

CRITICAL PREPAREDNESS, READINESS, AND RESPONSES TO THE COVID-19 PANDEMIC: A NARRATIVE REVIEW

Kesiagaan, Kesiapan, dan Tanggapan Kritis Pandemi COVID-19: Tinjauan Naratif

*Ravindra Pathirathna¹, Pamila Adikari², Dedunu Dias³, Udara Gunathilake⁴

¹Ministry of Health and Indigenous Medicine, Sri Lanka

²Department of Gastroenterology and Hepatology, Fiona Stanley Hospital, Australia

³Department of Health and Social Care, University of Lincoln, United Kingdom

⁴Ministry of Health and Indigenous Medicine, Sri Lanka

*Correspondence: ravindrapathiratne@gmail.com

ABSTRACT

Background: COVID-19 was declared a pandemic by the World Health Organization (WHO). Countries around the world took action to slow the spread of the disease and avoid overwhelming their health systems. The WHO issued interim guidance on critical preparedness, readiness, and response actions against COVID-19 to help countries prepare for and respond to the pandemic.

Aim: This study reviewed how Australia, Singapore, Sri Lanka, and the United Kingdom implemented the actions and priority areas of work as described in the interim guidance issued by the WHO under two disease transmission scenarios, namely the “no cases” and “sporadic cases” scenarios.

Methods: A non-systematic narrative review was conducted using relevant documents available from governmental websites. The data generated by this search were compiled, and the information was synthesized using the terminology from the WHO interim guidance on critical preparedness, readiness, and response actions against COVID-19. The study focused on the actions and priority areas of work given by the WHO interim guidance under scenarios of “no cases” and “sporadic cases.”

Results: The study found that there were differences in how each country implemented the strategic actions and priority areas of work identified by the WHO interim guidance. The key differences included the timeliness of emergency response plan activation and the kinds of case management strategies used, such as contact tracing, the management of asymptomatic contacts, isolation, quarantine, and the selection of individuals for laboratory investigation. In addition, there were differences in the availability and implementation of business continuity plans.

Conclusion: Political and health authorities worldwide need more robust mechanisms for preparing and coordinating responses to contagious diseases of a similar nature to COVID-19. The occurrence of even one case should trigger the implementation of stringent measures designed to prevent transmission and initiate the actions and priority areas of work as stated in the WHO interim guidance for COVID-19.

Keywords: pandemics, emergency response, health policy, COVID-19, emergency preparedness.

ABSTRAK

Latar Belakang: Virus Corona 2019 (COVID-19) dinyatakan sebagai pandemi oleh Organisasi Kesehatan Dunia (WHO). Negara-negara di dunia mengambil langkah untuk memperlambat penyebaran dan mencegah sistem kesehatan yang tak terkontrol. WHO mengeluarkan pedoman sementara tentang kesiagaan, kesiapan, dan tanggapan kritis COVID-19 untuk membantu tingkat kesiagaan dan kesiapan.

Tujuan: Penelitian ini mengulas bagaimana Australia, Singapura, Sri Lanka, dan Inggris mengambil tindakan dan area prioritas kerja seperti halnya dijelaskan di pedoman sementara yang dikeluarkan oleh WHO pada dua tahap pertama skenario penularan penyakit.

Metode: Penelitian ini merupakan tinjauan naratif non-sistematis. Dokumen yang relevan yang tersedia di website dipilih. Data yang digeneralisasi disatukan, dan informasi disintesa dalam kerangka kerja kesiagaan, kesiapan, dan tanggapan kritis COVID-19. Selanjutnya, skenario “tidak ada kasus” dan “kasus yang sporadis” dianalisis berdasarkan tindakan dan area prioritas kerja yang tercantum dalam kerangka kerja tersebut.

Results: Penelitian ini menemukan adanya perbedaan dalam pendekatan pelaksanaan tindakan dan area prioritas kerja strategis, misalnya pengerahan dan ketepatan melaksanakan rencana tanggap darurat, variasi dalam strategi pengendalian kasus seperti pencarian jejak kontak, pengendalian kontak tanpa gejala, isolasi, karantina dan pemilihan pihak yang terlibat dalam uji laboratorium. Selain itu, perbedaan terdapat pada ketersediaan dan pengerahan rencana keberlanjutan bisnis.

