Public health-oriented response to COVID-19 in Bhutan: Addressing the shortage of human resources for health and medical facilities*

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Abstract

Following the detection of the first case of novel coronavirus (hereafter referred to as COVID-19) in the Kingdom of Bhutan on March 5, 2020, the country successfully implemented several measures. These included stricter border controls than international standards, recruitment and redeployment of human resources for health, mobilization of volunteers, use of ICT (information and communication technology), as well as the implementation of national COVID-19 vaccination campaigns and collaboration between the health sector and other sectors. Under robust leadership, Bhutan managed to prevent widespread community transmission of COVID-19 until March 2022, when the Omicron variant outbreak occurred. The country kept the cumulative number of COVID-19-related deaths to a remarkably low 21, equivalent to 26.84 per million people, by September 2022. Recognizing the difficulty of treating severely ill patients in Bhutan due to a shortage of human resources for health and inadequate medical facilities and equipment, the response to COVID-19 focused on public health measures—including lockdowns—to control the spread of the virus until the population had received multiple doses of the vaccine. This approach was underpinned by a consistent philosophy among national leaders to prioritize the protection of people's lives by all means. The leadership effectively united the people throughout the implementation of the public health response, despite the restrictions it imposed on daily life. Although some health resources were initially difficult to obtain domestically (such as COVID-19-related information and technology, vaccines, and medical equipment), these were introduced through international cooperation. Within the country, resources that were available included the participation of citizens and volunteers in the response to COVID-19, cooperation between the health sector and other sectors, and the use of ICT applications developed domestically. Additionally, substitute medical facilities were established to compensate for the shortage of existing medical capacity.

Keywords: COVID-19, public health, health systems, leadership, human resources for health

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* The views expressed in this paper are those of the author(s) and do not necessarily represent the official positions of either the Japan International Cooperation Agency (JICA) or the JICA Ogata Research Institute for Peace and Development.

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I would like to thank the former Minister of Health of Bhutan, who took time out of her busy official schedule to give me two hours of her time for interviews, as well as the other fifteen people who cooperated in this study. I also thank the Japanese researchers and others who provided advice on the research policy and conducted peer review.

1. Background and objectives

The goal of this paper is to provide a review of the various initiatives implemented in Bhutan as part of its COVID-19 response. It will examine not only the specific measures undertaken but also the intentions behind their implementation.

For this research, semi-structured interviews were conducted with officials responsible at the central level for formulating and implementing the COVID-19 intervention measures in Bhutan. The aim was to elucidate the rationale for these initiatives. Secondary sources, such as official reports from the Bhutanese Ministry of Health and relevant newspapers, were also reviewed. Based on these sources, this paper seeks to answer the question of how the various responses to COVID-19 addressed the country's challenges of human resources for health, including the shortage of trained personnel.

In January 2022, following the outbreak of the COVID-19 Omicron variant, it became clear that it would be difficult to control community-acquired infections in Bhutan. Consequently, a major policy shift was made, leading to the removal of lockdowns after April 2022. The new policy focused on accepting community-acquired infections while prioritizing economic recovery. Therefore, this paper primarily covers the period from March 2020, in the early stages of the COVID-19 epidemic, to March 2022, before the above policy shift.[1]

[1] In Bhutan, a long-term lockdown was implemented from January to March 2022 following the arrival of the Omicron variant in Bhutan. Despite these measures, containment of community-acquired infections proved challenging. Meanwhile, beginning in March 2021, multiple doses of COVID-19 vaccination had been delivered to adults aged 18 years and above, followed by those aged 12 to 18 years, and subsequently to children aged 5 to 11 years. By early 2022, the majority of the population had received a COVID-19 vaccine. Consequently, Bhutan adopted a major policy change to tolerate community-acquired infections and rebuild the economy, ending lockdowns in principle after April 2022.

1.1 Overview of the Kingdom of Bhutan and its health systems

Bhutan is a small country with a land area of about 38,400 square kilometers. Surrounded by two major powers, India and China, to the south and north, it is a mountainous country that stretches from the plains on the southern India border to the 7,000-meter-high mountains of the Eastern Himalayas in the north. The relatively small population of about 785,000 lives (National Statistics Bureau, Bhutan 2022) in narrow mountain valleys and mid-mountainous areas, with a population density of about two persons per square kilometer. Gross national income (GNI) per capita is USD 3,000 in nominal terms (World Bank 2020), placing Bhutan among the least developed countries.[2]

According to the World Bank data for 2020, Bhutan's industry is approximately 19% primary (agriculture), 34% secondary (construction, industry, etc., including 26% hydropower-related), and 47% tertiary (services, tourism, trade, retail, etc.). With regard to employment, the unemployment rate increased from 2.7% in 2019 to 4.8% in 2021 due to the COVID-19 pandemic.

Bhutan has adopted gross national happiness (GNH), a development philosophy that values the well-being of the people, culture, and environment as its national policy, with education and health provided free of charge to the people. Education is provided in English from primary school through to university, except for classes in the national language (Dzongkha), ensuring that graduates are fluent in English.

Basic health services are guaranteed under Article 9 (21) of the Constitution of Bhutan, which states that "The State shall provide free access to basic public health services in both modern and traditional medicines" (Government of Bhutan 2008). Medical facilities are state-owned, and human resources for health are employed as civil servants.

[2]Bhutan graduated from least developed countries status in 2023, after the period covered in this research.

With regard to the provision of health services, Bhutan places a strong emphasis on primary health care. This is a reflection of the difficulties in providing advanced medical care in the country due to the limitations on human resources for health, medical facilities, medical equipment, and health financing.

Health and medical services are provided across three levels of medical facilities: primary health centers and ten-bedded hospitals at the primary level, district hospitals at the secondary level and, at the tertiary level, the National Referral Hospital (Jigme Dorji Wangchuck National Referral Hospital) in the capital, as well as two regional referral hospitals in the south-central and eastern regions. Bhutan has 186 primary-level health facilities and 49 secondary and tertiary hospitals (Ministry of Health, Bhutan 2022).

Human resources for health are limited in Bhutan. In 2021 there were 354 doctors (about 4.5 per 10,000 population) and 1,608 nursing midwives (about 20.5 per 10,000 population) (Ministry of Health, Bhutan 2022). Other key health professionals include 46 pharmacists, 683 health assistants (health professionals with limited medical practice, mainly in rural areas) and 205 traditional medicine practitioners. Institutions for training human resources for health include the only one national medical university (Khesar Gyalpo University of Medical Sciences of Bhutan, referred to as “KGUMSB”) and three private nursing schools. While nursing midwives, health assistants and traditional medicine practitioners can be trained in the country, there were no medical schools in Bhutan to train new graduate doctors at the time, and doctors, pharmacists, nutritionists and bio-medical engineers (engineers who handle medical equipment) could only be trained by studying abroad, for example, in India. The Bachelor of Medicine and Bachelor of Surgery (MBBS) course was subsequently launched by KGUMSB in 2023.

