materials consider the language, culture and other needs of vulnerable and marginalized populations during public health emergencies, so they are not left behind.
- The unique needs of vulnerable and marginalized populations must be considered when developing and revising public health emergency preparedness and response plans, to ensure such groups can access essential health services with minimal impediment.

3.12 Pillar 12: national legislation and financing

This pillar reviews the ability of the national legal framework (i.e. all legally binding instruments adopted at national or subnational levels) to authorize and implement response activities in an effective and legally sound manner. In addition, this pillar also aims to review normal and emergency budgets and other financing mechanisms to ensure adequate funding prior to and throughout the response, including whether appropriate funds were disbursed to and accounted for at the frontline. Ultimately, this pillar reviews whether the national legal framework is enacted and implemented, creating an enabling environment for response efforts. For the purposes of the WHO IAR methodology, policies, technical guidance and other soft law instruments should not be considered part of the legal framework by participants reviewing this pillar.



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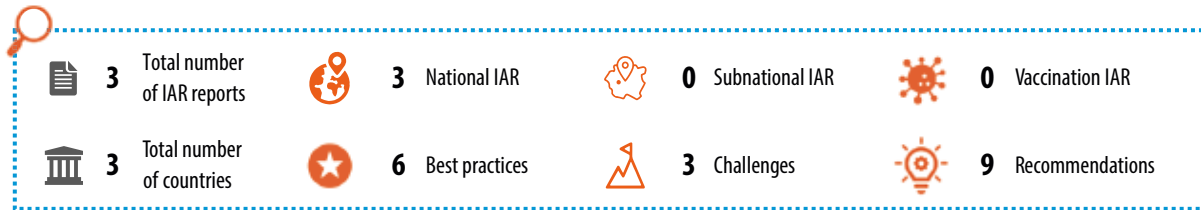
See [Box 3.12](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.12. Summary of key themes

1. Repurposing existing funds and rapidly establishing new funding sources for COVID-19 preparedness and response avoided delay in mobilizing resources for response activities.
2. Building funding allocation and monitoring mechanisms would assist future emergency preparedness and response activities.

Fig. 3.12 provides the number and types of IARs that reviewed pillar 12, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.12. Number of IARs that reviewed pillar 12, and type and volume of qualitative data extracted



3.12.1 How countries navigated challenges

This pillar was often reviewed as a part of other pillars, especially pillars 1 (national coordination), 4 (PoE), 5 (national laboratory system), 7 (case management), 8 (operations and logistics) and 9 (maintaining essential health services). However, three countries reviewed this pillar on its own, with some of the key highlights below.

1. Repurposing existing funds and rapidly establishing new funding sources for COVID-19 preparedness and response avoided delay in mobilizing resources for response activities

During this pandemic, it was critical for governments to rapidly identify funds to mobilize resources for the large-scale response required for COVID-19. This is particularly critical as delayed allocation of funds could hinder preparedness and response activities necessary to limit the spread of COVID-19. This was possible through various approaches taken by countries, including:

- repurposing existing or routine recurrent funds to supplement funding gaps for COVID-19 preparedness and response activities;
- establishing a new dedicated COVID-19 relief fund for COVID-19 preparedness and response activities;
- mobilizing funds from local and international partners and donors; and
- leveraging opportunities offered by the Partners Platform and other platforms for resource mobilization.

2. Building funding allocation and monitoring mechanisms would assist future emergency preparedness and response activities

It was reported in the IARs that funding allocation and mechanisms were necessary moving forwards for future public health emergencies. IAR recommendations on how to navigate this were proposed by several countries, including:

- conducting regular assessments to gain better knowledge of available emergency funds at different levels of the government and sectors;
- establishing emergency funding mechanisms at different levels of the government and sectors (if not already available);
- routinely conducting financial resource mapping to clarify all funding sources that can be used during public health emergencies;
- developing funding allocation criteria and mechanisms for monitoring funding utilization;
- developing guidelines for funding innovations and research during emergencies; and
- building capacity for staff in grant writing and fund management to ensure sufficient funding resources can be obtained during future public health emergencies, with an adequate workforce to manage the grants.

3.12.2 Conclusions for pillar 12 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 12.

- Countries utilized a combination of funding sources, including public, private, domestic and international donors to ensure the rapid mobilization of resources to combat the COVID-19 pandemic.
- Countries did not have all the tools and monitoring systems to map all funding sources and monitor fund allocation and usage for large-scale public health emergencies.

With regards to moving forwards, several considerations were identified in the country IARs.

- It would be useful to establish national legal frameworks that allow rapid action for enacting and enforcing statutes and ordinances, and resource mobilization through domestic or international financing for responding to health emergencies.
- Emergency response funding allocation should be included and maintained during the regular national budget planning cycle.

3.13 Pillar 13: public health and social measures

This pillar reviews the functioning of IHR core capacities and public health and social measures implemented at designated PoE, including international airports, ports and ground crossings, to prevent the global spread of infectious diseases including COVID-19, as well as in community spaces, at mass gatherings, on public transport and elsewhere. In addition, this pillar reviews any established or improvised bilateral or multilateral agreements with neighbouring countries, public health emergency contingency plans, guidelines and SOPs for COVID-19 surveillance, the coordination of rapid information exchange with public health authorities and conveyance operators, workforce training and equipment, IPC measures implemented and appropriate isolation/quarantine facilities at PoE, including the provision of safe transportation of suspected COVID-19 cases to designated medical facilities.



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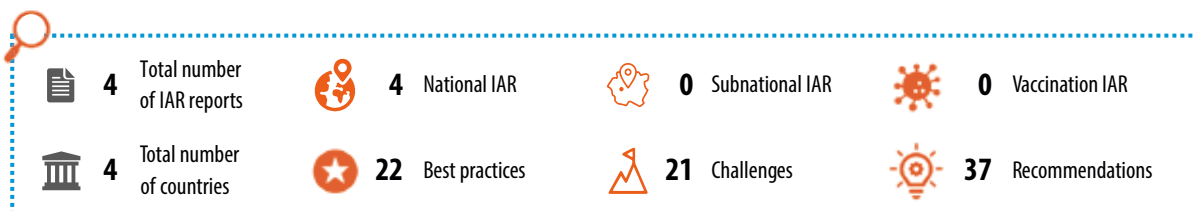
See [Box 3.13](#) for a summary of the key themes explored when reviewing this pillar.

Box 3.13. Summary of key themes

1. Governments’ early decision-making on public health and social measures gained time for preparedness activities before the first COVID-19 case was detected in the country.
2. Establishment of multisectoral advisory groups and committees helped consolidate the latest epidemiological evidence to guide the implementation and lifting of public health and social measures.
3. Multisectoral involvement and coordination were essential to enforce public health and social measures.
4. Management and implementation of public health and social measures by local governments and within workplaces and schools facilitated the monitoring of compliance and adherence to the measures.
5. Continuous two-way communication with the community promoted transparency and understanding of the public health and social measures implemented, their rationale and the support needed.

Fig. 3.13 provides the number and types of IARs that reviewed pillar 13, as well as the type and volume of qualitative data that were extracted, reviewed and analysed to develop the overall synthesis, themes and key messages.

Fig. 3.13. Number of IARs that reviewed pillar 13, and type and volume of qualitative data extracted



3.13.1 How countries navigated challenges

1. Governments’ early decision-making on public health and social measures gained time for preparedness activities before the first COVID-19 case was detected in the country

One of the critical aspects of how the pandemic affected countries was the timing of key decisions from the government on when to implement different public health and social measures. Countries noted that the early implementation of public health and social measures before the first case was identified led to a delay

in community transmission, which gained time for the country to be as prepared as possible before the case numbers surged. The following were also noted in the IAR reports:

- implementing early and decisive actions by the highest level of government in quick succession, such as temporarily suspending flights, cancelling mass gathering events or imposing school closures, among other public health and social measures, all contributed to slowing down disease transmission, especially at the beginning of the pandemic; and
- further consideration regarding the conditions and criteria (including the use of risk assessments) not only for imposing but also for lifting public health and social measures was needed to better communicate with the population anticipating and planning the re-establishment of the new normal.

2. Establishment of multisectoral advisory groups and committees helped consolidate the latest epidemiological evidence to guide the implementation and lifting of public health and social measures

To ensure that public health and social measures were implemented and adjusted following the latest COVID-19 situation on the ground, decisions had to be driven by real-time data using a risk-based approach as far as possible. Countries noted their efforts to ensure there was a group to provide oversight and guidance to this process, including:

- establishing multisectoral advisory groups or committees to continually review the latest evidence and guide the coordination and updating of protocols and recommendations for public health and social measures;
- utilizing real-time epidemiological data to continuously inform risk assessments and the development of recommendations on public health and social measures;
- leveraging existing preparedness activities, SOPs, contingency plans and simulation exercises to further build on these for developing public health and social measures during the COVID-19 pandemic; and
- assigning a dedicated budget line for communication campaigns and awareness activities surrounding public health and social measures to ensure that sustainable financing for these activities will be available for future public health emergencies beyond COVID-19.

3. Multisectoral involvement and coordination were essential to enforce public health and social measures

Many public health and social measures needed to be initiated and implemented by sectors other than health, such as education, tourism and transport. Cooperation and coordination are indispensable in implementing public health and social measures, as the health sector is not responsible for all public health and social measures. Multisectoral collaboration is also crucial when it comes to implementing mitigation measures, such as measures to reduce the unintended negative consequences of public health and social measures (e.g. social protection schemes for people affected by business closures). According to the IAR reports, countries engaged stakeholders from different sectors by:

- involving all sectors, including the military, in implementing and enforcing public health and social measures as well as participating in multisectoral risk assessments (e.g. for mass gathering events); and
- ensuring a strong focus on multisectoral collaboration to coordinate the COVID-19 response, including establishing the national task force for COVID-19 and having daily emergency operations centre meetings on operationalizing the enforcement and lifting of public health and social measures in different settings.

For some countries, it was noted in the IAR reports that closer coordination between sectors needed to be further strengthened for large-scale social restrictions. In addition, updating the communicable disease law or providing additional regulations and guidance on the criteria for terminating, relaxing or extending restrictions was critically needed, along with better reporting at all levels.

4. Management and implementation of public health and social measures by local governments and within workplaces and schools facilitated the monitoring of compliance and adherence to the measures

Implementing public health and social measures requires close monitoring and adaptation; this is not a simple task that can be managed through the central government. In addition, as the public's compliance with public health and social measures impacts the effectiveness of these measures in reducing disease transmission, continuous monitoring is crucial despite its challenges. Countries decentralized implementation and monitoring in different ways, including:

- implementing public health and social measures by local governments to facilitate close monitoring of community adherence or resistance to the restrictions enforced;
- providing guidelines on IPC protocols to be implemented at workplaces and public facilities; and

- supporting communities with financial grants or funds through local government to minimize the potential economic impact on communities and improve compliance.

5. Continuous two-way communication with the community promoted transparency and understanding of the implemented public health and social measures, their rationale and the support needed

With the large-scale public health and social measures that needed to be implemented by countries to limit community transmission of SARS-CoV-2, individuals and societies may have experienced an increased health, social and economic burden, among other direct and indirect impacts. One of the main challenges was therefore to garner community support and cooperation. Countries reported different ways of addressing this, including:

- improving the accessibility of information to the community through a dedicated spokesperson explaining the rationale of the measures to be implemented, and support provided to the community during daily press briefings, social media and other platforms;
- encouraging a two-way conversation by the installation and expansion of COVID-19 hotlines, providing community members with the opportunity to ask health professionals questions and have their concerns addressed; and
- utilizing a combination of data, such as behavioural and epidemiological data, to develop effective plans and campaigns to improve the community's uptake of public health and social measures.