Kesimpulan: Kewenangan kesehatan dan politik di seluruh dunia membutuhkan mekanisme yang kuat untuk kesiagaan, tanggapan, dan koordinasi penyakit menular dengan ciri yang serupa. Bahkan kejadian satu kasus harusnya mendorong adanya pengukuran pencegahan transmisi yang tak terkendali serta menginisiasi tindakan dan area prioritas kerja sebagaimana tercantum dalam pendoman semnetara WHO.

Kata kunci: pandemi, tanggap darurat, kebijakan kesehatan, COVID-19, kesiagaan darurat.

Received: 18 April 2020

Accepted: 28 May 2020

Published: 17 June 2020

INTRODUCTION

Coronavirus is a virus with pandemic potential that can cause severe acute respiratory distress and considerable human fatalities, leading to public health emergencies (Fineberg, 2014). COVID-19 is a new coronavirus that recently occurred in late December 2019 in Wuhan in the Hubei province of China in December 2019. On January 30th, 2020, the World Health Organization (WHO) declared a Public Health Emergency of International Concern, and a pandemic status was declared on March 11th, 2020 (WHO, 2020d). The WHO has worked tirelessly to help the affected countries increase their capacity to prepare for and respond to the pandemic by consulting with scientists, public health decision makers, the media, and civil society representatives (WHO, 2020a).

The COVID-19 pandemic has spread rapidly to countries beyond China and has required robust measures to be put into place to prevent its further transmission. The WHO has made many recommendations regarding risk communication and community engagement; active case-finding strategies; quarantine and isolation; disease surveillance; public health measures including hand hygiene, respiratory and cough etiquette, and social distancing; activities to prevent and control infection; laboratory testing; and clinical management. The WHO has defined four transmission scenarios for COVID-19: No cases, sporadic cases, clusters of cases, and community transmission. The interim guidance issued by the WHO helps

countries to develop their preparedness, readiness, and response actions against COVID-19. Many countries have enacted a combination of measures to delay the onset of patient surge and reduce community spread (WHO, 2020c).

The transmission of COVID-19 can be slowed or stopped, allowing countries more time to increase the capacity of their health and laboratory systems to better manage the pandemic (WHO, 2020c). The WHO guidance on critical preparedness, readiness, and response actions for COVID-19 discusses several strategies that countries can implement to slow the spread of the disease and prevent their health systems from becoming overwhelmed. Australia, Singapore, Sri Lanka, and the United Kingdom (UK) were selected for review in this study on the basis of their locations in different geographical regions, their relative distances from the initial epicenter of the disease, and the authors' familiarity with the health systems of each country.

The WHO guidance on critical preparedness, readiness, and response actions for COVID-19 describes a number of actions in different priority areas of work, namely emergency response mechanisms; risk communication and public engagement; case finding, contact tracing, and management; surveillance; public health measures; infection prevention and control; laboratory testing; case management strategy; case management recommendations according to case severity and risk factors; and societal response.

Differences in the actions taken by individual countries in the priority areas of

work will have a negative impact on transmission control and disease management (WHO, 2020b). Further exploration of these areas will make it possible to identify efficient and effective strategic approaches for each priority area and will improve future preparedness and response planning.

The COVID-19 pandemic has had a significant impact on the economies of all countries, and it will have an even greater economic impact on developing economies in the short run (Atkeson, 2020). Therefore, business continuity plans should be implemented to minimize the economic damage caused by the pandemic.

The aim of this study was to review how Australia, Singapore, Sri Lanka, and the UK have implemented the actions and priority areas of work as given by the WHO interim guidance on COVID-19 under two transmission scenarios, namely “no cases” and “sporadic cases.”

METHOD

We conducted a non-systematic narrative review of the policy documents, policy guidelines, and public notices that were issued by the governments and other key policymakers of the UK, Australia, Singapore, and Sri Lanka between December 2019 and April 2020, and which were available on official governmental websites under the heading of COVID-19. The major government websites reviewed in this study were those operated by the Australian Department of Health, the Ministry of Health in Singapore, the Ministry of Health and Indigenous Medical Services in Sri Lanka, and the UK Department of Health and Social Care. All documents that were published in English were included in the review.

The research team made lists of the key documents and guidelines relating to strategies of critical preparedness, readiness, and response actions as

categorized and defined in the WHO interim guidance for COVID-19. The search strategy used the terminology for actions and priority areas as given by the WHO interim guidance (WHO, 2020c). The literature search was conducted between March 19th and April 8th, 2020.

