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COVID-19 Health System Response Monitor

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Abbreviations and acronyms

APO	Asia Pacific Observatory on Health Systems and Policies
CAL	crisis alert level
CDC HQ	Central Disease Control Headquarters
CDM HQ	Central Disaster Management Headquarters
CDSC HQ	Central Disaster and Safety Countermeasure Headquarters
COVID-19	coronavirus disease-2019
DUR	drug utilization review
EIS	Epidemic Intelligence Service
EUA	emergency use authorization
GPS	Global Positioning System
HIRA	Health Insurance Review & Assessment Service
HSRM	health system response monitor
ICT	information, communication and technology
ICU	intensive care unit
KCDC	Korea Centers for Disease Control and Prevention
KDCA	Korea Disease Control and Prevention Agency
KRW	South Korean won
MCST	Ministry of Culture, Sports and Tourism
MERS	Middle East Respiratory Syndrome
MFDS	Ministry of Food and Drug Safety
MoE	Ministry of Education
MoEF	Ministry of Economy and Finance
MOEL	Ministry of Employment and Labor
MOFA	Ministry of Foreign Affairs
MoHW	Ministry of Health and Welfare
MoIS	Ministry of Interior and Safety
MOLIT	Ministry of Land, Infrastructure and Transport
NDIU	nationally designated isolation unit
NHI	National Health Insurance
NHIS	National Health Insurance Service
NMC	National Medical Centre
PCS HQ	Pan-government Countermeasure Support Headquarters
PHC	public health centre
PUI	patients under investigation
R&D	research and development
RoK	Republic of Korea
RT-PCR	reverse transcription polymerase chain reaction
SARS-CoV-2	severe acute respiratory syndrome coronavirus-2
SME	small and medium enterprises
SMR	Seoul Metropolitan Region
WHO	World Health Organization

Contents

Acknowledgements.....	ii
Abbreviations and acronyms	iii
Overview	1
1. Preventing local transmission	2
1.1 Health communication	2
1.2 Physical distancing	4
1.3 Isolation and quarantine	8
1.4 Monitoring and surveillance	10
1.5 Testing	13
2. Ensuring sufficient physical infrastructure and workforce capacity	14
2.1 Physical infrastructure.....	14
2.2 Workforce	16
3. Providing health services effectively	16
3.1 Planning services	16
3.2 Case management	17
3.3 Maintaining essential health services.....	20
4. Paying for services.....	21
4.1 Health financing.....	21
4.2 Entitlement and coverage	21
5. Governance.....	23
6. Measures in other sectors	25
6.1 Borders.....	25
6.2 Mobility.....	26
6.3 Economy.....	26
6.4 Social and income support	28
6.5 Cross-border collaboration	29
7. February 2021 update	31
7.1 Overview: Demands for tactic changes	31
7.2 Physical distancing measures calibration	31
7.3 Continued efforts to testing, surveillance and monitoring.....	32
7.4 Resource mobilization: securing the beds for severe patients	32
7.5. Vaccines and vaccination	33
7.6. Additional social and income support	34
7.7 Updates on border control.....	34
References.....	35
Annexures	44

Overview

The Health System Response Monitor (HSRM) is designed to collect and organize up-to-date information on how countries are responding to the coronavirus disease-19 (COVID-19) outbreak. This will be updated periodically (as and when there is a change in COVID-19-related measures) by the respective country contributors. The HSRM focuses primarily on the responses of health systems but also captures wider public health initiatives. The HSRM presents information under six heads:

1. **Preventing local transmission.** This section includes information on key public health measures that aim to prevent the further spread of the disease. It details how countries are advising the general public and people who (might) have the disease to prevent further spread, as well as measures in place to test and identify cases, trace contacts and monitor the scale of the outbreak.
2. **Ensuring sufficient physical infrastructure and workforce capacity.** This section considers the physical infrastructure available in a country and where there are shortages. It describes any measures being implemented or planned to address them. It also considers the health workforce, including what countries are doing to maintain or enhance capacity, the responsibilities and skill-mix of the workforce, and any initiatives to train or otherwise support health workers.
3. **Providing health services effectively.** This section describes approaches to service delivery planning and patient pathways for suspected COVID-19 cases. It also considers efforts by countries to maintain other essential services during periods of excessive demand for health services.
4. **Paying for services.** Health financing describes how much is spent on health and the distribution of health spending across different service areas. The section also describes who is covered for COVID-19 testing and treatment, whether there are any notable gaps (in population coverage and service coverage), and how much people pay (if at all) for those services out of pocket.
5. **Governance.** This discusses governance of the health system regarding COVID-19-related pandemic response plans and the steering of the health system to ensure its continued functioning. It includes emergency response mechanisms, how information is being communicated, and the regulation of health service provision to patients affected by the virus.
6. **Measures in other sectors.** This section contains information on measures undertaken in non-health sectors (such as border and travel restrictions, economic and fiscal measures) to tackle the pandemic.

1. Preventing local transmission

1.1 Health communication

Transparent and open communication is an essential component of the Republic of Korea (RoK)'s response to the coronavirus disease-2019 (COVID-19) crisis. Extensive public communication was conducted nationwide with information disclosure through briefings, guidelines, campaigns and posters on government websites and social media channels after the first case of COVID-19 was detected on 20 January 2020 (1). Many actors were involved in public communications, including Central Government entities (e.g. Ministry of Health and Welfare [MoHW], Ministry of Interior and Safety [MoIS], and Korea Disease Control and Prevention Agency [KDCA]) (2)¹ as well as local governments.

The frequency and format of the briefings have been flexible, depending on the COVID-19 situation in the RoK. Following the first briefing on the initial case of COVID-19 on 20 January, the government offered an increased number of official briefings when the (national) crisis alert level (CAL) reached level 3 (warning) on 27 January 2020 (3). These continued when the CAL was upgraded to highest level 4 (serious) on 23 February 2020 (4). The government decreased the number of live briefings or alternated them with written briefings until a resurgence of cases occurred in mid-August 2020; the number of briefings increased with mass transmission at the end of September (second peak).

The MoHW and KDCA have been leading the briefings since the first outbreak occurred. Once the Central Disaster and Safety Countermeasure Headquarters (CDSC HQ)² was organized on 23 February 2020, there were regular Central Government briefings by Central Disaster Management Headquarters (CDM HQ) and Central Disease Control Headquarters (CDC HQ), led by the MoHW and KDCA, respectively. They are televised nationwide and live streamed on social media by a standing speaker of each headquarters. Moreover, they are available as written documents on various government websites, including the official government COVID-19 response website (<http://ncov.mohw.go.kr/>). The contents of public communication encompass basic rules for hygiene and prevention measures to overall epidemiological statistics. The CDC HQ updates the epidemiological investigation status (i.e. the tally of the confirmed cases, overseas inflow, isolation, release from isolation, deaths, testing, and national and global trends) and countermeasures for prevention and treatment. Meanwhile, the CDSC HQ mainly shares national (or sometimes local) COVID-19 response interventions, including rules, regulations and policies based on discussions among the central and 17 local governments as well as 18 local provincial police agencies. To expand access to information, simultaneous sign language and English interpretations have been provided since the end of February. It is reported from the nationwide survey that the general public pays attention and has trust in the government briefings (5).

In addition, the Korean government has released and updated official public recommendations, campaigns and guidelines across various platforms (e.g. television, mobile phone, radio and online) in various formats, such as documents, posters, card news, text messages and videos. All the information

¹ KCDC (Korea Centers for Disease Control & Prevention) was promoted to KDCA (Korea Disease Control and Prevention Agency) as of September 2020 (2).

² CDSC HQ is a special taskforce created when a disaster occurs. It is chaired by the Prime Minister.

from the Central Government is communicated to the public through the official government COVID-19 response website as well as websites, blogs and social media channels of the respective government entities. The public can find the latest updates, government-subsidized policies, public advice and notices, guidelines and social distancing rules at one glance on the official government COVID-19 website. Some core materials are also translated into English and other languages for foreign residents in the ROK. Additionally, local governments also operate their platforms for information.

Information on the whereabouts of confirmed cases is shared with the public on websites and through mobile notification alerts (i.e. public safety alert) to prevent any additional transmission as well as help with their clinical management. Emergency notification messages are actively used to alert confirmed cases and to remind them of prevention measures. Detailed information is shared at the provincial and/or district level through respective communication channels such as websites or blogs. Meanwhile, the ROK has endeavoured to strike a balance between public health concerns and personal information protection. The scope of collection, usage and dissemination of personal information to the public is strictly limited and based on the amended Infectious Disease Control and Prevention Act, 2020 after the 2015 Middle East Respiratory Syndrome (MERS) outbreaks (6). In response to the additional concerns regarding invasion of privacy due to personally identifiable information, the CDC HQ has published and updated guides on the release of information from confirmed patients on 14 March, 12 April and 30 June 2020 (7). Based on these efforts, the guideline on release of information from confirmed patients was published by the CDC HQ in October, stipulating that all published travel routes be deleted after 14 days from the last exposure to contact with a confirmed case (8).

The KDCA call centre (hotline 1339) and MoHW call centre (hotline 129) are available for overall responses to COVID-19. They run 24/7 all year round, and all the services are toll-free. These call centres function to provide information on infectious diseases as well as to report cases (9). They also aim to relieve public concerns on COVID-19 by answering the caller's questions and providing them with relevant information. Initially operated with around 30 counsellors at the KDCA call centre, the number increased to 270 at the end of March to deal with the soaring number of the calls. There were 850 calls per day after the first COVID-19 case was confirmed in the RoK, which increased up to 70 000 calls per day with the increasing number of the confirmed cases. About 10 000–20 000 calls were handled per day by the end of March 2020 (10). For foreigners, the Immigration Contact Centre (hotline 1345) and Korea travel hotline (1330) are operated by the Ministry of Justice and Ministry of Culture, Sports and Tourism (MCST), respectively. It was reported that a total of 143 988 calls were handled with 142 809 consultations provided and 1179 interpretation services offered from 20 January to 22 September 2020 at the Immigration Contact Centre (11).

Along with efforts to disseminate accurate information on COVID-19, from medical knowledge to the code of conduct for basic hygiene and disease prevention, the RoK government has strived to halt the circulation of misinformation by holding briefings and issuing press releases to correct them in a timely manner. For monitoring purposes, the Cyber Bureau of the Korean National Police Agency has assigned police investigators to all metropolitan and provincial police agencies to track down false information and fake news on COVID-19 posted on major web portals. Once incorrect information and

misinformation online are detected, the investigators request the web portal companies or Korea Communications Standards Commission to block and delete such information (12).

1.2 Physical distancing

According to the guidelines for COVID-19 prevention for the general population, maintaining two arms' length (two meters) from each other is recommended, and for facilities with mass gatherings, it is reiterated that the population density should be restricted to 4 m² per person (13,14). Including this physical distancing as part of the code of conduct, the RoK introduced the "social distancing scheme" to prevent and manage COVID-19 cases. Social distancing entails safe distances to prevent and minimize transmission, while keeping up the functions and activities of society.³ The RoK's social distancing scheme has been developed considering many factors such as public health concerns, feasibility, economy, public fatigue and what has been learnt from the characteristics of the outbreaks. Initially, the format of social distancing was a campaign rather than a scheme, changing its name depending on the severity of the COVID-19 situation. Then, as of 28 June 2020, the "three-level social distancing scheme" was introduced. As of 7 November 2020, the more fine-tuned "five-level social distancing scheme" was introduced, which applies to additional situations of community transmission.

Before the elaborated social distancing scheme (29 February 2020–27 June 2020)

Beginning with "social distancing" (29 February–21 March 2020) without a specific level or phase detailed, transitions were made to "enhanced social distancing" (22 March–19 April 2020), "relaxed (eased) social distancing" (20 April–5 May 2020), and "distancing in daily life" (6 May–27 June 2020), depending on the severity of the situation (15). A three-level social distancing scheme was introduced based on more explicit criteria on 28 June 2020 (16).

Three-level social distancing scheme (28 June 2020–6 November 2020)

Based on the three-level social distancing scheme, level 1 measures come into effect during small-scale outbreaks, level 2 is operated when community spread occurs, and the highest level 3 measures operate when there are multiple outbreaks in the local community or large-scale outbreaks that are spreading rapidly (Figure 1). These levels have been scaled up or down as necessary in a flexible manner. Meanwhile, to help with delineating which level of social distancing measures can be considered, there are four risk assessment criteria are suggested: the number of confirmed daily patients, the rate of unknown infection routes, the status of cluster outbreaks under management, and the rate of cases being managed within the quarantine network. However, the actual transition between levels is not solely based on these indicators; social and economic variables are also reflected in decision making (Table1).

³ ECDC (2020) also states that the term "social distancing" refers to "efforts that aim, through a variety of means, to decrease or interrupt transmission of COVID-19 in a population (sub-)group by minimizing physical contact between potentially infected individuals and healthy individuals, or between population groups with high rates of transmission and population groups with no or a low level of transmission" (15).

Table 1. Social distancing transition criteria in the “three-level social distancing scheme”

Indicator	Social distancing level		
	Level 1	Level 2	Level 3
The number of confirmed daily cases (community spread in particular)	<50	50–100	100–200 or more (doubling twice within a week)
Rate of unknown infection routes	<5%	-	Surge
Status of cluster outbreaks under management	Decrease	Steady increase	Surge
Rate of cases being managed within the quarantine network	Increase or 80% or more	-	-

Source: MoHW of RoK (28 June 2020). Regular briefing of CDSC HQ on COVID-19.

Detailed guidelines on actions that should be taken by the public in social distancing level 1 were first published on 3 May and updated on 27 May, and again on 3 July 2020 by the CDSC HQ (17–19). These include basic rules for social distancing and detailed guidelines for different settings such as work, daily life, and outdoor and social activities. The information with infographics is well organized on the official government COVID-19 response website to promote easy understanding and convenience of access, as mentioned earlier.

The RoK maintained running of businesses with the basic preventive measures, including physical distancing and hygiene, at social distancing level 1. There were small sporadic outbreaks, but they were within the capacity of the health system to manage. It was recommended that institutions and companies conduct meetings, gatherings and events while complying with the guidelines and code of conduct for the public. The Ministry of Education (MoE) decided to close schools and kindergartens until the end of May, replacing classes with online courses (20). Universities postponed the start of the semester by a few weeks and shifted courses to online platforms in March (21).

On 19 August, level 2 social distancing measures took effect in the Seoul Metropolitan area (Seoul, Gyeonggi, Incheon) amid a continuing spike in the number of cases, especially at the community level (22). Consequently, stronger measures were applied to prevent the nationwide spread of COVID-19. Gatherings were prohibited, such as conferences, concerts, festivals, protests, weddings, funerals and exams with more than 50 people for indoor activities and 100 people for outdoor activities. Indoor national or public facilities as well as 12 types of high-risk facilities (i.e. clubs, karaoke centres, buffets, Internet cafes, etc.) were required to be closed. All professional sports were allowed only if there were no spectators. For religious facilities, churches in the Seoul Metropolitan Region (SMR) were allowed services that were not held face to face, and in-person gatherings, events or meals were prohibited. According to Article 80-7 of the Infectious Disease Control and Prevention Act, 2020, violators were subject to a maximum fine of South Korean won (KRW) 3 million (US\$ 2700) and could be liable to pay for the accompanying costs of follow-on transmission to others (6,23).

On 23 August 2020, the government expanded social distancing to level 2 nationwide, and starting from 30 August until 13 September 2020, introduced enhanced social distancing level 2 (also called as level 2.5) only in the greater Seoul area for more aggressive control of the spread (24,25). In addition to the level 2 measures, operating hours were slashed for restaurants, bakeries and bars, and only take-out and delivery services were allowed after 21:00 hours at the level 2.5. One third of all employees working in government agencies and public institutions were required to work from home. Private after-school tuition classes and indoor sports facilities were shut down. As of 14 September 2020, level 2.5 was lifted and downgraded to the level 2.

For Chuseok, the national holiday of the RoK, the health authority announced a two-week-long “Chuseok special prevention period” from 28 September to 11 October 2020 to bolster the government’s COVID-19 response, including social distancing measures (26). Level 2 distancing was maintained until mid-October; it was downgraded to level 1 on 11 October 2020 (14). Table 2 gives the social distancing measures by sector.