1.2 Overview of response to COVID-19 in Bhutan

The global COVID-19 pandemic "has also impacted high-income countries, previously considered to be sufficiently prepared for infectious disease crises with strong health systems, and exposed international disparities in access to vaccines and medical resources" (Komasawa et al. 2022). Bhutan's response to COVID-19 were noteworthy, given its position as a developing country with a small land area and population.

In Bhutan, the COVID-19 response was overseen by the outstanding leadership of His Majesty the King Jigme Khesar Namgyel Wangchuck, who demonstrated the strong will necessary to "put the lives of the people above all else." He was joined by former Prime Minister His Excellency Dr. Lotay Tsering, a medical doctor; former Minister of Health Her Excellency Dechen Wangmo, a public health expert; and former Minister of Foreign Affairs His Excellency Dr. Tandi Dorji, a former pediatrician and expert on immunization. Under their combined leadership, and with an awareness of the scarcity of health resources, the government took response to COVID-19 to thoroughly prioritize the prevention of the spread of community-acquired infections.

The initial response extended for about two years, from the first confirmed COVID-19 case in March 2020 until March 2022, the period when the Omicron variant outbreak began. Among the strategies employed, the government concentrated on border control measures at a level stricter than international standards (e.g., three-week institutional quarantine for those entering the country), securing human resources for health (e.g., rehiring retired human resources for health), and redeployment, and using ICT in infection control and lockdowns to prevent the spread of community-acquired infections. The government implemented nationwide COVID-19 vaccination campaigns to immunize the population rapidly. As a result, Bhutan was able to keep the number of deaths to a minimum, thereby achieving a globally highly commendable infection

control outcome while continuing to provide other essential health services. By the end of 2022, the number of human resources for health deaths due to COVID-19 in Bhutan remained at zero.[3]

However, due to the influx of the COVID-19 Omicron variant from January 2022 onwards, it was decided in principle that lockdowns would no longer be implemented in Bhutan from April 2022, and consequently, the number of infected people increased rapidly. Even so, according to data released by the Ministry of Health on September 19, 2022, the cumulative number of COVID-19-related deaths only reached 21 (equivalent to 26.84 per million).

Figure 1 shows the evolution of the COVID-19 response in Bhutan during this period, focusing primarily on health-related measures. It shows the pathway from the initial response plan through the decision to expand vaccination while still maximizing the prevention of community-acquired infections after the nationwide lockdown. It ends with the acceptance of community-acquired infections in April 2022.

Figure 1: Trends in Bhutan's response to COVID-19 in terms of healthcare

[3] WHO estimated that in 2021 there would be 115,000 deaths due to COVID-19 among the 135 million human resources for health working in health facilities worldwide.

1.3 Framework of this paper

In Bhutan, various distinctive features of the COVID-19 initiatives can be observed, particularly those aimed at addressing the shortage of human resources for health and medical facilities.

Two key measures were undertaken early in the crisis: (1) even before the first confirmation of COVID-19 case in the country, the Ministry of Health recognized the shortage of human resources for health and began securing them by rehiring retired personnel; (2) after the confirmation of COVID-19 cases, the period of institutional isolation of incoming travelers was set at three weeks, exceeding the international standard. These measures were intended to optimize the use of limited human resources for health and other health resources to cope with the expected increase in patients, even if community-acquired infections spread.

In addition, (3) volunteers and medical students were recruited to support infection control efforts and the work of health professionals, (4) multisectoral collaboration was prioritized, involving the police, military and local authorities, and (5) ICT systems, such as contact tracing apps and vaccination record systems, were developed domestically to provide crucial data. The measures helped to compensate for the shortage of health-related resources, including human resources for health.

The author believes that among the various components of health resources, the most critical element of the provision of health services is human resources for health, who are responsible for the provision of health services. The reason for this is that health resources other than “human resources” (technology, finance, information, etc.) are also handled by “human resources.”

Based on the above framework, Bhutanese government officials and others were asked the question, “Why were the various responses to COVID-19 implemented in Bhutan, including (1) to (5) above, carried out?” Using the interview results as the main data, a reconstruction of the

responses to COVID-19 and background factors were analyzed using an interpretive approach. In addition to government officials, interviews were conducted with ordinary citizens to understand the viewpoints of citizens. Secondary sources such as official reports from the Ministry of Health of Bhutan and newspaper reports were also used.

In this paper, health systems are defined as comprising leadership/governance, health financing, medical products, vaccines and technologies, health information and health service delivery, in addition to health workforce or human resources for health (World Health Organization 2007). While these components are interrelated, this paper primarily focuses on the human resources for health and examines how the various health systems components interrelated and functioned within Bhutan's COVID-19 response, i.e., how Bhutan effectively utilized its limited health resources in its COVID-19 response.

1.4 Interview survey and targeted persons

Interviews were conducted with a total of 15 people: the former Minister of Health, who was responsible for the overall health sector in the Bhutanese Government, seven key persons who supported Bhutan's response to COVID-19, two young health professionals who worked on the frontline delivering response to COVID-19, and six persons of the general public, who were the beneficiaries of the health services. All of the interviews were conducted between May and June 2022. The interviewees are listed in the annex. Where interviews are quoted in the text, the interviewees are indicated in brackets. The author has obtained permission from the interviewees to include their comments in this paper.

With regard to the Bhutanese national ethical review of this interview study, the department in charge of the Ministry of Health responded that no ethical review was required as the study does not deal with personal health data.

2. COVID-19 response planning and rapid implementation

2.1 Pandemic preparedness before COVID-19

The Joint External Evaluation of the International Health Regulations (IHR) is designed to assess a country's capacity to prevent, prepare, and respond to public health risks using a WHO-standardized tool. In 2017, before the outbreak of COVID-19, Bhutan was assessed as underprepared in 28 items—more than half of the 48 items (World Health Organization 2018).

In response to these findings, in November 2018 and shortly before the outbreak of COVID-19, Bhutan conducted a simulation with the support of WHO to prepare for an infectious disease outbreak, including border control measures at the international airport. Several stakeholders stated that "the training exercise to build cooperation between relevant departments of Ministries, led by the Department of Disaster Management (DDM) of the Ministry of Home and Cultural Affairs, was actually applied to the COVID-19 preparedness" (Former WHO Representative, Director of Royal Centre for Infectious Diseases (referred to as "RCDC"), confirmed this account).