Although communication is important to increase compliance, social protection measures implemented by local and national governments are critical to reducing the health, economic and social burden of public health and social measures. These may range from unemployment benefits to temporary eviction bans, universal health care or community support initiatives such as grocery shopping for vulnerable people. This was also highlighted in IAR reports as one of the main challenges, to ensure that the implementation of public health and social measures are supported with appropriate enforcement and incentives, such as social and financial support to minimize any negative impact on the population.

3.13.2 Conclusions for pillar 13 from analysis of IAR reports

Several key messages were observed in the IARs that reviewed pillar 13.

- The implementation of public health and social measures at an unprecedented scale and duration has been one of the key strategies used by countries to curb the spread of COVID-19, which has been met with varying degrees of compliance.

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- Prolonged enforcement of public health and social measures can directly and indirectly affect health and socioeconomic properties of individuals and communities, and must therefore be accompanied by feedback mechanisms and support systems.

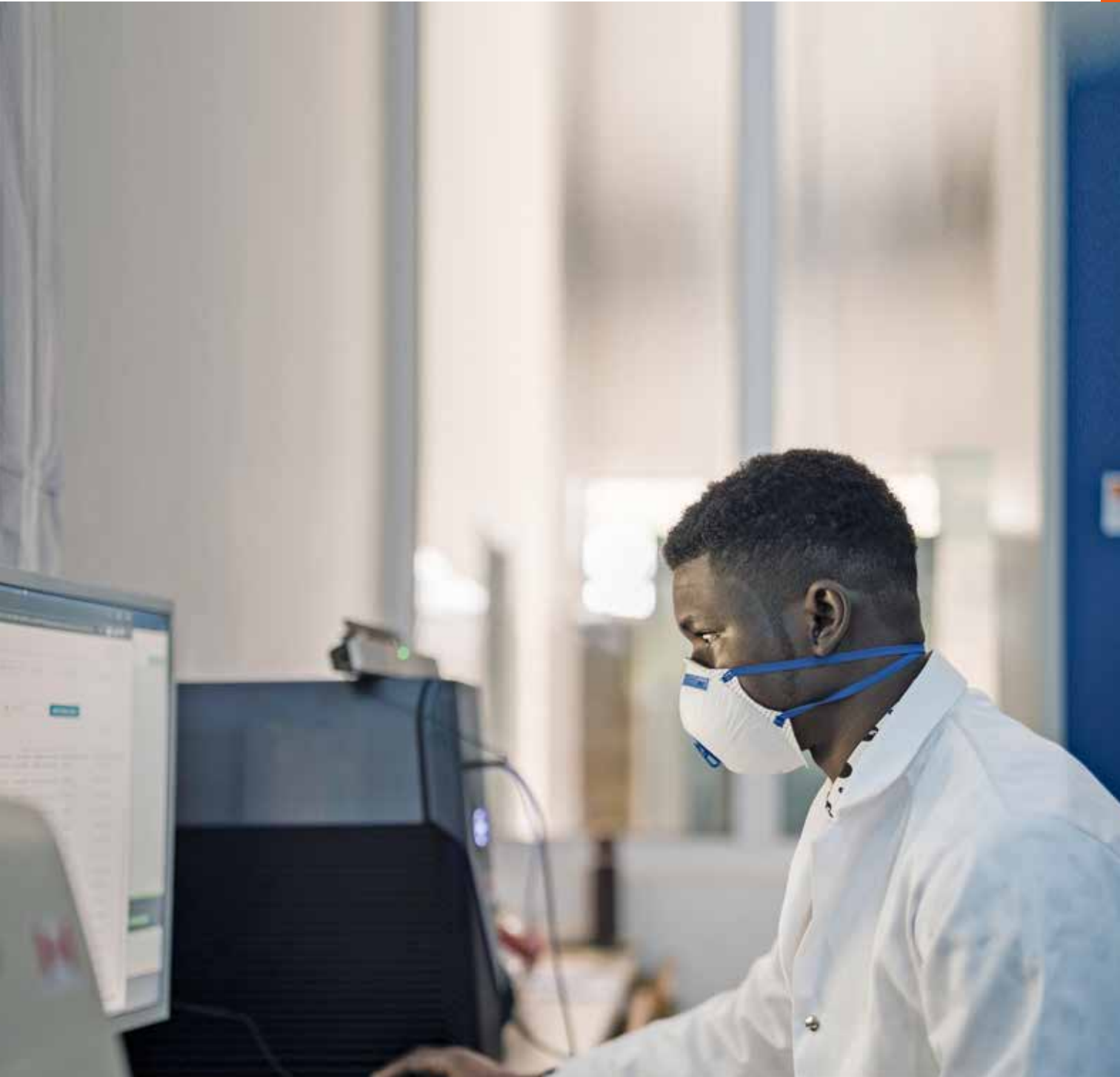
With regards to moving forwards, several considerations were identified in the country IARs.

- The research evidence on the effectiveness and impact of public health and social measures should be strengthened via a risk-based approach, identifying implementation enablers and challenges (including the use of country case studies) to inform evidence-based, context-specific and equitable public health and social measures decisions and implementation.
- A strategy to mitigate the unintended negative consequences of public health and social measures, and to protect vulnerable populations from disproportionate socioeconomic harm, should be implemented.
- A public health and social measures decision tool to support national and subnational decision-makers in their implementation of evidence-driven public health and social measures, while maximizing their benefits and minimizing their health, social and economic burden, should be developed.
- It is important to leverage experience gained during the implementation of COVID-19 public health and social measures, and systematically integrate these measures into national and subnational health emergency plans, while continuously assessing the capacity and readiness to effectively implement public health and social measures as an integral part of preparedness and response for future public health emergencies. ■

Chapter 4

Findings from interviews and survey

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**“ There is always a lot
of information available, but [knowing] how to
convert the data into specific actions was
the key point of the IAR process. ”**

Monitoring and Evaluation Staff,
WHO Regional Office

4

Findings from interviews and survey

It is a difficult task to develop guidance and tools that are appropriate for all countries with their unique health system, infrastructure, developmental level and resource availability. In designing the IAR guidance and tools, the goal was always to make the tool simple, practical and, most importantly, flexible, so that countries could customize it for their contexts. Ultimately, the aim of the IAR methodology is to help countries have a process and tool kit readily available for key stakeholders in the response to identify what is working and areas for further strengthening, so they can make real-time adjustments to the COVID-19 response. As the guidance and tools were designed to allow stakeholders to conduct in-country reviews, it is important to understand the perspectives and experiences of different countries when using the IAR process. As well as understanding what happened during the response, an understanding of whether these reviews were perceived as valuable by countries and how countries customized them to make them more effective or appropriate for their contexts was also sought.

Although IAR reports document how the IARs were customized and what has happened in the response, including high-level best practices, challenges and recommended activities collectively proposed by the participants, it is difficult to understand from the IAR reports themselves whether the IAR process was helpful for countries and in what way. It was also impossible to determine from the reports what happened following the IAR, especially whether the IAR recommendations were implemented, followed up, resulted in any progress, or whether integrated into national and subnational strategic plans for COVID-19 preparedness and response.

To provide this missing information, consultations were therefore conducted with individuals familiar with the conduct, implementation and follow-up of IARs, through semi-structured interviews and anonymized online surveys. This section explores what was shared in these consultations so WHO can use this information to further refine and improve the IAR guidance and tools for future emergencies beyond COVID-19, enhancing their usefulness and impact.

An understanding was first sought on how IARs were conducted in practice, including how countries customized the tool to fit their needs. The perceived values and impact of the IAR based on the interview and online

survey consultations, and proposed possible ideas to enhance the effectiveness and impact of the IAR moving forwards, were then explored.

The findings from this section were based on 27 key informant interviews and 29 online survey responses, from which the qualitative and quantitative information were used to develop the overall synthesis, including themes and key messages (Box 4.1).

Box 4.1. Summary of key themes

Customization of IARs

1. Countries adapted IARs to be conducted at the national and subnational level, and for multiple and single pillars.
2. Some countries conducted multiple IARs over time as the pandemic evolved.
3. Some countries went beyond the IAR group discussion to include other data collection methodologies for better triangulation of information.
4. Some countries reviewed specific pillars more frequently than others, while introducing additional pillars for review during the IAR.
5. Countries followed up on the IAR recommendations in different ways, and some required external support to conduct field missions to follow up on recommendations.

Impact of IARs

1. The IAR provided a collaborative context to allow the space and time for multisectoral stakeholders to come together and discuss strategies to combat the ongoing pandemic.
2. The IAR was perceived as a useful and timely methodology that can be used for COVID-19 and other public health emergencies.
3. IAR recommendations were integrated into national plans and strategies to contribute to long-term system strengthening.
4. IARs conducted at the local level were both useful and effective as recommendations could be immediately acted upon to make a difference in the response, requiring less bureaucratic administration processes.
5. IARs provided a flexible and useful approach that can be tailored to conduct focused reviews of any aspect of the response, especially when reviewing specific elements of a single pillar.

IAR: intra-action review.

4.1 Customization of IARs

4.1.1 Highlights from interviews

1. Countries adapted IARs to be conducted at the national and subnational level, and for multiple and single pillars

Among the 83 IAR reports reviewed in this analysis, 71 (85.5%) IARs were conducted at the national level and 12 (14.5%) at the subnational level. Each IAR was customized to the needs of the geographical region and therefore varied in scope depending on the context at the specific timepoint in the pandemic. Countries reviewed between one and 10 pillars in each IAR, with eight being the median number of pillars reviewed.

“We started evaluating the WHO tool and then we decided to take all the pillars in the analysis because we thought that we could have a better view of the whole situation.”

Among the 83 IAR reports, 23 (27.7%) IAR focused solely on the COVID-19 vaccination single pillar.

2. Some countries conducted multiple IARs over time as the pandemic evolved

Among the 83 IAR reports from 57 countries, 19 (33.3%) conducted multiple IARs. One country conducted multiple national IARs over time (1.7%), four (7.0%) countries conducted both national and subnational IARs, and two (3.5%) countries conducted multiple subnational IARs. A total of 14 (24.6%) countries conducted both national and single-pillar COVID-19 vaccination IARs. Among the countries that conducted both national and subnational IARs, some conducted these simultaneously, some conducted these sequentially and some conducted these completely separately. The importance of conducting multiple IARs over time or covering different aspects of the response was emphasized by interviewees.

“An IAR should not be seen as a one-off event; it is part of a bigger picture.”

3. Some countries went beyond the IAR group discussion to include other data collection methodologies for better triangulation of information

To supplement information from the IAR group discussion, countries also conducted the recommended desk reviews before the IAR and triangulated the data with an additional anonymized online survey before, during or after the IAR, or complemented the information with key informant interviews and site visits. Interviewees also reiterated how adopting different approaches depending on situations may generate more honest feedback and discussion.

“In some cases maybe experts could be afraid to talk, maybe then one-to-one discussions could be better so they can be honest with us.”

