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COVID-19 Health System Response Monitor

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Abbreviations and acronyms

“3Cs”	closed spaces with poor ventilation, crowded places and close-contact settings
AMED	Agency for Medical Research and Development
APO	Asia Pacific Observatory on Health Systems and Policies
COCOA	COVID-19 Contact-Confirming Application
COVID-19	coronavirus disease 2019
CRISIS	Cross ICU Searchable Information System
DMAT	Disaster Medical Assistance Team
DV	domestic violence
ECMO	extracorporal membrane oxygenation
EHI	Employee Health Insurance
FETP-J	Field Epidemiology Training Program – Japan
G-MIS	Gathering Medical Information System
HER-SYS	Health Center Real-time Information-sharing Systems
ICU	Intensive Care Unit
LSMC	late stage medical care
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MHLW	Ministry of Health, Labor and Welfare
MoF	Ministry of Finance
MoFA	Ministry of Foreign Affairs
NIID	National Institute of Infectious Diseases
NESID	National Epidemiological Surveillance of Infectious Diseases
NHI	National Health Insurance
NSC	National Security Council
PCR	polymerase chain reaction
PF	public funds
PHC	public health centers
PMDA	Pharmaceuticals and Medical Devices Agency
PPE	personal protective equipment
SHI	Social Health Insurance
WHO	World Health Organization

Contents

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 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

Health information was communicated by the Japanese government using various methods, including ministerial press conferences, official websites of relevant ministries, broadcast media and social networking sites during the coronavirus disease (COVID-19) epidemic in Japan.

The first COVID-19 case in Japan was reported on 15 January 2020 *(1)*. Since then, information on identification of COVID-19 cases has been published on the official website of the Ministry of Health, Labor and Welfare (MHLW), Japan (). In the early phase of the COVID-19 epidemic when the number of cases was small, detailed information such as age, sex, illness history, travel history and symptoms were published on the MHLW website. As the numbers increased, the content was changed to a daily report of the total number of confirmed cases at border quarantine stations as well as those within the country, hospitalized cases, severe cases, fatal cases and the number of COVID-19 polymerase chain reaction (PCR) tests conducted in a day. These reported numbers were summarized in various graphs, including epicurves, and were published on the COVID-19 dashboard on the MHLW website. The MHLW website also served to deliver other important messages to the general public, such as the importance of avoiding the "3Cs" (i.e. closed spaces with poor ventilation, crowded places with many people nearby, and close-contact settings such as close-range conversations), wearing masks, observing cough etiquette and complying with physical distancing. Multilingual information services (11 different languages) were introduced on the website to deliver these messages to foreign residents (https://www.covid19-info.jp). In addition, a call centre was established to answer questions from the general public about their concerns related to the COVID-19 epidemic in Japan *(2)*.

1.2 Physical distancing

On 20 February, the MHLW asked organizers of large sporting and cultural events to consider infection risk but there was no uniform request for cancelling events. However, on 26 February, the Japanese government requested the cancellation and postponement of events that would lead to mass gatherings *(3)*. On the same date, facilities for individuals at high risk for severe illnesses (e.g. facilities for the elderly) were requested to take general infection prevention measures to prevent potential COVID-19 transmission within such facilities *(4)*. Public and private schools were requested to physically close and shift to online classes on 27 February 2020 *(5)*. On 9 March 2020, the Novel Coronavirus Expert Meeting (the Expert Meeting) presented their assessment that environmental settings with "3Cs" were associated with the occurrence of clusters of COVID-19 cases (*see* Box 1).

Based on this assessment, they requested the general public to avoid such settings from 9 March 2020 *(6)*. In response to the increasing number of COVID-19 cases in metropolitan areas, the government declared a state of emergency in seven prefectures – Tokyo, Kanagawa, Saitama, Chiba, Osaka, Hyogo, and Fukuoka on 7 April 2020, using provisions provided in the Act on Special Measures for Pandemic Influenza and New Infectious Diseases Preparedness and Response (Act No. 31 of 2012) (the Act on Special Measures) Article 32 *(7)*.

Box 1: 3Cs

The three Cs describe situations that increase the risk of transmission. These are:

1. closed spaces with poor ventilation
2. crowded places
3. close-contact settings

Source: MHLW, Japan (https://www.mhlw.go.jp/content/3CS.pdf)

The state of emergency was expanded to all other prefectures on 16 April 2020. Based on this declaration, the general public was requested to stay at home, and refrain from domestic travel across prefectural borders. Furthermore, the government announced adoption of a "new normal" on 4 May 2020, which encouraged wearing masks, social distancing, observing cough etiquette, teleworking and staggering office hours. Facilities, shops, restaurants and bars that were considered to be at higher risk for COVID-19 transmission (e.g. those associated with night-life activities) were requested to close, although local governments varied the criteria used to issue closure requests. Given the decreasing number of cases in non-metropolitan areas, the state of emergency was lifted in 39 prefectures on 14 May 2020. The state of emergency was lifted in the remaining eight prefectures in metropolitan areas on or after 21 May 2020 (on 21 May for Osaka, Kyoto and Hyogo, and on 25 May for Hokkaido, Tokyo, Kanagawa, Saitama, Chiba). Schools were re-opened following the Guideline for Sustainable School Management in Response to Novel Coronavirus Infections published by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, on 5 June 2020 *(8)*. Restrictions on events that called for mass gathering and domestic travel were gradually eased after July.

1.3 Isolation and quarantine

COVID-19 was categorized by the Cabinet as a designated infectious disease on 28 January 2020 *(9)*. This is an ad-hoc category of emerging and re-emerging infectious diseases that can potentially have significant public health risks for Japanese citizens. The designation also serves as a legal basis for the Japanese government to place individuals infected with designated infectious diseases in isolation. The Novel Coronavirus Response Headquarters (the Government Response Headquarters) adopted the Basic Policies for Novel Coronavirus Disease Control on 25 February 2020, and established the COVID-19 Cluster Response Taskforce (Taskforce) *(4)*. During the COVID-19 epidemic, the MHLW and the Taskforce implemented a strategy called "cluster-based approach" to identify COVID-19 cases in the community *(10)*. This was based on the fact that up to 80% of COVID-19 cases, who were identified in the early phase of the epidemic, did not infect anyone, while the remaining 20% caused secondary transmissions and only a limited number of them caused super-spreading events (i.e. clusters), which resulted in the emergence of large number of new cases in the community *(11)*.