After thoroughly studying all of the websites, the research team extracted and organized in chronological order all of the key findings and phrases that pertained to the actions and priority areas of work as defined in the WHO framework. The results for each country were synthesized by individual experts using codes developed by the research team, and the final results were reviewed by all participants in a series of online conferences. Because the research team began its literature search during the early stages of the pandemic, there was limited formal scientific literature available. The team focused on the actions taken by each country that were described in detail on the governmental websites. The research team conducted a non-systematic narrative review of the relevant documents by using the website addresses assigned to each government document. The data were synthesized on the basis of the actions and priority areas of work for two transmission scenarios defined by the WHO, namely “no cases” and “sporadic cases.” This was done because each country was in a different phase of transmission at the time of the study, and because each country’s primary aim had been to prevent patient surge and community spread. The first two phases of transmission were also selected because it is of paramount importance that preventative actions be taken in a timely fashion during them.

The study considered two transmission scenarios, namely “no cases” and “sporadic cases.” A country was considered to be in the “no cases” scenario from the time at which the first COVID-19 patient was reported in China to the time at

which the first COVID-19 patient was reported in that country. The first case could either be imported or locally detected. A country was considered to be in the “sporadic cases” scenario from the time at which one or more cases (imported or locally detected) were reported to the time at which there were clusters of cases found, as defined by time, geographic location, or common exposure. Since different countries used different criteria to define the endpoint of the sporadic transmission scenario and the starting point of the cluster transmission scenario, the endpoint of sporadic transmission was identified using country-specific information, namely 100+ reported cases, epidemiological case mapping, and pre-defined color coding.

RESULTS AND DISCUSSION

In terms of their economic status, Australia, Singapore, and the UK are considered to be high-income while Sri Lanka is classified as an upper-middle-income country (The World Bank, 2019). In addition, the curative health systems of Australia, Singapore, and the UK are better developed than that of Sri Lanka. However, Sri Lanka has a well-developed primary health system with a health unit system in community health services that can be quickly deployed in a public health emergency (Perera and Perera, 2017).

As shown in Table 1, each country took steps during the “no cases” and “sporadic cases” scenarios that were in line with the actions and priority areas of work as defined by the WHO framework. The following discussion is organized by thematic areas, and the responses of each country under both transmission scenarios are presented along with comments by the research team members.

Emergency Response Mechanisms

There were differences in the activation of emergency response mechanisms by each country. Only Singapore activated its emergency response mechanisms during the “no cases” scenario. We attribute the swift response of Singaporean authorities to Singapore’s high level of population exchange with China, its role as a global travel hub and resulting susceptibility to the importation of communicable diseases, and its previous experience in dealing with tropical infections, influenza, and SARS (Lin et al., 2020). We recommend further exploration of the factors that can affect a country’s level of alertness and speed in activating emergency response mechanisms. The other countries considered in this study might have been slower to respond to COVID-19 because of their geographical locations and their lower degree of interconnectedness with China. There is a need for international authoritative agencies to develop a mechanism to alert countries to the potential risk that a pandemic poses based on their locations, the movement of their populations, and their interconnectedness with other countries.

Risk Communication and Public Engagement

There were also differences in how each country communicated risk to the public. While all countries communicated risk to institutional health care staff when the COVID-19 outbreak had reached an alarming level, only Sri Lanka and Singapore communicated risk to travelers, who are potential agents of disease transmission. All countries implemented multifaceted communication campaigns during the “sporadic cases” scenario. The differences in how each country implemented risk communication may be related to the different strategies that each country used. Singapore and Sri Lanka may have prioritized addressing public

health concerns and mitigating the projected surge in patients over other considerations, such as economic impact and maintaining the strong appearance of their own curative health sector.

Case Finding, Contact Tracing, and Management

All countries practiced case finding, contact tracing, and management. During the “no cases” scenario, Sri Lanka took additional steps to manage potential contacts. With the exception of the UK, all countries implemented strong public health measures—including quarantine—during the “sporadic cases” scenario. It appears that Sri Lanka was less concerned with maintaining individual rights and freedoms than with achieving its target of containing the outbreak. Sri Lanka’s strong bureaucratic and public management capacities may have contributed to its stringent level of contact management.

All countries considered in the study had a different response to case management. The differences in their responses may be the result of differences in their local contexts, socio-economic situations, levels of resources and experience, and the degree of political support for case management. Further study is needed to examine the factors underlying the disparate responses and the relative effectiveness of different approaches to case management.