“More countries should be willing for discussion in a standardized way. The IAR provides the standardized template but it is very flexible, people can have other approaches and adapt it.”

4. Some countries reviewed specific pillars more frequently than others, while introducing additional pillars for review during the IAR

Specific pillars were selected for review more frequently than others (Table 4.1). Among the 48 national IARs, the most commonly reviewed pillars were pillar 1 (45 countries; 93.8%), followed by pillar 6 (40 countries; 83.3%) and pillar 5 (38 countries; 79.2%). The least commonly reviewed pillars were pillar 11 (no countries; 0.0%) and pillar 12 (3 countries; 6.3%), probably the result of these pillars being proposed by WHO in the addendum to the IAR guidance in April 2021 (7). Among the 12 subnational IARs, the most commonly reviewed pillars were pillars 1, 2, 3 and 4 (all 12 countries; 100.0%). All of the 23 single-pillar IARs reviewed pillar 10 on COVID-19 vaccination, possibly because this pillar was encouraged to be conducted as a standalone IAR as an example for conducting focused reviews of other pillars. However, pillar 10 was reviewed less frequently in national and subnational comprehensive IARs. Although no countries reviewed pillar 11, the idea of this pillar was reviewed as a cross-cutting topic throughout other pillars.

Table 4.1. Number of COVID-19 IARs (n = 83) that reviewed each particular public health response pillar, as of 2 March 2022

Public health response pillars	No. of IARs (%)		
	National IARs (n = 48)	Subnational IARs (n = 12)	Single-pillar IARs (n = 23)
1. Country-level coordination, planning and monitoring	45 (93.8)	12 (100.0)	–
2. Risk communication, community engagement and infodemic management	36 (75.0)	12 (100.0)	–
3. Surveillance	34 (70.8)	12 (100.0)	–
4. Points of entry	35 (72.9)	12 (100.0)	–
5. National laboratory system and diagnostics	38 (79.2)	11 (91.7)	–
6. Infection prevention and control	40 (83.3)	11 (91.7)	–
7. Case management	35 (72.9)	11 (91.7)	–
8. Operations and logistics	27 (56.3)	9 (75.0)	–
9. Maintaining health services	21 (43.8)	2 (16.7)	–
10. COVID-19 vaccination	4 (8.3)	1 (8.3)	23 (100)
11. Vulnerable and marginalized populations	0 (0.0)	0 (0.0)	–
12. National legislation and financing	3 (6.3)	0 (0.0)	–
13. Public health and social measures	4 (8.3)	0 (0.0)	–

IAR: intra-action review.

Countries also developed their own pillars not proposed in the IAR guidance and addendum to review what was most relevant to their context. Throughout the 83 IAR reports, an additional six pillars were proposed and reviewed by countries (Table 4.2). Countries also touched briefly on other topics such as security, preparedness in high-risk areas and clusters in long-term care facilities, although not as a structured comprehensive pillar review.

The flexibility of the IAR process was echoed by many interviewees.

Table 4.2. Additional public health response pillars proposed and reviewed by countries during their COVID-19 intra-action reviews, as of 2 March 2022

Additional public health response pillar proposed	No. (%) of intra-action reviews in which additional pillar proposed (n = 83)
Information systems and management	5 (6.0)
Human workforce	3 (3.6)
Research and development	3 (3.6)
Mental health and psychosocial support	1 (1.2)
Responses beyond health	1 (1.2)
WHO support to country response	1 (1.2)

“The most important thing is that the IAR tool is flexible.”

“It is a very good tool, very useful and the possibility of adapting to the different context makes it even more useful.”

5. Countries followed up on the IAR recommendations in different ways, and some required external support to conduct field missions to follow up on recommendations

At the end of the IAR, countries identified recommended activities either as immediate quick-wins or middle- to long-term activities that would require more investment of time and resources. All recommended activities had to have clear responsible focal points and a required timeframe to ensure accountability. However, it was noted that this was insufficient; follow-up is generally considered the weakest part of the IAR.

“The IAR doesn’t talk about follow-up mechanisms, it is only an expectation but there is no guideline. It is up to the country to implement these mechanisms or not. I wonder if the implementation of recommendations could be more formalized. If we had it as part of the process, at least at the country level, we could say that it is our responsibility and then we would make sure that it is happening.”

“We had some long-term recommendations that have been hard to monitor; we didn’t have a template nor a plan to see if they were being implemented or not.”

A global analysis of COVID-19 intra-action reviews

It was therefore encouraging to see that some countries had proactively developed additional approaches to follow up on recommended activities. The countries had different approaches to following up and monitoring prioritized actions, which included a combination of the following:

- ensuring a follow-up strategy is integrated as part of the IAR process to close the loop to ensure progress is made following the IAR;
- designating a monitoring committee to ensure IAR recommendations are being implemented and progress made;
- developing and utilizing a progress monitoring tool to visualize the advancement of specific IAR recommendations;
- pre-defining the frequency of follow-up meetings, and scheduling these during the IAR to ensure time is set aside to monitor the implementation progress;
- engaging senior leadership and decision-makers in the IAR process so that IAR recommendations could be immediately actioned; and
- crafting detailed plans of how to implement the IAR recommendations, ensuring there are no issues at the operational and logistical level to impede their progress.

These additional approaches were described by some interviewees.

“At the provincial level we do follow-up meetings. It is part of the package; at the end of each one we do a review meeting to get feedback on the phase.”

“There is a national working group that brings together all the technical staff. This group evaluates the degree of implementation of recommendations and asks questions.”

“There is a committee that looks at whether recommendations are being implemented and their status to ensure that changes are actually taking place.”

“Every 2 weeks there is a videoconference meeting to monitor vaccination coverage against COVID-19. They look at how they are implementing the recommendations of the IAR through a dashboard... they look at the activities that are put in place at the operational level of the recommendations. This allows them to monitor the recommendations and how they are being implemented.”

“As we had decision-makers involved in the IAR, certain recommendations came very fast.”

“All the priority actions have been part of a detailed planning and this is what allows progress to be made.”

4.1.2 Highlights from online survey responses

During the online survey, respondents were asked whether the IAR methodology was adapted to fit with country contexts, the effectiveness of the methodology for following up on recommendations proposed in the IAR and whether IAR recommendations were implemented within the proposed timeframe. The online survey responses are shown in Fig. 4.1.

The flexibility, adaptability and customizability of the WHO IAR methodology were shown by the diverse range of scoring on the Likert scale based on the needs of the countries, with a median score of 7, a minimum score of 0 (no adaptation was required) and a maximum score of 10 (a lot of adaptation was required).

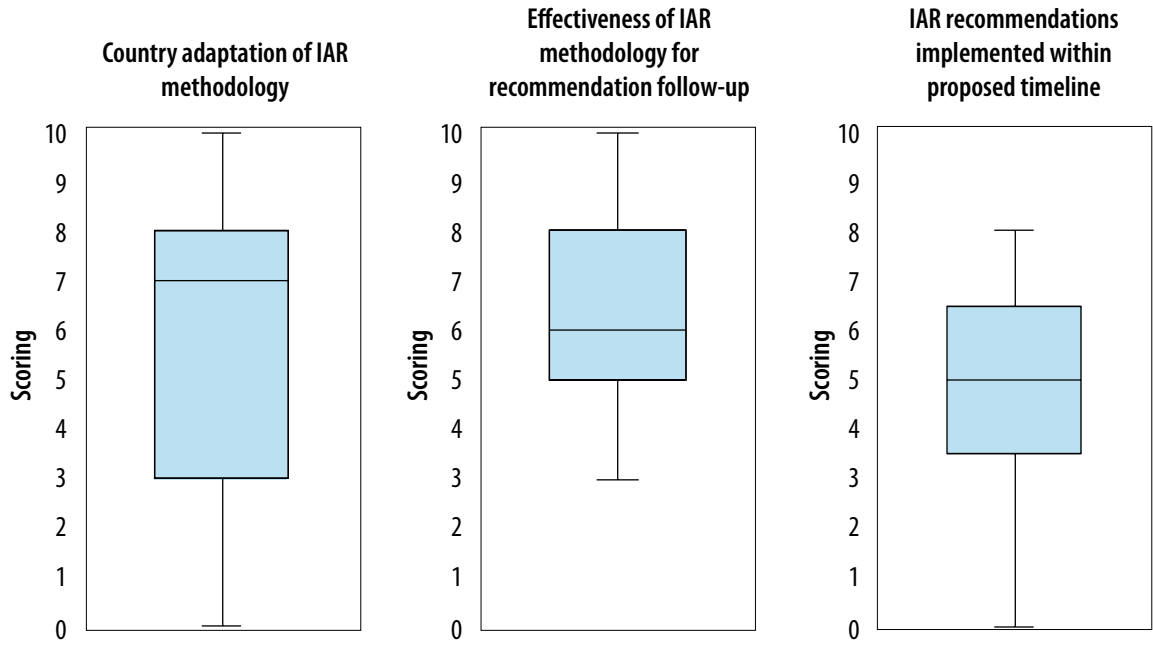
With regards to the effectiveness of the IAR methodology for monitoring and following up on proposed recommendations, a median score of 6, a minimum score of 3 and a maximum score of 10 were seen. The effectiveness of the IAR methodology to follow up on recommendations is variable and may be linked to how countries adapted the methodology, including incorporating approaches and accountability systems to ensure good follow-up.

When asked about whether recommendations were implemented within the timeframes proposed during the IAR, a median score of 5 (neither agree nor disagree), a minimum score of 0 (strongly disagree) and a maximum score of 8 (moderately agree) were seen.

When further probed, respondents reported that the most common reasons for the high likelihood of implementing IAR recommendations were the availability of time and resources, the authority to make decisions, the effectiveness of the IAR approach and good coordination between stakeholders to reach a consensus. The most common reasons for the low likelihood of implementing IAR recommendations were unavailability of time and resources, followed by a lack of decision-making power.

The scoring is based on a Likert scale with 0 indicating strongly disagree, 10 indicating strongly agree and 5 indicating neither agree nor disagree (neutral response).

Fig. 4.1. Online survey responses on how IAR methodology functioned in practice, conducted between 10 November 2021 and 1 December 2021



IAR: intra-action review.



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“ An IAR should not be seen as a one-off event; it is part of a bigger picture. ”

Monitoring and Evaluation Staff,
WHO Regional Office

4.2 Impact of IARs

It is important to note that the level of impact of an IAR depends on many factors, such as the composition of the coordination team, the stakeholders invited, the timing of the IAR and the effectiveness of the follow-up process in implementing IAR recommendations, among others. Not all IARs conducted resulted in a significant impact such as the revision of a strategic plan. The impact of the IARs was varied; the examples shown are those for which a larger impact was reported, with the aim of inspiring peer countries to maximize the benefits of an IAR.

4.2.1 Highlights from interviews

1. The IAR provided a collaborative context to allow the space and time for multisectoral stakeholders to come together and discuss strategies to combat the ongoing pandemic

One of the key highlights mentioned during the interviews and survey was that the IAR process provided a social and collaborative context for participants to discuss real-world situations and challenges that may otherwise be difficult to talk about. This fostered collaboration between sectors may not have occurred if the IAR had not been conducted. Some examples of this were seen in statements from the interviewees.

“The best part of the IAR is that it creates an atmosphere in which people discuss. That has probably been the most significant added value of the process, and this is what stands out over other methods for evaluation.”

