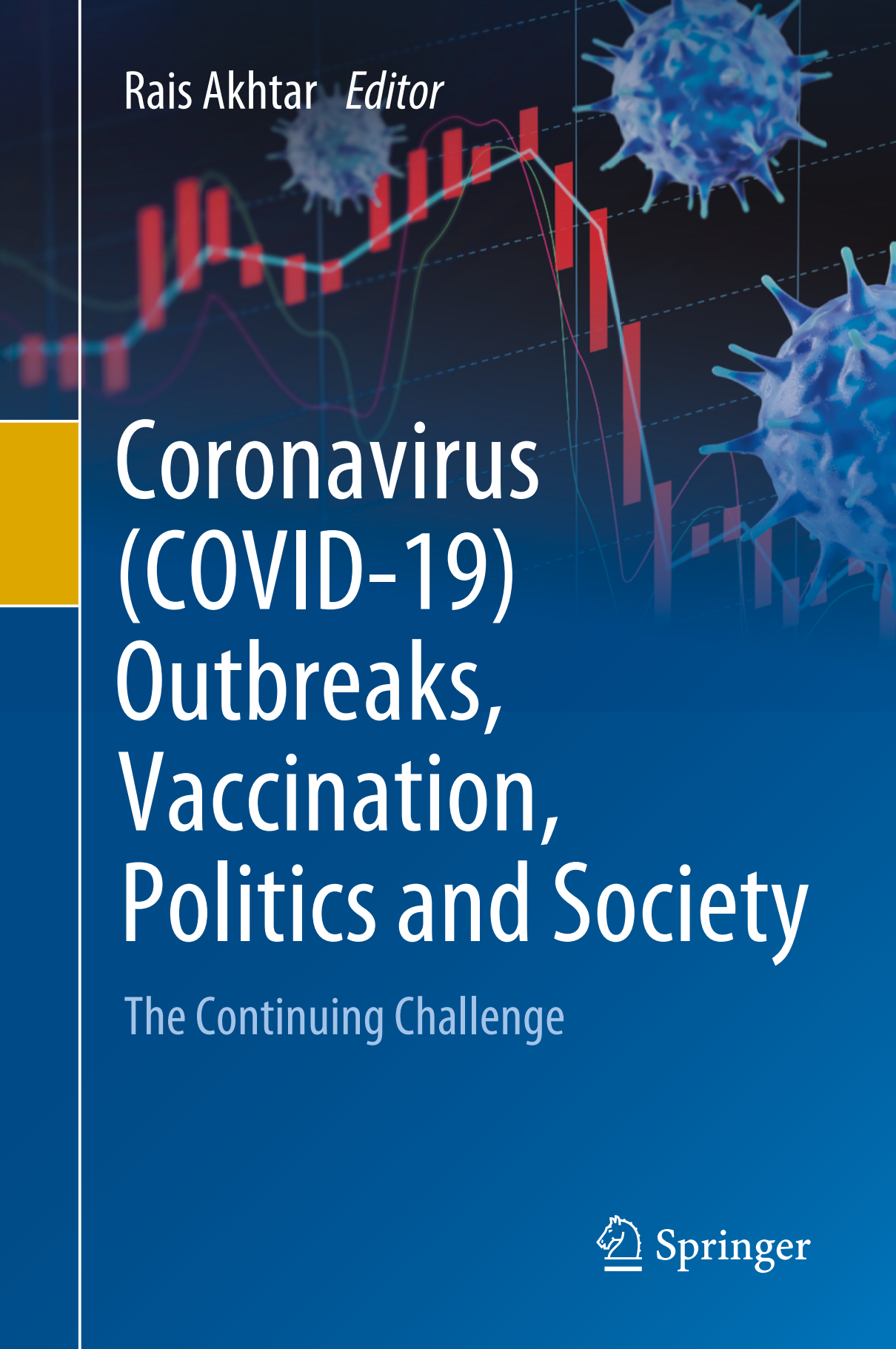


Rais Akhtar *Editor*



Coronavirus (COVID-19) Outbreaks, Vaccination, Politics and Society

The Continuing Challenge

 Springer

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Foreword

When COVID-19 struck in late 2019, no country was prepared for the impact it would have over the next two years. Countries, or parts of them, have been shut down, sometimes repeatedly, since 2020. But even as the pandemic begins to ease across the world, or at least pauses for a time before returning in some new variant, and is being accepted as remaining endemic, many countries continue to be seriously disabled by it. The contributions to this collection detail the many challenges facing governments and reaffirm that such a state of affairs is likely to remain the case for years to come.

Globally, the pandemic is far from over despite the attempts by some governments, especially those of a neoliberal persuasion, and on the back of successful vaccine rollouts in some countries, to insist that it is now a case of learning to live with the pandemic rather than prolonging an economic lockdown which is playing havoc with countries' finances and overall sense of security. But while vaccines remain a vital tool in managing the virus's impact and spread, they are not a silver bullet that promise to end the pandemic. There is no clear 'exit strategy' much as governments and their publics would like to locate one or pretend one exists. Compounding the epidemiological factors are political factors that have surfaced as the pandemic has unfolded and become interwoven with its progress.

While the pandemic was rampaging through countries and populations, it quickly became apparent that some groups in society were at greater risk than others. The pandemic shone a spotlight on persistent and long-standing inequalities within and between countries pointing starkly to what one commentator terms 'fractured societies'. For a time, it was argued that there could be no return to the old normal and that a new normal would emerge that was better and fairer. While that may remain a desire among some countries and communities, in others, it seems that many of the old ways of doing things are returning and in some cases more rapidly than was foreseen but with consequences that have yet to reveal themselves as we continue to live with the pandemic.

Countries' health and social care systems, and those working within them, have been especially hard hit during the pandemic. This is hardly surprising given their position in the frontline of treating and caring for those infected by the virus or seeking