Surveillance

All four countries activated their national surveillance systems during the “no cases” scenario. In addition, Singapore activated its sentinel surveillance system. While Australia, Singapore, and Sri Lanka extended their surveillance systems to trace and notify asymptomatic contacts, there is no evidence that the UK conducted contact tracing. The differences observed here might be the result of differences in the responsiveness of each country’s

authorities and health system and differences in how much each country values freedom of movement and compliance with health guidelines. There is a need to implement a uniform surveillance system across the globe to retrieve information in a more timely and reliable fashion.

Public Health Measures

Prior to the later phase of the “sporadic cases” scenario, Australia and the UK adopted a non-persuasive approach to implementing public health measures, relying on effective risk communication to encourage self-isolation and social distancing. The public health response was more proactive and robust in Singapore and Sri Lanka in the “no cases” scenario, perhaps as a result of these countries’ governments being less oriented toward individual freedom. In addition, Singapore and Sri Lanka’s previous experience in controlling tropical diseases with a similar nature to COVID-19 contributed to their strong public health response to COVID-19 (Ooi et al., 2012). The different levels to which public health measures were implemented in each country may have negatively affected efforts to control the borderless COVID-19 pandemic. Further study is required to understand the rationale behind the different approaches.

Infection Prevention and Control

During the “no cases” scenario, all of the countries considered in this study raised the awareness of health staff toward COVID-19, but no country adequately prepared for the pandemic by stockpiling essentials, such as respiratory support systems and personal protective equipment (PPE).

The health systems of Australia, Singapore, and the UK sought to protect the elderly, a vulnerable group, by implementing special practices for the

prevention and control of COVID-19 during the "sporadic cases" scenario. No such action was taken by Sri Lanka. This difference between Sri Lanka and the other three countries might be the result of Sri Lanka having lower awareness of the disease's spread and progression, less focus on the elderly by the health system, and an extended family social structure. The results of this review found that there was an insufficient supply of respirators and PPE and a lack of inclusive policies that spelled out specific measures targeting vulnerable populations.

Laboratory Testing

Early in the "no cases" scenario, Sri Lanka and Singapore used laboratory confirmation of suspected cases to detect the spread of COVID-19. This approach is described as the intensive measure of onward transmission (Bedford et al., 2020).

Although laboratory confirmation guidelines were given in all four countries, there were operational differences in the testing of asymptomatic cases. This difference led to speculation of how to test the cases by the public, healthcare workers, academics, and local and international decision makers. The WHO advised that intensified testing should be used to control the COVID-19 outbreak, and it stressed the importance of considering how laboratory services could be strengthened, distributed, and expanded to combat future pandemics of a similar nature. Health managers should ensure that all available resources in the system are coordinated and channeled to accomplish this. Future work should compare the relative economic benefits of early laboratory testing and case management.

Case Management Strategy

In accordance with the recommendations of the WHO, all four countries had triage protocols in place at

the points of entry to the health system. Case management strategies and guidelines were prepared, and referral systems were adapted from existing emergency preparedness plans.

As a result of climate change and globalization, the pandemic spread of infections is inevitable. As such, global health systems should be alert to the emergence of even a single case of a disease. In the "no cases" scenario, none of the countries considered in this study increased the capacity of their health sector in response to the higher demand expected to result from the COVID-19 pandemic. However, Sri Lanka established a referral center for COVID-19 patients and allocated centers across the country—including the National Institute of Infectious Diseases Hospital in the capital city—to treat infected patients.

Case Management Recommendations by Case Severity and Risk Factors

The case management strategies of Singapore and Sri Lanka offered institutionalized care for mild to moderately ill patients, while health authorities in the UK provided institutionalized care only in severe cases. Australia and Sri Lanka adopted different strategies to isolate, or cohort, asymptomatic contacts. We found great heterogeneity in the pandemic case management strategies of the four countries. This may be due to context-specific factors, such as the robustness of the existing health systems, each country's past experiences with similar diseases, and the willingness of the public to comply with health interventions.

Societal Response

To minimize the impact of a pandemic on the economy, it is essential to prepare business and industry. However, business continuity measures were not adopted during the "no cases" scenario by any of the countries considered here.

Because public health measures affected the routine operations of businesses and industry during the “sporadic cases” scenario, each country’s government downplayed the economic impact of these measures. Although high-income countries have their own business continuity plans, low-income countries lack comprehensive plans of this kind. The results of this review, therefore, highlight the importance of helping low- and middle-income countries to develop business continuity plans and pool the risks related to business.