“The multisectoral collaboration has [had] a huge impact. The whole society has looked on the response. We have had a good opportunity to join provinces, bring together health, education, administration and other different sectors.”

“Recognizing the importance of multisectoral collaboration and the opportunity to find ways of working better together has [had] a great impact. If we want to continue improving health outcomes outside the pandemics, we will have to maintain this multisectoral coordination.”

“IAR really stresses on the fact that the review should be multisectoral, bringing the opportunity of having all the sectors together around one table to do this review. This comes very clear in the guiding principles.”

“The opportunity to reflect, to develop a plan, to think on the next steps and to make sure that we are going in the right direction is one of the biggest impacts.”

However, one challenge often expressed by interviewees was for responders to take the time to come together for the IAR when they were busy with the COVID-19 outbreak response. It was necessary to identify the right moment or create the time for responders to participate in the IAR, especially given that the outcome of the IAR is highly dependent on having the right participants, as expressed by the interviewees.

“The methodology relies on the expertise of the people that we engage. We couldn’t bring all the experts per pillar because of the pandemics. Some of the pillar’s experts were very affected and busy (e.g. the surveillance pillar), so the participation in some pillars was less than the expected.”

“The Ministry only agreed to conduct the IAR using one day, it was a one day working group discussion and face-to-face. One day to review the whole year was ... stressful and I don’t think we captured everything.”

“The duration for the collection of information from the field as well as the review workshop was deemed insufficient to go in depth. These durations should be reviewed, e.g. at least 2 weeks for the data collection phase and 5 days for the IAR workshop.”

However, other interviewees also expressed that countries that had initially been apprehensive about investing the time in conducting an IAR later felt it was worth the time.

“Countries [that] have conducted an IAR had this initial perception of lack of time but at the end they appreciate it, the perception sharing.”

Good facilitators are critical to creating an atmosphere where participants feel comfortable sharing their experiences and dig deeper into identifying the underlying root causes of challenges seen. However, one of the challenges noted by some interviewees was the varying level of facilitation skills seen during the IAR.

“We have used the facilitator manual and adapted it and shared it in advance with our facilitators but we think it’s not enough if you want a good facilitation of the process. Root-cause analysis of challenges is something in which we struggle and this is one of the key [reasons that] we are doing an IAR.”

“The lack of facilitation skills, specifically to bring out the challenges and real issues, is our barrier.”

Interviewees emphasized the importance of conducting proper training for facilitators before the IAR to address this.

“Facilitation skills in the country are quite basic and this was where we really struggled and had to ask for specific support. We had a meeting with facilitators to discuss what was expected, but the skills were difficult to apply without having training in advance.”

“Training of facilitators is often an issue. That is really important, we always provide training to facilitators before going to a country to do IAR, they need to know what is going to be done, and to help [to create] a friendly atmosphere.”

2. The IAR was perceived as a useful and timely methodology that can be used for COVID-19 and other public health emergencies

On its own, the IAR process was perceived as a very useful tool that, although it was developed during the COVID-19 pandemic, interviewees felt can also be adapted to concomitant and future public health emergencies.

“Maybe if we had an IAR for cholera it would [not] have ... lasted that time.”

“The methodology was highly valuable. We will use it again. The IAR provides a setting in which people get together and reflect on what has been happening and engage in that setting.”

“The IAR is a good practice, it is one of those positive things that we will learn from COVID-19.”

“The process has been customized by the country. The methodology could be used in other diseases different from COVID-19. The methodology is suitable, and people [are] confident with it.”

“The IAR we did was useful; it opened [our] eyes on [what] the issues are, and the allocation of the resources.”

3. IAR recommendations were integrated into national plans and strategies to contribute to long-term system strengthening

One of the ways in which the IAR process can create the desired change and impact is to integrate IAR recommendations into the national plans and strategies of countries so they can be immediately implemented for the COVID-19 response and promote long-term system strengthening. Interviewees noted that when IARs were carried out just before the development or revision of national plans, IAR recommendations were able to be easily integrated into plans given the optimal timing.

“The planning of the IAR followed by the revision of the NDPV took place at the same time. Immediately after the IAR workshop, the country organized a workshop for the revision of its NDPV.”

“IAR evolved the policies.”

“In the national level we developed the COVID-19 response plan and also developed the guideline for ... COVID-19 which included many pillars. During the IAR we developed some recommendations that were adopted into the efficiency of the COVID-19 response plan and guideline that is disseminated to the subnational level from the Ministry of Health.”

4. IARs conducted at the local level were both useful and effective as recommendations could be immediately acted upon to make a difference in the response, requiring less bureaucratic administration processes

Several interviewees emphasized that IARs were most effective when conducted at the local level, and can create an important impact on the response based on the practical solutions that can be identified at the local level.

“It is important to go to the subnational and most feasible level.”

“Conducting it at the subnational level also allows the involvement of the operational and tactical teams, which can provide valuable inputs.”

“It does not make sense to conduct an IAR at the national level for bigger countries, it provides too much information. Analysing how health outcomes could have been improved is easier if it is done at subnational level.”

“The IAR was conducted in the national level even though we had representatives from the subnational level. We have a decentralized system, with different districts in which there are different capacities so the IAR should be performed at the subnational level.”

“I recommend to conduct the IAR at the subnational level; it will reveal strengths and gaps as the contacts from the national IAR would be different. Also, at subnational level they conduct exercises to see how the COVID-19 response and contingency plan is going.”

“I would encourage to perform the IAR at the subnational level, because there are different capacities.”

“I have to say that at the national level, the IAR doesn't make sense anymore as everything happens at subnational level, at least in the context of the COVID-19 pandemic.”

“I think in [this country] we are very good as a country in response, but we never get to think what it is between. The IAR at the subnational level has forced provinces to stop and reflect. Otherwise, it’s just act and act, but we don’t really think on what we are acting on. That has been a very big challenge, we have been doing many activities but we had to think if that was the right direction.”

“From the operational point of view, the impact of the IAR [depends] on how practical solutions are found, specially at the local (subnational) level.”

“How the infectious disease is controlled really depends on the capacities of the local units.”

5. The IAR process provided a flexible and useful approach that can be tailored to conduct focused reviews of any aspect of the response, especially when reviewing specific elements of a single pillar

Interviewees believed that the IAR was a flexible tool that could be most useful when adopted to conduct a focused review of specific aspects of selected public health response pillars.

“It makes sense to pick a pillar and then ... focus [on] it more within that pillar. Or maybe just pick ... one particular target [within] that pillar. I think the focus is certainly necessary, it has to be clear and you need to communicate to participants.”

“We could conduct the IAR per pillar, it could improve its implementation and in-depth understanding of the contributing factors.”

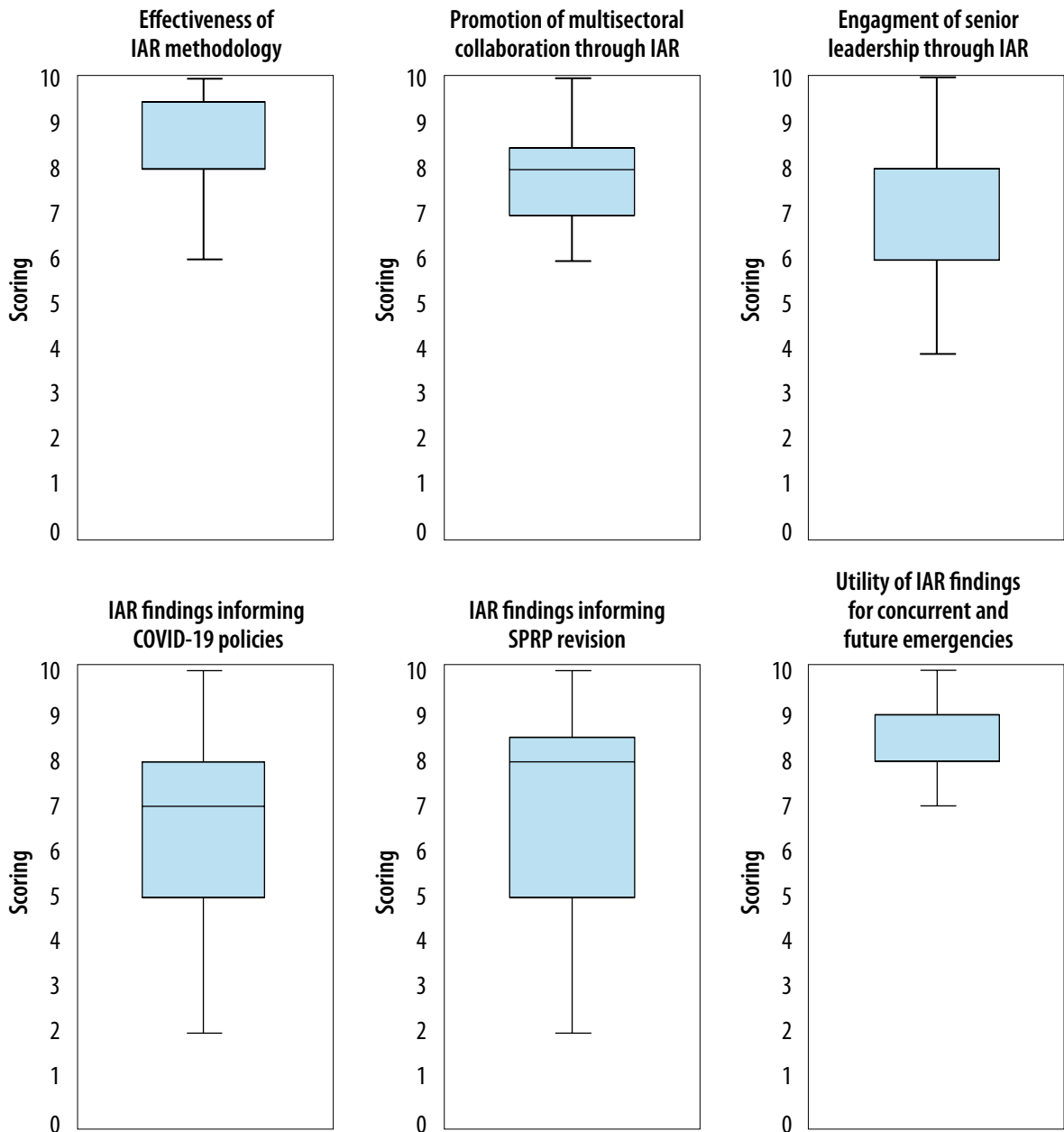
“The methodology is very flexible; you can adapt as you want. The pillars can help focusing and suggesting various ways of looking at COVID-19. If you want to look at cross-cutting issues or more than one pillar you can also do it, I wouldn’t see why you are limited at all.”

4.2.2 Highlights from online survey responses

During the online survey, respondents were asked about possible impacts triggered after conducting an IAR. The online survey responses are shown in Fig. 4.2.

When respondents were asked about the effectiveness of the WHO IAR methodology to identify best practices, challenges and lessons learned to adjust their COVID-19 response, a median score of 8 (moderately agree), a minimum score of 6 (slightly agree) and a maximum score of 10 (strongly agree) were seen.

Fig. 4.2. Online survey responses on the impact of IAR, conducted between 10 November 2021 and 1 December 2021



IAR: intra-action review; SPRP: Strategic Preparedness and Response Plan.