protection from it. But, again, the virus has brutally exposed long-standing weaknesses and gaps in health care, especially when it comes to public health and readiness for coping with a pandemic. In many countries early handling of the pandemic amounted to a catastrophic public health failure.

At the same time, notwithstanding the damage the virus has wreaked on public health, physical and mental health, and the state of health and social care services, there have been positive effects, too, and lessons for how governments might prepare for and manage such events in future if they are prepared to heed them. Sadly, however, as governments become preoccupied by other pressing matters affecting the economy and security of countries, there is every possibility that the proactive policies needed to tackle future pandemics will not be forthcoming.

Finally, if there is a single overarching theme that runs through all the contributions to this volume, it is the interplay between politics and health. To argue, as some have, that the two are quite separate is seriously to misread and misunderstand the events of the past two years. The claim in some countries that politicians were at all times following the science is disingenuous to say the least. At all stages, it was politicians who decided how to respond to the virus—when to lockdown, when to control borders, how to protect health and social care services from being overwhelmed, how to procure PPE and test and trace systems and so on. These were all political choices, and many of them were found seriously wanting. How they were made and how far ideology influenced the choices are matters for future inquiry as countries come to terms with the fallout from the pandemic. Learning to live with it does not mean ignoring the political choices made, their impact and their consequences.

It was the Prussian pathologist turned anthropologist turned parliamentarian, Rudolf Virchow (1821–1902), who wrote that ‘medicine is a social science, and politics nothing else but medicine on a large scale’. If evidence of the truth and wisdom of this insight is needed, then it is amply provided by the chapters which follow in the second edition of the book : *Coronavirus (COVID-19) Outbreaks, Vaccination, Politics and Society: The Continuing Challenge* edited by Rais Akhtar, who has been able to bring together diverse perspectives from countries as geographically and economically varied as Australia, Papua and New Guinea, Fiji, Hong Kong, South Korea, Japan, Indonesia, Bangladesh, India, South Africa, Zambia, West Africa, Italy, France, UK, Canada, USA, Mexico, Brazil and Argentina. The chapter authors belong to varied disciplines ranging from geography, sociology, public health, epidemiology, social and preventive medicine and healthcare planning.