CONCLUSION

Since the WHO first declared a public health emergency on January 30th, 2020, health systems worldwide have had to engage with the actions and priority areas of work as outlined by the WHO interim guidance on critical preparedness, readiness, and response actions for COVID-19. Because China was the site of the first reported case of COVID-19, Australia, Singapore, Sri Lanka, and the UK have experienced different transmission scenarios and have responded differently with respect to their actions and priority areas of work.

As described in the WHO interim guidance, the “no cases” and “sporadic cases” scenarios for a particular country cover the span of time from the first reported case in China to the emergence of cases in that country.”

The study found differences in the individual countries’ strategies for implementing the actions in each priority area of work as defined by the WHO interim guidance for COVID-19. There was particular variation in the speed at which emergency response plans were activated and the kinds of case management strategies that were used, including contact tracing, the management of asymptomatic contacts, isolation, quarantine, and the

selection of individuals for laboratory investigation. In addition, countries differed with respect to the availability and implementation of business continuity plans.

Given the massive scale of this pandemic, we suggest that political and health authorities worldwide need to have in place strong mechanisms to prepare for and respond to similar diseases in a coordinated way. The occurrence of even a single case of such a disease should trigger stringent measures to prevent its transmission and result in the implementation of the actions recommended by the WHO interim guidance, including technical advising, the management of resources (especially PPE), and the development of case management strategies, laboratory facilities, and internationally aided business continuity plans.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

REFERENCES

- Atkeson, A. (2020) *What will be the Economic Impact of Covid-19 in the US? Rough Estimates of Disease Scenarios*. Cambridge, {MA}. doi: 10.3386/w26867.
- Australian Government- Department of Health (2020) *Coronavirus (COVID-19), Coronavirus (COVID-19)*. Available at: <https://www.health.gov.au/> (Accessed: 16 April 2020).
- Bedford, J. *et al.* (2020) ‘COVID-19: towards controlling of a pandemic’, *The Lancet*, 395(10229), pp. 1015–1018. doi: 10.1016/S0140-6736(20)30673-5.
- Department of Health and Social Care (2020) *Department of Health and Social Care, Department of Health and Social Care*. Available at:

- <https://www.gov.uk/government/organisations/department-of-health-and-social-care> (Accessed: 16 April 2020).
- Fineberg, H. V (2014) 'Pandemic Preparedness and Response — Lessons from the H1N1 Influenza of 2009', *The New England Journal of Medicine*, 370(14), pp. 1335–1342. doi: 10.1056/NEJMra1208802}.
- Lin, R. J., Lee, T. H. and Lye, D. C. B. (2020) 'From SARS to COVID-19: the Singapore journey', *The Medical Journal of Australia*. Available at: <https://www.mja.com.au/journal/2020/sars-covid-19-singapore-journey>.
- Ministry of Health - Singapore (2020) 'Ministry of Health - Singapore'. Available at: <https://www.moh.gov.sg/> (Accessed: 16 April 2020).
- Ministry of Health and Indigenous Medical Services (2020) *Ministry of Health and Indigenous Medical Services - Sri Lanka, Ministry of Health and Indigenous Medical Services*. Available at: http://www.health.gov.lk/moh_final/english/ (Accessed: 16 April 2020).
- Ooi, P.-L., Seetoh, T. and Cutter, J. (2012) 'The Singapore field epidemiology service: insights into outbreak management.', *Journal of preventive medicine and public health*, 45(5), pp. 277–282. doi: 10.3961/jpmph.2012.45.5.277.
- Perera, A. and Perera, H. S. R. (2017) *Primary Health Care Systems (PRIMASYS) Case study from Sri Lanka*. Sri Lanka. Available at: https://www.who.int/alliance-hpsr/projects/alliancehpsr_srilankaprimasys.pdf?ua=1, pg 15.
- The World Bank (2019) *Countries and Economies, Countries and Economies*. Available at: <https://data.worldbank.org/country> (Accessed: 16 April 2020).
- World Health Organization (2020a) *Country & Technical Guidance - Coronavirus disease (COVID-19), Technical Guidance*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance> (Accessed: 16 April 2020).
- World Health Organization (2020b) *COVID-19 Strategy Update*. Geneva: World Health Organization. Available at: <https://www.who.int/publications-detail/covid-19-strategy-update---14-april-2020> (Accessed: 15 May 2020).
- World Health Organization (2020c) *Critical preparedness, readiness and response actions for COVID-19*. Geneva.
- World Health Organization (2020d) *Rolling updates on coronavirus disease (COVID-19), Events as They Happen*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen> (Accessed: 16 April 2020).