The concept of this strategy was to conduct intensive retrospective investigations on clusters of COVID-19 cases to identify the original source(s) of infection in the cluster and understand the dynamics of spread within it as well as external to it. The Taskforce also looked into the secondary effects of suppressing COVID-19 transmission by informing the general public of the environmental settings in which COVID-19 clusters were more likely to occur (i.e. environments with the 3Cs) and

urging them to adopt behavioural changes and avoid those settings *(12)*. This was not mandatory for the general public to follow it (e.g. fines were not applied), and the messages were delivered as requests from the government.

The general public was guided to contact COVID-19 consultation centres in the local government if they had any of the symptoms, including difficulty in breathing, cough, fatigue and fever (body temperature of 37.5 ºC and higher), which lasted for 4 days or longer *(13)*. A body temperature of 37.5 ºC or higher as a definition of fever and duration of 4 days or longer were excluded in the revised guidance published on 6 May 2020. Individuals at high risk for severe disease, such as the elderly, those with underlying medical conditions (e.g. diabetes, heart failure and chronic obstructive pulmonary disease), patients on dialysis and those under immunosuppression and chemotherapy were recommended to contact the consultation centres immediately, even if they presented with only mild symptoms. Individuals who met these criteria were guided to visit designated medical facilities and testing centres in the local community. Based on the Act on Prevention of Infectious Diseases and Medical Care for Patients Suffering Infectious Diseases (Act No. 114 of 1998) (Infectious Diseases Control Law) Article 12, doctors who diagnosed COVID-19 cases were mandated to report the cases to the local public health centers (PHCs). PHCs that receive the reports conduct case investigation and contact tracing for the identified COVID-19 cases under the Infectious Diseases Control Law Article 15. Following national guidelines, the PHCs search for potential COVID-19 cases among individuals who had contact with a confirmed case in the previous 14 days from the date of onset of symptoms *(14)*. The MHLW introduced the COVID-19 Contact-Confirming Application (COCOA), which can be used in smartphones, to the general public from 19 June 2020, to support the contact-tracing process. Methods of monitoring by PHCs included daily phone calls, emails and self-reporting using online applications. Self-quarantine was occasionally broken and contacts were subjected to COVID-19 testing before completing 14 days when they developed symptoms or when there was an urgent need to suppress potential COVID-19 transmission (e.g. clusters in long-term care facilities).

When individuals tested positive for COVID-19, three potential options were open to them:

1. hospitalization in medical institutions designated for infectious diseases,
2. hospitalization in general hospitals, and
3. isolation at home or in isolation facilities (e.g. hotels designated for management of mild cases).

Initially, on 1 March 2020, the MHLW had requested all COVID-19 cases to be hospitalized in medical institutions designated for infectious diseases, based on the Infectious Diseases Control Law Articles 19 and 20. In case the capacities of these medical institutions were overwhelmed, general hospitals were requested to prepare beds for COVID-19 cases with appropriate infection prevention and control measures in place. Asymptomatic and mild cases were isolated at home, except for individuals with high-risk severe diseases or those who lived with such individuals. The individuals who were exempted from isolation at home were isolated in hospitals or in isolation facilities (i.e. hotels). The cost of hospitalization in medical facilities and isolation facilities based on the Infectious Diseases Control Law was covered by the government. COVID-19 cases were discharged from medical facilities or released from isolation if they tested negative on two consecutive COVID-19 tests after resolution of

symptoms. When the capacity of the medical facilities in the community were overwhelmed, isolation could be discontinued without COVID-19 testing only if the patient was asymptomatic for 14 days from the initiation of isolation.

1.4 Monitoring and surveillance

In Japan, the government first faced the threat of COVID-19 on the occurrence of a cluster of cases on the Diamond Princess (DP) cruise ship *(15)*. A total 712 COVID-19 cases were identified among 3711 guests and crew members on board. The response team of various experts, including disaster management specialists from the Japan Disaster Medical Assistance Team (DMAT) and infectious disease specialists from the Japan Field Epidemiology Training Program (FETP-J), implemented various interventions, including health monitoring of guests and crew members, isolation of individuals with symptoms, quarantine of their contact persons, and transportation and treatment of confirmed cases in designated medical facilities. Information collected from the DP cluster included a large proportion of asymptomatic cases and transmission dynamics in closed environments, which contributed to the establishment of efficient containment measures for COVID-19 afterwards *(16)*.

In the early phase of the COVID-19 epidemic in Japan, information on COVID-19 cases was collected by the National Epidemiological Surveillance of Infectious Diseases (NESID). NESID has been conducted since 1999 under the Infectious Diseases Control Law Articles 12–16, and it collected information from the local governments about the incidence of designated infectious diseases *(17)*. In NESID, however, doctors reported COVID-19 cases by faxing the report forms to PHCs, which would then register patient information in NESID, which was a time-consuming and labour-intensive process. Furthermore, patient information, such as their health status, contact information, disease severity and clinical outcomes were not included in routine reporting. Therefore, they were separately collected by PHCs by contacting each COVID-19 case through face-to-face interviews, phone calls and emails. To solve these issues, the MHLW started the Health Centre Real-time Information-sharing Systems on COVID-19 (HER-SYS) on 29 May 2020 *(18)*. In HER-SYS, medical facilities and COVID-19 testing centres reported COVID-19 cases directly to HER-SYS by using its online reporting system. Collected information included illness history, underlying medical conditions, laboratory test results, history of contact and activities, symptoms, date of hospitalization, treatments (i.e. intensive care, ventilation, extracorporal membrane oxygenation [ECMO]) and clinical outcomes. Patients who were under isolation at home or in isolation facilities reported their symptoms by accessing HER-SYS from their smart phones. The collected information was stored in the cloud storage and shared among health-care workers and public health officers in medical facilities, PHCs and local governments for case management and epidemiological analysis.

After detection of the first COVID-19 case on 15 January 2020, the number of cases increased from mid-March and reached a peak in early April (Figure 1). The number of cases remained small between May and early June. However, the number of COVID-19 cases resurged from mid-June and reached its peak in late July and early August (Figure 1).