2.2 Public health-focused COVID-19 crisis management plan

In February 2020, the Bhutanese Ministry of Health announced a COVID-19 crisis management plan in response to the worldwide spread of the virus. The plan identified three priority initiatives: (1) securing human resources for health, (2) promoting mental health measures, and (3) bolstering efforts to protect the elderly.

On 5 March 2020, the day the first COVID-19 case was identified in Bhutan, efforts began to prevent the outbreak and reduce the spread of community-acquired infections by thoroughly testing individuals in close contact with the patients. Public outreach on hand washing and health

promotion to strengthen people's immunity was also intensified. During subsequent outbreaks of community-acquired infections, longer-term lockdowns were also implemented, with some extending for more than one month.

Since March 2021, efforts have also been made to reach a large number of people and children of all ages with COVID-19 vaccinations. Overall, Bhutan's response has been characterized by its strong emphasis on public health measures.

2.3 A sense of crisis and response to the shortage of human resources for health

Even before the first COVID-19 case occurred in Bhutan in March 2020, the Ministry of Health was aware of the shortage of human resources for health:

> *As an example of the shortage of human resources for health, there was only one each of an intensive care unit (ICU) specialist and a person with on-the-job training in ICU management. Furthermore, there were only a few specialists in thoracic medicine and cardiology each. Under these circumstances, it was clear that hospitals would not be able to cope with an increase in the number of COVID-19 patients, if they were to occur many hospital admissions (President, KGUMSB).*

In view of this shortage of human resources for health in Bhutan, "we requested WHO and neighboring countries to send medical doctors, but none of the countries or international organizations sent human resources during the global infectious disease pandemic" (Former Minister of Health).

Based on this recognition of the situation, and according to the COVID-19 crisis management plan in February 2020, the Ministry of Health confirmed the capacity of human resources for health and medical equipment of each health facility, checked the deployment of

human resources and compiled them into a single map. To fill the shortage of human resources for health, the Ministry began rehiring retiree health workers (Bhutanese health workers retire at a certain age because they are civil servants and there are no private hospitals in Bhutan).

2.4 Rapid emergency response and long facility isolation periods

Following the confirmation of the first case of COVID-19 in Bhutan, isolation treatment of patients and identification and testing of close contacts were promptly initiated. Measures were introduced almost immediately to halt tourists and other foreign arrivals and prohibit people from entering or leaving the country except for the delivery of goods at the southern border with India. His Majesty the King announced these measures in a televised address, swiftly garnering public support for the introduction of measures to prevent the spread of infection.

Despite the prolonged response to COVID-19, in Bhutan, "it was very helpful that the responses to COVID-19 were not politicized" (former Minister of Health), and "the opposition parties also cooperated with the ruling party in promoting response to COVID-19" (Former Registrar of KGUMSB).

The decision to set a three-week facility quarantine period for foreign arrivals after 31 March 2020, longer than in other countries, was that:

> *At the time, there were many unknowns about COVID-19, such as the incubation period and fatality rate, and if the spread of infection had occurred in a situation where the medical system of both the human resources for health and medical facilities was weak, and a large number of people may have died, for Bhutanese society and people's minds, such a situation would be "unendurable." His Majesty the King also issued instructions to "not let the people die from COVID-19" (Former Minister of Health).*

These statements demonstrate that setting the isolation period at three weeks—longer than the two weeks set by many other countries at the time—was a kind of "defensive measure" in response to the country's limited health resources, including human resources for health, and would not be able to manage the increase in patients that would occur if the infection spread throughout the country. In other words, from the outset, Bhutanese officials were keenly aware of their shortage of medical facilities and human resources for health and took measures accordingly.

3. How public health-oriented responses to COVID-19 have been achieved

3.1 Leadership at the central of government and information disclosure and communication

In the interviews, officials commented on the existence of "His Majesty the King's leadership and very precise instructions from His Majesty the King" (former Minister of Health and others) and the "excellent leadership of the response to COVID-19, led by the Prime Minister, who is a doctor, the Minister of Health, who is a public health expert, and the Minister of Foreign Affairs, who is a former pediatrician" (President, KGUMSB, Head of Laboratory, RCDC and others). In providing relief to economically affected people who had lost income due to COVID-19, it was noted that "His Majesty the King launched the benefits to the people called KIDU played an important role" (Former Minister of Health and others).

His Majesty the King spent more than eight months away from the royal palace during the first year after the first outbreak of COVID-19. He visited COVID-19 high-risk areas, such as the southern regions of the country, on numerous occasions. During these visits, His Majesty the King visited general shops in towns and spoke with the general public, encouraging people, as well as meeting with those in charge of the COVID-19 response in the field and advising them on the

activities. The Director of the RCDC said, “In retrospect, the instructions and advice from His Majesty the King, who was on the ground, were all right to the point.”

During the initial lockdown periods, which were carried out several times to halt the outbreak, no one was allowed to leave their homes. However, a “zoning system” was later introduced, whereby the city was divided into several sections, and within each section, people could go out to shop and do other activities for a limited period of time. A one-week quarantine for domestic migrants from the south border (where most infections occurred) was implemented. “These were His Majesty the King’s ideas as a means of protecting the country as a whole, but no one else could have thought of them” (Director, RCDC).

Since March 2021, when the nationwide COVID-19 vaccination campaign was launched, the former Minister of Health was reported to have said that “His Majesty the King has said that he will not get vaccinated until all the Bhutanese people have been vaccinated, so the people were encouraged to get vaccinated.” This message from His Majesty the King was perceived by the former Minister of Health and others as “encouraging the people to get vaccinated.”

In Bhutan, the unity and cooperation of the people in the government’s measures against COVID-19 was “very helpful” (Former Minister of Health and others) from the perspective of the Ministry of Health, which undertook the measures. It is understood that this is due to the fact that “His Majesty the King himself stayed up all night at the Ministry of Health when the first COVID-19 cases occurred and led the response. He visited various parts of the country for a long period of time to listen to the regional COVID-19 task force teams and advise on improving measures, and His Majesty the King listened to the public and continued to encourage people, which may have brought about national unity” (Former Minister of Health, President of KGUMSB and others).