Table 1. Actions during “No Cases” and “Sporadic Cases” Scenarios for each WHO Priority Area of Work.

Action Areas			Australia	Singapore	Sri Lanka	United Kingdom
A) Priority areas of work	1. Emergency response mechanisms	No cases	Activated prevailing emergency response mechanisms.	Activated prevailing emergency response mechanisms.	Activated prevailing emergency response mechanisms.	Activated prevailing emergency response mechanisms.
			No documented evidence of a comparatively early emergency response mechanism.	Implemented a comparatively early emergency response mechanism.	No documented evidence of a comparatively early emergency response mechanism.	No documented evidence of a comparatively early emergency response mechanism.
		Sporadic cases	Activated an enhanced emergency response plan.	Activated an enhanced emergency response plan.	Activated an enhanced emergency response plan.	Activated an enhanced emergency response plan.
			Enacted a country-specific legal framework.	Enacted a country-specific legal framework.	Enacted a country-specific legal framework.	Enacted a country-specific legal framework.
			Established a specific funding framework for activities related to COVID-19.	Established a specific funding framework for activities related to COVID-19.	Established a specific funding framework for activities related to COVID-19.	Established a specific funding framework for activities related to COVID-19.
	Established multi-stakeholder decision-making committees.	Established multi-stakeholder decision-making committees.	Established multi-stakeholder decision-making committees.	Established multi-stakeholder decision-making committees.		
	2. Risk communication and public engagement	No cases	Alerted and informed health care staff.	Alerted and informed health care staff.	Alerted and informed health care staff.	Alerted and informed health care staff.
			No documented evidence of engaging with vulnerable groups.	Targeted communications to reach vulnerable groups in the community.	No documented evidence of engaging with vulnerable groups.	No documented evidence of engaging with vulnerable groups.
			No documented evidence of addressing high-risk groups at entry points.	Communicated risk to high-risk groups at entry points.	No documented evidence of addressing high-risk groups at entry points.	No documented evidence of addressing high-risk groups at entry points.
		Sporadic cases	Implemented a national-level strategy for communicating with the public and the healthcare sector.	Implemented a national-level strategy for communicating with the public and the healthcare sector.	Implemented a national-level strategy for communicating with the public and the healthcare sector.	Implemented a national-level strategy for communicating with the public and the healthcare sector.
Adopted a wide range of communication methods to reach a broad audience (e.g. electronic and print mass media)			Adopted a wide range of communication methods to reach a broad audience (e.g. electronic and print mass media)	Adopted a wide range of communication methods to reach a broad audience (e.g. electronic and print mass media)	Adopted a wide range of communication methods to reach a broad audience (e.g. electronic and print mass media)	

Action Areas		Australia	Singapore	Sri Lanka	United Kingdom
		and social media) and multi-sectoral guidelines for infection prevention and control.	and social media) and multi-sectoral guidelines for infection prevention and control.	and social media) and multi-sectoral guidelines for infection prevention and control.	and social media) and multi-sectoral guidelines for infection prevention and control.
3. Case finding, contact tracing, and management	No cases	Engaged in active case finding.	Engaged in active case finding.	Engaged in active case finding.	No documented evidence of active case finding.
		Formulated case definitions.	Formulated case definitions.	Formulated case definitions.	Formulated case definitions.
		Implemented programs targeting outbound travelers.	Implemented programs targeting outbound travelers.	Implemented programs targeting outbound travelers.	Implemented programs targeting outbound travelers.
		No documented evidence of mechanisms for contact tracing and management.	No documented evidence of mechanisms for contact tracing and management.	Initiated mechanisms for contact tracing and management.	No documented evidence of mechanisms for contact tracing and management.
	Sporadic cases	Updated and refined their case definitions.	Updated and refined their case definitions.	Updated and refined their case definitions.	Updated and refined their case definitions.
		Strengthened their case-finding strategies.	Strengthened their case-finding strategies.	Strengthened their case-finding strategies.	Strengthened their case-finding strategies.
		Published guidelines on how to isolate cases.	Published guidelines on how to isolate cases.	Published guidelines on how to isolate cases.	Published guidelines on how to isolate cases.
	Initiated mechanisms for contact tracing and management, extended contact tracing and isolation to the community level, and imposed quarantine.	Initiated mechanisms for contact tracing and management, extended contact tracing and isolation to the community level, and imposed quarantine.	Initiated mechanisms for contact tracing and management, extended contact tracing and isolation to the community level, and imposed quarantine.	Initiated mechanisms for contact tracing and management, extended contact tracing and isolation to the community level.	
4. Surveillance	No case	Alerted their existing national surveillance system.	Alerted their existing national surveillance system.	Alerted their existing national surveillance system.	Alerted their existing national surveillance system.
		No documented evidence of activating the sentinel surveillance system.	Activated the sentinel surveillance system.	No documented evidence of activating the sentinel surveillance system.	No documented evidence of activating the sentinel surveillance system.
	Sporadic cases	Continued the formal surveillance system specific to COVID-19.	Continued the formal surveillance system specific to COVID-19.	Continued the formal surveillance system specific to COVID-19.	Continued the formal surveillance system specific to COVID-19.