In the end though, we must acknowledge that the COVID-19 pandemic associated with Omicron and its various variants including BA.2 is still causing havoc in different countries, and thus, there is still continuing challenge to combat the COVID-19 in 2022 despite availability and accessibility of vaccines and booster shots in major parts of the world.

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Preface

The first edition of the book, *Corona Virus (COVID-19) Outbreaks, Environment and Human Behaviour*, published in early 2021, focuses on the origin and diffusion of COVID-19, from Wuhan in China to surrounding regions of East and South Asia and to other parts of the world, particularly the developed countries of Europe and the USA. Emphasis was laid on physical and socio-economic and cultural determinants of the spread of COVID-19. Vaccine development was at an early stage in the early 2021.

With the fast development of resilient health infrastructure and the production of numerous vaccines, we succeeded in controlling the spread of COVID-19.

The present volume addresses aspects related to vaccine accessibility, politics of lockdowns, protests against vaccine mandate, global perspectives, covering both developed and developing countries regarding the question—WHEN COVID ENDS?

The book includes case studies from both developed and developing countries encompassing Australasia, Africa, Europe and Americas.

In chapter Australia ‘Under Promise and Over-deliver: The failure of political rhetoric in managing COVID-19 in Australia’, Evelyne and her colleagues in their chapter on Australia, entitled [Under-promise and Over-deliver: The Failure of Political Rhetoric in Managing COVID-19 in Australia](#) highlight government approach in combating COVID-19 in the country. The authors assert that but the insular approach to combatting COVID-19 cracked in the months since. Failures in vaccine procurement and rollout, ‘gold standard’ contact tracing that appeared nothing but, debilitating border closures, and an inability to coordinate policy and governance responses to the Delta variant of SARS-CoV-2 in a federal government architecture are the pivots of this next chapter in Australia’s pandemic response.

In his chapter on Papua and New Guinea entitled: ‘[COVID-19 and Culture in Papua New Guinea. Failing to Meet the Challenges of Diversity?](#)’, John Connell evaluates government policy on COVID-19 control. He argues that by closing its borders PNG largely escaped COVID-19 in 2020 but cases soared early in 2021. That raised concerns over supposedly curative Western medicine, and the utility of prayer, and raised the spectres of sorcery and ‘stranger danger’. Mobility was constrained

bringing a reluctance to visit hospitals. Local food markets closed. Vaccine hesitancy was substantial, through disbelief that this was a ‘local’ disease, widespread distrust of government and contradictory social media. Cultural and socio-economic issues restricted social distancing and mask wearing. Inadequate health services in rural areas, especially co-morbidity and shortages of supplies, accentuated social problems as the virus continued to spread.

Eberhard Weber and his colleague worked on ‘COVID-19 in Fiji—From Health and Economic to Major Political Crisis’. This country, in the Pacific, experienced a second wave of the disease starting in mid-April 2021. Within a few weeks, the country had infection cases per million population that were among the highest recorded globally.

With tens of thousands of COVID-19 cases and hundreds of deaths, the Fiji government came under great public pressure including opposition parties. Major background is that in 2022 Fiji is supposed to hold its next national elections. The Fiji government has been criticized that it allowed the coronavirus enter Fiji’s public and that it did not put enough effort to contain the spread of the Delta variant.

By the end of December 2021, Fiji seems to have mastered the second wave. This happened at costs unacceptably high. With 54,147 recorded COVID-19 cases and 700 deaths, Fiji ranks on top among Pacific Island Countries and stands at third place among all PICT. The last days of December 2021 also nurtured fears that a third wave has started, possibly driven by the Omicron variant of the coronavirus.