Bhutan was unified in 1907 under the current Wangchuck royal family, and in the 1970s, His Majesty the Third King opened the country to the outside world, modernizing Bhutan and enrolling it as a member of the United Nations. Following his reign, His Majesty the Fourth King was instrumental in formulating the principle of Gross National Happiness. In the process of modernizing the country, His Majesty the Fourth King developed modern health systems, education, and other areas, as well as initiated the transition to a constitutional monarchy. During the subsequent reign of His Majesty the Fifth King, the new Constitution was promulgated in 2008, and the country became a constitutional monarchy with the election of a publicly elected Cabinet and members of Parliament in the first general election. While following this history, today, the people of Bhutan have great respect for His Majesty the Fourth King and His Majesty the Fifth King. This historical background is one of the reasons why His Majesty the King has played an important role in uniting the population to implement the COVID-19 response measures.

Former Prime Minister His Excellency Dr. Lotay Tsering, a physician, held press conferences to announce the medical considerations for the public in the fight against COVID-19 and organized demonstrations in Thimphu to promote hand sanitization and hand washing to prevent community-acquired infections. High-level diplomacy was conducted, including telephone conversations with the leaders of South Korea and Singapore to secure a commitment to provide COVID-19 testing kits. He also demonstrated leadership on various fronts, such as being the first person to receive the COVID-19 vaccination when it was launched to allay public fears. Former Minister of Foreign Affairs His Excellency Tandi Dorji, a former pediatrician, was also very knowledgeable about vaccination due to his pediatric expertise, and His Majesty the King himself commented that “the knowledge of the former pediatrician, the Minister of Foreign Affairs, was instrumental in the success of the nationwide COVID-19 vaccination campaign.

Thanks to the Prime Minister, the Minister of Health and the Minister of Foreign Affairs, the proper COVID-19 response was made."

Former Minister of Health, Her Excellency Dechen Wangmo, a public health expert with a Master of Public Health from a graduate school in the United States, was the flag-bearer for the use of ICT in promoting infection control and mobilized ICT technicians to develop the COVID-19-related ICT systems. During the period of the spread of community-acquired infections, she statistically analyzed the infection trends and called on citizens to undertake public health measures while consistently providing encouragement to frontline human resources for health working against infectious diseases and treating patients. She also drew on her personal network with WHO Headquarters, the WHO South-East Asia Regional Office, and health experts from other countries to gather information, which she utilized in developing Bhutan's response to COVID-19. The former Minister of Health chaired the WHO World Health Assembly in 2021, where she also provided leadership on the international scene.

Under the central leadership of the government, "Advocacy to the public was done very well by His Majesty the King, Prime Minister, Minister of Health and others. The mechanism for information dissemination in the provinces also worked well" (President, KGUMSB and others). In addition, information dissemination on COVID-19 from the government to the public was evaluated as "accurate and timely through the media including television news, such as press conferences by central government leaders, and through Facebook pages of the Ministry of Health and the Prime Minister's Office" (KGUMSB lecturer, and others).

3.2 Multisectoral collaboration between the health sector and other sectors

Many interviewees stated that "multisectoral collaboration and national unity were the distinctive features of Bhutan's response to COVID-19." This section provides some specific examples of multisectoral collaboration.

To implement the response to COVID-19, the Ministry of Health formed groups of experts in infectious disease control and epidemiology: the Technical Advisory Group (TAG) for COVID-19 and the National Immunization Technical Advisory Group (NITAG), etc. These expert groups collected data from WHO and other sources and developed measures to prevent the spread of infection and the vaccination plan. In terms of human resources required for the formation of the expert groups, as there were very few experts in epidemiology, inter-organizational cooperation was undertaken, for example, by sending the former Director of Planning of the Postgraduate Medicine of KGUMSB, who is a veterinary doctor with expertise in epidemiology, as a member of the expert group organized by the Ministry of Health.

COVID-19 task force groups (Ministry of Health, police, military, Ministry of Agriculture and Forest, local administrations, etc.) were established in each region of the country (southern, eastern, and western regions including the capital) across all relevant ministries and sectors. The establishment of these task force groups was triggered in the course of the COVID-19 response, as mandated by the Department of Disaster Management of the Ministry of Interior and Cultural Affairs.

The police were responsible for controlling traffic and people's flow across regions of the country, while the military was part of the COVID-19 response, including the construction of temporary quarantine facilities for people crossing the country's border in the south.

In terms of laboratory work, the RCDC, the top referral laboratory for COVID-19, of the Ministry of Health initially had only two machines capable of conducting PCR tests. However,

the Veterinary Research Centre under the Ministry of Agriculture and Forest also had a PCR machine, and thus, intersectoral collaboration was observed in the form of "the lending of a PCR testing unit from the Veterinary Research Centre and the staff of the Veterinary Research Centre who could use it were involved in COVID-19 testing at the RCDC" (Director, RCDC).

3.3 Measures to address the shortage of human resources for health

As mentioned above, in response to the shortage of human resources for health, a mapping of human resources in medical facilities across the country was conducted to determine the types and numbers of human resources. The mapping also included human resources in the veterinary field, whose competence could be utilized in laboratory work and other areas.

Based on this mapping, "efforts were made to secure human resources by rehiring retired health workers and other means" (Former Registrar, KGUMSB). In addition, "we redeployed human resources and transferred human resources from relatively less busy departments to the response to COVID-19" (Former Medical Superintendent of National Referral Hospital), while "young health workers were transferred to COVID-19 related work and middle-aged and older health workers were transferred to essential health services with less contact with COVID-19 patients."[4]

Regarding the introduction of volunteers and health students into infection control settings to support the work of human resources for health, all of the health professionals interviewed noted the effectiveness of volunteers and health students working alongside human resources for health in testing and treatment, as well as managing the flow of people at vaccination centers during the COVID-19 response.

[4] From the report by Deki Pem, Deputy Dean, Faculty of Nursing and Public Health, KGUMSB, at the 6th International Conference on Medical and Health Sciences, 2020.

Bhutan has a volunteer scheme called De-Suup,[5] meaning peacekeeping volunteer, which was an initiative of His Majesty the King. The national agency, De-Suung headquarters, deploys registrants to places where volunteers are needed. After the COVID-19 outbreak, De-Suup volunteers were active in supporting disinfection measures to prevent infection, controlling the movement of people in public places, and helping to manage isolation and medical facilities. In addition to the De-Suups, the Bhutan Red Cross Committee volunteers, civil servants, and general public volunteers also worked to support the response to COVID-19. KGUMSB trained these volunteers in basic COVID-19 knowledge, hygiene, disinfection methods, and the use of PPE (personal protective equipment), including donning and doffing. As many of the volunteers were members of the Bhutan Red Cross Committee as well as taxi drivers, they were specifically trained in infection control during patient transport and handling of dead bodies in case of the death of an infected person.