Action Areas		Australia	Singapore	Sri Lanka	United Kingdom
		Extended the surveillance system to trace and notify asymptomatic contacts.	Extended the surveillance system to trace and notify asymptomatic contacts.	Extended the surveillance system to trace and notify asymptomatic contacts.	No documented evidence of extending the surveillance system to trace and notify asymptomatic contacts.
5. Public health measures	No cases	No documented evidence of public health measures such as hand hygiene, respiratory hygiene/cough etiquette, and social distancing.	Published official correspondence to initiate public health measures such as hand hygiene, respiratory hygiene/cough etiquette, and social distancing.	Published official correspondence to initiate public health measures such as hand hygiene, respiratory hygiene/cough etiquette, and social distancing.	No documented evidence of public health measures such as hand hygiene, respiratory hygiene/cough etiquette, and social distancing.
	Sporadic cases	Predominantly imposed public health measures through public empowerment and individual discretion rather than law enforcement.	Imposed public health measures using law enforcement.	Imposed public health measures using law enforcement.	Predominantly imposed public health measures through public empowerment and individual discretion rather than law enforcement.
		Formulated and disseminated workplace-specific public health measures.	Formulated and disseminated workplace-specific public health measures.	Formulated and disseminated workplace-specific public health measures.	Formulated and disseminated workplace-specific public health measures.
		Imposed social distancing measures.	Imposed social distancing measures.	Imposed social distancing measures.	Imposed social distancing measures.
		Provided information on the use of face masks.	Provided information on the use of face masks.	Provided information on the use of face masks.	Provided information on the use of face masks.
		Implemented mechanisms for telephone triaging.	No documented evidence of telephone triaging.	No documented evidence of telephone triaging.	Implemented mechanisms for telephone triaging.
		Implemented an environmental cleaning and disinfection plan.	Implemented an environmental cleaning and disinfection plan.	Implemented an environmental cleaning and disinfection plan.	Implemented an environmental cleaning and disinfection plan.
	No documented evidence of large-scale environmental disinfection.	No documented evidence of large-scale environmental disinfection.	Performed large-scale environmental disinfection.	No documented evidence of large-scale environmental disinfection.	
6. Infection prevention and control	No cases	Informed health staff about standard and airborne precautions for aerosol-generating procedures.	Informed health staff about standard and airborne precautions for aerosol-generating procedures.	Informed health staff about standard and airborne precautions for aerosol-generating procedures.	No documented evidence of informing health staff about precautions for aerosol-generating procedures.