The longer the second wave persisted, the less transparent did authorities get. They put almost exclusively their efforts in getting out of the crisis on a vaccination campaign, ignoring the need to strictly enforce other measures to contain the spread of COVID-19. The major enforcement was concerning the duty to wear face masks and the observation of night curfews. Other containment efforts were not very strictly enforced. This then finally allowed the disease to spread to a number of islands outside Viti Levu, Fiji’s main island, where COVID-19 was mainly concentrated.

According to Mei-Hui Li after nearly COVID-19 pandemic mitigation success of 2020, Taiwan experienced its first major domestic outbreak in mid-May 2021. Taiwan entered a nation-wide level-3 epidemic warning, one step away from a potential national lockdown, on 19 May 2021. Systems thinking is an effective tool to help policy-makers better understand the complex COVID-19 crisis. This chapter will apply causal loop diagrams (CLDs) to depict the causal connections among different components of the COVID-19 infection in Taiwan, including vaccine shortage and hesitancy, medical health resource and vaccine policy and prevention and control measures of Taiwanese government responding to the COVID-19 outbreak during 2021. This chapter attempts to use Taiwan as a case study to illustrate how changes in one component cascade, via feedback loops, potentially affecting the status of the entire system during COVID-19 pandemic.

In the chapter on Japan, Tashiro describes some polarized COVID-19 pandemic situations and experiences in Japan. In Japan, the response to COVID-19 is polarized. The increasing polarization and disinformation around the COVID-19 vaccine have led to some Japanese people attempting to get vaccinated with the call, ‘make the best efforts’, which implicitly encourages vaccination. While the increase of first

dose vaccination rate, the number of COVID-19 positive cases reached a record high soon after the Tokyo Olympics began. It is not clear whether the preventive COVID-19 measures such as wearing masks, statements of an emergency and vaccine promotion are regarded as effective measures for the end of COVID-19. On the other hand, the risk of death and severe disease from vaccination and the problem of spike protein which cannot fight other viruses except COVID-19 should not be overlooked. Although the number of cases and mortality rates is lower in Japan than in Europe and the USA, this may be due in large part to Japanese genetics and their unique lifestyle behaviours which minimize the increase. This study examines what differences in individual scientific understanding, knowledge of vaccines and behaviours are associated with COVID-19 response in Japan.

Chapter on Hong Kong and South Korea, by Keumseok Koh, Yun Fat Lam and Hyungjo Hu, have been often mentioned as the regions best responded to the COVID-19 pandemic, especially through non-pharmaceutical measures, during the pandemic. However, both economies have encountered challenges in implementing the massive vaccination rollout. In this study, authors examined how various factors behind their social settings from history, culture, economy and politics have complexly intertwined with COVID-19 vaccination in similar and different ways in the two East Asia's developed economies.

In the chapter on Thailand, Uma Langkulsen and Desire Tarwireyi Rwodzi explained the outbreak of the third wave of COVID-19 infections started on 1 April 2021. From 1 April to 27 August 2021, there have been 1,110,708 confirmed cases of COVID-19 with 10,493 deaths. COVID-19 vaccines are one of many crucial tools in the pandemic response and protect against hospitalization and death. The population was over 66.1 million; Thailand has a target of vaccinating 50 million people, including 712,000 healthcare professionals, 1,900,000 frontline health workers, 1,000,000 village health volunteers, 5,350,000 patients with 7 underlying diseases (chronic respiratory diseases, cardiovascular diseases, chronic kidney disease, cerebrovascular disease, obesity, diabetes and cancer), 28,638,000 general populations, 10,900,000 people aged 60 years and older and 500,000 pregnant women. As of 26 August 2021, a total of 29,504,769 vaccine doses have been administered, with 22,070,573 people receiving a first dose (33.3% of the country's population), 6,860,084 people receiving a second dose (10.4% of the country's population) and 574,112 people receiving a third dose (0.9% of the country's population). COVID-19 vaccination administration is a big challenge to make vaccines available for people residing in Thailand on a foundation of ethics, equality, academic-based evidences, accessible supply and management capability in national context.