The scoring is based on a Likert scale with 0 indicating strongly disagree, 10 indicating strongly agree and 5 indicating neither agree nor disagree (neutral response).

Survey responders perceived the IAR process to be an impactful tool for strengthening multisectoral collaboration and coordination in the country COVID-19 response, with a median score of 8 (moderately agree), a minimum score of 4 (slightly disagree) and a maximum score of 10 (strongly agree).

Obtaining agreement from senior leadership is critical for implementing recommendations proposed during the IAR process. When asked whether the IAR process engaged these individuals, a median score of 8 (moderately agree), a minimum score of 4 (slightly disagree) and a maximum score of 10 (strongly agree) were seen.

When respondents were asked whether IAR findings impacted COVID-19 policies, a median score of 7 (moderately agree), a minimum score of 2 (moderately disagree) and a maximum score of 10 (strongly agree) were seen. As well as the ability of IAR findings to inform policies, this diverse scoring may also partially reflect the complexity of the policy-making process in different country contexts.

Respondents were also specifically asked whether IAR findings informed the revision of the COVID-19 SPRP. A median score of 8 (moderately agree), a minimum score of 2 (moderately disagree) and a maximum score of 10 (strongly agree) were obtained. As some interviewees mentioned during the key informant interviews, the integration of IAR findings and recommendations into national plans such as SPRP and the NDVP is highly dependent on the timing of the IAR with respect to the revision of the plans.

Finally, respondents were asked whether lessons learned from the COVID-19 IAR will be useful in preparing and responding to concurrent and future public health emergencies. A median score of 8 (moderately agree), a minimum score of 6 (slightly agree) and a maximum score of 10 (strongly agree) were obtained. It appears the respondents perceived that lessons from this pandemic may be applied moving forwards to strengthen public health emergency preparedness and response.

4.3 Key messages and critical areas for improvement

There were several key messages observed from the interviews and online survey responses.

- The IAR has the potential to create change and affect the response when implemented at the right time, particularly at the local level, adopting a focused approach, involving the right multisectoral stakeholders and engaging decision-makers.
- The IAR process provides a collaborative and enabling environment to build healthy collaboration between multisectoral stakeholders, promoting a coordinated response to the COVID-19 outbreak and other future public health emergencies.

- The planning and conduct of the IAR process itself is as valuable as the outcome it is trying to achieve.
- Several critical areas of the IAR methodology that could be improved were identified.
- Follow-up and progress monitoring of IAR recommendations should be included as part of the continuum of the IAR process.
- The systems developed during COVID-19 IARs should be built on to institutionalize continual introspection as good practice in the emergency preparedness and response cycle.
- Applicable lessons learned during COVID-19 IARs in peer countries should be reflected upon and adopted to improve responses to future public health emergencies. ■

Chapter 5

Discussion and concluding remarks

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**“ Flexibility is the main
methodological requirement to allow
for a comprehensive analysis of
the COVID-19 response in all contexts. ”**

IAR/AAR Focal Point,
WHO Regional Office

5

Discussion and concluding remarks

5.1 Pushing boundaries to fight the pandemic

Countries pushed the boundaries of both research and development, and technological innovation, in their response to the COVID-19 pandemic; rapid advances were made as a result of the pressure of the pandemic. The swift progress of research and development and approval of multiple new vaccine products was unprecedented, but demonstrated what countries could achieve when working together in unity. These actions were in line with the Global Preparedness Monitoring Board (GPMB) report in 2019 (19), which reiterated that “countries, donors and multilateral institutions must be prepared for the worst” and ensure “adequate investment in developing innovative vaccines and therapeutics, surge manufacturing capacity, broad-spectrum antivirals and appropriate non-pharmaceutical interventions”. In their 2020 report, the GPMB also called on the research community, private sector, governments and international organizations to “improve coordination and support for research and development in health emergencies and establish a sustainable mechanism to ensure rapid development, early availability, effective and equitable access to novel vaccines, therapeutics, diagnostics and non-pharmaceutical interventions for health emergencies, including capacity for testing, scaled manufacturing and distribution” (20). The IARs analysed in this report show how countries successfully expedited vaccine approval both through their own regulatory system or using WHO’s emergency use listing system, which has approved 10 COVID-19 vaccine products to date (21). Countries also reported advancing their diagnostic testing capacities over the course of the pandemic, as global diagnostic testing kits and capacity increased throughout the pandemic (22).

COVID-19 has also encouraged technological innovations that are changing the way in which countries respond to a public health crisis, in line with the recommendation from the Rome Declaration at the Global Health Summit to “further enable increased use of health technologies and the digital transformation of health systems” (23). In the IAR reports, countries highlighted the use of real-time platforms to monitor and redistribute vaccine and vaccine supplies between sites to reduce wastage. In addition, many countries also reported on

the development and adoption of app-based contact tracing with GPS, which overcame the limitations of traditional contact tracing in terms of scalability, notification delays, recall bias and locating contacts (24,25). The technological advances gained during this pandemic cannot be underestimated, as they will likely have a lasting impact on outbreak management in future emergencies.

The widespread use of digital technology such as social media also provided a platform to inform and connect a large portion of the population. The leveraging of digital communities can also promote adherence to public health and social measures and encourage vaccine demand. However, the same tools also amplified the spread of confusion, concerns, unanswered questions, outdated and low-quality information, misinformation and disinformation, creating an infodemic that undermined the global response strategies and measures to control the pandemic. This prompted calls from the Seventy-third and Seventy-fourth World Health Assembly held in 2020 and 2021 for Member States to “*take measures to counter misinformation and disinformation as well as malicious cyber activities*” (26) and for international actors, partners, civil society and the private sector in coordination with Member States to address “*the proliferation of disinformation and misinformation particularly in the digital sphere, as well as the proliferation of malicious cyber-activities that undermine the public health response*” (27). It was also emphasized that countries strengthen health literacy by “*providing access to other sources of fact- and science-based information*”. Moreover, 123 Member States signed a cross-regional statement on infodemics in the context of COVID-19 to the UN Secretary-General in June 2020 (28), with several side events at the UN General Assembly held on topics related to the infodemic, misinformation and disinformation. The Independent Oversight and Advisory Committee has also reiterated the same call in their 2021 report to “*further invest in risk communication as an essential component of epidemic management*” (29).

The political attention given to the infodemic, misinformation and disinformation has also translated into investment at the country level. Among the countries that participated in the pulse survey on the continuity of health services, 90% consistently reported having the capacity to track and address the infodemic and health misinformation during the pandemic, while 69% reported investment in technologies and methods for infodemic management; infodemic management therefore ranks within the top five long-term strategies to support health system preparedness, recovery and resilience (30). Communication, meetings and consultations were also digitized during the COVID-19 pandemic since face-to-face contact was impossible. As reported in the IARs, this has offered clinicians worldwide opportunities to connect and share their experiences on COVID-19 case management with each other. The potential of telemedicine was capitalized during the pandemic when physical consultation posed increased exposure risks for high-risk populations (31–33). The world will likely continue to reap the benefits of e-health moving forwards.

This increased use of technology is not just limited to countries. The IHR Review Committee has also recommended that WHO leverage digital technology to facilitate formal and informal real-time communication between

National IHR Focal Points, WHO and State Parties (34). In their 2021 report, the Independent Panel for Pandemic Preparedness and Response (IPPPR) further called for WHO “to establish a new global system for surveillance based on full transparency by all parties, using state-of-the-art digital tools to connect information centres around the world and include animal and environmental health surveillance, with appropriate protection of people’s rights” (35). These calls were echoed at the Global Health Summit in the Rome Declaration and during the Seventy-fourth World Health Assembly to invest in an “interoperable early warning information, surveillance and trigger systems in line with the One Health approach” (23) to ultimately “secure global digital health information exchange” (27).

5.2 Enhancing efficiency by repurposing existing systems and minimizing bureaucracy

A cross-cutting theme reported across the pillars in the IARs was how countries enhanced the efficiency of the COVID-19 response by repurposing existing systems, platforms and resources (36). Countries reported leveraging the Global Influenza Surveillance and Response System (GISRS) by adapting existing guidelines for COVID-19, and including COVID-19 detection in ILI/SARI sentinel surveillance sites, given their similar clinical presentations. Investing in PIP for more than a decade reaped benefits during the COVID-19 pandemic, with National Influenza Centres serving as COVID-19 reference or testing laboratories globally in the early phase of the pandemic, and GISRS laboratories conducting and sharing genomic sequencing online (37). WHO also provided interim guidance for the adaptation of GISRS to include the monitoring of SARS-CoV-2 in November 2020 (38), in line with the Independent Oversight and Advisory Committee recommendation (29).

Several countries also reported that they repurposed local manufacturers to produce critical pandemic equipment and supplies to ensure sufficient quantities were available for their population. Some countries went even further by temporarily easing or lifting regulations to expedite administrative or approval procedures to promote local production. There was also a call to further expand and increase the capacity for the local manufacturing of medicines and diagnostics in sub-Saharan Africa to increase regional health security (39,40). The provision for technology transfer could increase pharmaceutical production capacity in low- and middle-income countries to provide more equitable access to these global public goods (41).

In an emergency, there is a need to expedite approvals and clearance procedure timelines by leveraging global expertise and know-how, while not minimizing the quality and thoroughness of the process. To enhance the efficiency of the COVID-19 response, many processes and systems were decentralized so that local authorities could manage the situation more rapidly (42). One country conducted multiple subnational IARs, demonstrating how decentralized decision-making systems can help the response at the subnational

level. Janssen and van der Voort highlighted different types of governance in the COVID-19 pandemic (43), and saw countries adopt flexible versus adaptive governance at different times and stages of the pandemic response. While agility is important for improving the speed of the response, this flexibility to adapt the governance structures, regulations, systems and guidelines of countries was noted to be a major determinant of a timely response and resource mobilization during these uncertain times. Finally, several countries also reported the importance of designating senior leadership, such as ministers of health or prime ministers, to lead the COVID-19 steering committee to make decisions promptly. This was in line with a preliminary analysis of the first 20 IAR reports published in 2021, which showed strong senior leadership engagement that facilitated timely decision-making and action (3).

5.3 Adopting a whole-of-government and whole-of-society approach

It is unlikely that a single entity or a single country could successfully manage the dynamic and complex challenges encountered during the COVID-19 pandemic. At the global level, it was highlighted in the IAR reports that governments worked closely together to coordinate efforts for the cross-border management of COVID-19 through formal agreements or transparent real-time data sharing. At the individual country level, countries also embraced the whole-of-government and whole-of-society approaches in their COVID-19 response. These included multisectoral and multilevel coordination, such as establishing multisectoral committees that collaborate at the national and subnational levels. The public-private partnership was also leveraged during the pandemic response, including for local production of critical pandemic response equipment and scaling up testing capacities. Surge capacity was also widely drawn from different sources in many countries, including volunteers, academia, students and civil society (36). This aligns well with the IPPPR recommendation (35) to ensure “*national and subnational public health institutions have multidisciplinary capacities and multisectoral reach and the engagement of the private sector and civil society*”, given that “*evidence-based decision-making should draw on inputs from across society*”.