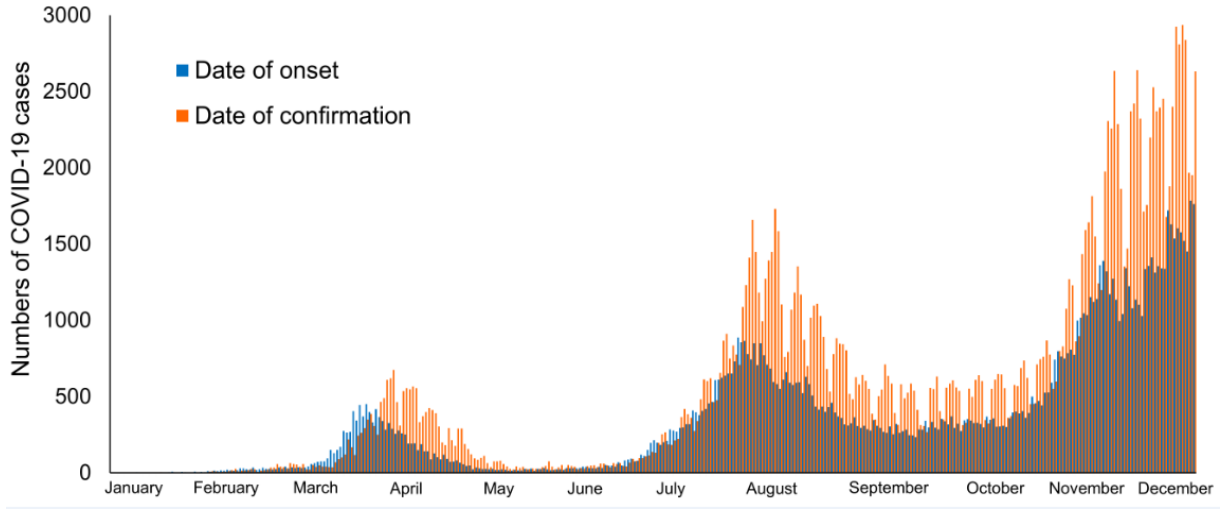

Figure 1. Temporal distribution of COVID-19 cases in Japan between 15 January and 31 December 2020

The temporal distribution of COVID-19 cases was indicated in an epicurve based on the date of onset as well as date of confirmation of COVID-19-positive tests. COVID-19 case information published by local governments was summarized in a database and used to draw the epicurve as previously described *(19).*

COVID-19 cases were initially distributed mainly in metropolitan areas but gradually spread to small cities during those periods (Figure 2). The geographical distribution of COVID-19 cases was limited to metropolitan areas in June; however, cases spread again all over Japan in August (Figure 2).

A cross-sectional survey for the prevalence of COVID-19 antibodies was conducted for a total of 7950 individuals in Tokyo, Osaka and Miyagi in the first week of June 2020, which revealed that 0.03–0.17% of the tested individuals were positive for neutralizing antibody *(20).*

In addition to the national surveillance, the number of severe COVID-19 cases requiring intensive care, ventilation or ECMO was also collected and monitored by the Cross ICU Searchable Information System (CRISIS), which is a joint network of multiple academic societies, including the Japanese Society of Intensive Care Medicine, the Japanese Association for Acute Medicine and the ECMOnet *(21).* More than 600 medical facilities containing a total of 5500 intensive care unit (ICU) beds, which covered approximately 80% of the total ICU beds in Japan, participated in the CRISIS.

During the COVID-19 epidemic, PHCs were at the forefront of the COVID-19 response in local governments and took part in a wide range of public health activities, including surveillance, case investigation, health monitoring of contacts, and coordinating testing in public health institutes and hospitalization of identified cases. Their vigorous case investigations and COVID-19 testing thereafter revealed the source of infection or clusters in over 60% of confirmed COVID-19 cases *(17).* Field epidemiologists of FETP-J assisted PHCs by providing guidance on the COVID-19 response in local communities *(22).*