The chapter on Indonesia by Budi Haryanto, Henry Setiawan, Rita Kusriastuti and Ririh Yudhastuti recounts that the country has experienced with the second wave of the COVID-19 pandemic. The number of people who have been confirmed positive has now approached 4,215,000 with the number of deaths approaching 142,000 people. About 22% of more than 208 million targeted people had completed the second vaccination. Our paper aims to provide detailed reporting and analyses of the present rapid responses to COVID-19 up to September 2021 in Indonesia. We

particularly highlight responses taken by the governments, non-government organisations and the community. The authors outline gaps and limitations in the responses, based on a collection of information and views from a number of sources regarding the development of the COVID-19 pandemic and ways of overcoming with it, in Indonesia. Budi Haryanto and colleague present some strategies and recommendations towards more rapid, effective and comprehensive current responses as well as for post-epidemic. In the chapter on Malaysia, Nasrin Aghamohammadi, Logaraj Ramakreshnan, Chng Saun Fong and Moy Foong Ming assert that COVID-19 spread by the SARS-CoV-2 virus is one of the pronounced ongoing communicable deathly disease outbreaks in Malaysia. The immunization programme is currently administering Pfizer–BioNTech, Oxford–AstraZeneca and Sinovac (CoronaVac) candidate vaccines in several phases targeting different categories of recipients per phase and is expected to be completed by February 2022. Issues pertaining to COVID-19 vaccine literacy, acceptance and hesitancy still need more investigation to generate baseline information as an initial step for interventions and building trust in vaccination efforts. This will accelerate the achievement of the immunization programme’s target of immunizing at least 80% of Malaysian by 2022.

In the chapter on Bangladesh, Palash Basak, Soma Dey and K. Maudood Elahi contend that as the eighth largest populous country in the world, Bangladesh has been facing several challenges in controlling the COVID-19 pandemic situation. While several countries, including the USA, UK and France, had a coronavirus infection rate of over 10%, Bangladesh still has managed to keep that number below 1% (as of August 2021). However, there are differences in the distribution of COVID-19 cases in different parts of Bangladesh. The spatial distribution of the virus also changed over time. This chapter explores the spatio-temporal distribution of coronavirus infection in Bangladesh and examines factors associated with the significant patterns. It also investigates the accessibility of vaccination against the virus. By analysing data collected from secondary sources, the study reveals that the virus initially spread in the densely populated urban canters but later reached remote parts of the country. Population density, level of urbanization and distance from the capital city were associated with the viral distribution. Some recommendations have been formulated in the light of the research findings.

In their chapter on India, Hem Dholakia and Malav Jhala argued that during the COVID-19 pandemic the focus was on treating affected patients led to a decline in the quantity and quality of care for non-COVID-19 patients. Globally, there are several accounts of cancellations of non-essential procedures (e.g. knee replacements), difficulties in access to cancer care and general apprehension of people to visit hospitals. The primary consequence was increase in out-of-hospital mortality driven by endocrine, cardiovascular and neoplasms. In India, studies estimate that in the first four months of lockdown (April–Jul 2020) there was a 22–25% increase in excess mortality across non-COVID-19 patients who required dialysis. Some of the possible drivers include reduced ability to seek health care due to lockdowns, apprehension on being infected and lack of clear information on infection control measures. In addition, new diseases and risk factors such as mucormycosis were

seen, especially in India, where estimated prevalence was 70 times that of global data. Those affected most were women and disadvantaged populations.

Whereas pandemics may require a reallocation of health resources, it is critical to find the balance between managing an underlying disease burden and those affected by the pandemic. This requires better preparedness through strengthening health infrastructure, early warning systems and emergency response plan.