This whole-of-society approach does not only apply to individual countries but also to international governance structures at the global level. As the GPMB 2021 report recommended, it is important to “*empower communities and ensure engagement of civil society and the private sector: leadership and governance structures for preparedness must include effective means to promote inclusivity, transparency and active participation of communities, One-Health sectors and relevant stakeholders including civil society and the private sector as well as engagement by all countries, not only a group of powerful nations*” (44). This is particularly important as discussions have been ongoing to create an international pandemic treaty or convention with formal pandemic prevention, preparedness and response systems with their own governing bodies (45).

Many of the countries that conducted IARs developed and implemented COVID-19 CPRPs that took a whole-of-society multisectoral approach, engaging multiple ministries with contributions from partners and the private sector for a more coordinated and synergistic response for all stakeholders involved. This is in line with recommendations from the Seventy-third World Health Assembly, which called on the Member States to implement their national COVID-19 action plan for preparedness, response and long-term health system strengthening using a whole-of-government and whole-of-society approach (26). In the Rome Declaration at the Global Health Summit, it was also emphasized that achieving effective preparedness, prevention, detection and response measures can be made possible by “*promoting meaningful and inclusive dialogue with local communities, civil society, frontline workers, vulnerable groups, women’s organizations, etc. and countering misinformation*” (23), which should be reinforced with trust and transparency.

5.4 Leaving no one behind

As stated in the GPMB 2020 report (20) and echoed in the Rome Declaration at the Global Health Summit in 2021 (23), a key aspect of this pandemic was to “*safeguard the vulnerable, leaving no one behind*”. However, of the 83 IAR reports analysed here, none specifically reviewed pillar 11 that focuses on vulnerable and marginalized populations; a possible reason for this was that pillar 11 was proposed by WHO in an addendum to the IAR guidance in April 2021. For the purposes of the COVID-19 IAR, as explained in the IAR pillar 11 description (46), these populations may include, but are not limited to, “*people experiencing homelessness, people in prisons, refugees and internally displaced persons living in camps, migrants, unregistered workers, people living in extreme poverty, people living with disabilities, people living in long-term care facilities, people living in psychiatric institutions, people with chronic health conditions, older people, pregnant women, ethnic minorities, among others*”, and may be at higher risk of COVID-19 infection and the direct and indirect impact of COVID-19, including both health and socioeconomic impact (47). Although a handful of countries reviewed aspects of this topic in other pillars in their IAR, the importance of considering the unique needs and concerns of these populations when reviewing their COVID-19 response and revising their strategic plans must be emphasized.

As mentioned in the Seventy-third World Health Assembly, Member States were called to implement comprehensive national action plans that take into consideration age, disability and gender-specific COVID-19 response measures to ensure human rights are respected, and that countries pay particular attention to “*the needs of people in vulnerable situations, promoting social cohesion, taking the necessary measures to ensure social protection and protection from financial hardship, and preventing insecurity, violence, discrimination, stigmatization and marginalization*” (26).

The 2021 IPPPR report also called on countries to “*work with marginalized communities in the co-creation of plans*” (35), especially regarding risk communication policies and strategies. The report of the *Pan-European commission on health and sustainable development: rethinking policy priorities in the light of pandemics* (48) also emphasized the importance of making “*health systems more inclusive, including with measures to ensure that everyone, whatever their characteristics, is able to participate in decision-making at all levels and to obtain access to health and social services*”, as well as ensuring “*women participate effectively in decision-making bodies and ensure that their rights and needs are equally recognized and reflected in policies*”.

In addition, it is also important to recognize the unique challenges that countries may face when responding to the COVID-19 pandemic in insecure settings such as conflict zones and humanitarian contexts. As emphasized in the Seventy-third World Health Assembly (26), it was critical for Member States and WHO to work with the UN Secretary-General and the UN Office for the Coordination of Humanitarian Affairs to advance pandemic preparedness in fragile states and conflict-affected areas.

5.5 Limitations and strengths of this analysis

No analysis is without its limitations (Box 5.1). Conducting a global analysis of IARs is a challenging task, mainly because of the diversity in format, content and scope of the reviews, depending on the needs of the country. However, this is also reported by the interviewees as one of the greatest strengths of the IAR process, in that it is a flexible tool that countries can customize for their unique contexts to meet their needs. As stated in Resolution 48 of the Seventy-fourth World Health Assembly, it is important that WHO advice and support to the Member States on public health emergency preparedness and response “*takes into consideration different national circumstances and focuses*” (27). Ultimately, the WHO IAR guidance and tool (1) are designed to be customizable so that countries can make the process as thorough as desired according to what is feasible and appropriate.

IAR reports document the deliberations resulting from the discussions between the invited key stakeholders; the reports may not document everything discussed during the IAR. In addition, a specific public health measure may have been taken by countries but simply not discussed during the IAR. For these reasons, the frequencies and percentages presented in this report are conservative estimates. The true figures are probably higher as not everything was documented in the IAR reports and therefore captured. However, one of the key strengths of the IARs was that they were performed during the response, minimizing the possibility of recall bias.

Only the countries that used the WHO IAR methodology in part or in whole were included in this analysis. Other approaches to review the COVID-19 response may also have been proposed and used – such as those from the European Centre for Disease Prevention and Control and the United States CDC –but were not considered in this analysis. It may be useful to collectively examine the findings from various types of reviews beyond the IARs to obtain a more comprehensive picture.

Box 5.1. Limitations and strengths of the IAR reports as data sources**Limitations**

- IAR reports are meant for internal use by countries to document the deliberations resulting from discussions among key stakeholders. The reports may therefore not document everything that was discussed during the IAR.
- The IAR process and reports are flexible to facilitate customization to the needs of individual countries; this means that findings presented in IAR reports are unique to country context and may not be comparable.
- The quality of an IAR depends on the participation of knowledgeable stakeholders to identify best practices, bottlenecks and deep insights from the response. Because many of these individuals were also key responders to the COVID-19 pandemic, they may not have participated in the IAR because of time constraints; it is therefore possible that some of the key elements and lessons learned from the COVID-19 responses of countries were not captured during the IAR.

Strengths

- IAR reports are unique in that they document the real-time strategic thinking, reflections and prioritized actions from each country's decision-makers and key responders to the COVID-19 pandemic.
- IARs brought together a wide range of multisectoral stakeholders, and could therefore capture the diverse views of responders working on different public health response pillars during the ongoing pandemic.
- IARs were performed during the response, therefore minimizing the possibility of recall bias.

IAR: intra-action review.

The findings presented here may not be generalizable, especially considering that the IARs were not evenly distributed throughout the globe and that 73.7% (42/57) of the IARs analysed were conducted within lower-middle- or low-income countries (Table 2.1). The fact that countries within these World Bank income groups are more likely to seek WHO technical support and use WHO tools may affect the types of challenges and solutions documented in the IAR reports analysed.

However, the innovative approaches adopted by countries to address various common challenges encountered during the pandemic offer inspiration for countries to learn from each another in developing their own solutions to strengthen their preparedness for and response to future public health emergencies.

This global analysis of IAR reports was supplemented with interviews with key stakeholders and an online survey for COVID-19 responders who were familiar with the IAR process. However, despite their active involvement and familiarity with the in-country IAR implementation, the majority of these key informants were mainly from WHO regional and country offices, given that ministry staff were actively responding to the ongoing pandemic. For the online survey, it was also not possible to calculate the response rate. As a snowballing

approach was used following the dissemination of the survey to the first point of contact, it is not known how many other possible respondents the survey was shared with; no reliable denominator is therefore available.

In the future, it could also be useful to complement findings by cross-checking the data from IAR reports with additional key stakeholders (e.g. Ministry of Health representatives, frontline health workers who responded to the pandemic and vulnerable populations). This could achieve a more diverse range of viewpoints to ensure that countries fully capture the lessons learned and improvements needed for public health emergency preparedness and response from a whole-of-society perspective. [Box 5.2](#) lists other areas in which the IAR process could be strengthened.

Box 5.2. Critical areas for strengthening the intra-action review methodology

1. Involve representatives of communities and vulnerable populations in the IAR to incorporate the knowledge from communities and identify ways to strengthen and maintain trusted relationships between health authorities and populations.
2. Involve senior leadership during the entire IAR process to ensure recommendations can be rapidly endorsed and actioned.
3. Consider the timing of the IAR carefully to bring about the greatest benefit and impact, such as immediately before the revision of a strategic response plan so IAR recommendations can be directly integrated.
4. Conduct regular focused IARs on specific aspects of a single or few pillars, such as COVID-19 vaccination IARs, to enable a swift and efficient review process with minimal disruption to the actual response.
5. Conduct IARs at the local or subnational levels to ensure immediate action from local governments and authorities to respond to events rapidly before they expand to become emergencies.
6. Learn from approaches taken by peer countries and other programmes following a review to identify a reliable and systematic approach to monitor IAR recommendations, and to ensure they progress within the proposed timeline and meet the desired outcomes.
7. Incorporate continual reflective learning such as IAR in addition to AAR as a systematic and institutionalized standard operating model during the entire emergency preparedness and response cycle.

AAR: after-action review; IAR: intra-action review.

5.6 Implications of IARs for COVID-19 and future pandemics

This analysis provided a snapshot of the functional capacities and capabilities of countries to prepare for and respond to the COVID-19 pandemic, highlighting national and subnational government experiences and approaches taken to address challenges faced during the response. IARs provide insights on critical areas to help countries adjust their response to the COVID-19 pandemic. All lessons learned and systems developed during this pandemic have become foundations that countries can leverage for future epidemics and pandemics.

It is hoped that this report can allow countries to reflect on the challenges they faced and how they navigated them, and learn from the experience of other countries. As countries gradually transition management of COVID-19 from an acute emergency response to a longer-term management approach, they may choose to conduct a COVID-19 after-action review (AAR), an opportunity to reflect on how they responded to the COVID-19 outbreak during the various phases of the protracted emergency. At that point, countries can also use this report as a reference document to refresh their memories of the approaches they either adopted or deliberated on but chose not to take during the outbreak response. This report could offer new ideas they can incorporate into their AAR recommendations on how countries may wish to revise their legal framework, mechanisms and processes for future pandemics and public health emergencies. Finally, it is hoped that this report will also serve as a knowledge base for all countries to refer to when designing future policies and interventions for health emergency management.

One of the key principles of IAR and AAR is for countries to foster a culture of continuous learning and improvement in a safe discussion space. For countries that conducted a COVID-19 IAR, this global analysis may provide additional ideas on how the review could be more effective and impactful should they wish to conduct additional IARs. For countries that did not conduct a COVID-19 IAR, this report may demonstrate some of the value in reflecting on the ongoing situation for real-time adjustment of their response in future public health emergencies. Finally, for partners and donors, this global analysis may provide ideas of how they could support countries to improve their preparedness for and response to the next pandemic or public health emergency.

The emergence of new zoonotic diseases has been increasing, with 60% of all emerging infectious diseases being of zoonotic origin (49). With this trend likely to continue, it is important not to forget the lessons identified from COVID-19 IARs and lose the momentum in building resilient preparedness and response systems triggered by this pandemic. Countries must not become complacent, but instead continue to sustain, test and improve their preparedness and response systems through simulation exercises (preferably at the multisectoral level on a regular basis, as recommended by IPPPR (35) and GPMB (20)). In particular, it is critical to test and ensure the ability of countries to rapidly scale-up their response, such as diagnostic testing and workforce, as needed during the COVID-

19 pandemic. Moreover, it is imperative that the lessons and middle- to long-term recommendations proposed during the IARs are not lost but integrated into national plans such as the NAPHS.