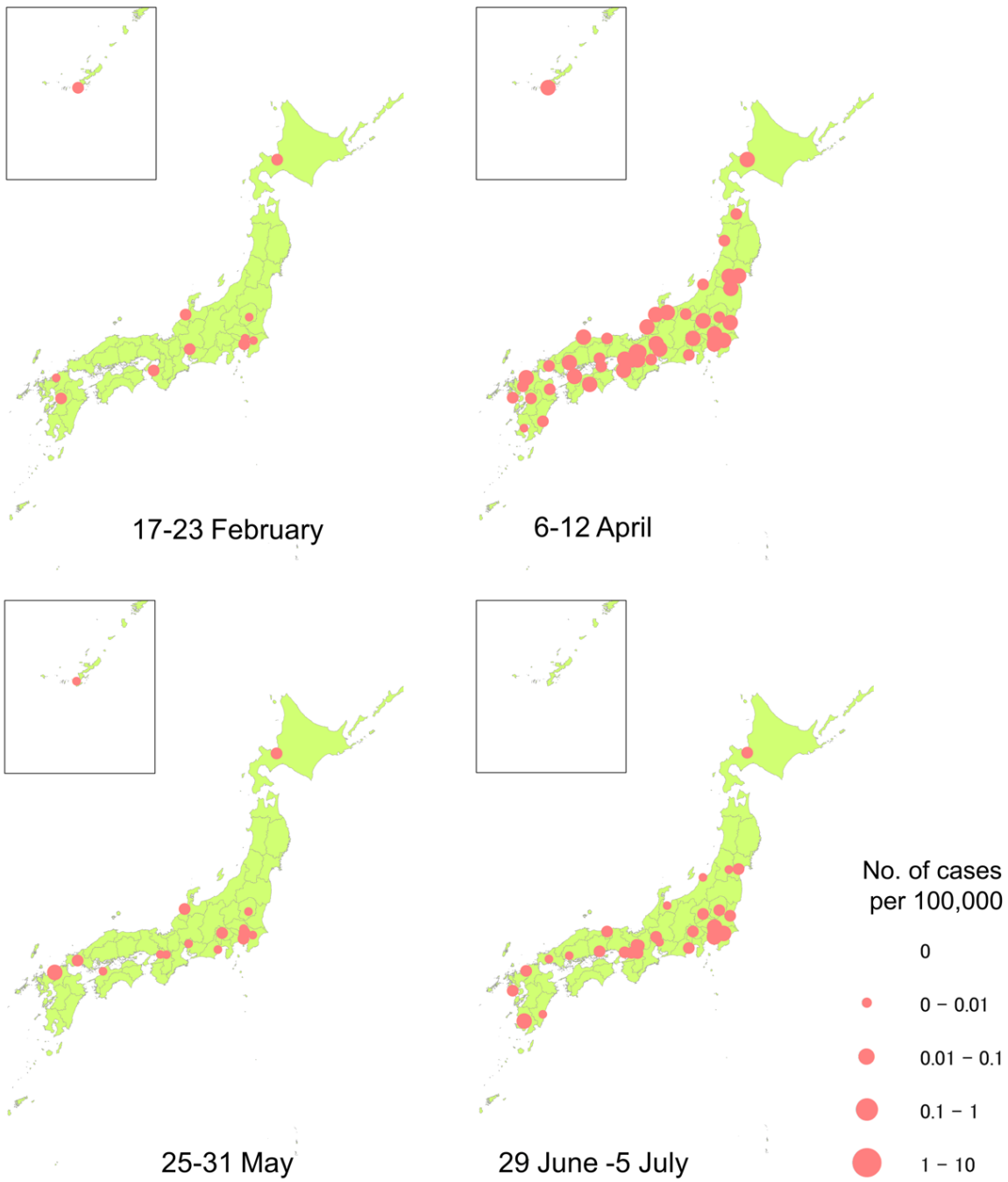

Figure 2. Geographical distribution of COVID-19 cases in Japan
The geographical distribution of COVID-19 cases in Japan was generated using ArcGIS. Maps were generated for epidemiological weeks 8, 15, 22 and 27. COVID-19 case information published by local governments was utilized *(17).*

These monitoring systems for COVID-19 cases and severe cases, which were established in the early phase of the COVID-19 epidemic in Japan, were shown to be useful during the resurgence of cases during July–September and November. Furthermore, information collected by these systems (e.g. number of new COVID-19 cases per week, proportion of severe cases among them, PCR-positivity

rate) was utilized to generate an assessment tool of the intensity of the COVID-19 epidemic in the country *(23).*

1.5 Testing

COVID-19 testing on respiratory samples using PCR has been conducted for individuals who matched the criteria for contacting COVID-19 consultation centres and those who were suspected to have COVID-19 based on the examination of physicians in medical facilities and testing centres. In the early phase of the epidemic, COVID-19 testing was conducted only in the National Institute of Infectious Diseases (NIID), border quarantine stations and public health institutes *(24)*. However, testing facilities were expanded to include private laboratories, universities and medical facilities after 6 March 2020, when national health insurance (NHI) was applied to the COVID-19 testing. Testing capacities were very limited in the early phase of the COVID-19 epidemic in Japan. The total number of samples tested by PCR in a week did not exceed 10 600 until mid-March *(24)*. Testing capacity increased significantly in April, and more than 58 300 samples per week were tested in mid-April *(24)*. The proportion of samples tested in public laboratories was as high as 96% before 6 March 2020. However, this proportion reduced to 55% by mid-June, which helped to prevent the testing capacity in the country from being overwhelmed *(24)*. Over 75 000 PCR tests can be done in a day as of 22 October 2020, and further efforts to increase PCR testing capacity are in progress.

Since 2 June 2020, PCR testing using saliva samples was also approved for patients whose date of onset was up to 9 days prior to the date of sample collection and from 17 July 2020 also for asymptomatic cases *(25)*. In addition to PCR testing, alternative testing methods (e.g. antigen detection by point-of-care testing, antibody measurements) were approved afterwards *(26)*. However, negative tests by antigen detection (point-of-care testing) were recommended to be confirmed by PCR testing, considering its lower sensitivity compared to PCR testing.

2. Ensuring sufficient physical infrastructure and workforce capacity

2.1 Physical infrastructure

There are over 8300 hospitals with more than 887 800 beds in the general wards, 1800 beds in infectious disease wards *(27)* and 17 000 beds in ICUs (including ICU-equivalent beds such as beds in high-dependency care units), which is equivalent to 1.3 beds per 100 000 population *(28)*. Both public and private facilities were engaged in COVID-19 patient care, as Japanese citizens have access to all hospitals, whether public or private, and there is no difference in reimbursement rates. During the COVID-19 epidemic, hotels were utilized as isolation centres for mild cases. The number of beds in these designated facilities for isolation was limited to approximately 12 000 in April; however, they increased to over 20 000 by the beginning of July 2020 *(29)*. During the COVID-19 epidemic, medical facilities reported information on their operating status, bed occupancy rates in general wards, infectious disease wards and ICUs, and utilization rates of ventilators and ECMOs, to the Gathering Medical Information System (G-MIS), which was introduced by the MHLW and the Cabinet Secretariat from 27 March 2020 *(30)*. This information was summarized and published in a dashboard on the official website of the Cabinet Secretariat *(31)*. According to the summary published by the

Government Response Headquarters on 15 May 2020, the total number of available beds and those in ICUs was as low as 54% (17 290/30 639) of the beds required for the estimated number of COVID-19 hospitalizations and 56% (2356/4232) of the ICU beds required for the estimated number of severe cases *(32)*. However, these improved significantly to 81% of the total beds and 78% of the ICU beds by 5 August 2020 *(32)*.

During the COVID-19 epidemic, Japan faced an issue of increasing demand for personal protective equipment (PPE) and shortage in the market. The MHLW requested an increase in domestic production and importation of PPEs. Reuse of PPEs was partly approved in case of shortages in medical facilities *(33,34)*. The government also facilitated distribution to medical facilities with high priority and delivered over 210 million surgical masks, 110 million N95 masks, 70 million gowns, 20 million face shields and 80 million pairs of gloves to medical facilities by mid-October *(35)*. The procurement status of PPEs was monitored by G-MIS.

The MHLW requested the domestic pharmaceutical and medical device industries to secure their supply chains during the COVID-19 epidemic *(36)*. Given the limited medical resources, G-MIS was also utilized for calculating number of drugs, such as remdesivir, to be procured for each medical facility *(37)*.