In their chapter on South Africa, Ntatamala, Naidoo, Ncayiyana and Jeebhay elaborated work-related and economic factors contributing to the geographical distribution of COVID-19 (SARS-CoV-2 infection) during the first wave of COVID-19 in South Africa that were investigated. Provincial demographic, employment and financial data were analysed in relation to COVID-19 disease cumulative case incidence rates (CCIR) during the respective first wave to gain deeper insights into spatial distribution and temporal variability across provinces using an ecological study design. Provinces with the largest GDP per capita and considered to be the economic hubs of South Africa (Gauteng, Western Cape and KwaZulu-Natal) had some of the highest CCIR in the country compared to other less economically developed provinces (North-West, Mpumalanga, Limpopo Province). Multivariate Poisson regression analysis found that provinces with a higher proportion of employed working population or having greater percentage changes of mobility to workplaces prior to the commencement of the first provincial wave were more likely to have increasing cumulative case incidence rates (incidence rate ratio, IRR = 1.05). The study suggests that the first provincial waves in South Africa were also driven by economic factors of employment and mobility to workplaces. Workplace preventative strategies should be an important focus for the current COVID-19 pandemic.

When the COVID-19 pandemic finally arrived in Zambia in March 2020, Wilma Nchito expounded in her chapter on Lusaka Zambia that many citizens thought it was a political hoax. Many denied its existence, while those who believed it was real, thought it could not affect Africans and Zambians specifically. As the numbers infected by the virus slowly increased in Lusaka the capital, a pattern seemed to appear in terms of the spatial location of those affected. Initially, it was only the upper middle class and upper-class neighbourhoods where the affected lived. The fact that the first person who tested positive had come from a holiday in Europe also fuelled the narrative that COVID-19 was a disease for the rich and did not affect the poor. The result was that during the first and second waves (so far Zambia has had three waves) some parts of the city carried on as though the pandemic did not exist. Markets, bus stations and streets in these areas carried on with a 'business as usual' approach. There was no adherence to social distancing, masking, sanitizing and hand washing. In other parts of the city the situation was very different. People were practising social distancing, wearing masks, sanitizing and washing hands everywhere they went. This chapter analyses the dual responses by accessing the urban services and infrastructure as well as the messaging from government institutions and others that facilitated and encouraged these responses.

Stanley Okafore and Uguru Ibor contend that West Africa has not experienced as much devastation from COVID-19 as was initially expected but the pandemic is a significant problem nonetheless. Using official statistics, this paper examines the

spatial and temporal patterns of COVID-19 in the sub-region, with a special attention on its epicentre, Nigeria. As expected, the disease burden varies from country to country and the variation was found to be a function of variations in population size, GDP and international air passenger traffic. These variables are the main determinants of the geography of COVID-19 in West Africa and Nigeria. The temporal pattern approximates an S-shaped curve, which is typical of spatial diffusion processes. Waves are also discernible in the spread of the virus. Misconceptions fuelled by misinformation and disinformation have led to vaccine hesitancy and hamper efforts to combat the disease.

The pandemic has still left many aftermaths around the world, and also in Italy. In a globalized world and especially in countries that are the destination of numerous trips, Cosimo Palagiano contends that tourism and immigration such as in Italy, the consequences of COVID-19—now at the fourth wave—are being felt a lot. Despite the call from the authorities to get vaccinated, some citizens are afraid to get vaccinated and others, under the acronym *no-wax*, also violently protest against journalists, scientists and politicians. Therefore, Cosimo Palagiano opined that vaccinations, the only remedy against the pandemic, are slow. In addition, many people did not adopt the recommendations to wear the face masks and adopt the spacing. Many young people, with the excuse of the search for freedom, gather in indoor venues, attracted by the invitations that are exchanged through social media. The biggest problems concern frail people and school pupils.