The number of volunteers trained at KGUMSB between 2020 and 2022 amounted to 560 De-Suups and 144 others. In addition, among the De-Suups, those who underwent careful training and passed a written test on more medical-related content (blood pressure measurement, oxygen level control, temperature control, body mechanics for moving patients, how to disinfect medical equipment, etc.) were specifically called “De-Suup Plus” and were assigned to work inpatient treatment facilities.

Medical students also worked in the COVID-19 treatment and vaccination centers:

[5] A De-Suup is a volunteer member who undergoes about a month’s training (which includes rescue training). On completion of the training, they are provided with an orange uniform and asked to serve the country in times of need. The national agency De-Suung headquarters is responsible for the operation of the system, including training the volunteers and staffing them in times of need. De-Suup volunteers who have other income work without pay, but during COVID-19, a decision was made to pay unemployed De-Suup volunteers from the national budget for their De-Suup work.

Those who had already learned how to give injections were deployed to COVID-19 vaccination sites. Clinical laboratory students assisted with specimen collection conducted by the RCDC to combat community-acquired infections. As for whether or not medical students participated in response to COVID-19, only those who wanted to do so were sufficient, but many students volunteered to participate because they wanted to help society, and the KGUMSB actively sent students to COVID-19-related sites (Former Registrar, KGUMSB).

In this way, Bhutan compensated for the shortage of human resources for health by task shifting (i.e., having trained others to carry out tasks originally performed by specialists).

3.4 Response to COVID-19 such as lockdown supported by citizens and volunteers

In March 2022, the government changed its policy to allow community-acquired infections, as most of the population had already been vaccinated. However, up until that time, Bhutan aimed to thoroughly prevent community-acquired infections. This included several long-term lockdowns in areas where community-acquired infections had occurred (a total of four lockdowns of one month or more in the capital and even longer in the southern border region):

"During the lockdowns, De-Suup volunteers and others provided a service to deliver essential medicines to people with pre-existing medical conditions. They also supported delivering vegetables and daily necessities to citizens" (KGUMSB Lecturer and others).

Meanwhile, "farmers delivered vegetables to the Ministry of Health, which was at the center of the response to COVID-19, citizens offered momo (a kind of dumpling cuisine), and there was support from the general public to the Ministry of Health" (Former WHO Representative).

Students in the health sector took the initiative to help in the medical field, and medical educators took the initiative to conduct infection control training, "because it was the part where they could be useful, thus, many of them wanted to do something they could do to help in some way with the 'national crisis' of COVID-19" (Former Registrar, KGUMSB).

During the national lockdown, the Ministry of Agriculture and Forestry coordinated a vegetable distribution plan for the public and De-Suup volunteers distributed vegetables from door to door. COVID-19 also facilitated community mutual aid.

> *"During the lockdown, residents in the same zone who were allowed to move around communicated with each other on social networking groups, which created a sense of compassion among residents, for example, people with electric heaters lent to those who were in need in cold winter" (Former Registrar, KGUMSB).*

Interviews with citizens revealed some criticisms, such as "the infection control measures with behavioral restrictions were too strict," and "the economy was sacrificed greatly. There could have been a different approach." On the other hand, others stated that "the government's responses to COVID-19 were strict, but it was a good thing because it resulted in fewer deaths."

3.5 Use of ICT in response to COVID-19

The use of ICT through the development of a software application to trace contacts and a vaccination record system was also helpful in the public health-oriented response to COVID-19 deployed in Bhutan.

The Ministry of Health urgently requested the Ministry of Information and Communication—which is in charge of ICT—and ICT entrepreneurs under its jurisdiction to develop systems for response to COVID-19: "Contact tracing application software (to record the movement of people and identify persons in close contact with an infected person), and a system

to register the movement of vehicles across the region played an important role in the fight against infection" (Former Minister of Health, President, KGUMSB). The development of these software apps was "completed in just one week to 10 days, with several ICT engineers staying at the Ministry of Health" (Former Minister of Health). The completed software was rolled out nationwide immediately after its release. News of its release was posted on the Government's Facebook page and broadcast on national television to promote its use among the general public.

The contact tracing application software was called Druk Trace and, by downloading the application to smartphones, it was able to generate QR codes to be posted in shops, offices, etc. People scanned the QR codes posted at the entrances of the places they visited with their smartphones. This function allowed the government to keep track of who had visited the location at a particular date and time. At the beginning of its use, De-Suup volunteers were deployed at the entrances to places where many people entered and exited, such as banks and vegetable markets, to encourage people to use the Druk Trace application. For those who did not have access to a smartphone, notebooks were placed at the entrances to shops and other locations, and people were encouraged to write down their names and contact details.

At the RCDC, "the PCR test results were initially tabulated manually in Excel, but the laboratory staff could no longer keep up, so application software was developed to manage the number of infections, and from then on, the work became more efficient" (Head of Laboratory, RCDC).

As these examples show, the development of various software applications helped to streamline work and compensate for the shortage of human resources for health.

In terms of information sharing among health professionals, "online training courses with content such as COVID-19 infection control methods were organized by the Ministry of Health and others. For day-to-day problems in dealing with infected patients, the exchange of opinions on the

Doctors' Forum, a social networking group to which almost all doctors and other human resources for health in the country subscribe, and webinars conducted by WHO and development partners were also useful (including webinars conducted by JICA to disseminate Japan's COVID-19 response experience, another example is the South Korean institutions also conducted)" (Head of Laboratory, RCDC).

With regard to telemedicine, no system directly linked to COVID-19 treatment was introduced. However, in order to strengthen maternal and child health, which was delayed due to the impact of the COVID-19 response, a mobile cardiotocography, fetal heartbeat monitor telemedicine system, was introduced nationwide in 2021 by the Ministry of Health with cooperation from JICA and United Nations Development Programme (UNDP). This system allows general doctors, nursing midwives, health assistants and others from rural health facilities who have conducted antenatal check-ups and attended deliveries to share data such as fetal heartbeat records via cloud telemedicine system. They could then receive advice from obstetric specialists, who are few in number and are only placed in referral hospitals. This initiative was introduced during the COVID-19 pandemic to compensate for the shortage of human resources for health, and in particular, specialist doctors.

3.6 Emphasis on mental health measures

The emphasis on mental health was one of the key features of Bhutan's response to COVID-19. Mental health was already positioned as one of the pillars of the COVID-19 response plan announced in February 2020, before the first COVID-19 case in the country.