2.2 Workforce

Medical workforce

There are 2.6 doctors, 11.7 nurses and 2.5 pharmacists per 1000 population in Japan *(38)*. Among doctors, 1490 are specialized in infectious diseases and 1850 in intensive care medicine *(39)*. The MHLW provided health-care workers with training on the use of ECMO to further enhance their capacity to manage severe cases in the country. The Government Response Headquarters published their basic policies on 28 March 2020, which said that they would take measures to prevent leave of health-care workers as well as promote reallocation of potentially qualified personnel in medical facilities *(40)*. Nurses who were on temporal leave were requested to return to work by the Japan Nurses Association, which reassigned nearly 700 nurses to medical facilities after training *(41)*. Despite the increasing capacity of medical facilities in metropolitan areas, the limited number of health-care workers in rural areas to engage with large clusters of COVID-19 cases remained an issue. In such cases, the DMATs, which were composed of experts in acute medicine and disaster medicine, were dispatched to assist local governments in responding to COVID-19 clusters. Nurses were also occasionally dispatched to local governments with a limited number of health-care workers based on the request of the MHLW *(42)*.

Public health workforce

During the COVID-19 epidemic, PHCs took part in various public health interventions for COVD-19 as the spearhead of the COVID-19 response in local communities. Japan has a total of 469 PHCs with over 28 000 officers *(43)*. PHCs enhanced their capacities by reassigning officers from the prefectural administrative offices and re-employing former PHC officers. These efforts led to an approximately 3.8

times larger number of PHC officers in the epidemic area *(44)*. Field epidemiologists of the FETP-J assisted PHCs by providing guidance on the COVID-19 response in local communities. As of 2 October 2020, FETP epidemiologists and alumni were deployed to a total of 118 clusters of COVID-19 cases in the country *(22)*. Experts in global public health emergencies who were trained in the Infectious Disease Emergency Specialist Training Program also took part in various activities of the COVID-19 response, such as supporting the Taskforce, participating in the Government Response Headquarters, and attending suspected cases on charter flights back from Wuhan *(45)*.

3. Providing health services effectively

3.1 Planning services

In response to the increasing number of COVID-19 cases in the country, the Government Response Headquarters issued a statement on 1 March 2020, to request (i) prefectures to establish COVID-19 response committees in local governments to increase the number of COVID-19 consultation centres, COVID-19-designated outpatient clinics, and isolation facilities for mild and asymptomatic cases, and (ii) medical facilities to enhance their capacity to accept COVID-19 cases in general wards, infectious disease wards and ICUs *(13)*. During the COVID-19 epidemic, hotels were utilized as isolation facilities for mild and asymptomatic cases. The number of beds in medical facilities and isolation centres was rapidly increased as previously mentioned. Despite the increasing capacities of medical facilities in general, the limited bed availability and staff capacity at provincial levels remained an issue. During the resurgence of COVID-19 cases in September 2020, 35% (2428/4000) of the total beds were occupied in Tokyo, while over 50% were occupied in some of the local governments, such as Ishikawa and Okinawa *(32)*. Further efforts to increase the surge capacities of medical facilities in those areas are in progress *(46)*.

3.2 Case management

A clinical guideline for COVID-19 was developed by the guideline committee consisting of clinicians in various specialties, including infectious diseases, respiratory diseases, paediatrics and intensive care medicine *(47)*. The first version of this guideline was published from the Government Response Headquarters on 17 March 2020, which was revised four times as of 4 September 2020. The guideline provided health-care workers with COVID-19-related information, including the epidemiology, patient characteristics, case definitions, laboratory testing criteria, assessment of disease severity, treatments, and guidance for consultation and case reporting to PHCs. After COVID-19 cases were identified in designated medical facilities and testing centres as described in “1.3. Isolation and quarantine”, they were classified into four groups – mild cases, moderate cases type 1 without respiratory failure, moderate cases type 2 with respiratory failure, and severe cases based on the criteria summarized in Table 1.

Table 1. Classification of severity of COVID-19

Severity	***Saturation levels***	***Clinical presentation***
Mild	SpO_2 >= 96%	No respiratory symptoms, only cough without shortness of breath
Moderate type 1 (without respiratory failure)	SpO_2 of 93% - 96%	Shortness of breath, clinical findings indicative of pneumonia
Moderate type 2 (with respiratory failure)	SpO_2 =<93%	Requiring oxygen therapy
Severe		Requiring intensive care or ventilation

Based on the guideline, moderate cases type 1 were recommended to be hospitalized in medical facilities for monitoring of symptoms and receiving supportive therapy. Use of antiviral agents (remdesivir) was also considered depending on the clinical course of the patients. Moderate cases type 2 were further subjected to oxygen therapy (e.g. nasal canula, reservoir mask, high-flow nasal canula, and non-invasive positive pressure ventilation), and they were considered for the use of antiviral agents and steroids (dexamethasone) and referral to medical facilities with ICUs. Severe cases were managed in the ICU and ventilated, following treatment strategies for acute respiratory distress syndrome (ARDS) if necessary. In addition to remdesivir and dexamethasone, off-label use of other therapeutic agents, such as anti-human immunodeficiency viral agents, protein decomposition enzyme inhibitors, and anti-interleukin-6 chimeric monoclonal antibodies were considered for cases that did not respond to the initial treatments. Additional treatments, including ECMO, leukapheresis, and anti-thrombus therapy (heparinization) were considered for cases that deteriorated further.

3.3 Maintaining essential health services

Based on the statement of the Government Response Headquarters on 1 March 2020, local governments were requested to secure medical facilities not accepting potential COVID-19 cases, such as cancer centres, dialysis facilities, and maternal and child health centres *(13)*. Patients with chronic medical conditions were advised to have regular medical check-ups and prescriptions by using communication devices such as phone calls and faxes. Routine vaccinations were requested to be continuously implemented based on the Immunization Act Article 5. Routine vaccinations were allowed after the designated dates depending on the intensity of COVID-19 transmission and availability of medical facilities in the community *(48)*. Surgeries were considered for postponement if the diseases were not at critical stages based on the recommendations of the Japan Surgical Society *(49)*. Elderly and handicapped persons in long-term care facilities were encouraged to keep themselves healthy with general infection prevention measures in place *(50)*. In maternal centres, attending deliveries and visitors were restricted during the COVID-19 epidemic *(51)*. Given the government's request to refrain from domestic travel across prefectural borders, pregnant women

who were planning home births were requested to consider cancelling them based on the guidance of the Japan Society of Obstetrics and Gynecology *(52)*.