Table 2. Social distancing measures by sector in “the three-level social distancing scheme” in the Republic of Korea

Sectors	Level 1	Level 2	Level 3
Schools (e.g. primary, higher education, etc.)	-Mix of distance learning and attending school	-Mix of distance learning and attending school -The population density should be lowered to one third (for high schools, two thirds) of students	-Distance learning or break
Workers (e.g. essential workers, child-care workers, etc.)	-[Public] Limit the number at the workplace; one third work remotely -[Private] Remote working and flexible working hours recommended	-[Public] Limit the number at the workplace by having half work remotely -[Private] Limit the number at the workplace (recommended)	-All work remotely except essential ones
Businesses (e.g. small and medium enterprises (SMEs), restaurants, etc.)	-Allowed with preventive measures	-Buffet restaurants under the ban on gatherings -Restaurants, cafes and bakeries can serve until 9 p.m. From 9 p.m. to 5 a.m., only takeaway and delivery services are allowed (level 2.5) -Only takeaway and delivery services allowed for franchise cafes, bakeries, and ice cream shops (level 2.5)	-All high-risk facilities are closed -Low-risk facilities have limited operating times -Essential services are open
Travel (in-country)	-None	-Not mentioned or discussed	-Not mentioned or discussed
Gatherings (events, informal)	-Allowed with recommended preventive measures	-Ban on gathering of 50 or more people indoors and 100 or more people outdoors	-Ban on gathering of 10 people or more

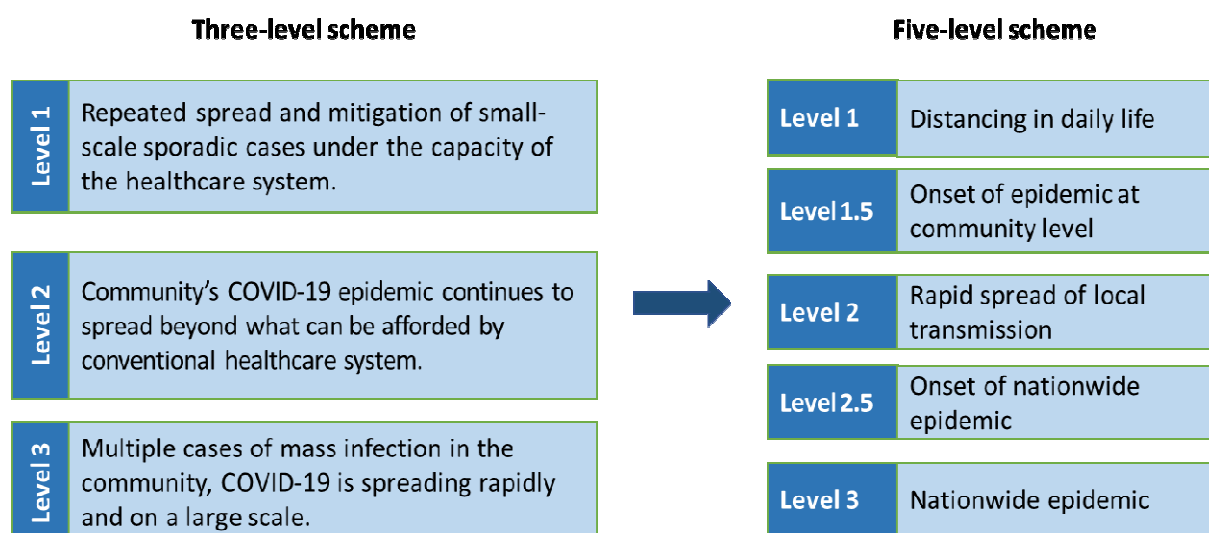
gatherings, religious services, etc.)		-All sports events switch to non-spectator games	-All sports events are banned
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Source: Compiled from the COVID-19 briefings of the Korean government

Five-level social distancing scheme (7 November 2020 onwards)

Considering the social acceptability of the prolonged COVID-19 situation, the existing “three-level social distancing scheme” has been reorganized into a “five-level social distancing scheme”, scaling up by 0.5 units of level on 7 November 2020 (Figure 1). Aligning with the three-level scheme, the five-level scheme also aims to strengthen prevention measures by adjusting appropriate level of ban on gatherings and limiting the number of people using facilities or reducing the operating hours of facilities. As aforementioned in the three-level scheme, a multiplicity of indicators (e.g. number and characteristics of confirmed patients, bed capacity for severe patients, the capability of epidemiological investigation, reproduction number, the status of cluster outbreaks, etc.) along with the situations are taken into consideration for the level transition. Level 1 was maintained until mid-November since the five-level scheme was introduced. However, due to continuously increasing daily transmission at the community level in SMR, along with over 100 daily confirmed cases on average in a week from 11 to 17 November 2020, level 1.5 took effect on 19 November 2020 (27). With the level transition conditions met, level 2 was applied for SMR and level 1.5 for Honam (Jeolla) province as of 24 November 2020 (28).

Figure 1. Social distancing scheme changes from 3 levels to 5 levels



Sources: MoHW of RoK (4 November 2020); MoFA of the RoK (2020)

Compared to the three-level scheme, the categorization of facilities has changed. The existing facility categorization with high, medium and low risk in the three-level scheme is no longer applied. Instead, facilities are divided into two categories: priority control and general management facilities. Facilities with priority control include nine facilities (i.e. nightlife entertainment venues, a few types of bars and pubs, singing rooms, indoor standing concert halls, restaurants and cafeteria, direct/door-to-door sales,

business promotion halls) and general management facilities include 14 facilities (i.e. PC cafes⁴, funeral halls, indoor wedding halls, private academies, vocational training institutes, public baths, concert halls, movie theatres, amusement parks/water parks, arcades/multi-rooms, indoor gyms, hair salons, stores/supermarkets/department stores, study rooms/study cafes). All those operating facilities would be banned if quarantine rules on gatherings were violated (29) [Table 3].

Table 3. Five-level social distancing scheme in the Republic of Korea

Facility category (no.)	Level 1	Level 1.5	Level 2	Level 2.5	Level 3
Priority control facilities (9)	Core quarantine rules mandatory (e.g. wearing masks, limiting number of users at facilities)	Expansion of restrictions on the number of people using facilities in the area of transmission	Five nightlife entertainment facilities (i.e. nightlife entertainment venues, karaoke bars, retro pubs, colattheque ⁵ , hunting pocha ⁶) in the area are under the ban on gatherings	Under the ban on gatherings	
			Other than five nightlife entertainment facilities, operating hours are slashed after 21:00 hours		
			For cafes, only takeaway or delivery is allowed For restaurants, only takeaway or delivery is allowed after 21:00 hours		
General management facilities (14)	General quarantine rules mandatory (e.g. wearing masks, managing visitor entry log, ventilation, disinfection)	Restrictions on the number of people using facilities in the area of transmission	Expansion of restrictions on the number of people using facilities. Ban on high-risk activities (e.g. eating out)	Most of the facilities close after 21:00 hours	All facilities are under a ban on gatherings, except essential facilities

Source: MoHW of RoK (4 November 2020). Q&A on “five-level social distancing scheme”.

1.3 Isolation and quarantine

While isolation refers to separating someone who is infected with the virus from others, and quarantine means keeping someone who might have been exposed to the virus away from others, the

⁴ Personal Computer (PC) cafes are facilities where a computer with internet access is provided for multiple purposes, including gameplay.

⁵ Colattheque is a discotheque where soft drinks are served.

⁶ Hunting pochas are bars designed to increase socializing between groups of men and women.

RoK, in response to COVID-19, has measures at multiple levels: self-quarantine, facility quarantine and hospital isolation (13). Self-quarantine denotes keeping a person in isolation in an independent space at his/her home, facility quarantine denotes keeping a person in isolation at temporary quarantine facilities, hospital isolation refers to keeping a patient in isolation at a hospital or residential treatment centre for treatment.

According to the latest COVID-19 response guideline 9-3 in the RoK, a person who has had contact or may have had contact with a confirmed or suspected case, a person who has stayed in a quarantine inspection area and is concerned about being infected, as well as a person who is concerned about infection due to exposure to risk factors such as infectious disease pathogens are all subject to a 14-day self-quarantine. Once the person is required to self-quarantine, a notice is issued by the relevant public health centre (PHC), and the person is asked to comply with the self-quarantine guidelines along with monitoring by government officials. Such persons are not allowed to leave their home or quarantine facilities and must refrain from contact with others unless it is necessary (e.g. medical treatment) with the PHC being aware of it. The quarantine period ends once the person does not show COVID-19 symptoms anymore. Meanwhile, those who need more rigorous checking for infection (e.g. personnel at medical institutions, students enrolled from preschool to high school, workers or residents at social welfare residential facilities, families of the confirmed case, the elderly over 65 years of age, etc.) are required to go through additional testing on day 13 from the date of last contact with the confirmed case and once they test negative, the quarantine ends.

For the management of self-quarantine, dedicated teams conduct monitoring on a one-on-one basis through the Self-Quarantine Safety Protection App at least twice a day, along with cooperation at the local level such as delivering rations, medicines and daily necessities to those in quarantine. The Self-Quarantine Safety Protection App helps the assigned government officer to monitor symptoms of those in self-quarantine their and compliance with the rules. To enhance compliance to self-quarantine guidelines and management, the RoK is responding to violations of it with the one-strike out system, enforcing the respective measures for people with non-compliance. For example, a safety band – an electronic wristband for tracing – can be applied to those who move from the quarantine site following transfer to the quarantine facilities. However, if they have no justifiable reason for moving out, in the one-strike out system, violators can face up to a fine of KRW 10 million (US\$ 9000) or 1 year of imprisonment. Foreign nationals who violate self-quarantine protocols can be ordered to leave the country or be deported.

Inpatient treatment during hospital isolation is categorized into hospital treatment and facility treatment. Treatment in a residential treatment centre belongs to the latter. The place where the treatment is given is determined by the severity of illness of the patients and other factors.

There were no domestic movement restrictions due to isolation or lockdown in the city or province in the RoK. Even when more than 5000 cases were confirmed in Daegu province after the first case of coronavirus on 18 February 2020, it was just recommended to stay home and avoid movement for two

weeks rather than locking down the city (4). However, cohort isolations⁷ were used to stem further spread to nearby groups or the community (30). For example, the Daenam Hospital in Cheongdo and the Asiad hospital in Busan were put into cohort isolation after their staff tested positive for COVID-19 (31,32).

1.4 Monitoring and surveillance

The RoK defines a confirmed COVID-19 case as “a person who has been confirmed to be infected with the infectious disease pathogen according to the diagnostic testing standard, regardless of clinical manifestations” (33). The case definition has been revised as new information accumulates. According to the latest guideline published on 10 November 2020, there are three categories of case definition for COVID-19 – confirmed case, suspected case and patients under investigation (PUI) (Table 4) (33). Unlike the World Health Organization (WHO), the RoK classification includes PUI instead of probable cases. Overall, in the guideline of the RoK, symptoms in “14 days” is integrated in the definition of the case.

Table 4. Definition of cases in the Republic of Korea

Category	Definition	
Confirmed case	A person who has been confirmed to be infected with the infectious disease pathogen according to the diagnostic testing standard, regardless of clinical manifestations	
Suspected case	A person who has clinical symptoms of COVID-19 within 14 days of contact with a confirmed patient	
Patient under investigation (PUI)	PUI 1	A person who is suspected of having COVID-19 and has clinical symptoms of COVID-19 according to the doctor’s medical opinion, with any of the following: *Testing is highly recommended (and reported as PUI 1) when: <ul style="list-style-type: none"> • a family (flatmate) or a person living in the same facility has COVID-19 clinical symptoms; • a person is in contact with a family member, friend or acquaintance within 14 days of their entry into the country from abroad; • the person has a history of visiting an institution or place where a confirmed case has occurred in consideration of the trend in the community; or • the results of the emergency screening test or rapid antigen test are positive.
	PUI 2	A person who has a history of being abroad and has clinical symptoms of COVID-19 within 14 days of entry
	PUI 3	A person who is deemed to need a diagnostic test due to their epidemiological association with the domestic mass outbreak of COVID-19

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

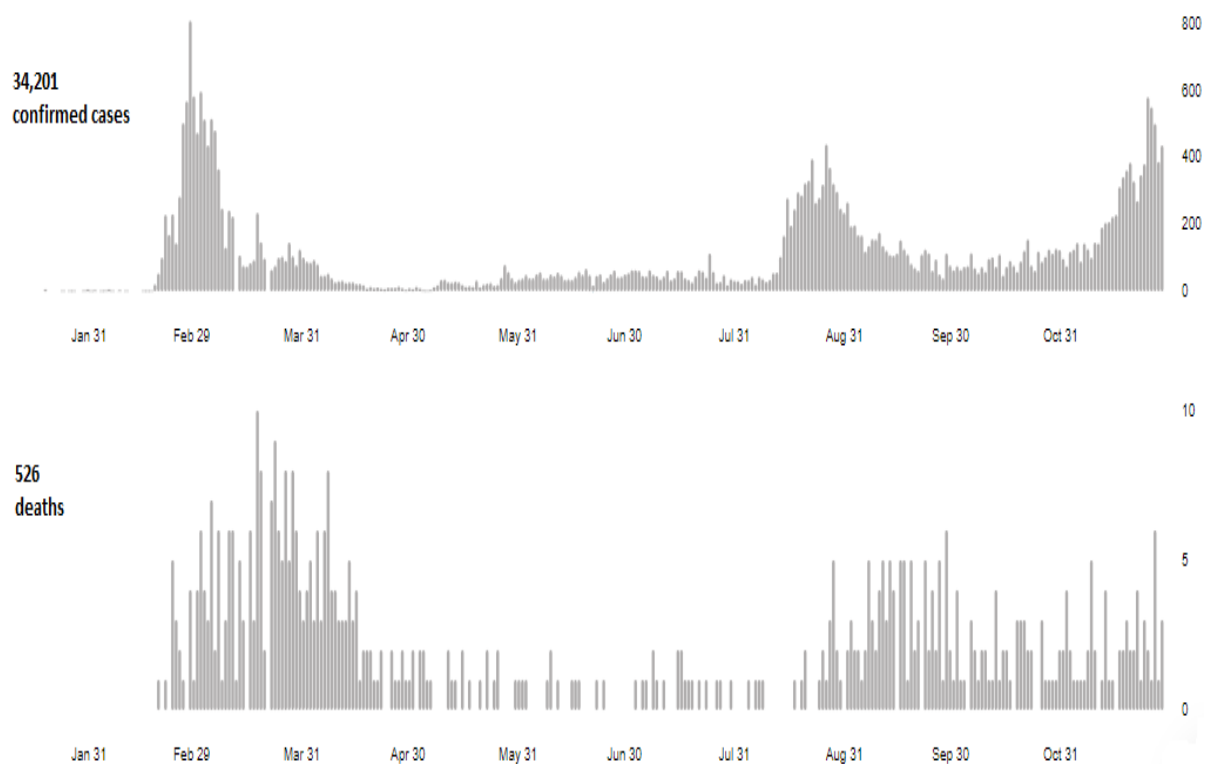
Confirmed cases of COVID-19 must have a positive real-time reverse transcription polymerase chain reaction (RT-PCR) test for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from

⁷ Cohort isolation is used to separate a group of patients (cohort) exposed to or infected by the same pathogen in the same hospital room or ward. The cohorts are groups based on the results of microbiological testing and clinical diagnosis depending on the epidemiology of the source of infection or method of transmission (30).

nasopharyngeal, oropharyngeal swabs and/or sputum. The COVID-19 response guidelines are regularly updated and widely circulated to all health facilities and local governments. The 9-2 edition and 9-3 editions of the guideline included updated guidance on diagnosis and treatment as well as protocols for reporting, management and epidemiological investigation (33).

As of 1 December 2020, there have been 34 201 confirmed cases of COVID-19 and 526 deaths in the RoK, with the first peak transmission occurring from February to March and the second peak with resurgence in SMR in August through September (Figure 2). Since then, comparably small but sporadic cases at the community level have been reported nationwide till early-November, followed by the third wave with a high number of cases nationwide until late-November.

Figure 2. Confirmed cases and deaths of COVID-19 in the Republic of Korea as of 1 December 2020



Source: WHO (2020). RoK situation (<https://covid19.who.int/region/wpro/country/kr>, accessed 1 December 2020).

Once a patient tests positive for COVID-19, epidemiological investigation is conducted to trace the source of the infection. Exact and timely epidemiological investigations are key to successfully identifying and isolating COVID-19 cases. Therefore, extensive and rapid contact tracing was done since the beginning of the response. Once a person tests positive, all routes are traced to identify where and when the patient visited. In addition to the interview data from confirmed cases (and, if necessary, their health-care workers and family members), credit card transactions, CCTV⁸ footage, mobile Global

⁸ Closed-circuit television (CCTV) is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. The South Korean national and local governments have been installing a large number of CCTV cameras every year in public places. As of 2019, approximately 1.15 million cameras were in operation.

Positioning System (GPS⁹) data and medical records are used to map the movements and contacts of confirmed cases (34). This epidemiological investigation is conducted by the epidemic intelligence service (EIS) officers from either the KDCA and/or provincial and local health authorities.

To facilitate epidemiological investigations, the government introduced the COVID-19 Epidemiological Investigation Support System¹⁰ as a centralized data collection and multi-agency coordination platform, speeding up the procedure for data request and approval to be implemented within 10 minutes for each case; earlier, it could take up to 24 hours (35). The system was built on a smart city data hub research and development (R&D) system,¹¹ utilizing the fourth industrial revolution technologies (e.g. big data technology, artificial intelligence technology). The MOLIT developed it by applying their existing system in progress to epidemiological investigation through two weeks of system development and 10 days of pilot operation, and eventually transferred the system to the Korea Centers for Disease Control and Prevention (KCDC) inaugurated on 26 March (36). This COVID-19 Epidemiological Investigation Support System enabled contact tracing faster and made it less burdensome.

The contacts identified during the investigation (e.g. family members, housemates and other contacts identified by epidemiological investigation along the patient's route of contact) were asked to have their symptoms monitored, and stay in self-quarantine for 14 days with the Self-Quarantine Safety Protection App installed. As briefly mentioned earlier in section 1.3, isolation and quarantine, and self-quarantine monitoring aim to check if COVID-19 symptoms occur during the maximum incubation period. The MoIS and local governments manage those under self-quarantine on a one-on-one basis. Active monitoring is conducted through the Self-Quarantine Safety Protection App by the assigned officer twice a day to monitor symptoms and can be alerted when self-quarantine orders are broken with the App's GPS-based location tracking. The roles of the dedicated team and the health team for managing the monitoring are flexibly operated, depending on the conditions of local governments.