The number of psychiatry specialists in Bhutan is very low (at the time of the COVID-19 outbreak, there were only two psychiatry specialists working in hospitals). To compensate for the shortage of human resources, the Ministry of Health brought back a psychosomatic specialist who

had already retired as a contract employee to work the COVID-19 mental health response team, to which he was assigned as the leader. The mental health response specialist team conducted a mental health awareness campaign, including setting up a dedicated telephone number to respond to calls from the public, producing mental health pamphlets for the public and airing spot programs on TV. The JICA Bhutan office began work in the year 2020 to produce mental health awareness spot programs in collaboration with the Ministry of Health and the national television network. This was the first cooperation in the field of mental health by a development partner in Bhutan after the COVID-19 outbreak.

The importance of monasteries (state-controlled Buddhist organizations) in mental health interventions was raised during interviews: “The behavioral restrictions imposed by COVID-19 for a period of two years can be stressful. Monasteries played a significant role with regard to mental health” (Former Minister of Health, Head of Laboratory, RCDC). For example, every time the COVID-19 vaccine arrived at Paro International Airport from abroad, the monks offered a mantra (prayer) of the Medicine Buddha and sprinkled holy water on the storage containing the vaccine. This was reported on TV news, as it “was important to ensure that the public could receive the vaccine without worry. Prayers by high monks for the containment of the disease also provided reassurance to the public during the COVID-19 disaster” (President, KGUMSB and Head of Laboratory, RCDC). This is due to the fact that Tibetan Buddhist monasteries are publicly run in Bhutan and are respected by both the government and the citizens.

3.7 Emphasis on measures to protect the elderly

Bhutan was also unique in that it had already specified and emphasized efforts to protect the elderly in its COVID-19 action plan of February 2020. In Bhutan, approximately 9% of the population is over 60 years of age (National Statistics Bureau, Bhutan 2018) and the population

is aging. After the launch of the response to COVID-19, the national television broadcast "Protect our fathers and mothers." In accordance with the plan to protect the elderly, local administrations listed up the elderly in each region so that the necessary support related to COVID-19 could be provided.

Later, but before switching to the social management of "With COVID" in April 2022, a new concept of "reverse isolation" was launched, whereby the government rented out hotels and other facilities dedicated to protecting the elderly from infection. Reverse isolation means that previously, COVID-19-infected people were isolated and treated in facilities, but after allowing community-acquired infection, the risk of infection among the elderly increased, so those who were not infected were asked to stay temporarily in facilities that were isolated from the outside world, thereby protecting them from infection. This was a countermeasure to protect the elderly by taking a reverse approach. The Bhutanese Government's emphasis on protecting the elderly as one of the pillars of the response to COVID-19 was an important initiative that corresponds to "the most important perspective, i.e., protecting "vulnerable populations" in human security" (Komasawa et al. 2022).

3.8 Rapid roll-out of COVID-19 vaccination - simultaneous national campaigns

From March 2021, once the COVID-19 vaccine became available, the Government of Bhutan made continuous efforts to reach as many people and age groups as possible with the vaccine.

The first nationwide COVID-19 vaccination campaign was launched on March 27, 2021, and by April 8, approximately 472,000 people (approximately 94% of the eligible population aged 18 years and above) had been vaccinated against COVID-19. This represents about 61% of the total population—in line with Israel, which at the time had the world's highest vaccination coverage as a percentage of the total population. The vaccine used was Covishield (Oxford-

AstraZeneca vaccine from the Serum Institute of India Pvt. Ltd.), provided by the Government of India.

The vaccines for the first nationwide COVID-19 vaccination campaign were delivered to Paro, the location of the international airport, on March 23, 2021. After a prayer by monks, they were transported by helicopter across the country. On the morning of March 27, the launch day of the national vaccination campaign program, the first vaccine was given to “a 30-year-old woman born in the Year of the Monkey” (a symbolic event according to the divination of a Buddhist astrologer). She was followed by former Prime Minister Dr. Lotay Tshering and former Prime Minister’s elderly parents and several cabinet ministers. After this, vaccination of the general public began. It was announced that active frontline workers (e.g., health workers and De-Suup volunteers engaged in vaccination implementation) would be the last to be vaccinated at the end of the week-long nationwide vaccination campaign, in order to prioritize the implementation of the program (in reality, the extra vaccines were administered sequentially to the health professionals at the end of the daily vaccination campaign). More than 1,000 vaccination centers were prepared across the country, and people pre-registered on the vaccination registration system set up on the Ministry of Health’s website before going to the vaccination center. After being vaccinated at the center, they were guided by De-Suup volunteers to a waiting area where people stayed for 30 minutes to make sure there were no side effects or other specific problems after the vaccination. They then went home.

As noted above, the vaccine was provided by the Government of India for the first campaign, but the subsequent spread of infection in India made it difficult for the Government of Bhutan to ask the Government of India to provide the vaccine for a second campaign. As a result, the Government of Bhutan approached other countries for vaccine assistance, and eventually, a

second nationwide vaccination campaign was conducted from July 20, 2021, using 500,000 doses of the Moderna vaccine provided by the United States.

Once this was complete, in May 2022, a sequential vaccination of children under 18 years of age and a second vaccination of children aged five years and over began, steadily expanding the coverage and increasing the number of vaccinations.

4. Measures to ensure continuity of health services and address challenges

4.1 Measures to address shortfalls in medical facilities and laboratory testing capacity

Bhutanese government officials stated that "the perception of inadequate capacity in health and medical facilities was shared by all stakeholders from the preparatory stage of the response to COVID-19 in early 2020" (Former Medical Superintendent of the National Referral Hospital). Therefore, the Ministry of Health intensified the procurement of medical equipment, laboratory equipment, consumables such as PPE, and medicines. Cooperation from development partners, including JICA, also played a significant role. For example, "the RCDC was provided with three PCR testing machines and other equipment from JICA, which enabled the establishment of additional PCR testing centers in the region. This has been very beneficial in decentralizing testing activities that were previously concentrated in one only center and establishing a system of decentralized PCR testing centers without the need for specimen transfer" (Head of Laboratory, RCDC).

Regarding the capacity of medical facilities, the shortage of ICU facilities and equipment, as well as the human resources for health capable of providing treatment and management in ICUs, was particularly critical. Therefore, training in the operation and management of ICUs was provided and facilities equivalent to ICUs were prepared in regional hospitals. In each hospital,

rapid testing was carried out at the entrance to prevent COVID-19-infected patients from entering the hospital and spreading the infection. Temporary “flu clinics” were also set up outside the national hospitals, where people with cold symptoms could consult a doctor while avoiding COVID-19-infected patients coming into contact with other patients: “Similarly, temporary flu clinics were set up in provincial hospitals using disaster preparedness tents” (Former WHO Representative and others). Moreover, “Medical staff were divided into two groups: those performing COVID-19-related tasks and those providing regular medical care, with COVID-19 staff working in three shifts” (Former Medical Superintendent, National Referral Hospital).