Action Areas		Australia	Singapore	Sri Lanka	United Kingdom
	Sporadic cases	Revised recommendations for COVID-19 infection prevention and control as the pandemic progressed. Published recommendations for COVID-19 infection prevention and control practices that targeted vulnerable populations.	Revised recommendations for COVID-19 infection prevention and control as the pandemic progressed. Published recommendations for COVID-19 infection prevention and control practices that targeted vulnerable populations.	Revised recommendations for COVID-19 infection prevention and control as the pandemic progressed. No documented evidence of publishing recommendations for vulnerable populations.	Revised recommendations for COVID-19 infection prevention and control as the pandemic progressed. Published recommendations for COVID-19 infection prevention and control practices that targeted vulnerable populations.
7. Laboratory testing	No cases	Issued testing protocols for laboratory investigation of symptomatic cases admitted to the hospital. No documented evidence of testing asymptomatic contacts.	Issued testing protocols for laboratory investigation of symptomatic cases admitted to the hospital. Tested asymptomatic contacts.	Issued testing protocols for laboratory investigation of symptomatic cases admitted to the hospital. Tested asymptomatic contacts.	Issued testing protocols for laboratory investigation of symptomatic cases admitted to the hospital. No documented evidence of testing asymptomatic contacts.
	Sporadic cases	Updated the testing protocols as case definitions were revised.	Updated the testing protocols as case definitions were revised.	Updated the testing protocols as case definitions were revised.	Updated the testing protocols as case definitions were revised.
B) Case management strategy	No cases	Implemented triage protocols at the points of access to the health system. Prepared case management strategies and guidelines to treat patients affected by COVID-19. Set up a referral system.	Implemented triage protocols at the points of access to the health system. Prepared case management strategies and guidelines to treat patients affected by COVID-19. Set up a referral system.	Implemented triage protocols at the points of access to the health system. Prepared case management strategies and guidelines to treat patients affected by COVID-19. Set up a referral system.	Implemented triage protocols at the points of access to the health system. Prepared case management strategies and guidelines to treat patients affected by COVID-19. Set up a referral system.
	Sporadic cases	Implemented triage protocols at the points of access to the health system. Increased the capacity of the health sector in response to predicted demand associated with COVID-19. No documented evidence of assigning patients with COVID-	Implemented triage protocols at the points of access to the health system. Increased the capacity of the health sector in response to predicted demand associated with COVID-19. No documented evidence of assigning patients with COVID-	Implemented triage protocols at the points of access to the health system. Increased the capacity of the health sector in response to predicted demand associated with COVID-19. Sri Lanka designated 24 centers across the country to	Implemented triage protocols at the points of access to the health system. Increased the capacity of the health sector in response to predicted demand associated with COVID-19. No documented evidence of assigning patients with COVID-19

Action Areas		Australia	Singapore	Sri Lanka	United Kingdom
		19 to specific hospitals; cases were managed within the existing infrastructure.	19 to specific hospitals; cases were managed within the existing infrastructure.	accommodate COVID-19 patients.	to specific hospitals; cases were managed within the existing infrastructure.
C) Case management recommendations by case severity and risk factors	No cases	Took steps to test suspected COVID-19 cases according to laboratory testing strategies.	Took steps to test suspected COVID-19 cases according to laboratory testing strategies.	Took steps to test suspected COVID-19 cases according to laboratory testing strategies.	Took steps to test suspected COVID-19 cases according to laboratory testing strategies.
		No documented evidence of implementing asymptomatic contact isolation by cohorting patients in community facilities.	No documented evidence of implementing asymptomatic contact isolation by cohorting patients in community facilities.	Implemented asymptomatic contact isolation by cohorting patients in community facilities.	No documented evidence of implementing asymptomatic contact isolation by cohorting patients in community facilities.
	Sporadic cases	Continued to test suspected COVID-19 cases according to laboratory testing strategies.	Continued to test suspected COVID-19 cases according to laboratory testing strategies.	Continued to test suspected COVID-19 cases according to laboratory testing strategies.	Continued to test suspected COVID-19 cases according to laboratory testing strategies.
		Used telephone triaging for home isolation of mild to moderately ill patients.	Organized institutionalized care for mild to moderately ill patients and developed intermediate care facilities for moderate cases.	Organized institutionalized care for mild to moderately ill patients.	Used telephone triaging for home isolation of mild to moderately ill patients.
		Took additional measures to isolate/cohort asymptomatic contacts at specific community facilities.	No documented evidence of asymptomatic contact isolation.	Took additional measures to isolate/cohort asymptomatic contacts at specific community facilities.	No documented evidence of asymptomatic contact isolation.
D) Societal response	No cases	Did not develop society and business continuity plans specific to COVID-19.	Did not develop society and business continuity plans specific to COVID-19.	Did not develop society and business continuity plans specific to COVID-19.	Did not develop society and business continuity plans specific to COVID-19.
	Sporadic cases	Developed society and business continuity plans.	Developed society and business continuity plans.	Developed society and business continuity plans.	Developed society and business continuity plans.

Provided financial assistance to affected businesses and industries.

Provided financial assistance to affected businesses and industries.

Provided financial assistance to affected businesses and industries.

Provided financial assistance to affected businesses and industries.

Implemented online awareness programs for COVID-19.

Implemented online awareness programs for COVID-19.

No documented evidence of online awareness programs.

Implemented online awareness programs for COVID-19.