To strengthen contact tracing, an electronic entry log (i.e. KI-Pass) was also implemented at high-risk facilities, enforced from 10 June 2020 (37). Users could enter a facility by presenting a personal QR code¹² issued. Alternatively, the handwritten log was collected. It was a temporary measure only for CAL 3 (warning) and 4 (serious) to help tracing. The information is encrypted before storage and distribution and it is impossible to know who visited where and when. Not only that, the information collected is automatically destroyed after four weeks (38). However, with increasing concerns on revealing personal information, the government decided that the status of log data management should be disclosed and each log regularly deleted on the 29th day of collection (39). As an additional effort at early detection and treatment of potential cases, health facilities and pharmacies are provided

⁹ Global Positioning System (GPS) is a satellite-based radionavigation system. GPS data, including location information, are received continuously in real time through GPS stations installed on the ground.

¹⁰ It is also called as "COVID-19 Smart Management System" by the Ministry of Land, Infrastructure and Transport (MOLIT).

¹¹ The MOLIT was in the process of developing the system in 2018–2022 to analyse big data in the city and use it for smart city services, and the system aims to create meaningful new data by converging data from various fields in the city.

¹² Quick Response (QR) code is a two-dimensional barcode which can contain information for reading by the camera on a smartphone or tablet.

with information on the travel history of patients to certain high-risk countries to support screening of suspected patients at the community level from the International Traveller Information System provided through the drug utilization review (DUR) system (40,41).

1.5 Testing

Well-organized and coordinated public–private partnerships among the government, academia and private biotech testing kit production companies, along with a legal foundation for emergency use authorization (EUA) of test kits allowed the early development and mass production of testing kits to meet the demand in the RoK. EUA was put into place back in 2016, with the experience of MERS, and the time for the legal process of approving products that require clinical trials was reduced from 80 days to 2–3 weeks, even 7 days (10). As the first case of COVID-19 was reported, the government activated a fast-track approval to prepare for mass-scale production of test kits, which was approved within a week. It was activated on 28 January and the use of the first kit approved on 4 February. KogeneBiotech, the first local diagnostic reagent company that developed an RT-PCR testing kit (PowerChek™ 2019-nCoV Real-time PCR Kit), swiftly obtained authorization on 4 February 2020 through EUA (42).

Approved COVID-19 diagnostic reagents used in the RoK are gene diagnostic reagents using the “molecular diagnosis (RT-PCR) method” and they are classified as “confirmed test products” and “emergency screening products”, depending on the purpose of use (42). A “confirmed test product” can diagnose the results within 6 hours to identify COVID-19 patients, while the “emergency screening product” can check the results within an hour. Emergency screening is available only for asymptomatic patients who have visited the emergency room and need immediate treatment. However, if a person tests positive as a result of the latter, re-examination of the person is required with a “confirmed test product” to determine whether the test is confirmed to be positive or not. For diagnostic reagents, a total of 16 (seven confirmed test products and nine emergency screening products) were granted EUA and were available for domestic use, as of September 2020 (43).

One of the reasons behind the RoK’s capacity for mass testing was ample public and private laboratory facilities with a considerable number of screening clinics nationwide. Per day, 15 000–20 000 tests could be performed with a testing turnaround time of 6–24 hours by mid-February from around 600 screening centres across the country. As of November 2020, there are 137 testing facilities – 25 public facilities, 96 civil hospitals and 16 referral laboratories – that provide diagnostic tests. These include the KDCA, national quarantine stations, research institutes for public health and environment, and private clinical laboratories and hospitals (33); 80% of the laboratory facilities are in the private sector. With laboratory facilities available for testing, screening clinics for COVID-19-suspected patients were set up to increase access to collection of specimens. If an examination is deemed necessary, a specimen is collected and sent to the laboratory facility. The suspected patients will go home and wait for the results of their tests while in isolation. Test results can be provided within 6–7 hours (10).

Drive-thru and walk-thru screening clinics are among the well-known innovative approaches that RoK pioneered to meet the extensive testing demands by collecting samples easier and faster than in the traditional setting. Since its pilot implementation in February 2020, it was established as one of the testing models in the world. It is convenient, safe and efficient as it reduces the specimen collection

time to 10 minutes, three times faster than a regular screening centre. Drive-thru screening clinics helped to minimize the risk of cross-infections during sample collection in the midst of the surge of confirmed cases in February and March nationwide. The Korean government published the *Drive-thru screening clinics standard operating instructions* to guide health facilities and local governments (44). As of March 2020, there were 79 drive-thru screening clinics. Walk-thru screening centres operate like the drive-thru ones but require much a smaller space and shorter time for sample collection. There is a single booth that separates medical staff from the patients being tested. Many private hospitals and Incheon International Airport introduced open walk-thru screening clinics.

2. Ensuring sufficient physical infrastructure and workforce capacity

2.1 Physical infrastructure

As a result of the outbreak of MERS in the RoK in 2015, the Korean government emphasized outbreak response capacities, which have greatly contributed to the current emergency of the COVID-19 response. The government increased its budget allocation for addressing new infectious diseases from KRW 68.8 billion (US\$ 62 million) in 2015 to KRW 194.3 billion (US\$ 175 million) in 2020 (45). In April 2018, a government-wide R&D fund for infectious disease research (KRW 40 billion, US\$ 36 million) for five years 2018–2022) was launched, which funded many research projects that contributed to providing scientific evidence for the government’s response to COVID-19 (46). The government has also made efforts to increase the number of epidemiologists and infection control professionals, establish hospitals dedicated to infectious diseases, and invest in increasing the number of negative pressure isolation rooms.

At an early stage of the RoK’s COVID-19 response, all people who tested positive were hospitalized. At the peak of the COVID-19 outbreak in Daegu province, the health system capacity was overrun with a shortage of intensive care unit (ICU) beds for critical patients with COVID-19, leading to increased mortality among patients who waited at home for hospitalization. Reflecting on the lessons learned, the government introduced a “residential treatment centre” to accommodate COVID-19 patients with mild or no symptoms to free up hospital beds for critical patients with COVID-19 and those with high-risk conditions (47). It provides support to those who are likely to naturally recover or would recover with symptomatic treatment alone. The private sector engaged in this initiative. Large suburban residential buildings used by public or large private companies (e.g. Samsung and LG) as their training and retreat facilities have been transformed into residential treatment centres for mild cases of COVID-19. All the residential treatment centres are supported by private or public hospitals.

For effective treatment, existing resources were re-orientated. The government designated 43 hospitals dedicated to infectious diseases on 21 February and increased their number to 67 hospitals in March (48) and to 2468 hospitals nationwide as of 17 November 2020 to have adequate health facilities dedicated to COVID-19 treatment (49). Some public hospitals were earmarked for exclusively providing care for patients with mild-to-severe COVID-19, freeing up other hospitals to deal with patients with non-COVID-19 conditions. As the numbers of COVID-19 cases decreased, some of these reverted to their original functions on 23 April 2020. In addition to the hospitals dedicated to infectious diseases, the government identified nationally designated isolation units (NDIUs). The NDIU is a hospital ward that is ready for an immediate response to patients with an infectious disease, equipped

with negative pressure systems and staffed by well-trained professionals. The Central Government oversees the NDIUs and provides financial support for their upkeep (10). “National safe hospitals” for non-COVID-19 patients were also designated by the government. National safe hospitals treat people with respiratory ailments away from general patients by separating the wards and restricting movement between different wards to prevent cross-infection (10). As of 3 October, 270 national safe hospitals were designated to separate the diagnostic and treatment processes for patients with respiratory and non-respiratory illnesses to prevent hospital-acquired infections (50). In addition, telemedicine and prescribing without a visit to a doctor were temporarily allowed (with certain restrictions) to improve access to care and reduce potential infection during outpatient visits in specific facilities, including health facilities and nursing homes from the end of February 2020 (51).

Since 20 January 2020, the RoK has been providing protective equipment for COVID-19. These include 3.24 million items of protective clothing and 7.52 million N95 masks. In addition, as of September 2020, 977 mobile negative compressors and 188 mobile X-ray units were provided to screening centres and hospitals dedicated to infectious diseases nationwide for negative pressure isolation and early diagnosis (52). In May 2020, the government provided KRW 30 billion (US\$ 27 million) to expand the number of nationally designated negative pressure isolation rooms, creating 244 negative pressure rooms with 281 beds in 39 public hospitals (53). There have been more than 100 critical patients since 30 August, but there is no shortage of critical care equipment. As of 10 October 2020, the MoHW secured 71 ICU beds for critically ill patients with COVID-19 in the public and private sectors (54).

Face masks were classified into two – general supply and priority supply. Priority supply masks were distributed to health-care institutions, while the public could buy general supply masks through pharmacies, designated Mart stores and post offices. The government made efforts to stabilize the market by banning hoarding of masks and hand sanitizers (5 February) and put in place emergency adjustment measures (12 and 26 February). Starting from 9 March 2020, the government implemented a 5-day rotation system for purchasing masks to ensure access for all citizens. Purchase history was monitored using the health care institution business portal system of the Health Insurance Review & Assessment Service (HIRA) (55). The general supply intervention ended on 12 July 2020 when mask supplies stabilized in the market. For foreign residents staying in the RoK, the government supported them to easily purchase face masks at affordable prices from pharmacies through the “Mask Supply System for Foreigners” in consultation with the MoHW, the National Health Insurance Service (NHIS) and the HIRA (11). Meanwhile, the RoK police penalized acts of fraud in online secondhand markets that were selling substandard products, etc. (56).

With the explosion of cases in SMR in August 2020, a Central Co-response Situation Room was organized at the National Medical Centre (NMC) on 16 August 2020 to help with patient triaging and coordination, and allocation of hospital beds across the region (57). The system was operationalized on 21 August 2020 to help with assigning beds and assisting with the referral of COVID-19 patients in SMR. As the volume of patients with critical conditions in SMR increased from less than 20 (before August) to 79 (on 30 August), followed by 175 (on 10 September), additional COVID-19-dedicated ICU beds were needed. From September 2020, instead of relying on voluntary reporting of available ICU beds to the Central Co-response Situation Room, the government designated 64 specific ICU beds in 16 primarily

public hospitals in SMR for patients with COVID-19 (56). Meanwhile, hospital beds for patients with mild and moderate illness in the greater Seoul area were provided by reassigning hospitals dedicated to infectious diseases and securing additional residential treatment centres. As of 15 September 2020, in the RoK, hospital wards dedicated to infectious diseases had 4138 beds at 43 hospitals, of which 1531 beds (37%) were in use. For residential treatment centres, 19 facilities were running with 4297 rooms and 652 patients were admitted (15.2%) (57).

2.2 Workforce

Many health-care professionals and staff were mobilized to respond to the COVID-19 pandemic in the RoK. EIS officers took charge of tracing and surveillance. For testing, doctors and medical laboratory scientists were involved. For provision of masks, pharmacists were involved, especially when the 5-day rotation system (emergency distribution system) for purchasing masks was introduced.

After the first COVID-19 case in Daegu was confirmed on 18 February, the number of cases soared, and 6275 patients tested positive in a month. It overwhelmed EIS officers and the health-care workforce, including medical professionals, along with a shortage of hospital beds and supplies. Daegu was proclaimed as a “special disaster zone” on 15 March 2020. Health-care professional volunteers from other cities in both the public and private sectors were recruited and mobilized to cope with the situation. To ensure safety of the mobilized professionals, the government prepared guidelines that included information about remuneration, duration, housing and monitoring (58).

After the Daegu outbreak, the Central Government focused its efforts on maintaining adequate hospital beds and human resources by strengthening triage and applying flexible re-allocation of resources, depending on the severity of the situation. As of September 2020, there has been no noticeable shortage of workforce for the COVID-19 response.

3. Providing health services effectively

3.1 Planning services

Key measures underpinning the RoK government’s COVID-19 response are characterized by its swift and broad 3Ts (test – trace – treat) strategy (59). Those at risk of infection are tested, quarantined if necessary, and treated. For treatment, as previously described in section 2.1, the RoK government is flexible in designating and mobilizing hospital beds for patients with severe COVID-19 within the existing health system, rather than establishing new systems or institutions. Depending on the situation of the cases, hospitals can function as they were, or they can be designated and used as COVID-19-dedicated hospitals.

The RoK has a centralized single-fund health financing system with the National Health Insurance (NHI), covering all citizens. All health providers (both public and private) should join the system. The NHIS makes it possible for the government to plan and provide services, reaching out to the entire population and health providers. The legal basis of the Infectious Disease Control and Prevention Act, 2020 (6) also made it possible to mobilize the resources needed for planning national services during unexpected sudden disease outbreaks such as COVID-19.

The Government of the RoK also strives to specifically improve access to COVID-19 services for vulnerable populations. For immigrants without a legal status, the government has relaxed its measures on illegal stays and gets them tested and treated without the fear of being reported and deported. Monitoring and provision of essential supplies such as face masks and hand sanitizers (60) have been provided for the homeless who have no noticeable transmission among them. The government related COVID-19 management with the existing national tuberculosis examination project using X-ray data (61). In the case of the military, in places that were densely populated, stricter preventive and management measures were applied (49). In addition, intensive inspection and management of vulnerable facilities were done by the respective ministries: restaurants and cafes (8 September, Ministry of Food and Drug Safety [MFDS]), infection-prone workplaces, including call centres (7 September, Ministry of Employment and Labor [MOEL]), distribution and logistics centres (10 September, MOLIT) (62).

3.2 Case management

Incoming international travellers are classified and managed according to the place of entry (airport/port), symptoms (symptomatic/asymptomatic), nationality (Korean/foreign), duration of stay for foreigners (long term/short term) and quarantine exemption. Those who have symptoms are tested at quarantine stations. If the diagnostic test result is positive, they are assigned to a hospital or a treatment centre according to the severity of symptoms. Incoming travellers without symptoms and those who are symptomatic but test negative are subject to 14 days of home quarantine or quarantine at a government-provided facility.

The government's rules on patient triage for COVID-19 are included in the COVID-19 response guideline (33). Locals who have suspected symptoms can get tested at a nearby screening clinic at hospitals or PHCs. If the test result is positive, they are subjected to treatment under isolation at a hospital or a residential treatment centre, depending on the severity, and receive appropriate medical attention. Suspected cases who test negative undergo 14 days of home quarantine.

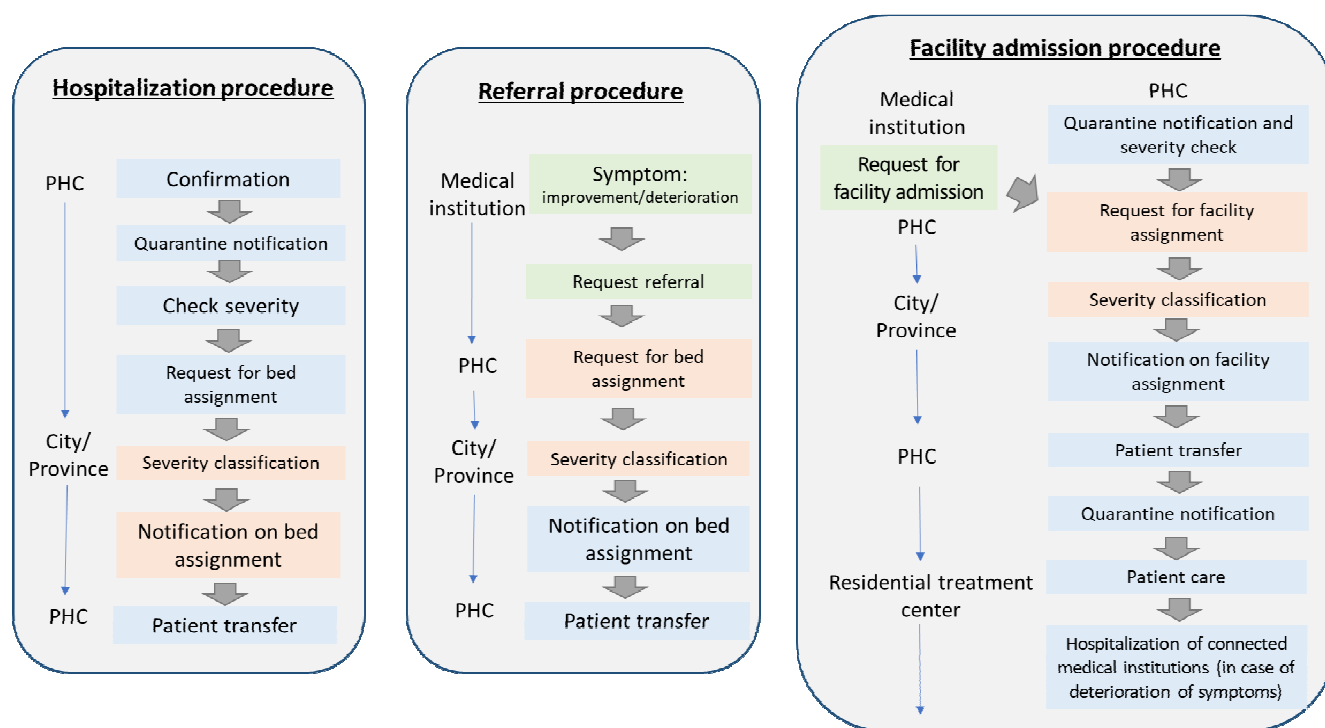
There are protocols for the response, depending on whether the case is confirmed, suspected or PUI. Once there is a suspected case, the PHC that first recognized it notifies the person to be subjected to quarantine, guides the person on inspection, and notifies the PHC of his/her actual residence. Then the PHC of actual residence will provide initial visits and guidance, issue a quarantine notice and living rules notices, as well as conduct active monitoring for the 14 days of quarantine. Even if the test results are negative, quarantine is maintained for 14 days and if the test is positive, the person is transferred to the process for confirmed patient care.

For PUIs, the agency that first recognized the case reports the occurrence to the relevant PHC then carries out disinfection and ventilation along the patient's paths of movements. PUIs who test negative receive health education, and those who test positive go through the process detailed for confirmed cases.