Prior to the policy change that would lift the lockdown and allow community-acquired infections after April 2022, temporary hospitals (converted buildings for other purposes) were prepared in key areas of the country to specialize in receiving COVID-19 patients as a precautionary measure against severe cases: “Preparing substitute medical facilities was an important measure to prepare for both infection control (separating infected patients from other patients) and treatment of infected patients, even though there were few existing medical facilities” (Former Minister of Health). This point was echoed by many other participants.

As of 2020, it proved difficult to secure inpatient treatment facilities for COVID-19 in eastern Bhutan compared to the west, where the capital is located. His Majesty the King therefore instructed the Ministry of Health to use a building owned by the Royal Family (the Royal Guest House) in Mongar, in the heart of the eastern region, as a temporary medical facility in case of an outbreak of COVID-19.

With regard to isolation facilities for foreign arrivals and persons in close contact, “at the beginning of the COVID-19 response, there were few private facilities that could be used as isolation facilities, but gradually private hotels began to offer their cooperation to be used as isolation facilities” (Director, RCDC).

In terms of testing capacity, the need arose to carry out a large number of PCR tests on close contacts and suspected cases as part of the COVID-19 response, but:

> *"In Bhutan, there was the problem that both PCR testing equipment and human resources who could handle it were very limited. What was useful at that time was the method used during the 2009 H1N1 influenza pandemic, specimens collected from five or ten people were mixed once and PCR testing was carried out in one session; if the results were negative, everyone tested negative, and if positive, the positive specimens were tested again individually to identify the positive ones" (Head of Laboratory, RCDC).*

Using the experience gained at that time, RCDC also began using a similar method under the COVID-19.

4.2 Provision of health services to citizens during the lockdown and challenges faced

During the lockdown period, citizens experienced increased difficulties in accessing hospitals. Although hospital visits were pre-authorised, citizens mentioned in interviews that "it was difficult to get pre-approved appointments for hospital visits." Another said, "I did not want to go to hospitals because I was afraid of infection."

As a result, the number of direct hospital visits by citizens decreased, but in turn, the number of consultations with the health and medical telephone advice service increased. Two of the young KGUMSB Lecturers interviewed had both been deployed to the telephone consultation service at some point during the COVID-19 response period, and they commented that "I was sent to the role without manuals for dealing with telephone consultations to the people. When I did not know how to respond to consultations, I had no choice but to devise ways of dealing with the situation on the spot, such as contacting someone in the know personally and asking them to teach them how to respond." In addition, telephone consultations were "difficult to deal with because we

could not see the affected area to give advice to the patient as there was no mechanism such as a video call, only over the phone."

On the other hand, "a system was put into operation whereby human resources for health would come to the doorstep to provide medical services upon request by telephone" (Former Minister of Health). Interviews with citizens revealed that this was "very helpful."

In relation to the COVID-19 responses, there are some reported cases in Bhutan where "some aspects may have gone wrong," according to a report in the Kuensel newspaper of February 12, 2022. A 34-year-old woman from Samtse district in the south needed dialysis treatment. However, because Samtse district hospital did not have dialysis facilities at that time, she was receiving dialysis treatment at Phuntsholing district hospital, the main town in the south. In early 2022, she was referred from the Phuntsholing district hospital to the national referral hospital in the capital for treatment. The family of the deceased woman alleged that she was found to be COVID-19 positive after she was transferred to the capital and before treatment began, she "died without medical assistance" while ordered to stay in an isolation hotel in the capital. Her relatives said they "hope the Ministry of Health would take the situation seriously and publish a report to improve the situation."

The patient's death on January 28, 2022, was the fourth COVID-19-related death in Bhutan. The Ministry of Health reported a cumulative total of 21 COVID-19-related deaths in Bhutan due to the subsequent outbreak of the Omicron strain. According to the Ministry of Health, almost all of the deaths occurred during the initial course of COVID-19 infection, either because the patients were already seriously ill with other non-communicable diseases, or because they had received fewer vaccinations than they could have received, or because they had not been vaccinated.

4.3 Delays in policy to strengthen maternal and child health

By 2019, the Ministry of Health had developed a new policy, One Thousand (1000) Golden Days Plus, which aims to reduce maternal and newborn deaths, especially in rural areas. It is based on the idea that the "first 1000 days"—from the fetus to around two years of age—are crucial for the child's future development. The policy includes the promotion of (1) early participation in antenatal care (about 50% of pregnant women have delays in attending antenatal care), (2) increased participation in postnatal care (only about 27% of mothers receive postnatal care at the required frequency and duration), and (3) improved neonatal nutrition through the promotion of complementary food and the distribution of essential nutrients powder. A particular highlight of the policy was the provision of transport subsidies for pregnant women and mothers in rural areas to travel to primary health centers for antenatal and postnatal care to improve the rates of antenatal and postnatal care.

The start of this policy was significantly delayed after March 2020 because the health sector had to concentrate its financial and human resources on the COVID-19 responses, and by July 2022, it had not yet been fully launched.

As a result, after COVID-19, the implementation of measures to improve maternal and child health challenges could not proceed as planned. It should also be noted that the Bhutanese government promoted COVID-19 responses at the expense of planned health policy implementation, albeit partially.

5. Conclusion

The response to COVID-19 in Bhutan can be seen as an example of how public health responses and lockdowns can also be utilized to prevent community-acquired infections, based on a full

recognition of the inadequacy of both human resources for health and medical facilities and equipment. The efforts to control community-acquired infections while administering multiple doses of vaccine to the population across wider age groups were a rational response based on the recognition of the "weakness" of the health systems.

To recapitulate Bhutan's response to COVID-19, (1) leadership and information disclosure and dissemination built a system of public collaboration, and (2) trained volunteers and health students were deployed in the field, as well as temporary medical facilities and ICT systems were utilized to compensate for the shortage of human resources for health and medical facilities.

5.1 Leadership and information disclosure and dissemination

In Bhutan's COVID-19 response, strong leadership in the fight against infectious diseases was a prominent factor behind the public's acceptance of the pandemic response and consistent support for the government's policies, despite the inconvenient living conditions.