Finally, if the countries involved had not been willing to share their report publicly or confidentially with WHO, it would not have been possible to conduct this global analysis of COVID-19 IARs. For the benefit of all countries, and in the spirit of sharing experiences, lessons learned and best practices (Box 5.3) with peer countries and WHO, as recommended in the Seventy-third World Health Assembly (26), WHO encourages more countries to share their IAR or AAR reports in the future.

Box 5.3. High-level considerations emerging from this global analysis of best practices demonstrated by countries

1. Invest in health emergency preparedness as an integral part of national security and a global public good, including setting targets for domestic financial contributions towards health security to improve readiness for future public health emergencies of any nature and magnitude.
2. Build on the innovative tools, networks and processes successfully utilized in the COVID-19 pandemic, such as through the regular application of these in routine work and domestic public health emergencies to further enhance the preparedness and response to future international health emergencies.
3. Encourage real-time data-driven decision-making and evidence generation by leveraging digital interoperable platforms where possible to triangulate data from multiple sources from different sectors, and maintain data quality through a systematic cross-checking process.
4. Continue a whole-of-government and whole-of-society dialogue and engagement to ensure all sectors and perspectives are considered during peacetime, so that no population groups are left behind during public health emergencies.
5. Maintain existing and develop new bilateral and multilateral cross-border agreements between governments to promote smooth collaboration and coordination during international health emergencies, especially with neighbouring countries.
6. Maintain infrastructure, systems and workforce capacity and readiness developed during the COVID-19 pandemic by continuing to test preparedness and response plans with different scenarios, ensuring preparedness for future emergencies and the ability to rapidly scale-up resources.
7. Ensure that the lessons and middle- to long-term recommendations from COVID-19 IARs are not lost, but integrated into the NAPHS to better prepare countries for future health emergencies.

NAPHS: National Action Plan for Health Security.

Some of the considerations in Box 5.3 are not new, but are repeated from previous recommendations and calls to action by GPMB (19,20), the Seventy-third and Seventy-fourth World Health Assemblies (27,50), G7 (51) and G20 (52) to urge heads of governments to prioritize and invest in emergency preparedness,

including developing mechanisms for sustainable domestic financing, leveraging public–private partnerships and adopting an inclusive approach to preparedness. As recommended in the Seventy-third World Health Assembly, countries should “*enable an inclusive multisectoral, all-hazards, health-in-all-policies and whole-of-society approach to preparedness, including, as appropriate, collaboration with civil society, academia and the private sector*”.

The scope of the findings and key considerations proposed in this report also aligns with the 5Cs (core subsystems) proposed in the WHO Director-General’s vision and proposals to strengthen the Global Architecture for Health Emergency Preparedness, Response and Resilience (53). The five core subsystems include collaborative surveillance and public health intelligence, community protection, clinical care, access to countermeasures and emergency coordination, which all are fundamental and contribute to building operational readiness to prepare for, prevent, detect and respond effectively to health emergencies at national, regional and global levels.

5.7 Impact of IARs

The interviews and online survey with individuals familiar with the entire IAR process helped to identify elements that could bring about the most direct and immediate impacts on the COVID-19 response.

First, one of the most important aspects was to conduct IARs at strategic time points, such as just before the revision of specific response plans or before a key decision or policy was enforced. This ensured that the findings and recommendations from the IAR were incorporated into the response while the discussions and ideas were still fresh.

Second, having senior leadership, especially decision-makers, involved in the IAR can greatly facilitate rapid endorsement of the recommendations, the release of funds and implementation of actions. This also aligns with the GPMB in their 2020 report, which urged that “*national leaders and leaders of international organizations and other stakeholders take early decisive action based on science, evidence and best practice when confronted with health emergencies*” (20).

Third, IARs conducted at the national level provide a comprehensive view of the situation. However, the greatest impact of an IAR is achieved when it is conducted at the subnational level, focusing on specific aspects of the response. This is where immediate actions can be taken after the review to improve the response at the frontline, where it matters most (54). This is similar to grassroots actions and response, where locally inspired actions using a bottom-up approach are best suited for issues on the ground best understood by the local community and authorities (55,56).

Lastly, as seen with after-action reviews, often the hardest part is not the planning or conducting but ensuring recommendations are followed up and acted upon (57). This analysis revealed that countries felt that the current tool does not sufficiently guide them on how to conduct effective follow-up as part of the continuum of the IAR process. Some countries have developed extremely

useful tools and processes that effectively monitor the progress of implementation of IAR recommendations. Part of the reason for conducting this analysis was for WHO to learn from countries, and make the best ideas available to other countries at the global level. With permission from the reporting countries, aspects of these tools and processes are currently being reviewed and adapted for integration into WHO guidance. This is also in line with the IHR Review Committee recommendation for WHO to “*continue to review and strengthen its tools and processes for assessing, monitoring and reporting on core capacities, taking into consideration lessons learned from the current pandemic including functional assessments, to allow for accurate analysis and dynamic adaptation of capacities at the national and subnational levels*” (34).

It is also interesting that some interviewees felt the process was extremely valuable. Even if not all IAR recommendations could be implemented, the value was already seen by conducting the reflection process collectively as a group. This was similar to what was perceived for other IHR Monitoring and Evaluation Framework processes, such as the Joint External Evaluation that brought benefits such as collaboration and coordination between different departments and sectors (58). On the whole, the IAR process aligns with the IHR Review Committee recommendations for WHO “*to structure rigorous and all-inclusive, whole-of-government assessments and other preparedness activities*” (34). Moving forwards, countries could benefit from using IARs as a fast, replicable and routine process for continuous quality improvement.

5.8 Concluding remarks

The COVID-19 pandemic meant that this interconnected world was reminded of the indiscriminate vulnerability all countries are exposed to from the borderless nature of infectious disease threats. Before the global population enter the usual panic-and-forget phase following most public health emergencies, this report documents the efforts made by governments to overcome this crisis, and WHO commends their efforts in conducting real-time reviews and adjustments of their response during one of the most complicated pandemics in modern times. It was evident from the IAR reports that countries developed innovative approaches to address common obstacles, and it was a privilege to bring their learning to the rest of the world. The willingness of countries to share their IAR reports and experiences with WHO is encouraged and appreciated, and the creativity they exhibited during the pandemic acknowledged.

According to the IARs reviewed in this global analysis, several factors proved critical during the COVID-19 emergency preparedness and response process. Early decisive action from senior leadership enabled countries to prepare before the first COVID-19 case was detected in their countries. Speed and efficiency were essential for countries to respond to the rapidly evolving COVID-19 context. The agility to evolve with the pandemic ensured that national and subnational response strategies were continually reviewed and updated on the dynamic situation. Transparent information exchange between

multisectoral stakeholders, different levels of government and the private sector, civil society, vulnerable populations and communities ensured all stakeholders were informed and coordinated. Real-time data using the latest technology and innovation supported timely planning and response, including forecasting needs and reallocating resources. All of these actions would not have been possible without the solidarity and joint commitment from all sectors and levels to work together, streamline processes and public communication, and overcome the habit of working independently.

Although the IAR methodology (1,7) was created during the COVID-19 pandemic, the process can be easily adapted and used for concurrent and future public health emergencies. Among the perceived value addition reiterated by interviewees were the usefulness and timeliness of the publication of the IAR guidance and tools that countries could immediately leverage and customize for their own use. Following this global analysis, the intention is to use the lessons to update the WHO IAR guidance and tools so they can continue to evolve. Moving forwards, WHO is committed to continue to listen to the needs of countries and absorb feedback on the IAR process. WHO will continue to support Member States in cultivating a culture of continuous improvement through collective and individual learning, both during and after real-world public health emergencies. ■



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“ The IAR has contributed to enhance trust in the response and to understand what we were doing much better. ”

Public Health Professional,
Ministry of Health

References

1. Guidance for conducting a country COVID-19 intra-action review (IAR). Geneva: World Health Organization; 2020 (https://www.who.int/publications/i/item/WHO-2019-nCoV-Country_IAR-2020.1, accessed 25 November 2022).
2. Wulandari EW, Hastuti EB, Setiawaty V, Sitohang V, Ronoatmodjo S. The first intra-action review of Indonesia's response to the COVID-19 pandemic, August 2020. *Health Secur.* 2021;19(5):521–31. doi:10.1089/hs.2021.0071.
3. Mayigane LN, Vente C, Charles D, Chiu de Vázquez C, Bell A, Copper F et al. Operationalizing COVID-19 intra-action reviews – preliminary findings. *Wkly Epidemiol Rec.* 2021;4 (<https://apps.who.int/iris/handle/10665/345636>, accessed 25 November 2022).
4. Talisuna A, Iwu C, Okeibunor J, Stephen M, Onuche Musa E, Herring BL et al. Assessment of COVID-19 pandemic responses in African countries: thematic synthesis of WHO intra-action review reports. *BMJ Open.* 2022;12(5):e056896. doi:10.1136/bmjopen-2021-056896.
5. Statement on the fourth meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of coronavirus disease (COVID-19). Geneva: World Health Organization; 2020 ([https://www.who.int/news/item/01-08-2020-statement-on-the-fourth-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-coronavirus-disease-\(covid-19\)](https://www.who.int/news/item/01-08-2020-statement-on-the-fourth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-coronavirus-disease-(covid-19)), accessed 25 November 2022).
6. COVID-19 Strategic Preparedness and Response Plan: 1 February 2021 to 31 January 2022. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/340072>, accessed 25 November 2022).
7. Guidance for conducting a country COVID-19 intra-action review (IAR): addendum 1, 28 April 2021. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/341024>, accessed 25 November 2022).
8. COVID-19 Partners Platform. Geneva: World Health Organization; 2022 (<https://partnersplatform.who.int/en/>, accessed 25 November 2022).
9. Rapid hospital readiness checklist for COVID-19. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/332778>, accessed 25 November 2022).
10. Risk assessment and management of health-care workers in the context of COVID-19. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/334366>, accessed 25 November 2022).
11. Continuity of essential health services: facility assessment tool: a module from the suite of health service capacity assessments in the context of the COVID-19 pandemic: interim guidance, 12 May 2021. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/341306>, accessed 25 November 2022).
12. Clinical management of patients with COVID-19: general considerations. OpenWHO. Geneva: World Health Organization; 2020 (<https://openwho.org/courses/clinical-management-COVID-19-general-considerations>, accessed 25 November 2022).