When it comes to a confirmed COVID-19 case, the severity is promptly checked by the PHC, then classified into four groups by health-care staff at the city or provincial patient management team, depending on the severity: mild, moderate, severe and extremely severe. Once classified, moderate,

severe and extremely severe cases are admitted to hospitals dedicated to infectious diseases or nationally designated treatment facilities for immediate inpatient treatment. Moderate and severe cases are immediately hospitalized for treatment, while mild cases who do not need hospitalization are isolated and monitored at a residential treatment centre with regular monitoring of symptoms (Figure 3). In addition, the government has also shared WHO's guidelines on "algorithm for COVID-19 triage and referral" by including its translation in the guideline for the COVID-19 response of health facilities published on 20 August 2020 (63).

Figure 3. Management of confirmed cases of COVID-19 in the Republic of Korea



Note: PHC: public health centre

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

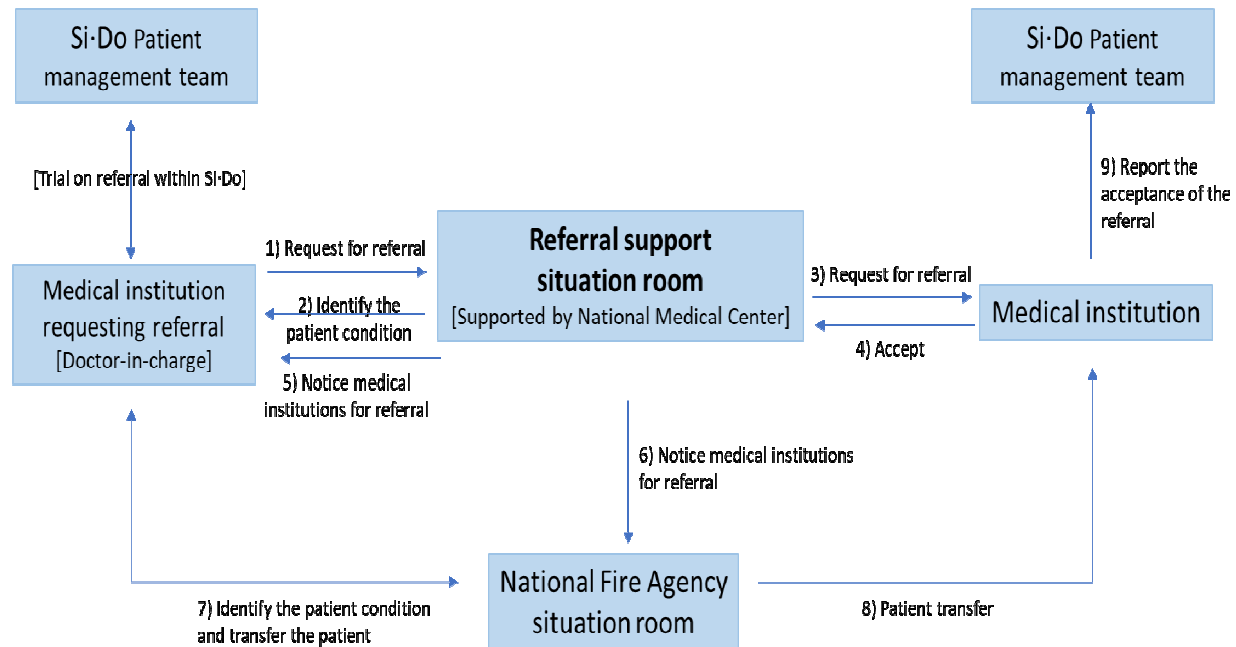
For hospital treatment, the PHC contacts the city and provincial patient management teams to request a classification of severity and allocation of available beds, and the PHC transfers patients to the relevant medical institution once the beds are allocated.

Confirmed patients may need referral when the symptoms change. In the referral system for patients with severe COVID-19 between city and/or provincial level (Figure 4), the doctor in charge of the patient at the medical institution can request referral by calling a referral support situation room at the NMC. The situation room will then directly consult with the referring medical institution to decide the need and refers the patient to the receiving medical institution if necessary. If accepted, both the sending institution and National Fire Agency situation rooms are notified to arrange the referral using dedicated transportation, which is managed by the Fire Agency.

Mild cases, or those whose symptoms are improving, are managed at the residential treatment centre. When a referral is made to the residential treatment centre, the doctor in charge requests a referral to

the city or provincial case management team via the PHC. The patient management team directly consults with the residential treatment centre regarding the referral. When the consultation does not go well, facility coordination can be requested by the CDM HQ (33).

Figure 4. Referral system of severe patients between cities and provinces (Si-Do) in the Republic of Korea



Note: Si: city; Do: province

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

Confirmed cases can be discharged from isolation if either clinical or test-based criteria are met. For clinical criteria, a person should not have fever and show improvement in clinical symptoms for at least 72 hours after 10 days of onset. By testing criteria, a person should not have fever and show improvement in clinical symptoms after seven days of onset. Thereafter, the person should test negative on PCR tests twice in a row with at least a 24-hour interval (33). Recognizing that the current criteria are too strict, the government has been revising the admission and discharge criteria following new evidence on COVID-19.

According to the government's COVID-19 response guideline, there is no specific treatment recommended for COVID-19 in the RoK, as of September (63). Instead, symptomatic treatment can be given using antipyretics, fluid therapy, antitussives, etc. Once the patient has difficulty in breathing, oxygen can be provided and measures, such as mechanical ventilation or extracorporeal membrane oxygenation (ECMO), can be offered if necessary. Antiviral drugs such as remdesivir or lopinavir/ritonavir can be administered based on the judgement of the responsible medical team (64). Some benefits of the use of remdesivir have been confirmed in patients requiring oxygen treatment, and it has been placed on emergency approval in the RoK. Remdesivir has been provided to 529 patients in 60 hospitals, as of 3 October 2020 (65). The effects of dexamethasone have been announced by British researchers, but WHO has not updated its clinical management guidelines

accordingly, which currently indicate the need for careful assessment prior to use of systemic steroids for viral pneumonia (66).

The RoK formed a Whole-of-Government Support Committee for COVID-19 treatment and vaccine development to accelerate and assist the R&D of vaccines and therapies in collaboration with academia as well as industry from the private sector (11,67). For instance, the National Institute of Health and RoK's domestic pharmaceutical company Green Cross Corp are cooperating to develop a COVID-19 blood plasma treatment drug (GC5131A) (68). It is the first to enter phase II trials for COVID-19 plasma treatment in the RoK. They aim to complete phase 2 clinical trials by the end of this year. Alongside, the government is attempting to secure sufficient convalescent plasma to boost the development of the blood plasma treatment drug. The government is currently accelerating the clinical testing and R&D of vaccines and therapies by working closely with the private sector.

3.3 Maintaining essential health services

Essential health-care services for patients who have illnesses other than COVID-19 are sustained in the health system of the RoK because there has been no major lockdown and the health system has not been overloaded with COVID-19 patients. Remote medical services are also utilized to support both patients and health-care professionals in providing health-care services to those without COVID-19 to avoid potential COVID-19 infection.

For patients without COVID-19, the aforementioned “national safe hospitals” were designated by the government. They operate dedicated areas for respiratory diseases, separated from non-respiratory diseases to prevent cross-infection from respiratory to non-respiratory cases in hospitals. In addition, consultation and prescription via telephone were temporarily introduced from 24 February 2020 (51). This measure is based on Articles 39, 40 and 44 of the Framework Act on Health and Medical Services 2020, Article 59.1 of the Medical Service Act, 2020, and Article 4 of the Infectious Disease Control and Prevention Act, 2020, and it can be decided by the doctor without prior application or registration (6,69,70). Once over-the-phone medical consultation is done, the prescription is sent to the pharmacy designated by the patient and the pharmacist counsels the patient via phone or in a written format. Utilization of this service is rapidly increasing, with 26 520 episodes until March, which jumped by an additional 51 000 consultations within a week from 30 March to 6 April (71). By 10 May 2020, there were 260 000 instances of phone consultation, of which 42% were from the local clinics of physician offices (72). In particular, one third of these consultations were in Daegu, North Gyeongsang Province, where a large number of confirmed cases of COVID-19 had occurred. From 8 May 2020, phone consultation or prescription services implemented at the local clinic level generated an additional fee of 30% of the normal consultation fee, which is covered by the NHIS (no copayment or out-of-pocket payment for the additional fee) (73).

The government is providing mental health services for increased anxiety and depression due to containment measures such as physical distancing. There is a psychological counselling hotline (1577-0199) and a suicide prevention counselling line (1393). Various support services such as Kakao Talk chat, posters and self-examination apps are provided. As of 29 January, the National Trauma Centre has operated an integrated psychological support group (74). It offered 48.9 million psychological counselling services and 152.7 million instances of information provision until September (75). The

monthly average counselling sessions increased by 78.6% compared to the past year. Psychological support by related ministries were introduced on 9 August 2020 (76). For example, the MoIS conducted psychological counselling for small business owners and economically vulnerable people, and the Ministry of Gender Equality and Family conducted 130 000 counselling sessions for multicultural families.

Free influenza vaccination coverage was expanded to a wider age range to lessen the dual burden of COVID-19 and seasonal influenza (77). At the same time, the dates of the vaccination service and the maximum number of people vaccinated per day kept to the physical distancing requirements in medical institutions (78). In addition, the government prepared and monitored a safe blood collecting environment to maintain sufficient blood stores for more than five days (79,80).

4. Paying for services

4.1 Health financing

As of mid-June, 0.5% of the NHI's budget for 2020 (US\$ 310 million out of US\$ 62 billion) has been spent on coping with COVID-19, including direct medical costs, cost of maintaining essential health services for patients with illnesses other than COVID-19 and compensation for losses incurred by health providers (81). As of 26 June 2020, COVID-19 testing and hospitalization claims amounted to KRW 130 billion (US\$ 117 million), where 67.4% is accounted for by diagnostic tests and hospitalization fee in negative pressure isolation rooms – KRW 47.3 billion (US\$ 42.5 million) and KRW 40.3 billion (US\$ 36 million), respectively (82).

Based on the Article 70 of the Infectious Disease Control and Prevention Act, 2020 (6), to compensate for lost income, medical institutions have been paid monthly estimated wages since April for temporary losses. The government has paid KRW 102 billion (US\$ 92 million) (1st tranche, 9 April), KRW 130.8 billion (US\$ 118 million) (2nd tranche, 29 May), KRW 62.2 billion (US\$ 56 million) (3rd tranche, 29 June), KRW 107.31 billion (US\$ 97 million) (4th tranche 31 July), KRW 99.6 billion (US\$ 90 million) (5th tranche, 28 August) – a total of KRW 501.9 billion (US\$ 451 million). About 72% of the KRW 700 billion (US\$ 630 million) extra budget and reserve funds were used (26). In addition, the compensation for lost income of medical institutions, pharmacies and general business sites due to COVID-19-relevant measures also started in August (26).

4.2 Entitlement and coverage

The NHIS, with universal coverage of the population, made it more efficient for the government to mobilize all medical resources at once. Utilizing the existing health system for the emergency COVID-19 response enabled early diagnosis and early treatment, which eventually led to well-organized case management and governance. The NHIS also pays for the cost of COVID-19 tests for those who test positive, suspected patients, PUI and for those who travelled abroad with symptoms or with physician recommendations, etc.

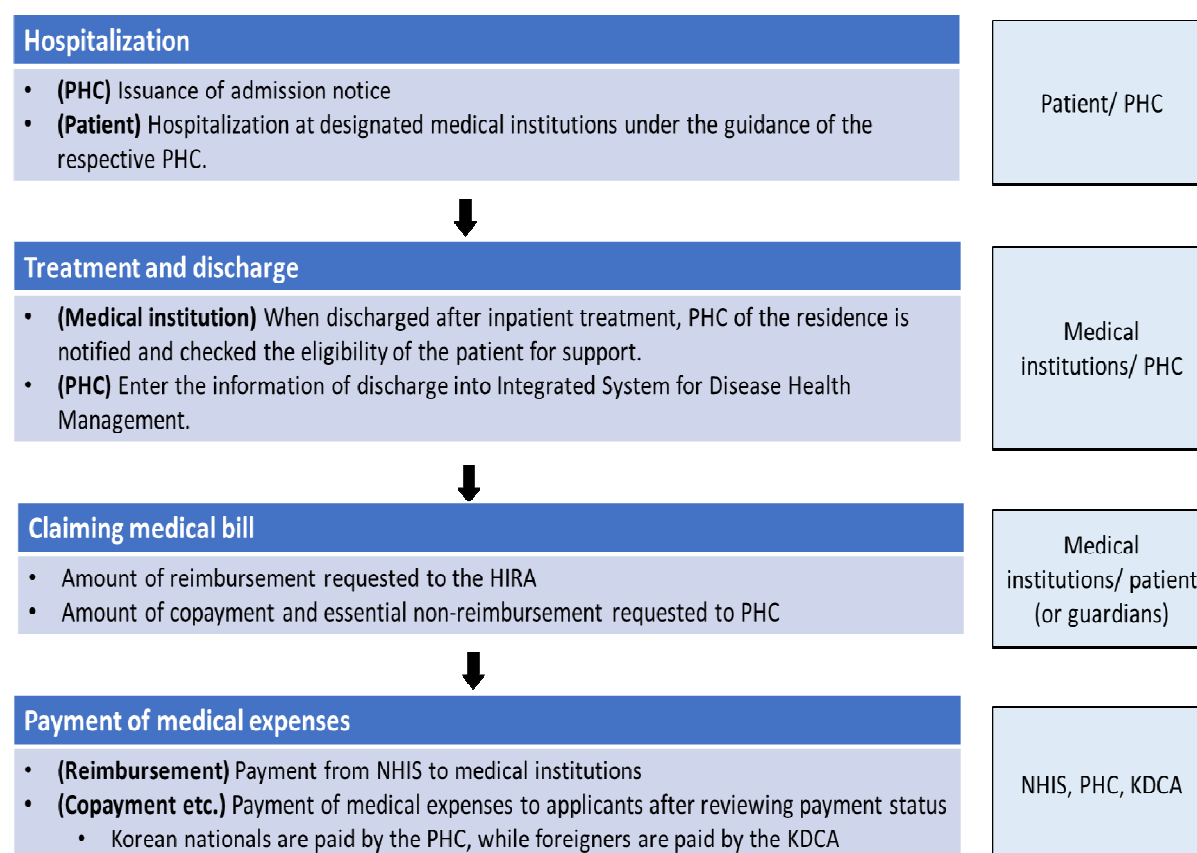
Under the NHIS, all Koreans are entitled to utilize the health services when needed, with 20–30% of the cost as copayment, depending on the level and type of care. Health services for treatment of COVID-19 are provided free of charge; 80% of the cost is covered by the NHIS and the remaining cost (patient copayment component) is covered by the government budget. This has also helped with transparent

communication among the public for case management. The NHIS has rapidly expanded the benefit package to include medicines and services related to the treatment of COVID-19 patients.

For an example in the case of confirmed patients admitted to the residential treatment centre, all expenses for isolation inpatient treatment related to COVID-19 is fully paid for after registration at the PHC. The expenses of isolation hospital treatment encompass the costs of diagnostic tests, inpatient treatment, investigation and examination. Suspected patients and PUIs requiring inpatient treatment are supported only for isolation room hospitalization and COVID-19 testing fees (83).

In the RoK, medical expenses from COVID-19 are supported for hospitalized patients or those quarantined due to COVID-19 (i.e. confirmed patients, protected patients, PUIs who received the order for isolation treatment according to the COVID-19 response guideline). Medical institutions and residential treatment centres can claim reimbursement from the HIRA and copayment and essential non-reimbursement from the PHC after receiving the issuance of quarantine disclosure. However, support is no longer available when a patient rejects a necessary change in the place of isolation (Figure 5) (13).

Figure 5. How the cost of the COVID-19 medical expenses due to isolation and hospitalization is supported in the Republic of Korea



Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

For foreign nationals, coverage has changed. All foreign nationals used to be tested and treated for free, with the fee paid by the RoK. However, revision of the Infectious Disease Control and Prevention

Act, 2020 on 12 August 2020 made it possible to charge a fee from patients with confirmed COVID-19 entering from foreign countries (6). As of 17 August, foreign patients with COVID-19 were charged full fees if they violated domestic countermeasures, such as deviation of the quarantine or submission of false PCR test results. In addition, a reciprocity arrangement is in place with other governments for foreigners entering the countries after 24 August 2020. Therefore, for countries that support overseas citizens of the RoK, the entire medical expenses incurred due to COVID-19 in Korea from those nationalities are paid by the RoK government (except for non-essential non-reimbursed services). Those nationals entering from countries that do not support the medical expenses of RoK citizens have to pay the medical expenses themselves. In the case of countries that provide conditional support to overseas RoK citizens, the hospitalization fee for isolation is state-funded, but the fee for food and treatment is borne by them. Support is no longer available once violation incurs (13).

5. Governance

The RoK's governance of the COVID-19 response is characterized by swift intragovernmental communication between ministries as well as between the central and local governments through a whole-of-government approach (Figure 6). Combined with a centralized and strong health system, it was efficient to implement countermeasures for COVID-19 throughout the nation by mobilizing resources in localities. Last but not least, the cooperation of citizens in basic measures of prevention and hygiene such as face masks, combined with the legal basis for public health, has largely helped the government to strike a balance between individual rights and public health.