His Majesty the King, who played a central leadership role at the heart of government, left the Royal Palace for long periods to visit COVID-19 high-risk areas, meet with COVID-19 response team members on the ground and advise the COVID-19 task groups. His Majesty the King also continually encouraged people in different parts of the country by meeting and talking to them. His Majesty the King remained on the ground longer than anyone else. Based on the knowledge he gained, His Majesty the King devised Bhutan's own measures to prevent the spread of the disease, including a response tailored to Bhutan's situation, a "zoning system" that allows people to move within certain zones in cities under lockdown and week-long institutional isolation for those moving from the high-risk south to other areas.

The frequent press conferences held by the former Prime Minister, a medical doctor, and the former Minister of Health a public health expert, provided convincing information on public

health backed by expertise. Information was also frequently posted and communicated on Facebook and other platforms of the Ministry of Health and the Prime Minister's Office.

5.2 Response to COVID-19 in the context of a shortage of human resources for health and medical facilities

The shortage of human resources for health was addressed through task shifting by mobilizing trained volunteers and medical students. The shortage of medical facilities was mitigated by establishing temporary facilities.

While items that were difficult to obtain domestically (information and knowledge on COVID-19, vaccines, medical equipment, etc.) were actively introduced with the support of foreign countries, the following measures to use available domestic resources were taken at maximum: participation of the public and volunteers; construction of isolation facilities or conversion and operation of existing facilities; mobilization of the military and police for lockdown implementation; cooperation with traffic, airport, police, etc. to control human flow; and the development and use of ICT systems in their own country. These were distinctive features of Bhutan's COVID-19 response. Figure 2. shows a conceptual representation of the various aspects of the response to COVID-19 in Bhutan.

In Bhutan, a "resilient health system" is a health system in which "the capacity of health actors, institutions, and population to prepare for and effectively respond to crises; maintain core functions when a crisis hits; and, informed by lessons learned during the crisis, reorganize if conditions require it" (Kruk et al. 2015) had been realized during the crisis caused by COVID-19.

Regarding the response to COVID-19 in Bhutan, some citizen interviewees said that "excessive effort was put into the health response," and the "economy was sacrificed to some

extent," but it is a fact that many Bhutanese continued to cooperate with the government's response to COVID-19 over a long period of two years.

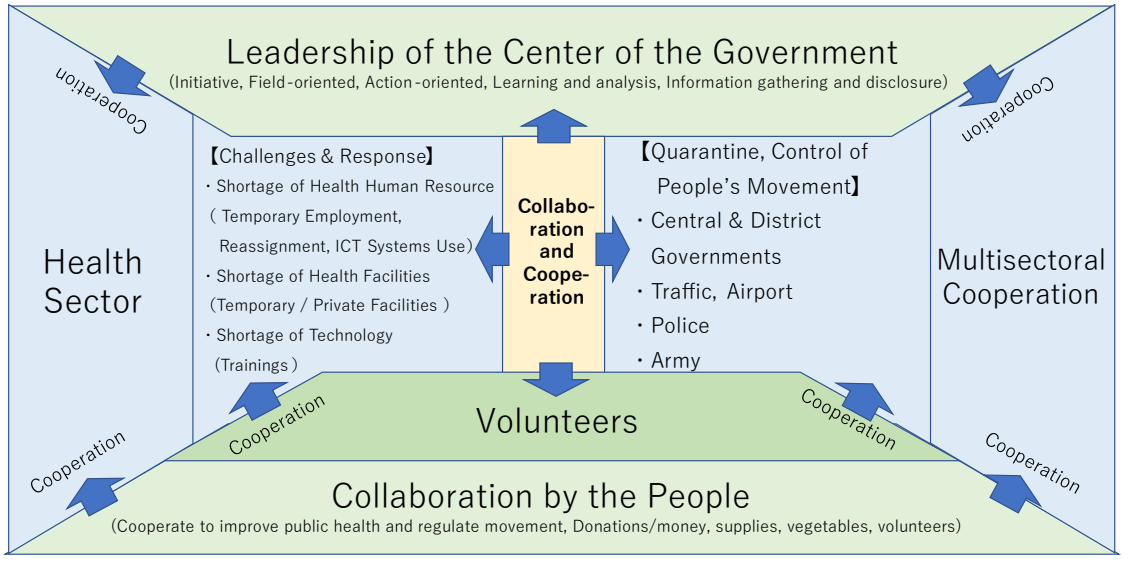

Figure 2: The COVID-19 response of Bhutan

6. Closing Message

For two years, Bhutanese leaders continued their efforts to increase vaccination rates while reducing community-acquired COVID-19 infections. There was a clear and consistent philosophy of "protecting the lives of the people with all means." Bhutan's response to COVID-19, which can be described as having a "heavy emphasis on a public health response," may be considered globally atypical. However, it was this belief that allowed His Majesty the King's message to be heard: "lost lives will not come back, but even if the economy is damaged, it can be restored later if everyone works hard."

Finally, the author would like to share some of the messages from Bhutan, a developing country, with international organizations such as WHO and developed countries in the event of COVID-19 and other future global pandemics. As the author heard in the interview, “In relation to WHO, the learning from each other among the Technical Advisory Groups of the South-East Asia Regional Office (SEARO) countries on the COVID-19 response was important and needs to be strengthened as a framework for regional information sharing in the future. We would like developed countries to strengthen their responsibility as major powers to respond to the global infectious disease crisis by disclosing and sharing technology and information and advising developing countries. If the global infectious disease crisis is politicized by developed countries, developing countries will end up in a thoroughly confused situation. I believe that it is their responsibility as major powers to engage in conversation with developing countries to address the global infectious disease crisis” (Former Minister of Health).

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Annex: Interviewees Information

	Interviewee	Interview Month, Year
①	Former Minister of Health	May, 2021
②	President, KGUMSB	June, 2021
③	Former Registrar, KGUMSB	June, 2021
④	Director, RCDC	June, 2021
⑤	Head of Laboratory, RCDC	June, 2021
⑥	Former Medical Superintendent, Jigme Dorji Wangchuck National Referral Hospital	June, 2021
⑦	Representative, WHO Bhutan Office	June, 2021
⑧	Lecturer, KGUMSB	June, 2021
⑨	Lecturer, KGUMSB	June, 2021
⑩	Citizen（1）Male	June, 2021
⑪	Citizen（2）Female	June, 2021
⑫	Citizen（3）Male	June, 2021
⑬	Citizen（4）Male	June, 2021
⑭	Citizen（5）Male	June, 2021
⑮	Citizen（6）Male	June, 2021