A global analysis of COVID-19 intra-action reviews

13. Clinical management of patients with COVID-19: investigations and care for mild, moderate and severe disease. OpenWHO. Geneva: World Health Organization; 2021 (<https://openwho.org/courses/clinical-management-COVID-19-mild-mod-severe>, accessed 25 November 2022).
14. Clinical management of patients with COVID-19: initial approach to the acutely ill patient. OpenWHO. Geneva: World Health Organization; 2021 (<https://openwho.org/courses/clinical-management-COVID-19-initial-approach>, accessed 25 November 2022).
15. Clinical management of patients with COVID-19: rehabilitation of patients with COVID-19. OpenWHO. Geneva: World Health Organization; 2021 (<https://openwho.org/courses/clinical-management-COVID-19-rehabilitation>, accessed 25 November 2022).
16. Guidance on developing a national deployment and vaccination plan for COVID-19 vaccines: interim guidance, 1 June 2021. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/341564>, accessed 25 November 2022).
17. COVID-19 vaccine post-introduction evaluation (cPIE) guide: interim guidance, 25 August 2021. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/344721>, accessed 25 November 2022).
18. Analysis of COVID-19 vaccination intra action review reports. MM Global Health Consulting; 2022 ([https://www.technet-21.org/en/library/main/8337-vaccination-intra-action-review-\(iar\)-report-analysis-](https://www.technet-21.org/en/library/main/8337-vaccination-intra-action-review-(iar)-report-analysis-), accessed 25 November 2022).
19. A world at risk: Global Preparedness Monitoring Board 2019. Geneva: World Health Organization; 2019 (<https://www.gpmb.org/annual-reports/annual-report-2019>, accessed 26 November 2022).
20. A world in disorder: Global Preparedness Monitoring Board Annual Report 2020. Geneva: World Health Organization; 2020 (https://www.gpmb.org/docs/librariesprovider17/default-document-library/annual-reports/gpmb-2020-annualreport-en.pdf?sfvrsn=bd1b8933_36, accessed 26 November 2022).
21. COVID-19 vaccines with WHO emergency use listing. Geneva: World Health Organization; 2021 (<https://extranet.who.int/pqweb/vaccines/vaccinescovid-19-vaccine-eul-issued>, accessed 25 November 2022).
22. Mercer TR, Salit M. Testing at scale during the COVID-19 pandemic. *Nat Rev Genet.* 2021;22(7):415–26. doi:10.1038/s41576-021-00360-w.
23. Rome Declaration, Global Health Summit. European Union; 2021 (https://global-health-summit.europa.eu/rome-declaration_en, accessed 25 November 2022).
24. Shahroz M, Ahmad F, Younis MS, Ahmad N, Kamel Boulos MN, Vinuesa R, et al. COVID-19 digital contact tracing applications and techniques: a review post initial deployments. *Transp Eng.* 2021;5:100072. doi:10.1016/j.treng.2021.100072.
25. Hegde A, Masthi R. Digital Contact tracing in the COVID-19 pandemic: a tool far from reality. *Digit Health.* 2020;6:2055207620946193. doi:10.1177/2055207620946193.
26. COVID-19 response. In: Seventy-third World Health Assembly, Geneva, 18–19 May and 9–14 November 2020. Summary records of committees. Geneva: World Health Organization; 2020 (WHA73/2020/REC/3, https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R1-en.pdf).
27. Strengthening WHO preparedness for and response to health emergencies. In: Seventy-fourth World Health Assembly, Geneva, 24 May–1 June 2021. Summary records of committees. Geneva: World Health Organization; 2021 (WHA74/2021/REC/3, https://apps.who.int/gb/ebwha/pdf_files/WHA74/A74_R7-en.pdf).
28. Cross-regional statement on “infodemic” in the context of COVID-19. New York: Permanent Mission of France to the United Nations; 2022 (https://onu.delegfrance.org/IMG/pdf/cross-regional_statement_on_infodemic_final_with_all_endorsements.pdf, accessed 26 November 2022).
29. Independent oversight and advisory committee for the WHO Health Emergencies Programme. A74/166. In: Seventy-fourth World Health Assembly, Geneva, 24 May–1 June 2021. Summary records of committees. Geneva: World Health Organization; 2021 (WHA74/2021/REC/3, https://apps.who.int/gb/ebwha/pdf_files/WHA74/A74_16-en.pdf).

30. Third round of the global pulse survey on continuity of essential health services during the COVID-19 pandemic: November–December 2021: interim report 7 February 2022. Geneva: World Health Organization; 2022 (<https://apps.who.int/iris/handle/10665/351527>, accessed 26 November 2022).
31. Kichloo A, Albosta M, Dettloff K, Wani F, El-Amir Z, Singh J et al. Telemedicine, the current COVID-19 pandemic and the future: a narrative review and perspectives moving forward in the USA. *Fam Med Community Health*. 2020;8(3):e000530. doi:10.1136/fmch-2020-000530.
32. Monaghesh E, Hajizadeh A. The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. *BMC Public Health*. 2020;20(1):1193. doi:10.1186/s12889-020-09301-4.
33. Hincapié MA, Gallego JC, Gempeler A, Piñeros JA, Nasner D, Escobar MF. Implementation and usefulness of telemedicine during the COVID-19 pandemic: a scoping review. *J Prim Care Community Health*. 2020;11:2150132720980612. doi:10.1177/2150132720980612.
34. WHO's work in health emergencies. Strengthening preparedness for health emergencies: implementation of the International Health Regulations (2005). A74/9 Add.1. In: Seventy-fourth World Health Assembly, Geneva, 24 May–1 June 2021. Summary records of committees. Geneva: World Health Organization; 2021 (WHA74/2021/REC/3, https://apps.who.int/gb/ebwha/pdf_files/WHA74/A74_9Add1-en.pdf).
35. COVID-19: Make it the last pandemic. The Independent Panel for Pandemic Preparedness and Response; 2021 (https://theindependentpanel.org/wp-content/uploads/2021/05/COVID-19-Make-it-the-Last-Pandemic_final.pdf, accessed 26 November 2022).
36. Health systems resilience during COVID-19: Lessons for building back better. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/348493>, accessed 26 November 2022).
37. Hammond A, Cozza V, Hirve S, Medina MJ, Pereyaslov D, Zhang W. Leveraging global influenza surveillance and response system for the COVID-19 pandemic response and beyond. *China CDC Wkly*. 2021;3(44):937–40. doi:10.46234/ccdcw2021.226.
38. Maintaining surveillance of influenza and monitoring SARS-CoV-2: adapting global influenza surveillance and response system (GISRS) and sentinel systems during the COVID-19 pandemic: interim guidance, 8 November 2020. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/336689>, accessed 26 November 2022).
39. Bright B, Babalola CP, Sam-Agudu NA, Onyeaghala AA, Olatunji A, Aduh U et al. COVID-19 preparedness: capacity to manufacture vaccines, therapeutics and diagnostics in sub-Saharan Africa. *Global Health*. 2021;17(1):24. doi:10.1186/s12992-021-00668-6.
40. Banda G, Mugwagwa J, Wanjala C, Mackintosh M, Kale D. Local manufacturing, local supply chains and health security in Africa: lessons from COVID-19. *BMJ Glob Health*. 2021;6(6):e006362. doi:10.1136/bmjgh-2021-006362.
41. Franssen L, Nkengason J, Srinivas S, Vella S. Boosting equitable access and production of diagnostics, therapeutics and vaccines to confront Covid-19 on a global footing. *G20 Insights*; 2021 (https://www.g20-insights.org/policy_briefs/boosting-equitable-access-and-production-of-diagnostics-therapeutics-and-vaccines-to-confront-covid-19-on-a-global-footing/, accessed 26 November 2022).
42. Zakoji M and Sundararaman T. Emerging good practices and lessons learnt to maintain essential health services during the COVID-19 pandemic. *WHO South-East Asia J Public Health*. 2021;10(3):26–9 (<https://apps.who.int/iris/handle/10665/351477>, accessed 26 November 2022).
43. Janssen M, van der Voort H. Agile and adaptive governance in crisis response: Lessons from the COVID-19 pandemic. *Int J Inf Manag*. 2020;55:102180. doi:10.1016/j.ijinfomgt.2020.102180.
44. From worlds apart to a world prepared: Global Preparedness Monitoring Board Report 2021. Geneva: World Health Organization; 2021 (https://www.gpmb.org/docs/librariesprovider17/default-document-library/gpmb-annual-report-2021.pdf?sfvrsn=44d10dfa_9, accessed 26 November 2022).

A global analysis of COVID-19 intra-action reviews

45. Duff JH, Liu A, Saavedra J, Batycki JN, Morancy K, Stocking B et al. A global public health convention for the 21st century. *Lancet Public Health*. 2021;6(6):e428–33. doi:10.1016/S2468-2667(21)00070-0.
46. Guidance for conducting a country COVID-19 intra-action review (IAR). Tool 5. Trigger question database – 28 April 2021. Geneva: World Health Organization; 2021 (<https://www.who.int/publications-detail-redirect/WHO-2019-nCoV-Country-IAR-templates-trigger-questions-2021.1>, accessed 26 November 2022).
47. Barron GC, Laryea-Adjei G, Vike-Freiberga V, Abubakar I, Dakkak H, Devakumar D et al. Safeguarding people living in vulnerable conditions in the COVID-19 era through universal health coverage and social protection. *Lancet Public Health*. 2022;7(1):e86–92. doi:10.1016/S2468-2667(21)00235-8.
48. Rethinking policy priorities in the light of pandemics – a call to action. Copenhagen: Pan-European Commission on Health and Sustainable Development; 2021 (https://www.euro.who.int/__data/assets/pdf_file/0010/495856/Pan-European-Commission-Call-to-action-eng.pdf, accessed 26 November 2022).
49. Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL et al. Global trends in emerging infectious diseases. *Nature*. 2008;451(7181):990–3. doi:10.1038/nature06536.
50. Strengthening preparedness for health emergencies: implementation of the International Health Regulations (2005). WHA73.8. In: Seventy-third World Health Assembly, Geneva, 18–19 May and 9–14 November 2020. Summary records of committees. Geneva: World Health Organization; 2020 (WHA73/2020/REC/3, https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R8-en.pdf).
51. 100 Days Mission to respond to future pandemic threats – A report to the G7 by the pandemic preparedness partnership. Pandemic preparedness partnership; 2021 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/992762/100_Days_Mission_to_respond_to_future_pandemic_threats__3_.pdf, accessed 26 November 2022).
52. A global deal for our pandemic age. Report of the G20 High Level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response; 2021 (<https://pandemic-financing.org/report/foreword/>, accessed 26 November 2022).
53. 10 proposals to build a safer world together: strengthening the global architecture for health emergency preparedness, response and resilience. Geneva: World Health Organization; 2022 (<https://cdn.who.int/media/docs/default-source/emergency-preparedness/2022-06-24-who-hepr-june-2022.pdf>, accessed 26 November 2022).
54. Dutta A, Fischer HW. The local governance of COVID-19: disease prevention and social security in rural India. *World Dev*. 2021;138:105234. doi:10.1016/j.worlddev.2020.105234.
55. Gilmore B, Ndejjo R, Tchetchia A, Claro V de, Mago E, Diallo AA et al. Community engagement for COVID-19 prevention and control: a rapid evidence synthesis. *BMJ Glob Health*. 2020;5(10):e003188. doi:10.1136/bmjgh-2020-003188.
56. Marston C, Renedo A, Miles S. Community participation is crucial in a pandemic. *Lancet*. 2020;395(10238):1676–8. doi:10.1016/S0140-6736(20)31054-0.
57. Copper FA, Mayigane LN, Pei Y, Charles D, Nguyen TN, Vente C et al. Simulation exercises and after action reviews – analysis of outputs during 2016–2019 to strengthen global health emergency preparedness and response. *Glob Health*. 2020;16(1):115. doi:10.1186/s12992-020-00632-w.
58. Kandel N, Sreedharan R, Chungong S, Sliter K, Nikkari S, Ijaz K et al. Joint external evaluation process: bringing multiple sectors together for global health security. *Lancet Glob Health*. 2017;5(9):e857–8. doi:10.1016/S2214-109X(17)30264-4.



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