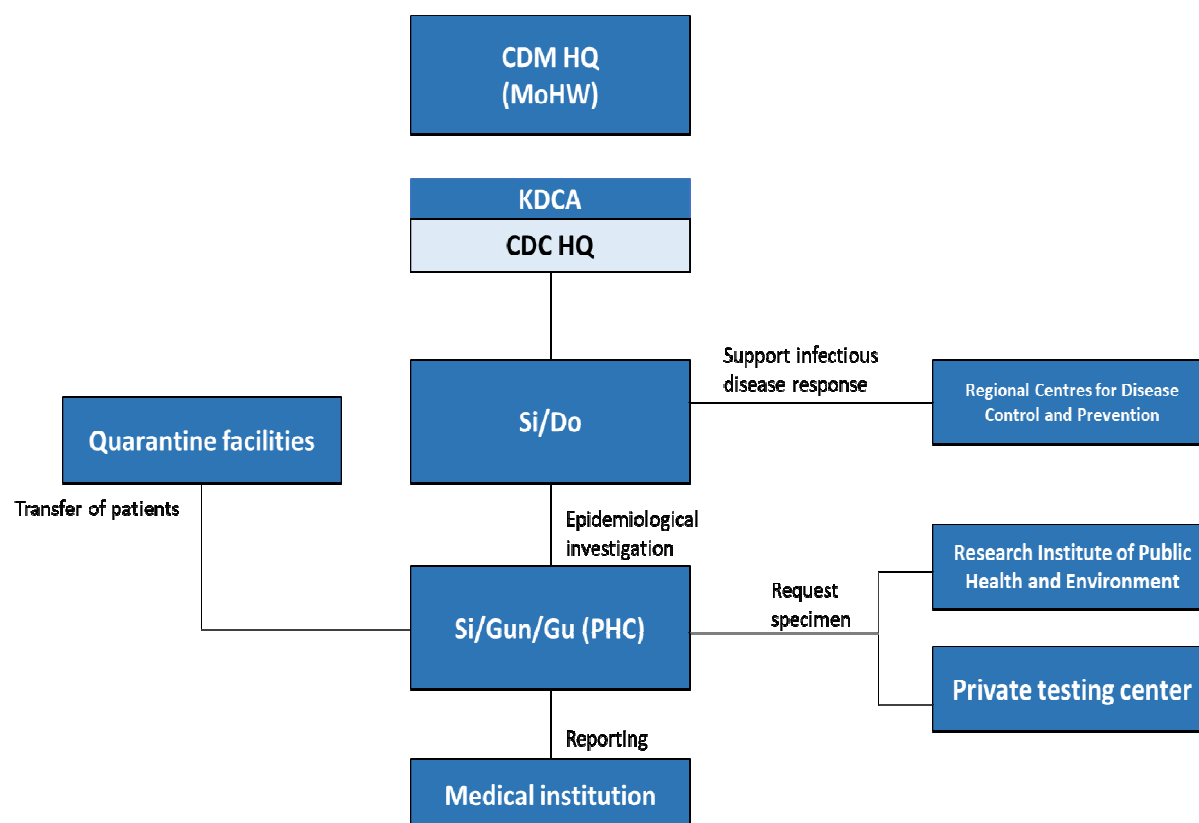
The RoK government's COVID-19 emergency response system has changed its organizational structure, as the country's CAL intensified. As of 20 January 2020, with the first case of COVID-19, the country's CAL was raised to level 2 (caution). Once the country's CAL moved from level 2 (caution) to level 3 (warning) on 27 January 2020, the CDM HQ was operationalized.

The RoK's COVID-19 taskforce, the CDSC HQ, headed by the Prime Minister, was assembled on 23 February 2020 after raising the country's CAL from level 3 (warning, orange) to level 4 (serious, red, the highest) to cope with the mass outbreak in Daegu. The CDSC HQ is the control tower for prevention and control of the disease. It is supported by the CDM HQ, which is led by the MoHW, the Minister of Health and Welfare being the first vice head of the CDSC HQ. The Pan-government Countermeasure Support Headquarters (PCS HQ) is led by the MoIS, the Minister of Interior and Safety being the second vice head of the CDSC HQ. The PCS HQ provides assistance for disaster management and coordination between government levels, including mobilizing resources such as allocation of patients across public hospitals. Other relevant ministries and agencies also assist in the countermeasures by these headquarters. For instance, the NHIS is in charge of funding treatment and testing of COVID-19 patients. The Ministry of Economy and Finance (MoEF) leads the provision of emergency financial support and economic relief packages for the fight against COVID-19 (84).

Local governments have Local Disaster and Safety Countermeasure Headquarters, headed by the mayor or governor of the local government according to Article 16 of the Framework Act on the Management of Disasters and Safety, 2020 (85). They cooperate with the countermeasures of the Central Government, while running their own interventions, considering the local context. They are

responsible for managing regional PHCs and hospitals with their own health planning, and provide public health services, including infectious disease control, vaccination, antenatal care and chronic disease management. In close communication between central and local governments, the Central Government may provide the necessary resources when the countermeasure required is beyond the capacity of local governments.

Figure 6. Working system of central–local governments of the RoK in response to COVID-19



Note: Si: city; Do: province; Gun: county; Gu: district

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

The backbone of the current infectious disease control and management system of the RoK was developed by the KCDC, which was established in 2004 to strengthen the infectious disease prevention and response system after experiencing severe acute respiratory syndrome (SARS) in 2003. The KCDC was under the MoHW, providing technical support for disease prevention and control, surveillance, quarantine, and overseeing laboratory testing and research at the national and subnational levels. The role of the KCDC in infectious disease surveillance and response has been more organized through the experience of MERS in 2015, with extensive overhaul of the Infectious Disease Control and Prevention Act, 2020 (6). In addition, in 2015, clear responsibilities were assigned to the central and local governments on testing, quarantine, tracing and containment, and treatment (87).

On 12 September 2020, the KCDC was promoted to the KDCA, no longer under the MoHW. As a newly formed central public institution, the changes allow the agency independence in its organization,

human resources and budget allocations. There will be an increased number in the workforce, with jurisdiction over six laws, including the Infectious Disease Control and Prevention Act, 2020, and the authority to enforce them (6). The subnational response system with five regional centres will also be changed with central bodies in charge. Within the KDCA, a National Institute of Infectious Diseases has been established to promote development of vaccines and therapeutics. The KDCA is expected to play a key role in managing and responding to infectious diseases in the RoK through expanded authority (2).

The Infectious Disease Control and Prevention Act, 2020 is the legal foundation for extensive and aggressive contact tracing, isolation and case management throughout the COVID-19 response (6). It has been revised, adopting the need for effective control and prevention of COVID-19 in 2020. Beginning with the first revision on 4 March 2020, additional revisions were done on 12 August and 29 September 2020 (6). Accordingly, local governments, disease control authorities, and the RoK police jointly deal with serious violations of the Act, such as quarantine breaks, dissemination of false information around COVID-19, and collective and organizational disruption, as mentioned earlier (87). Based on the legal ground, health authorities are allowed to request patients' information on transaction history of credit cards, bank records, CCTV footage and GPS data. Reconstructed movements in the form of anonymous travel logs are disclosed and made publicly available through websites and government-sent text messages, so that people could know where and when an anonymous infected person was and check if they might have been exposed. Although there was social consensus among the public willing to accept extensive contact tracing at the expense of some levels of privacy violation, the optimal balance between privacy and public health goals is not easy.

6. Measures in other sectors

6.1 Borders

Concerning the potential negative impacts of border closure on the economy in the long run, the RoK has not been sealed off, the exception being the entry ban on foreign nationals from Hubei province of China immediately after identifying the first case. Instead, a special entry procedure was applied as of 4 February 2020 (88). The RoK government applied this measure to all travellers from China in the beginning, expanded it to selected other countries (89–91), and eventually applied it globally on 19 March 2020 (92). In accordance with the procedure, all entrants receive temperature screening and fill out a health questionnaire and special quarantine declaration. In addition, all those entering the country must undergo 14 days of self-quarantine either in government-funded facilities or at home, as of 1 April 2020 (93).

All those with symptoms (e.g. fever or respiratory symptoms) at entry screening are tested for COVID-19, irrespective of nationality. If positive, they are transferred to a hospital or residential treatment centre. If negative, RoK nationals and long-stay foreigners are placed under self-quarantine, while short-term foreign visitors are subject to facility-based quarantine.

All asymptomatic passengers, irrespective of nationality, are subjected to the same procedures as those with a negative test result. Asymptomatic RoK nationals and long-stay foreigners are put under self-quarantine. They have to instal a “Self-Quarantine Safety Protection App” and get the test done at

a PHC within three days. For short-term foreign visitors, they have to undergo facility quarantine for two weeks as well, with a Self-Quarantine Safety Protection App and Self-Diagnosis App installed. They have to get tested within 14 days of arrival either at a screening clinic at the airport or in the community.

Special ambulances, buses, trains and taxi services are operated to transport those who are subjected to treatment or self-quarantine at a hospital, residential treatment centre or their homes, respectively, while some local governments run their own direct transport services (94). Although there were some concerns and opposition from some local residents when designating and operating a residential treatment centre, there was not a single case of community transmission related to residential treatment centres, thanks to the rigorous control and management of the facilities (95).

6.2 Mobility

The RoK has not imposed any aggressive restriction on domestic transport. Overall, the government has ensured the freedom of individuals to movement while maintaining proper physical distancing. Wearing of masks on public transport, previously optional, became mandatory since 26 May 2020 as per the guideline in SMR; administrative fines were introduced nationwide on 13 November 2020 (96,97). The operation of city buses was temporarily reduced after 21:00 hours, when level 2.5 of social distancing was implemented in Seoul in early September.

For external travel, the RoK government is updating travel advice through the official website of the Ministry of Foreign Affairs (MoFA) on overseas safe travel (www.0404.go.kr). The RoK government has temporarily suspended visa waiver agreements with 56 countries from 13 April 2020; therefore, RoK nationals who wish to visit countries abroad for a short-term stay (e.g. tourism) must obtain a visa from the relevant country before departure. Meanwhile, to support essential business trips, the RoK government negotiated with other countries on easing entry restrictions (e.g. exemption from quarantine upon arrival or reduction of the quarantine period), which were approved and applied to business trips of large companies in the countries of Viet Nam, China, Czech Republic, Hungary and Kuwait. Alongside, a “fast-track procedure” was introduced to allow a swift entry approval process and reduced quarantine period for RoK and counterpart nationals on business trips. With these endeavours, a total of 20 188 RoK nationals were assisted in entering 21 countries for business as of 22 September 2020 (11).

6.3 Economy

Along with the global economic recession, COVID-19 also brought economic shock in addition to the health crisis in the RoK. Although a complete lockdown was not observed, households are tightening their purse strings and many of the micro, small and medium enterprises are closed. In parallel with the 3T’s preventing the spread of COVID-19, the RoK government has undertaken 3P’s (protecting, preserving and preparing) economic response measures to minimize COVID-19’s impact on the economy. Protecting denotes stabilizing employment, support for vulnerable groups and protecting local economies. Preserving focuses on economic resilience by stimulating domestic consumption, revitalizing exports, providing support for the supply chain, customized measures for each industry, etc. Lastly, preparing encompasses a new government initiative, “the Korean New Deal”, aiming for innovation in industrial and economic structures, and an inclusive society with a stronger safety net (98).

Support for industries

The government introduced its economic measures for KRW 150 trillion (US\$ 135 billion) in response to the COVID-19 pandemic, through four rounds of Emergency Economic Council Meetings from 10 April 2020. These provide relief funds to small and medium enterprises (SMEs) and households and to boost consumption – KRW 100 trillion (US\$ 90 billion) for financing support for businesses, KRW 32 trillion (US\$ 29 billion) for the corporate bond market and short-term money market stabilization, and lastly, KRW 20 trillion (US\$ 18 billion) for addressing stock market stabilization (67). For example, in addition to the relief funds to SMEs, ultra-low interest loans were also offered to help address their urgent capital needs (11). In particular for the local economies, the Central Government front-loaded KRW 137 trillion (US\$ 123 billion), which accounts for 60% of municipal budgets, in the first half of the year. Local governments also participated in this action by issuing more regional gift certificates this year. Along with these efforts, COVID-19 damage report centres in 17 provinces were launched to assist local companies (11).

The eighth emergency economic council meeting on 10 September 2020 planned KRW 12.4 trillion (US\$ 11 billion) of support, with KRW 7.8 trillion (US\$ 7 billion) financed by the fourth extra budget. It was approved by the National Assembly on 22 September 2020 (99). Accordingly, the relief package included emergency relief for small businesses, and for contract workers and job seekers, emergency livelihood support, and emergency childcare support and others (84).

In addition, extra support measures equivalent to a total of KRW 349 trillion (US\$ 314 billion) were taken by social security contribution and tax payment deferrals (KRW 27.1 trillion; US\$ 24 billion), loan and guarantee extension (KRW 24.1 trillion; US\$ 22 billion), Korea–US\$ swap line (KRW 77.1 trillion; US\$ 69 billion), and front-loaded investments and prepayment (KRW 3.3 trillion; US\$ 3 billion) (100). The base rate was lowered from 1.25% to 0.75% and a temporary bilateral currency swap arrangement was arranged to provide liquidity to the US dollar (67). The government also purchased KRW 1.5 trillion (US\$ 1.3 billion) worth of treasury bonds (101). To provide liquidity to companies suffering from temporary financial problems, reactivation of the bond market stabilization fund and utilization of the joint funds between banks, securities companies and insurance companies were taken (11).

The government provided customized support for various industries, such as early purchases for the public sector, associated tax cuts or tax payment deferrals, emergency liquidity injection, or a campaign launch to promote sales. Especially for those companies hit hard by COVID-19 with a shrunk global supply chain, the Export–Import Bank of Korea and the Korea Trade Insurance Corporation launched financial assistance programmes worth more than KRW 20 trillion (US\$ 18 billion) and KRW 36 trillion (US\$ 32 billion), respectively.

Tax measures

Direct and indirect tax measures were adopted in the RoK (102). Tax credits were given to rental business owners who had lowered the rental fee of a commercial building from January until December 2020. Income and corporate tax reductions were made for SMEs in special disaster areas (Daegu, Gyeongsan, Bonghwa and Cheongdo) as well as overseas companies' returning to the RoK due to damages from COVID-19. Temporary relief from value-added tax (VAT) for SMEs was decided at the National Assembly as of 17 March 2020. There was also a temporary increase in the income tax

deduction rate for credit card or other expenses from March to June 2020. Temporary reduction of individual consumption tax on cars is currently active from March until December 2020. Not only that, the mandatory NHI contribution was also discounted by 30–50% for vulnerable populations for three months (March–May) (103). An average of 3.29 million households with 6.96 million people were the beneficiaries per month and a total of KRW 911.5 billion (US\$ 820 million) was offered (82).

6.4 Social and income support

Livelihood support for the general population

The government introduced two emergency fund provisions for disaster relief in order to stabilize livelihoods and stimulate domestic consumption (104).

The first emergency disaster relief fund was offered nationwide from May, regardless of income level, in the form of cash, gift certificates, prepaid cards, credit or debit card top-up. The amount was up to KRW 400 000 (US\$ 360) for single-person households, KRW 600 000 (US\$ 540) for two-person households, KRW 800 000 (US\$ 720) for three-person households, and KRW 1 million (US\$ 900) for households with four or more members (105). The fund was available for use until 31 August 2020 but limited to use in the local residing community.

Starting with cash payments to the vulnerable on 4 May, a total of KRW 14.24 trillion (US\$ 13 billion) was paid to 22.16 million households nationwide. Close cooperation among the central and local governments and private companies for rapid payment of relief funds allowed most households (98.2% as of 31 May) to receive funds within a month from 30 April when the budget was finalized at the National Assembly (11). As a result, KRW 12.07 trillion (US\$ 10.96 billion) (99.5%) of the KRW 12.13 trillion (US\$ 11 billion) (excluding cash and gift certificates) was used within the deadline. Of the funds, 63.5% was used at small- and medium-sized credit card merchants (stores with annual sales of less than KRW 3 billion; US\$ 3 million) of which 24.9% were small merchants (stores with annual sales of less than KRW 300 million; US\$ 270 000) (106). Meanwhile, KRW 5.68 trillion (US\$ 5 billion) of the funds were used by credit and debit cards, mostly spent on dining (24.8%) and grocery shopping (24.2%), followed by hospital or pharmacy expenses (10.4%). The sales of traditional markets also went up by 20% after the funds were distributed (107).

The second relief fund started on 24 September. Unlike the first one, it targeted vulnerable groups such as small business owners, young job seekers, the unemployed, the working poor, and households with childcare expenses (108). Aside from the Central Government's fund, some local governments also provided their own disaster relief fund to the residents – nine (52.9%) out of 17 metropolitan and provincial governments, and 77 (34.1%) out of a total of 226 local governments. The funds were given various names and also designed differently in payment standards and amount (109).

According to the financial support approved at the National Assembly, the MoHW and MoE started supporting 6.7 million people with special care expenses and online study expenses to help ease the financial and care burden caused by the continued closure of daycare centres and schools, as of September 2020 (110). The government provided a one-time payment of KRW 200 000 (US\$ 180) per child in elementary school and KRW 150 000 (US\$ 135) per middle-school student. Along with financial

support, emergency childcare services and support for online classes for children of working parents were also offered.

Unemployment benefits, job security measures

To deal with the huge drop in employment due to COVID-19, Emergency Measures for Employment Stabilization and Measures for the Public Sector Employment Shock were introduced on 22 April and 14 May 2020, respectively. The measures target both employers and employees. For employers, the government increased employment retention subsidies and expanded subsidies for businesses that reduced the working hours of their employees. To support employees with decreased income due to temporary lay-offs or low demand, the government provided KRW 500 000 (US\$ 450) a month (up to three months) to low-income job seekers as well as an employment success package programme. A low-interest loan programme for low-income workers was also included as livelihood support (11).