4. Paying for services

4.1 Health financing

The MHLW is in charge of budget allocation for the health system. Overall, they utilized the Supplementary Budget with SHI funds as financial resources during the novel coronavirus outbreak period.

The Japanese Parliament agreed to release the Supplementary Budget for the novel coronavirus outbreak on 7 April and 27 May 2020 *(53)*. These included financial support not only for the health system but also for other sectors, such as employment, economy and education, summarized in Table 2. This subsidy was fully covered from national sources.

Table 2. Supplementary Budget for the health system*

Purpose	***7 April***	***27 May***
The Comprehensive Emergency Subsidy • Expanding PCR testing capacity • Keeping bed capacity • Installing medical devices • Human resource support • Rewards for health professionals (2nd budget) • Prevention of nosocomial infection (2nd budget)	¥1535 billion	¥2237 billion
Procurement of medical infrastructure • Distribution of masks, face shields and PPEs • Production of ventilators	¥209.5 billion	¥438 billion
Research and Development of new drugs and vaccines	¥65.5 billion	¥205.5 billion

* Japanese Yen (¥1 = US$ 0.0096, as of 26 November 2020)

Source: MoF, Japan (1 June 2020). Explanatory material on additional measures taken to manage new coronavirus infection *(53).*

The Comprehensive Emergency Subsidy for the novel coronavirus outbreak (the Emergency Subsidy) is a main pillar of strengthening the health system in the Supplementary Budget. This subsidy covered the costs of expanding PCR testing capacity, earmarking aside a certain number of hospital beds, installing medical devices and enhancing human resources *(54)*.

Since it was crucial to make available ICU beds at tertiary hospitals in order to accept new COVID-19 patients, a certain number of beds were secured with cost reimbursement to the hospitals from the Emergency Subsidy *(55)*. Also, additional medical devices, such as ventilators, ultrasound machines and broncho-fibrescopes, were installed to provide adequate health services *(55)*.

This Subsidy was allocated to 47 prefectures in Japan based on their number of COVID-19 patients. Since the context differed across local areas, each local government had its own health system preparedness initiative. Even though they could use this Subsidy as an extraordinary channel, it was linked with health systems strengthening so they had to submit a budget plan in advance and report on their projects afterwards.

In addition, considering the tough working environment in the hospital from both the mental and physical perspective, lump-sum rewards to health professionals were provided – ¥50 000, ¥100 000 or ¥200 000 depending on the facility level *(55)*.

As another pillar, procurement of medical infrastructure was also strengthened through the first and second Supplementary Budget plan. This included production and distribution of surgical masks, face shields, PPEs and ventilators. At the same time, research and development of new drugs and vaccines was also conducted, as shown in Table 2.

4.2 Entitlement and coverage

Japan achieved universal health insurance in 1961 through the National Health Insurance Law. Historically, Social Health Insurance (SHI) started from the Employee's Health Insurance (EHI), followed by NHI. In 2008, the Late-stage medical care (LSMC) for individuals over 75 years came into effect as a new scheme for the elderly. As of 2015, the coverage ratios were as follows: EHI 58.7%, NHI 28.3%, LSMC 12.4% *(56)*. Irrespective of the health insurance system they use, patients have to pay 10–30% of medical costs depending on their age and income *(56)*.

All residents in Japan were eligible to receive COVID-19-related medical procedures for free, regardless of their entitlement and nationality. SHI payment rates were applied to cover these costs as in other diseases. After the amendment of the Infectious Diseases Control Law to include COVID-19 as a designated infectious disease on 28 January 2020, the Japanese government compensated out-of-pocket payments of COVID-19 testing and treatment from public funds *(57)*. This law was applied to all citizens in Japan, including migrants, uninsured people, prisoners and people on social security. However, most of the local governments set a deductible amount for the high-income population where the first ¥20 000 of covered health services must be paid out of pocket *(58)*. Also for PCR testing, reimbursement through public funds was applied only for suspected patients, such as contacts and symptomatic cases. As long as they are suspected, these costs are covered by public funds even though the result is negative.

For people who had difficulty in paying their contribution because of losing their income due to job loss or economic slowdown, the MHLW announced that local governments should take this into account and reduce their copayment according to the degree of income loss *(59)*.

In addition, public funds cover only treatment and testing costs, exclusive of transportation costs and consultation fees. For example, if those between 6 and 69 years of age visit an outpatient clinic in a hospital, 70% of PCR test costs are covered by an insurer at first. Thereafter, 30% of the testing fee (¥4500) is subsidized by public funds while 30% of the consultation fee (¥864) and transportation costs must be paid by the patient *(60)*.

PCR test fee (national fixed cost): ¥15 000		**Consultation fee: ¥2880**		**Transportation**
SHI	PF	SHI	OOP	OOP
¥10 500	¥4 500	¥2 016	¥864	(as needed)

Figure 3. Schematic view of cost breakdown (Example: COVID-19 patient at outpatient clinic)

SHI: Social Health Insurance; PF: public funds, OOP: out of pocket

Source: Authors

On the other hand, some tests were conducted on request, with out-of-pocket payment. These included testing for travel, requirement from the workplace, broad screening upon admission or for contacts, and for their own reassurance. The cost of testing was determined by the market price, which was two to three times as expensive as national fixed costs.

5. Governance

The response to COVID-19 has been led by the ad-hoc Government Response Headquarters, which was established on 30 January 2020 by a Cabinet decision. It was supported by the Act on Special Measures, Article 15, since 26 March 2020 *(61)*. Its chairperson is the Prime Minister, at that time Shinzo Abe. Additionally, Yasutoshi Nishimura, the Minister of State for Economic and Fiscal Policy, was appointed as a Minister responding to the novel coronavirus pandemic on 6 March 2020, and assigned as a vice chairperson along with Chief of Cabinet and the Minister for Health, Labor and Welfare *(62)*. The Government Response Headquarters coordinated with relevant ministries and agencies, including the MHLW, which played a primary role in managing the medical and public health systems. Shinzo Abe resigned as prime minister and the role was handed down to Yoshihide Suga, the former Chief Cabinet Secretary on 16 September 2020 *(63)*.