Support for education

Countermeasures for education during COVID-19 in the RoK are characterized by the introduction of online classes and support for teacher training. To protect the health and safety of students and to ensure continuity in their learning, the government decided to phase in online classes in elementary, middle and high schools starting from 9 April 2020. Technical assistance for online streaming and information, communication and technology (ICT) platforms for schools were offered with the cooperation of the Ministry of Science and ICT and MCST (111). Two sets of the learning management system (LMS) platforms (KERIS e-learning site for elementary school students and EBS online class for middle and high school students) were established, each allowing concurrent access by 3 million students (11).

The government also provided free digital device rental services and support for Internet access to students from low-income families in order to prevent any blind spots in online learning. For students with disabilities, supervisors were assigned to help children in emergency care at schools with online classes. Moreover, the government operated pilot schools and encouraged teachers to share information, online class content and strengthen their capacity through the community of 10 000 representative teachers.¹³ As of 8 June 2020, all schools in the RoK had reopened, with the flexibility of online alternative classes if necessary (11).

6.5 Cross-border collaboration

The RoK government actively participated in international meetings, including those by the Asian Development Bank (ADB), Association of Southeast Asian Nations (ASEAN), European Union (EU), Group of 20, United Nations (UN), WHO meetings, and addressed the importance of international solidarity and cooperation. In addition, the government contributed to the introduction of some global initiatives by chairing “The Group of Friends of Solidarity for Global Health Security” by the UN (launched 12 May), “Support Group for Global Infectious Disease Response” by WHO (launched on 20 May), and “Group of Friends for Solidarity and Inclusion with Global Citizenship Education” by the United Nations Economic, Social and Cultural Organization (UNESCO) (launched 26 May), sharing their

¹³ The Community of 10 000 Representative Teachers is a communication platform designed to help teachers receive real-time assistance for handling difficulties and sharing online class programmes, policies and best practices.

experiences and lessons learned (11). The government also endorsed global vaccine initiatives, including the COVAX (COVID-19 Vaccine Global Access) Facility led by the Coalition for Epidemic Preparedness Innovations, Global Alliance for Vaccines and Immunization and WHO, and supported the International Vaccine Institute headquartered in Seoul to support its efforts at expanding government membership.

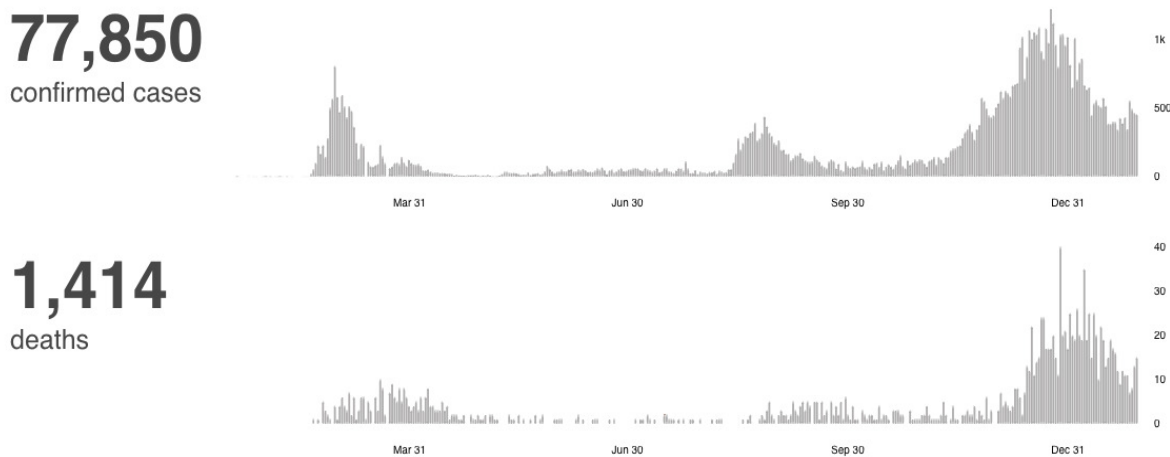
For bilateral cooperation, humanitarian assistance and a development cooperation programme were carried out. The RoK government supported 109 countries with essential supplies, as of 22 September (11). In addition, the Korea International Cooperation Agency introduced the “Agenda for Building Resilience against COVID-19 through development cooperation (ABC programme)” as well as continued knowledge-sharing activities through the COVID-19 information hub (<https://koica.go.kr/sites/covid19/index.do>) (112).

7. February 2021 update

7.1 Overview: Demands for tactic changes

The third COVID-19 wave in RoK began in November 2020 and is more extensive and long-lasting than the first and second peaks (Figure 7). It has become more challenging to trace and manage the source of infection and whereabouts due to prevalent transmission at the community level and unspecified mass transmission coinciding nationwide. In particular, mass outbreaks continue in vulnerable groups (e.g. long-term care hospitals, nursing homes, correctional facilities, etc.) (113). The government is also watching closely on the risk of COVID-19 mutation variants' transmissibility. Korean government implemented pre-emptive testing to catch the asymptomatic infection and strengthened physical distancing nationwide in response to these changes and demands. Moreover, they elaborated on resource mobilization and referral to correspond to the increasing need in securing beds for severe patients.

Figure 7. Confirmed cases and deaths of COVID-19 in the Republic of Korea as of 30 January 2021



Source: WHO (2021). RoK situation (<https://covid19.who.int/region/wpro/country/kr>, accessed 30 January 2021).

7.2 Physical distancing measures calibration

Facing the third wave, the Korean government introduced more stringent social distancing measures throughout the nation under the “five-level social distancing scheme.” As of 8 December 2020, the level scaled up to 2.5 for SMR (Seoul Metropolitan Region) and 2 for the rest of the regions. The government extended the respective measure by two weeks, and currently, the bar is maintained until 14 February 2021 (114-116). The government fine-tuned the restrictions taking into account the risk level, combining quantitative approaches using data and qualitative approaches with consultations with experts (117). For instance, cafes have only been allowed for takeaway and delivery services under level 2. However, as of 18 January 2021, dine-in services were allowed until 21:00 as long as they comply with quarantine rules as restaurants. Besides, some facilities such as indoor sports facilities and private academies, which had to close at 21:00, are now allowed to operate in compliance with quarantine rules (e.g. wearing masks and banning food intake) (118). Having mass outbreaks occurred in a detention center, social distancing level 3 was implemented for two weeks from 31 December 2020 to 13 January 2021 throughout all correctional facilities nationwide, restricting the reception of inmates

and activities related to inmates in the facilities (119). Meanwhile, the COVID-19 official website provides the public with visualization of the social distancing level by region.

7.3 Continued efforts to testing, surveillance and monitoring

- **Lower barrier of testing:** As of 9 December 2020, anyone could get tested regardless of the symptoms (120). The testing is still free of charge. The criteria for the closure of quarantine for the confirmed patients have been slightly eased, too. For example, in terms of clinical improvement, the treatment criterion of '72-hour' without fever was reduced to 'at least 24 hours (48 hours for critical illness)' (121).
- **Rapid antigen diagnostic tests:** South Korea has previously introduced rapid antigen tests. They were used to improve the pre-inspection at vulnerable facilities such as long-term care hospitals in the SMR and supplement PCR tests when PCR test is unavailable (e.g. emergency rooms, ICU, marginalized areas). However, they cannot replace the RT-PCR testing results. The recent COVID-19 response guidelines added countermeasures using rapid antigen diagnostic tests to elaborate the response (121).
- **COVID-19 Variant:** Whole Genome Sequencing (WGS) based on Next Generation Sequencing (NGS) method is performed for the confirmed cases among those entrants from the countries with COVID-19 variants spread (121).

7.4 Resource mobilization: securing the beds for severe patients

Since late November 2020, the number of confirmed cases has increased sharply, making it difficult to secure beds for intensive care units. In particular, Gyeonggi Province was hit hard due to the high number of high-risk population at long term care hospitals and nursing homes in the region (122). To improve case management, including bed assignment and referral protocol, 'Emergency Medical Response Plan in the SMR,' 'Emergency Medical Response Plan for Long term care Hospitals' took effect, and protocol for dedicated care beds for severe patients of COVID-19 was established.

- **Emergency Medical Response Plan in the SMR (as of 13 December 2020):** It is a plan to estimate the future demands of sickbeds and secure them under the assumption that 1000 patients will occur in 20 days in SMR. It focused on increasing bed numbers, including dedicated care beds for severe patients, and improve procedures for patient assignment and referral. Accordingly, elderly patients with good health conditions could enter the residential treatment center, instead of hospitals. The SMR hospital bed assignment was temporarily led by CDM HQ, instead of local governments, to respond promptly to the demand (123). As a result, the number of patients waiting for the bed assignment more than one day in the SMR has decreased significantly from more than 500 to zero as of 3 January 2021 (124,125).
- **Emergency Medical Response Plan for Long term care Hospitals (as of 3 January):** Despite the implementation of infection prevention measures for vulnerable facilities, there was an increasing number of confirmed cases and mortality. This plan primarily focuses on long-term care hospitals, for preliminary prevention, early response and cohort isolation, patient referral, and follow-up measures (123). According to an analysis of mass infection incidents in medical institutions and long-term care facilities for a month from mid-December, long term care hospitals, nursing homes, and mental hospitals took up 17 cases (68%), general hospitals and

clinics occupied 9 cases (32%) (126). The main risk factors of those infections were healthcare workers - infections caused by private gatherings of the workers, insufficient infection check when replacing caregivers, inadequate testing of new entrants, and lack of monitoring of the patients with the symptoms – in addition to the lack of infection control during the cohort isolation as well as the insufficient support for medical resources and referrals on time (123,126). Hence, periodic PCR test of the workers at the vulnerable facilities such as long-term care hospital and nursing homes was mandatory as of 21 December 2020. The cycle of the testing was gradually shortened to once a week nationwide (115).

- **Establishment of a protocol for dedicated care beds for severe COVID-19 patients:** Based on the protocol for dedicated care beds for severe patients, medical institutions manage the admission and discharge. Medical institutions report the status of dedicated care beds for severe patients and inpatient status daily to CDM HQ. ‘Hospitalization management headquarter for dedicated care beds for severe patients’ monitors the daily status and recommends or orders discharge if the hospitalization is inappropriate (121).

At the end of December 2020, CDM HQ issued an administrative order to secure more than 1% of the licensed beds of general tertiary hospitals and national university hospitals as intensive care beds, securing 460 beds (123). The compensation for (estimated) lost income associated with the treatment of COVID-19 patients is provided to medical institutions and increased by 10% in 2021 (127).

7.5. Vaccines and vaccination

As of January 2021, the government of RoK secured COVID-19 vaccines to inoculate a total of 56 million people, which are expected to be procured through the COVAX facility and several pharmaceutical companies (123). The COVID-19 vaccination designated as temporary vaccination has a legal basis on Article 25 of the Infectious Disease Control and Prevention Act (113). Korea's COVID-19 vaccination scheme consists of the vaccine introduction, distribution and supply, implementation, and adverse reaction management and operates by intragovernmental cooperation (123,128). Vaccination aims to minimize deaths considering the high fatality of COVID-19 in the elderly population and prevent community transmission through high-risk facilities vulnerable to COVID-19 (128).

- **Vaccine introduction:** In terms of safety and effectiveness management, the MFDS has a separate review team. The team enforces permission and shipment approval through three external expert consultation procedures (Safety and Efficacy Advisory Group → Central Pharmaceutical Affairs Council → Final Inspection Council) (128).
- **Vaccine distribution and supply:** The Korean government is cooperating with private companies in establishing a distribution management system. For real-time management, an integrated control center based on the IoT will control the entire delivery and storage of vaccines (128).
- **Vaccination:** Priority for vaccine rollout is determined after deliberation by the Korea Expert Committee on Immunization Practices considering the epidemic situation, the timing of supply, and quantity of vaccines (123). Currently, the Korean government is planning to start vaccination for 1.3 million patients and workers at high-risk medical institutions in the first quarter of 2021, followed by 9 million elderly (more than 65 years old) and workers at long term care facilities and other medical institutions in the second quarter. In the third quarter,

adults (18-64 years old) and those with chronic disease are expected to get vaccination (123,129). The vaccination is free of charge, paid by the government (128,130). KDCA gradually secured the budget for both vaccine supply and incidental expenses for vaccination. Individuals cannot select vaccine type or brand (128). As of 1 February 2021, the COVID-19 vaccination information website (<http://ncv.kdca.go.kr>) provides vaccination-related information and aims to function as a vaccination booking platform.

- **Post-vaccination management:** Adverse reaction monitoring is conducted after vaccination. Damages recognized to be caused by vaccination are compensated by government (e.g. medical expenses, disability and death compensation, etc.) according to the 'National Vaccination Injury Compensation Scheme,' which was introduced in 1995 (128,131).

7.6. Additional social and income support

The Korean economy has been hit hard continuously by prolonged COVID-19 and enhanced social distancing measures. Following two previous emergency disaster relief funds in 2020, the third relief fund is offered at the beginning of 2021 (132). The fund targets vulnerable population, and registration dates and procedures differ depending on the fund program for each beneficiary group. For example, an employment support fund is provided for freelance workers and workers in special employment types¹⁴. It starts on 11 January 2021, offering KRW 1 million for new beneficiaries and KRW 0.5 million for the existing beneficiaries who already received previous support (132,133). Meanwhile, the Bank of Korea expressed concerns about small business owners and low-income people being hit harder and at the risk of being alienated from recovery (134). Disparities in the socio-economic impact of the enhanced and prolonged social distancing measures are also burdensome (135).

7.7 Updates on border control

To prevent the inflow of mutant viruses, the government strengthened monitoring and managing of mutant viruses by reducing the period of diagnostic tests after entering the country from 'within three days of entry' to 'within one day of entry' on 18 January 2021 (136,137). Before that, submission of 'the laboratory certificate PCR proven free of infection with COVID19' became mandatory for all entrants (from 8 January 2021 for airport entrants and 15 January for port entrants). The government also strengthened the management of facilities and self-isolation for them (131). Moreover, additional testing were implemented before the quarantine closure (121). Notably, in response to the potential risk of virus mutant, thorough response and management is implemented to the entrants from the UK and South Africa, e.g., a temporary suspension of visa issuance and flights from those countries (23 December 2020~28 January 2021) (113,137).

¹⁴ 'Workers in special employment types' means people who need to be protected from occupational accidents because the Labor Standards Act does not apply although he/she provides labor similar to workers regardless of the type of contract (e.g. delivery drivers, caregivers, interpreters, etc.).

References

1. MoHW of the RoK (20 January 2020). Increased crisis alert level for infectious diseases in response to new coronavirus confirmed patient from overseas (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352435&contSeq=352435&board_id=&gubun=ALL, accessed 15 September 2020).
2. MoIS of the RoK (8 September 2020). The Korea Disease Control and Prevention Agency (KDCA) was launched on 12 September, and the MoHW implements a multiple vice-ministerial system (https://www.mois.go.kr/frt/bbs/type010/commonSelectBoardArticle.do?bbsId=BBSMSTR_00000000000008&nttid=79824, accessed 15 September 2020).
3. MoHW of the RoK (27 January 2020). Infectious disease crisis alert level raised from 2 (caution) to 3 (warning) (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352517&contSeq=352517&board_id=&gubun=ALL#, accessed 16 September 2020).
4. MoHW of the RoK (23 February 2020). COVID-19 regular briefing of Pan-Government Countermeasures Meeting (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353064&contSeq=353064&board_id=&gubun=ALL, accessed 15 September 2020).
5. MoHW of the RoK (5 May 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=354363&contSeq=354363&board_id=&gubun=ALL, accessed 15 September 2020).
6. Korea Law Information Center (2020). The Infectious Disease Control and Prevention Act(<https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EA%B0%90%EC%97%BC%EB%B3%91%EC%9D%98%EC%98%88%EB%B0%A9%EB%B0%8F%EA%B4%80%EB%A6%AC%EC%97%90%EA%B4%80%ED%95%9C%EB%B2%95%EB%A5%A0>, accessed 10 November 2020).
7. KDCA of the RoK (9 October 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360234&contSeq=360234&board_id=&gubun=ALL#, accessed 10 October 2020).
8. KDCA of the RoK (6 October 2020). Guideline on the release of information from confirmed patients, first edition (http://www.cdc.go.kr/board.es?mid=a20507020000&bid=0019&act=view&list_no=710797#, accessed 10 October 2020).
9. KDCA of the RoK. 1399 Call centre (<http://www.cdc.go.kr/contents.es?mid=a20701000000>, accessed 24 September 2020).
10. Cheong Wa Dae (The Bluse House) (31 March 2020). South Korea's secret weapon against COVID-19, explained by 13 frontline workers (<https://www.youtube.com/watch?v=xAVolr-LqY>, accessed 6 November 2020).
11. Government of the RoK (2020). All about Korea's response to COVID-19 (https://www.mofa.go.kr/eng/brd/m_22591/view.do?seq=35&srchFr=&srchTo=&srchWord=&srchTp=&multiitmseq=0&itmseq_1=0&itmseq_2=0&company_cd=&company_nm=&page=1&titleNm=, accessed 6 November 2020).
12. Science and Technology Policy Institute (2020). South Korea's responses to COVID-19: factors behind (<http://www.stepi.re.kr/app/report/view.jsp?cmsCd=CM0015&categCd=A0204&ntNo=33>, accessed 6 November 2020).
13. CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition) (https://is.cdc.go.kr/upload_comm/syview/doc.html?fn=160496947932300.pdf&rs=/upload_com/m/docu/0019/, accessed 11 November 2020).

14. MoHW of the RoK (11 October 2020). COVID-19 regular briefing of CDSC HQ (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360241&contSeq=360241&board_id=&gubun=ALL, accessed 11 November 2020).
15. ECDC (2020). Considerations relating to social distancing measures in response to COVID-19 – second update (<https://www.ecdc.europa.eu/en/publications-data/considerations-relating-social-distancing-measures-response-covid-19-second>, accessed 6 November 2020).
16. MoHW of the RoK (28 June 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=355170&contSeq=355170&board_id=&gubun=ALL#, accessed 16 September 2020).
17. CDSC HQ (3 May 2020). Routine distancing guideline, first edition (<https://bit.ly/33pLauA>, accessed 30 October 2020).
18. CDSC HQ (27 May 2020). Routine distancing guideline, second edition (<https://bit.ly/2EWm9xG>, accessed 30 October 2020).
19. CDSC HQ (3 July 2020). Routine distancing guideline, third edition (<https://bit.ly/36tirHb>, accessed 30 October 2020).
20. MoE of the RoK (4 May 2020). Announcement of schooling and class plans (<https://moe.go.kr/boardCnts/view.do?boardID=294&boardSeq=80510&lev=0&searchType=null&statusYN=W&page=25&s=moe&m=020402&opType=N>, accessed 20 September 2020).
21. MoE of the RoK (2 March 2020). Announcement of school operation and education support plan for COVID-19 response (<https://www.moe.go.kr/boardCnts/view.do?boardID=294&boardSeq=79917&lev=0&searchType=null&statusYN=W&page=2&s=moe&m=020402&opType=N>, accessed 20 September 2020).
22. MoHW of the RoK (18 August 2020). Plan to enhance infection prevention and control measures in the Seoul Metropolitan region (http://ncov.mohw.go.kr/en/infoBoardView.do?brdId=14&brdGubun=141&dataGubun=&ncvContSeq=3415&contSeq=3415&board_id=&gubun=, accessed 20 September 2020).
23. MoHW of the RoK (20 August 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359101&contSeq=359101&board_id=&gubun=ALL, accessed 19 September 2020).
24. MoHW of the RoK (22 August 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359127&contSeq=359127&board_id=&gubun=ALL, accessed 19 September 2020).
25. MoHW of the RoK (28 August 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359477&contSeq=359477&board_id=&gubun=ALL, accessed 19 September 2020).
26. MoHW of the RoK (25 September 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360054&contSeq=360054&board_id=&gubun=ALL, accessed 29 September 2020).
27. MoHW of the RoK (17 November 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=361056&contSeq=361056&board_id=&gubun=ALL, accessed 18 November 2020).
28. MoHW of the RoK (22 November 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=361268&contSeq=361268&board_id=&gubun=ALL, accessed 1 December 2020).
29. MoHW of the RoK (4 November 2020). Q&A on 'Five-level social distancing scheme' (<https://youtu.be/aiQ6GhKRcEA>, accessed 7 November 2020).

30. Government of the RoK (2020). Frequently asked questions “What is cohort isolation?” (http://ncov.mohw.go.kr/en/faqBoardList.do?brdId=13&brdGubun=131&dataGubun=&ncvContSeq=&contSeq=&board_id=&gubun=, accessed 25 September 2020).
31. MoHW of the RoK (22 February 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353050&contSeq=353050&board_id=&gubun=ALL, accessed 27 September 2020).
32. MoHW of the RoK (25 February 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353123&contSeq=353123&board_id=&gubun=ALL, accessed 27 September 2020).
33. CDC HQ, CDM HQ (20 August 2020). COVID-19 response guideline for local governments (9-2 edition) (<https://bit.ly/36ufiqH>, accessed 23 November 2020).
34. Government of the RoK (15 April 2020). How Korea responded to a pandemic using ICT – flattening the curve on COVID-19 (https://www.mois.go.kr/eng/bbs/type002/commonSelectBoardArticle.do?bbsId=BBSMSTR_00000000022&nttId=76748, accessed 25 September 2020).
35. MOLIT of the RoK (25 March 2020). Smart city technology makes tracing of COVID-19 confirmed patients faster and more accurate (http://www.molit.go.kr/USR/NEWS/m_71/dtl.jsp?id=95083710, accessed 25 September 2020).
36. MOLIT and KCDC (9 April 2020). Online briefing on COVID-19 smart management system (https://www.youtube.com/watch?v=C9o_HGN6v8E&feature=youtu.be, accessed 6 November 2020).
37. MoHW of the RoK (10 June 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=354948&contSeq=354948&board_id=&gubun=ALL, accessed 26 September 2020).
38. MoHW (12 August 2020). QR code based digital sign-in system, much safer than manual sign-in sheets (<https://www.youtube.com/watch?v=oBtBzzGQRjA>, accessed 6 November 2020).
39. CDC HQ (3 October 2020). Update of electronic entry log (QR) collection and destruction (<http://ncov.mohw.go.kr/shBoardView.do?brdId=2&brdGubun=21&ncvContSeq=3641>, accessed 2 October 2020).
40. MoHW of the RoK (11 February 2020). Regular briefing of CDM HQ on new coronavirus infection (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352827&contSeq=352827&board_id=&gubun=ALL, accessed 24 September 2020).
41. HIRA (23 January 2020). Careful attention to healthcare institutions to prevent the spread of the new coronavirus (<https://www.hira.or.kr/bbsDummy.do?pgmid=HIRAA020041000100&brdScnBltno=4&brdBltno=9996&pageIndex=1>, accessed 12 November 2020).
42. MFDS of RoK (22 September 2020). Updates on COVID-19 vaccines and clinical trials in South Korea (https://www.mfds.go.kr/brd/m_99/view.do?seq=44619&srchFr=&srchTo=&srchWord=&srchTp=&itm_seq_1=0&itm_seq_2=0&multi_itm_seq=0&company_cd=&company_nm=&page=5, accessed 26 September 2020).
43. MFDS of the RoK (15 September 2020). Updates on COVID-19 diagnostic reagents authorization and approval in South Korea (https://www.mfds.go.kr/brd/m_99/view.do?seq=44619&srchFr=&srchTo=&srchWord=&srchTp=&itm_seq_1=0&itm_seq_2=0&multi_itm_seq=0&company_cd=&company_nm=&page=5, accessed 26 September 2020).
44. CDM HQ (March 2020). Standard model for drive thru screening clinics (https://covidtranslate.org/KCDC-drive-thru-manual_KR.pdf, accessed 30 October 2020).

45. Lee S, Narasallim Research Institute (January 2020). Budgets on responding to new infectious diseases in South Korea
(https://www.medric.or.kr/Uploads/BLibrary/Future_Horizon_%EC%A0%9C44%ED%98%B8.pdf, accessed 30 October 2020).
46. GFID (2019). 2018 Annual report of Government-wide R&D Fund for infectious disease research (GFID) (<https://www.gfid.or.kr/data/bbsData/15591127891.pdf>, accessed 30 October 2020).
47. MoHW of the RoK (19 June 2020). Meeting with cooperative hospitals with COVID-19 residential treatment center
(http://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=1&CONT_SEQ=355063, accessed 24 September 2020).
48. MoHW of the RoK (19 June 2020). Subsidies of 39 billion KRW to 69 hospitals dedicated to infectious disease
(http://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=1&CONT_SEQ=353539, accessed 24 September 2020).
49. MoHW of RoK (18 November 2020). Regular briefing of CDSC HQ on COVID-19
(http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=361069&contSeq=361069&board_id=&gubun=ALL, accessed 20 November 2020).
50. MoHW of the RoK (2020). List of national safe hospitals
(https://www.mohw.go.kr/react/popup_200128.html, accessed 30 September 2020).
51. MoHW of the RoK (2 March 2020). A guide to temporary telephone consultation and prescription
(http://www.mohw.go.kr/react/al/sal0101vw.jsp?PAR_MENU_ID=04&MENU_ID=040101&page=1&CONT_SEQ=353269, accessed 10 October 2020).
52. MoHW of the RoK (14 September 2020). Regular briefing of CDSC HQ on COVID-19
(<https://www.gov.kr/portal/ntnadmNews/2264268%20>, accessed 24 September 2020).
53. MoHW of the RoK (29 May 2020). 83 negative pressure isolation rooms preparing for COVID-19 response
(http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=354783&contSeq=354783&board_id=&gubun=ALL#, accessed 27 September 2020).
54. MoHW of the RoK (10 March 2020). Regular briefing of CDSC HQ on COVID-19
(http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360241&contSeq=360241&board_id=&gubun=ALL, accessed 11 October 2020).
55. Lee J, Cho S, Cha S, Kim JH (14 May 2020). Government innovation strategies in the post COVID-19 Era: implications based on the analyses of Korean COVID-19 response cases. Korea Institute of Public Administration
(https://www.kipa.re.kr/site/kipa/research/selectPublishView.do?gubun=IS&pblctId=PUBL_00000000000499, accessed 1 December 2020).
56. Korean National Police Agency (20 April 2020). Policing under and against COVID-19
(https://www.police.go.kr/user/bbs/BD_selectBbs.do?q_bbsCode=1002&q_bbscttSn=20200420161331023&q_tab=&q_searchKeyTy=lngtCn_1002&q_searchVal=Policing&q_rowPerPage=10&q_currPage=1&q_sortName=&q_sortOrder=&, accessed 8 November 2020).
57. MoHW of the RoK (16 September 2020). Regular briefing of CDSC HQ on COVID-19
(http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359905&contSeq=359905&board_id=&gubun=ALL, accessed 29 September 2020).
58. MoHW of the RoK (27 February 2020). Preparing guideline for supporting and operating medical professionals dispatched for the COVID-19 treatment
(http://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=1&CONT_SEQ=353208, accessed 17 September 2020).

59. MOTIE of the RoK (11 June 2020). On its way to make the 'K-response model' as a world standard (<https://www.gov.kr/portal/ntnadmNews/2182907>, accessed 8 November 2020).
60. MoHW of the RoK (14 October 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360281&contSeq=360281&board_id=&gubun=ALL, accessed 8 November 2020).
61. MoHW of the RoK (1 May 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=354320&contSeq=354320&board_id=&gubun=ALL, accessed 8 November 2020).
62. MoHW of the RoK (21 September 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359972&contSeq=359972&board_id=&gubun=ALL, accessed 8 November 2020).
63. CDC HQ, CDM HQ (20 August 2020). COVID-19 response guideline for medical institutions (1-1 edition) (http://ncov.mohw.go.kr/upload/viewer/skin/doc.html?fn=1598328987575_20200825131628.hwp&rs=/upload/viewer/result/202010/, accessed 30 October 2020).
64. Korean Society of Infectious Diseases, Korean Society for Antimicrobial Therapy, Korean Society of Pediatric Infectious Diseases (13 March 2020). Expert recommendations for COVID-19 treatment (http://www.ksid.or.kr/rang_board/list.html?num=3844&code=notice3, accessed 29 September 2020).
65. KDCA of the RoK (3 October 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360146&contSeq=360146&board_id=&gubun=ALL, accessed 3 October 2020).
66. World Health Organization (27 May 2020). Clinical management of COVID-19: interim guidance (<https://apps.who.int/iris/handle/10665/332196>, accessed 4 November 2020).
67. MoEF (16 April 2020). Tackling COVID-19 in South Korea (<https://www.youtube.com/watch?v=VDLYHyEozY&feature=youtu.be>, accessed 9 November 2020).
68. MoHW of the RoK (30 July 2020). Head of National Institute of Health visited the COVID-19 blood plasma treatment drug development site (https://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=3&CONT_SEQ=358776, accessed 20 September 2020).
69. Korea Law Information Center (2020). Framework Act on Health and Medical Services (<https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EB%B3%B4%EA%B1%B4%EC%9D%98%EB%A3%8C%EA%B8%B0%EB%B3%B8%EB%B2%95>, accessed 10 November 2020).
70. Korea Law Information Center (2020). Medical Service Act (<https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%9D%98%EB%A3%8C%EB%B2%95>, accessed 10 November 2020).
71. CDSC HQ (19 April 2020). COVID-19 live briefing (<https://www.youtube.com/watch?v=SeA3pFyLmDk>, accessed 10 October 2020).
72. CDSC HQ (19 May 2020). COVID-19 CDSC HQ briefing (<https://www.youtube.com/watch?v=bJlGkxT3MA>, accessed 10 October 2020).
73. MoHW of the RoK (8 May 2020). Notice on temporary application of service fee for telephone consultation and prescription (<https://www.hira.or.kr/bbsDummy.do?pgmid=HIRAA020002000100&brdScnBltno=4&brdBltno=7930>, accessed 10 October 2020).
74. MoHW of the RoK (18 September 2020). Regular briefing of CDSC HQ on COVID-19 (<http://ncov.mohw.go.kr/tcmBoardView.do?contSeq=359943>, accessed 28 September 2020).
75. MoHW of the RoK (28 September 2020). Regular briefing of CDSC HQ on COVID-19 (<http://ncov.mohw.go.kr/tcmBoardView.do?contSeq=360086>, accessed 28 September 2020).

76. MoHW of the RoK (9 September 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=358934&contSeq=358934&board_id=&gubun=ALL, accessed 20 September 2020).
77. MoHW of the RoK (7 September 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359783&contSeq=359783&board_id=&gubun=ALL, accessed 10 October 2020).
78. KDCA of the RoK (21 September 2020). Updates on COVID-19 in RoK (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=359975&contSeq=359975&board_id=&gubun=ALL, accessed 10 October 2020).
79. MoHW of the RoK (2 March 2020). Regular briefing of CDSC HQ on COVID-19 (<http://ncov.mohw.go.kr/tcmBoardView.do?contSeq=353274>, accessed 25 September 2020).
80. MoHW of the RoK (20 May 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=354616&contSeq=354616&board_id=&gubun=ALL, accessed 25 September 2020).
81. Salmon A (15 June 2020). Inside Korea's low-cost, high-tech COVID-19 strategy (<https://asiatimes.com/2020/06/the-secrets-behind-south-koreas-covid-19-success/>, accessed 20 September 2020).
82. National Assembly Budget Office (2020). Fiscal trends & issues. 2(13) (<https://www.nabo.go.kr/Sub/01Report/08 Board.jsp?func=view&bid=62&bidx=&idx=7264>, accessed 10 November 2020).
83. CDC HQ (21 August 2020). COVID-19 quarantine hospitalization support plan, fifth edition (http://ncov.mohw.go.kr/upload/viewer/skin/doc.html?fn=1598003591555_20200821185311.hwp&rs=/upload/viewer/result/202010/, accessed 30 October 2020).
84. MoEF of the RoK (10 September 2020). Results of COVID-19 emergency economic council meeting (<https://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd=N0001&seq=4975>, accessed 10 October 2020).
85. Korea Law Information Center (2020). Framework Act on the Management of Disasters and Safety (<https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%9E%AC%EB%82%9C%EB%B0%8F%EC%95%88%EC%A0%84%EA%B4%80%EB%A6%AC%EA%B8%B0%EB%B3%B8%EB%B2%95>, accessed 10 October 2020).
86. Chung D, Soh HS (23 March 2020). Korea's response to COVID-19: early lessons in tackling the pandemic (<https://blogs.worldbank.org/eastasiapacific/koreas-response-covid-19-early-lessons-tackling-pandemic>, accessed 11 October 2020).
87. MoHW of the RoK (7 October 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=360210&contSeq=360210&board_id=&gubun=ALL, accessed 9 October 2020).
88. MoHW of the RoK (3 February 2020). Regular briefing of CDM HQ on new coronavirus infection (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352656&contSeq=352656&board_id=&gubun=ALL, accessed 20 September 2020).
89. MoHW of the RoK (4 February 2020). Regular briefing of CDM HQ on new coronavirus infection (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352680&contSeq=352680&board_id=&gubun=ALL, accessed 20 September 2020).
90. MoHW of the RoK (14 February 2020). Regular briefing of CDM HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352882&contSeq=352882&board_id=&gubun=ALL, accessed 20 September 2020).
91. MoHW of RoK (10 March 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353467&contSeq=353467&board_id=&gubun=ALL, accessed 20 September 2020).