The Novel Coronavirus Expert Committee (the Committee) was formed as an expert panel subsidiary of the Government Response Headquarters on 14 February 2020. It consisted of 12 medical and public health experts to provide medical advice on measures to control coronavirus infection *(64)*. With the evolving epidemic, however, there were debates over its independence from the government and the absence of other advisory professional bodies (e.g. economics, behavioural science and communication). The Committee was abolished in July, and two organizations took over its role; the Advisory Board to the MHLW, which provides epidemiological analyses and technical advice in the field of medical and public health, and the Subcommittee on Novel Coronavirus Disease Control (the Subcommittee) under the Government Response Headquarters, consisting of experts from various

fields, to discuss and provide opinions on the government's measures *(65)*. Furthermore, for better collaboration between the MHLW and experts in infectious disease and epidemiology, the MHLW established the COVID-19 Cluster Response Taskforce (the Taskforce) on 25 February 2020 *(66)*. Public health and infectious disease specialists from the NIID, National Institute of Public Health and universities worked within the MHLW as consultants and took part in various activities, including epidemiological analysis and risk assessment. This enabled close and timely communication between the experts, the Ministry and other stakeholders. Some of the experts in the Taskforce were also members of the Committee and Subcommittee.

The government classified COVID-19 as a designated infectious disease based on the Infectious Diseases Control Law on 28 January 2020. The Act on Special Measures was amended to include COVID-19 on 14 March 2020. Thenceforth, those two acts were used as the legal basis for the Japanese COVID-19 response.

A state of emergency was declared on 7 April 2020, as described in section 1.2 "Physical distancing". The state of emergency in Japan was different from the "lockdown" imposed in other countries, in the absence of restrictive measures supported by law enforcement and penalties for not complying with them. Based on the state of emergency, citizens were requested to follow mitigation measures (e.g. stay at home, avoid the "3Cs" and minimize non-essential travel crossing prefecture boundaries). The state of emergency was lifted in 39 prefectures on 14 May, and in the remaining eight prefectures in metropolitan areas by 25 May 2020.

During the COVID-19 epidemic, COVID-19-related products such as diagnostic tools, medical devices and drugs were reviewed by the Pharmaceuticals and Medical Devices Agency (PMDA) and approved with the highest priority by the MHLW *(67)*. For pharmaceutical products, although Japan does not have a system of emergency use authorization for unapproved medical products, Special Approval for Emergency (an exceptional fast-track approval pathway) is allowed based on the Pharmaceutical and Medical Device Act, Article 14-3. The MHLW granted Special Approval for Emergency to remdesivir for its use in severe cases of COVID-19 on 7 May 2020 *(68)*. PMDA's website illustrates the situation of various COVID-19-related activities (https://www.pmda.go.jp/english/about-pmda/0002.html).

6. Measures in other sectors

6.1 Mobility

Since Japan is an island, it holds several airports and marine ports as national ports of entry. Three steps, i.e. Customs, Immigration and Quarantine (aka C.I.Q), have to be gone through by every traveller upon arrival in Japan, which are under the jurisdiction of the Ministry of Finance (MoF), the Ministry of Justice and the MHLW, respectively. The Immigration Control and Refugee Recognition Act (the Immigration Act) and the Quarantine Act play important roles in strengthening the capacities of border quarantine stations. The National Security Council (NSC) under the Cabinet leads the overall border control in conjunction with relevant ministries, including the Ministry of Defense and the Ministry of Foreign Affairs (MoFA).

In response to the COVID-19 epidemic in Japan, the NSC, using Article 5 of the Immigration Act decided on 31 January 2020 that foreigners travelling from Hubei province in China or those who hold passports issued by Hubei province would be denied entry into Japan, unless there were exceptional circumstances *(69)*. As COVID-19 spread worldwide, the number of countries whose citizens were denied entry to Japan increased. However, COVID-19 clusters associated with imported cases occurred before implementation of these border quarantine measures for some countries, raising the issue of the timeliness of these measures *(70)*. As of 28 September 2020, foreigners who have stayed in designated areas, including in 159 countries and regions, in the previous 14 days are not allowed to land in Japan *(71)*. However, all Japanese citizens are allowed to enter the country. In terms of quarantine measures, since COVID-19 was classified as a designated infectious disease on 28 January 2020, it could be treated under the Quarantine Act *(57)*, allowing physical examination, testing, isolation and quarantine of travellers *(72)*. For instance, all travellers must fill out questionnaires about their physical condition and must undergo a body temperature check *(73)*. If they have stayed in any of the designated areas in the previous 14 days, they also have to undergo COVID-19 testing (e.g. PCR, antigen detection) at the quarantine gates at the port of entry. After passing through the gates, all travellers must self-quarantine for 14 days. The accommodation for self-quarantine and even travel measures used to get there must be arranged in advance and shown to quarantine authorities since they are prohibited from using public transport to reach there *(72)*.

There were some special cases at the beginning of the outbreak where the quarantine director isolated suspected cases at designated areas under Article 14 and Article 16 of the Quarantine Act *(74)*. Examples include Japanese evacuees from Wuhan province who were quarantined in designated accommodation in January and passengers and crew on the Diamond Princess cruise ship who were mandated to stay inside the ship for 14 days in February.

As the global pandemic situation evolved, the Government Response Headquarters decided to lift the border response measures gradually, depending on the countries' ongoing COVID-19 transmission situation. As of 26 November, foreign travellers from the Republic of Korea, China, Thailand, Viet Nam, Taiwan, Singapore, Brunei, Australia and New Zealand *(75)* are able to stay in Japan without 14 days of self-isolation as long as they submit a negative PCR test certificate conducted within 72 hours at the quarantine gate, and they follow and use three mobile applications for 14 days; condition reporting app, contact-tracing app, and Global Positioning System app. Japanese residents who have returned from foreign countries are all requested to conduct a 14-day self-quarantine, and those who have returned from designated countries are requested to have COVID-19 testing (e.g. antigen detection tests) at the airport *(76).*

Domestic transport

The prefectures were entitled to request staying at home, avoiding visiting places with the "3Cs", and non-essential travel to other prefectures under the Special Measures Act, although it was not a compulsory restriction. Eventually, every prefecture requested their citizens to stay at home in May under the state of emergency *(77)*. Even after the lifting of the Declaration, inter-prefectural travel was discouraged until 19 June. Also, there has been no mandatory wearing of masks in public transport, although social norms heavily encourage it *(78)*.