92. MoHW of the RoK (17 March 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353588&contSeq=353588&board_id=&gubun=ALL, accessed 20 September 2020).
93. MoHW of the RoK (29 March 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353790&contSeq=353790&board_id=&gubun=ALL, accessed 23 September 2020).
94. MoHW of the RoK (31 March 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353815&contSeq=353815&board_id=&gubun=ALL, accessed 23 September 2020).
95. MoHW of the RoK (29 July 2020). Regular briefing of CDSC HQ on COVID-19 (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=358766&contSeq=358766&board_id=&gubun=ALL, accessed 23 September 2020).
96. MoHW of the RoK (25 May 2020). Regular briefing of CDSC HQ on COVID-19 (<https://www.gov.kr/portal/gvrnPolicy/view/H2005000000666810?policyType=G00301&Mcode=11218>, accessed 18 September 2020).
97. CDM HQ (10 November 2020). Key content related to mandatory rules of wearing masks (http://ncov.mohw.go.kr/guidelineView.do?brdId=7&brdGubun=71&dataGubun=&ncvContSeq=4056&contSeq=4056&board_id=&gubun=, accessed 13 November 2020).
98. MoEF of the RoK (11 June 2020). Safeguarding economic resilience (<https://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd=N0001&seq=4917>, accessed 13 November 2020).
99. MoEF of the RoK (22 September 2020). The National Assembly approved the 4th extra budget for 2020 (http://www.moef.go.kr/nw/nes/detailNesDtaView.do?searchBbsId1=MOSFBBS_000000000028&searchNttId1=MOSF_000000000045551&menuNo=4010100, accessed 25 September 2020).
100. MoEF of the RoK (2020). Comprehensive economic policy response to the COVID-19 pandemic (http://ncov.mohw.go.kr/en/duBoardView.do?brdId=12&brdGubun=121&dataGubun=&ncvContSeq=1955&contSeq=1955&board_id=&gubun=, accessed November 2020).
101. Korea International Trade Association, Institute for International Trade (7 May 2020). Effects of COVID-19 on export and the prospects (http://iit.kita.net/newtri2/report/iitreporter_view.jsp?sNo=2065&sClassification=1, accessed 6 November 2020).
102. KPMG (28 October 2020). South Korea: Tax developments in response to COVID-19 (<https://home.kpmg/xx/en/home/insights/2020/04/south-korea-tax-developments-in-response-to-covid-19.html>, accessed 9 November 2020).
103. MoHW of the RoK (10 April 2020). Health insurance premiums from March to May will be reduced (http://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=1&CONT_SEQ=354023, accessed 17 September 2020).
104. Government of RoK (30 March 2020). Plans for emergency disaster relief fund (http://www.moef.go.kr/com/synap/synapView.do?atchFileId=ATCH_000000000013639&fileSn=2, accessed 10 October 2020).
105. Government of the RoK (2020). COVID-19 Emergency disaster relief fund project (<https://www.gov.kr/portal/service/serviceInfo/174100000014>, accessed 15 November 2020).
106. MoIS of the RoK (22 September 2020). Government emergency disaster relief fund, 14.2357 trillion KRW paid to 22.16 million households nationwide (<https://www.gov.kr/portal/ntnadmNews/2275209>, accessed 10 October 2020).
107. MoIS of the RoK (11 June 2020). Emergency relief fund, mostly spent for dining and grocery shopping

- (https://www.mois.go.kr/frt/bbs/type010/commonSelectBoardArticle.do?bbsId=BBSMSTR_000000000008&nttid=77785#none, accessed 7 November 2020).
108. MoEF of the RoK (11 September 2020). The 4th extra budget for 2020 – customized emergency disaster relief package (http://www.moef.go.kr/nw/mosfnw/detailInfograpView.do?searchNttId1=MOSF_000000000045329&menuNo=4040500, accessed 10 October 2020).
 109. Korea Institute of Local Finance (2020). An analysis of the relationship between local government's financial power and disaster assistance. Tax Issue Paper. Vol. 16 (<https://www.narasallim.net/2719>, accessed 15 November 2020).
 110. MoE of the RoK (29 September 2020). Special child care subsidies will be completed before Chuseok (<https://moe.go.kr/boardCnts/view.do?boardID=294&boardSeq=82135&lev=0&searchType=null&statusYN=W&page=1&s=moe&m=020402&opType=N>, accessed 30 September 2020).
 111. MoHW of the RoK (21 August 2020). Regular briefing of CDSC HQ on COVID-19 (<https://www.gov.kr/portal/ntnadmNews/2236456>, accessed 18 September 2020).
 112. KOICA (2020). ABC program description (<http://www.koica.go.kr/covid19/8022/subview.do>, accessed 10 November 2020).
 113. KDCA of the RoK (4 January 2021). Updates on COVID-19 in RoK [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=3&brdGubun=31&dataGubun=&ncvContSeq=4561&contSeq=4561&board_id=312&gubun=ALL, accessed on 30 January 2021).
 114. MoHW of the RoK (2 January 2021). Regular briefing of CDSC HQ on COVID-19 [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=362858&contSeq=362858&board_id=&gubun=ALL, accessed 16 January 2021).
 115. MoHW of the RoK (23 December 2020). Regular briefing of CDSC HQ on COVID-19 [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=362390&contSeq=362390&board_id=&gubun=ALL#, accessed 16 January 2021).
 116. MoHW of the RoK (31 January 2021). Keeping social distancing level 2.5 in SMR and level 2 in other regions [press release] (http://ncov.mohw.go.kr/upload/viewer/skin/doc.html?fn=1612090470439_20210131195433.pdf&rs=/upload/viewer/result/202102/, accessed 1 February 2021).
 117. Kwon, Soonman (17 December 2020). South Korea's experience of COVID-19 response/Interviewer: WHOwebinar "sustaining livelihoods: a decision framework for calibrating social and movement measures during the COVID-19 pandemic" [panel presentation].
 118. MoHW of the RoK (16 January 2021). Keeping social distancing level 2.5 in SMR and level 2 in other regions [press release]. (http://www.mohw.go.kr/upload/viewer/skin/doc.html?fn=1610769728756_20210116130211.pdf&rs=/upload/viewer/result/202102/, accessed 23 January 2021).
 119. Ministry of Justice of the RoK (31 December 2020). Online briefing on COVID-19 mass infection at institutional corrections facilities (<https://youtu.be/l7p7hblEufA>, accessed 16 January 2021).
 120. MoHW of the RoK (9 December 2020). Regular briefing of CDSC HQ on COVID-19 [press release]. (http://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=22&CONT_SEQ=361552, accessed 16 January 2021).
 121. CDC HQ, CDM HQ (22 January 2021). COVID-19 Response guidelines (9-5 edition) (https://www.kdca.go.kr/upload_comm/syview/doc.html?fn=161187893232600.pdf&rs=/upload_comm/docu/0019/, accessed 30 January 2021).
 122. Na, Kyunghye (8 January 2021). It is the time to secure the beds rather than finding a confirmed case. Sisa IN. (<https://www.sisain.co.kr/news/articleView.html?idxno=43655>, accessed 28 January 2021).

123. MoHW of the RoK (3 January 2021). Regular briefing of CDSC HQ on COVID-19 [press release] (http://www.mohw.go.kr/react/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&CONT_SEQ=362868&page=1, accessed 16 January 2021).
124. MoHW of the RoK (17 January 2021). The social distancing adjustment plan will take effect tomorrow [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=363130&contSeq=363130&board_id=&gubun=ALL, accessed 31 January 2021).
125. MoHW of the RoK (30 December 2020). Regular briefing of CDSC HQ on COVID-19 [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=362735&contSeq=362735&board_id=&gubun=ALL, accessed 16 January 2021).
126. MoHW of the RoK (16 December 2020). Updates on COVID-19 in RoK [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=361802&contSeq=361802&board_id=&gubun=ALL, accessed 16 December 2020).
127. MoHW of the RoK (29 January 2021). 10% increase in compensation for estimated lost income of COVID-19 treatment medical institutions [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=363332&contSeq=363332&board_id=&gubun=ALL#, accessed on 31 January 2021).
128. KDCA of the RoK (28 January 2021). Free COVID19 vaccination for all citizens [press release] (http://ncov.mohw.go.kr/upload/viewer/skin/doc.html?fn=1611811915219_20210128143155.pdf&rs=/upload/viewer/result/202102/, accessed 31 January 2021).
129. KDCA of the RoK (2021). Vaccination sequence (http://ncv.kdca.go.kr/content/plan_01_01.html, accessed 28 January 2021).
130. KDCA of the RoK (11 January 2021). Updates on COVID-19 in RoK [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=3&brdGubun=31&dataGubun=&ncvContSeq=4603&contSeq=4603&board_id=312&gubun=BDJ, accessed 30 January 2021).
131. KDCA of the RoK (2021). National Vaccination Injury Compensation Scheme (<https://nip.cdc.go.kr/irgd/information.do?MnLv1=3>, accessed 28 January 2021).
132. Government of the RoK (25 January 2021). The third Government Disaster Fund (<https://www.korea.kr/special/policyCurationView.do?newsId=148882738#L2>, accessed 28 January 2021).
133. MOEL of the RoK (15 January 2021). Public announcement of the third emergency employment stabilizationsupport fund implementation [press release] (<http://www.moel.go.kr/skin/doc.html?fn=20210115092323aa7b417dd6434aadacf19a66fd47a4d5.hwp&rs=/viewer/BBS/2021/>, accessed 30 January 2021).
134. Bank of Korea (4 January 2021). New Year's address delivered by Lee Juyeol, Governor of Bank of Korea [press release] (<http://www.bok.or.kr/viewer/skin/doc.html?fn=202012310958586091.pdf&rs=/webview/result/P0000559/202012/>, accessed 16 January 2021).
135. Kwon, Soonman (2 February 2021). Toward sustainable COVID-19 response policy/Interviewer: hosted by MoHW An open forum for the reorganization of the social distancing level, RoK.
136. KDCA of the RoK (18 January 2021). Updates on COVID-19 in RoK [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=3&brdGubun=31&dataGubun=&ncvContSeq=4651&contSeq=4651&board_id=312&gubun=ALL, accessed 23 January 2021).
137. KDCA of the RoK (19 January 2021). Updates on COVID-19 in RoK [press release] (http://ncov.mohw.go.kr/tcmBoardView.do?brdId=3&brdGubun=31&dataGubun=&ncvContSeq=4656&contSeq=4656&board_id=312&gubun=ALL, accessed on 30 January 2021).

Annexures

Annex 1. Management of suspected cases and PUI cases of COVID-19 in the Republic of Korea

Management of suspected cases of COVID-19 in the Republic of Korea

		Details	Relevant Agency
1	Report of suspected case	<ul style="list-style-type: none"> Entering the Integrated System for Disease Health Management Check overseas visits, domestic group occurrence related status, occupation, etc. * Actions taken in accordance with the confirmed patient if the rapid antigen test is positive. 	PHC first recognized
2	Management of the suspected case (Quarantine)	<ul style="list-style-type: none"> Issuance of quarantine notice (bed assignment and transfer if necessary) Sample Collection and Request Enter the contents of the request into the integrated system of disease health management 	<ul style="list-style-type: none"> PHC (Si/Do patient management team) Si/Do immediate response team Si/Gun/Gu epidemiological investigation team
3	Closure of quarantine	<ul style="list-style-type: none"> Checking the results of an examination of suspected case 	<ul style="list-style-type: none"> Si/Do patient management team Si/Gun/Gu epidemiological investigation team

Management of PUI cases of COVID-19 in the Republic of Korea

		Details	Relevant Agency
1	Report of suspected case	<ul style="list-style-type: none"> Entering the Integrated System for Disease Health Management Check overseas visits, domestic group occurrence related status, occupation, etc. * Actions taken in accordance with the confirmed patient if the rapid antigen test is positive. 	PHC first recognized
2	Management of the suspected case (Quarantine)	<ul style="list-style-type: none"> Issuance of quarantine notice (bed assignment and transfer if necessary) Sample Collection and Request Enter the contents of the request into the integrated system of disease health management 	<ul style="list-style-type: none"> PHC (Si/Do patient management team) Si/Do immediate response team Si/Gun/Gu epidemiological investigation team
3	Closure of quarantine	<ul style="list-style-type: none"> Checking the results of an examination of suspected case 	<ul style="list-style-type: none"> Si/Do patient management team Si/Gun/Gu epidemiological investigation team

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

Annex 2. Step-by-step response agent(s) for hospitalization · referral · residential treatment centre admission

Category		Issuance of inpatient treatment notice		Check Severity	Request for bed facility assignment	Categorization of Severity	Notice of bed facility assignment	Patient transfer	Reissuance of inpatient treatment notice	Report the situation	Disclosure notice
Hospitalization	Not home ☐ Medical institution	Public health centre (PHC) initially recognized the case			Si ·Do Patient management severity classification team	Si ·Do Patient management bed assignment team	PHC initially recognized the case	-	PHC of the patient's residence	Medication institution ☐ PHC of the patient's residence ☐ PHC of the patient's address	
	Home ☐ medical institution	PHC of the patient's residence					PHC of the patient's residence	-	PHC of the patient's residence		
Referral	Medical institution ☐ another medical institution	-	PHC of the patient's residence and a doctor in charge at medical institution	PHC of the patient's residence	Si ·Do Patient management severity classification team	Si ·Do Patient management bed assignment team	PHC of the patient's residence			-	
Residential treatment center	Medical institution ☐ residential treatment center	-	PHC of the patient's residence and a doctor in charge at medical institution	PHC of the patient's residence	Si ·Do Patient management severity classification team	Si ·Do Patient management bed assignment team	PHC of the patient's residence			Medication institution ☐ PHC of the patient's residence ☐ PHC of the patient's address	
	Not home ☐ residential treatment center	PHC initially confirmed the case									
	Home ☐ residential treatment center	PHC of the patient's residence									

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

Annex 3. Roles and responsibilities of relevant agencies for COVID-19 response in the Republic of Korea (at the CAL 4, serious)

Relevant agency	Roles and responsibilities
MoHW (CDM HQ)	<ul style="list-style-type: none"> • Continuing operation of the CDM HQ • Issuance of crisis alert and propagation of situation accordingly • Support for pan-government response • Organization and operation of a central-local government working group • Supporting activities of the CDC HQ (support according to quarantine measures) • Consultation between ministries related to infectious diseases responses • Hospitalization, treatment, living support, compensation for damage, psychological support, etc. • Support for crisis communication among the public (Unification of communication channels through the KDCA)
KDCA (CDC HQ)	<ul style="list-style-type: none"> • Continuing operation of the CDC HQ • Support for on-site measures such as conducting epidemiological investigations and quarantine (mainly for high-risk groups and critical patients). • Strengthening monitoring and evaluation of crisis situations • Strengthening the operation of a 24-hour general situation room • Prevention of additional inflow through strengthened quarantine, etc. • Switching the functions of a base hospital from outpatient care to inpatient and intensive care. • Operation of surveillance system for severe patients, such as deaths • Operation of the mutual cooperation and coordination system between related agencies. • Laboratory testing management (support for strengthening testing capabilities of local and private medical institutions), communication with the press (briefing, press releases, press support), response to civil complaints, and management of public communication. • Request to send emergency notification texts if necessary
Disease response centers (SMR, Chungcheong Province, Honam (Jeolla) Province, North and South Gyeongsang Province)	<ul style="list-style-type: none"> • Establish a cooperative system for responding to infectious diseases with local governments and support for strengthening preparedness and response capabilities. • Monitoring, epidemiological investigation, and on-site support for infectious diseases that cannot be carried out alone by the local government. • Support for joint management and utilization of medical response resources, such as quarantine materials by region, etc. • COVID-19 Laboratory testing during the quarantine inspection process

<p style="text-align: center;">Si/Do Si/Gun/Gu</p>	<ul style="list-style-type: none"> • Operation of local quarantine response teams across the country at all levels including Si/Do and Si/Gun/Gu. • Operation of the regional disaster safety headquarters in the Si/Do and jurisdictional Si/Gun/Gu in the outbreak area • Cooperation in the operation of a central-local working group • Operation of all Si/Do patient management teams (severity classification teams, bed assignment teams) • Strengthening the monitoring system for local patients • Operation of local quarantine infrastructure • Local epidemiological investigations, on-site quarantine measures, patient transport, support for identifying contact, management of patients and contacts, disclosure, etc. • Strengthening the cooperative system with related agencies in the region • Strengthen communication with local residents, including education and public relations • Management of isolation beds and isolation facilities in the region and preparation of additional plans • Reorganization of functions and reinforcement of inspection personnel at public health centers focusing on quarantine work
<p style="text-align: center;">Research Institute of Public Health and Environment</p>	<ul style="list-style-type: none"> • Laboratory testing of COVID- 19 pathogens at the level of Si, Do
<p style="text-align: center;">Regional Centres for Disease Control and Prevention</p>	<ul style="list-style-type: none"> • Technical support such as monitoring, epidemiological investigation, and data analysis of COVID-19 at Si/Do level • Technical support for managing COVID-19 customized for each Si/Do
<p style="text-align: center;">Medical institutions</p>	<ul style="list-style-type: none"> • Diagnosis and treatment of patients with COVID-19, etc. • COVID-19 reporting (occurrence, death, discharge) • Cooperation for epidemiological investigation and infectious disease management in the event of COVID-19 cases • Operation of screening clinics of COVID-19

Source: CDC HQ, CDM HQ (10 November 2020). COVID-19 response guidelines (9-3 edition).

Annex 4. Summary of the main contents from the Infectious Disease Control and Prevention Act 2020* in the Republic of Korea

*Revised on 13 October 2020; enforced on 29 September 2020

Chapter	Article	Contents
4. Surveillance of infectious diseases, epidemiological investigation, etc.	18	Epidemiological investigations
	18-4	Requirement for presentation of materials and other relevant matters
	20-2	Methods of conducting funeral for the deceased
7. Measures to prevent spread of infectious diseases	34-2	Disclosure of information during infectious disease emergency
	35-2	Prohibition of presentation of false statement to medical personnel during disaster
	37	Establishment of infectious disease control institutions during infectious disease emergencies
	41	Management of patients of infectious disease
	41-2	Employer's obligation to cooperate
	42	Compulsory dispositions with respect to infectious diseases
	43	Hospitalization notice to patients of infectious disease
	46	Measures for medical examination and vaccination, etc.
	47	Control measures against epidemic of infectious diseases
8. Preventive measures	49	Prevention measures against infectious diseases
9. Disease Control Officers, Epidemiological Investigation Officers, Quarantine Inspection Commissioners, and Disease Prevention Commissioners	60	Disease Control Officers
	60-2	Epidemiological Investigation Officers
	60-3	Temporary duty orders
10. Expenses	70	Compensation for loss
	70-3	Subsidization to medical persons and founders of medical institutions
	70-4	Livelihood assistance for patients of infectious disease
11. Supplementary provisions	76-2	Request for provision of information and verification of information

Sources: CDC HQ, CDM HQ (10 November 2020), Korea Law Translation Center (2020)

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