After the state of emergency was lifted, domestic travel has been encouraged to promote the tourism industry and stimulate local business. From 22 July, the "Go to Travel" campaign, implemented by the Ministry of Land, Infrastructure, Transport and Tourism, subsidizes up to 50% of costs for transportation, accommodation and restaurants *(79)*. Initially, Tokyo was excluded from that campaign as it was recognized to be an epicentre of the novel coronavirus outbreak, but was added on 1 October. Moreover, the "Go to Eat" campaign also started on 1 October implemented by the Ministry of Agriculture, Forestry and Fisheries, where users can earn ¥500 or ¥1000 for every meal as long as they have lunch or dinner at designated restaurants with reservation. These campaigns are scheduled to end in January 2021.

6.2 Economy

The Japanese Parliament agreed on the Supplementary Budget for the novel coronavirus outbreak emergency response, ¥25 trillion on 7 April, followed by the second Supplementary Budget, an additional ¥31 trillion on 27 May *(53)*. As shown in Table 3, the budget is allocated for supporting business and employment in small- and middle-sized companies, strengthening the health system, providing income support for housing and economic recovery through "Go to" campaigns, maintaining supplies of food and essential goods, and discretionary reserve.

Table 3. Breakdown of the Supplementary Budget

First Supplementary Budget (7 April)		**Second Supplementary Budget (27 May)**	
Purpose	***billion ¥***	***Purpose***	***billion ¥***
Protecting business & employment	19 490	Protecting business & employment	12 091
Health systems strengthening	1 810	Health systems strengthening	2 989
Economic recovery ("Go to" campaign)	1 848	Income support for housing	2 024
Strengthening food & goods supply	917	Others	4 713
Discretionary reserve	1 500	Discretionary reserve	10 000
Total	**25 565**	**Total**	**31 817**

Source: MoF, Japan (1 June 2020). Explanatory material on additional measures taken to manage new coronavirus infection *(53).*

Since all the budget relies on government bonds, the amount of government bonds issued has skyrocketed from ¥37.1 trillion in 2019 to ¥90.2 trillion in 2020 *(53)*. The percentage of government bonds in the total annual revenue abruptly rose up from 35.4% in 2019 to 56.3% in 2020, which is the highest percentage on record *(53)*. Overall, the total value of the COVID-19 fiscal policy package accounts for 42% of the gross domestic product (GDP), which is the highest in the world *(80)*.

6.3 Other social supports

Financial support

The Japanese government provided various types of financial support for each resident and business owner. All the residents received ¥100 000 as Special Cash Payment regardless of their nationality *(81)*. Also, for a maximum duration of 3 months, local governments would compensate accommodation fees (rental or mortgage fees) for those who could not afford them *(82)*. In addition, single-parent households can apply for an additional lump-sum subsidy of ¥50 000 to nurture their children *(83)*.

Business owners also have several options to maintain their businesses. The Subsidy Program for Sustaining Businesses was launched in May, which provides ¥1 or 2 million for an individual or company business owner, respectively *(84)*. Using the Subsidy for Employment Adjustment, support was given to cover 66% to 100% of staff salaries, depending on the fulfilment of specific conditions *(85)*. For example, for a small company that continued to hire employees despite tight business conditions, 100% of their wages would be covered by the Subsidy for Employment Adjustment. A special subsidy for teleworking was provided to companies that installed and established network systems in order to encourage teleworking during the coronavirus outbreak *(86)*.

With regard to business suspension under the state of emergency, prefectures could decide this independently, thereby the compensation was also at their discretion. As a result, the amount of compensation depended on the budget of the local governments, ranging from a maximum of ¥1 million in Tokyo and Osaka to other prefectures which did not provide any support.

Education

School closure was requested by the Government Response Headquarters as one of the initial countermeasures to contain the novel coronavirus outbreak on 2 March 2020, followed by the State of Emergency from 7 April to the end of May *(87)*. Therefore, schools were closed for around three months in Japan (March to May). For universities, around 90% postponed opening from the beginning of April to the middle of May *(88,89)*.

After schools reopened on 1 June until August, 1166 student cases had been reported in Japan *(90)*. However, 56% of them were identified as household secondary cases, and transmission in school accounted only for 15%, indicating that school reopening seemed to have a small influence on infection transmission among students in Japan.

Both a guideline on sustainable school management and a hygiene manual in school settings were published by MEXT *(91)*. The former describes how to guarantee students' learning opportunity within a limited time schedule, such as shortening the summer vacation, extending daily class schedules and establishing online study circumstances. The latter describes how to prevent novel coronavirus outbreaks, mainly by avoiding the "3Cs" and basic hygiene techniques.

Domestic violence

Domestic violence (DV) during the novel coronavirus outbreak is a major concern. According to the Gender Equality Bureau Cabinet Office, the number of consultations at the DV hotline centre increased by 30% in April *(92)*. The Cabinet Office expanded the hotline centre on 20 April with a national government subsidy *(92)*. This includes 24-hour services, SMS and web consultations, and services in 10 foreign languages. However, as household subsidies were allocated to the male head of households, women (including victims of DV) who were undergoing divorce were not entitled to the subsidy.

Role of the Armed Forces

The Japan Self-Defense Forces played an important role in the emergency response *(93)*. For instance, they supported quarantine measures by taking PCR specimens at the Narita airport in April when many Japanese travellers were returning from abroad. They also supported the transportation of passengers from airports to their accommodation and patients from isolated areas (e.g. islands) to designated hospitals. Furthermore, they organized lectures for the general public on infection prevention measures as well as how to wear PPEs.

Supporting COVID-19-related research

To support COVID-19-related research, ¥271 billion was raised through the first and second Supplementary Budgets. Various organizations that supported research activities and development of the medical industry include the MHLW Health and Labour Sciences Research Grants Program and the Japan Agency for Medical Research and Development (AMED). AMED collects public funds from the Japanese government, such as the MHLW, MEXT, the Ministry of Economy, Trade and Industry, and matches these funds with research institutes or universities. When it comes to COVID-19-related research, these include laboratory research, vaccine development and clinical studies. As of September 2020, more than 100 research studies are ongoing *(94)*.

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