In case of France, Isabelle Roussel opined that this virus has highlighted the fragility of the country which has been shaken in its certainties. Health is emerging as a priority over economic considerations ‘whatever the cost’. This pandemic has shown that both health crises and ecological crises affect all parts of the country whose political management is complex in a context of uncertainty. Tensions between science and policy have been strong to contain the epidemic as well as possible and to promote a vaccine policy. This pandemic is not a simple crisis; this zoonosis is causing profound changes in the society, in its economy, its healthcare system and its relationship with nature. If barrier gestures and vaccines are emergency measures, in the longer term it is necessary to find the way to build a more resilient society living with the virus rather than fighting against it.

In the chapter on England, Tom Douglass and Michael Calhan examine the social forces shaping the design and delivery of the vaccination programme in England. Looking beyond direct inclusion or exclusion in policy decision-making, we view health and health care as an arena containing several powerful interest groups. Focusing on these different actors, our approach considers the influences, interests and strategies that can work to reshape, constrain, challenge or reject policy and policy decision-making, although actors do also collaborate or develop alliances and allegiances that support and facilitate policy. We analyse these dynamics in the context of the various dimensions of the COVID-19 vaccination programme in England (in relation to supply and manufacturing, regulation, prioritization, vaccine nationalism and vaccine coverage). Overall, we argue that, though there were examples of actors working to challenge or reject policy and decision-making in the development and delivery of the vaccination programme, there were limited impacts on or resulting

changes to policy—particularly where this was counter to the interests of government or the pharmaceutical industry. Additionally, groups have to a greater extent acted and collaborated in a manner that has been supportive and facilitative of policy.

The United Kingdom (UK) has been in the international spotlight from the beginning of the COVID-19 pandemic, experiencing an ostensibly high prevalence of the disease, failing to respond as quickly as other countries with respect to border controls and social distancing measures, but also rolling out one of the most successful vaccine programmes in the world. In this chapter on UK, Sheena Asthana considers the British response to COVID-19 from a welfare regime perspective. Does the UK government's initial resistance to deploying emergency powers, its preference for outsourcing contracts for key COVID services to private providers rather than relying on local and national statutory providers and the fact that the National Health Service (NHS) and social care providers were at considerably reduced capacity following years of economic austerity reflect the fact that the UK is essentially a 'liberal' welfare regime? Or does the remarkable increase in public expenditure (estimated to range from £315 to £410 billion), years of investment in vaccine research and development and the pro-social and solidarity-related behaviours exhibited by the British population speak to a more collective, social democratic welfare regime? The chapter suggests that, in regime terms, the British welfare state is mixed, though the fact that COVID-19 has been experienced unequally in the UK—by socio-economic status, ethnicity, age and disability—is more suggestive of a liberal regime that is willing to tolerate high levels of inequality.

The chapter on Canada by Robin Meadows examines types and rates of vaccination in Canada, as well as the impacts of the COVID-19 pandemic on the healthcare system and the impacts on healthcare workers, including a systematic review of news articles reporting on stress in healthcare workers. Vaccination in Canada began in December 2020, using predominantly the Pfizer-BioNTech Comirnaty vaccine, with more than 60% of the population fully vaccinated by the end of summer in August 2021. In response to the threat of treating COVID-19 patients, surgeries were cancelled, decreasing by 50% during the first wave in March–June 2020 compared to March–June 2019. This has created a backlog of surgeries, diagnostic procedures and other appointments that will need substantially more money or time to clear. A systematic review and several surveys of health professionals revealed that being overworked and understaffed have likely led to increased stress and, for nurses, a desire to leave the profession.

Glen MacDonald and Travis Longcore propound that the second year of the COVID-19 (SARS-CoV-2) pandemic in the USA witnessed the widespread availability of effective vaccines and a new presidential administration promising a more coherent and science-based approach. Despite this, the authors assert that the USA in 2021 also experienced a continued series of waves in infection and mortality, driven in part by the emergence of the more transmittable Delta and Omicron variants. As was the case in 2020, the magnitude of per capita infection and mortality varied substantially between states in 2021. State vaccination rates also showed appreciable geographic variations and are significantly negatively correlated with infection

rates and strongly so with death rates. Wave severity through 2021 differed somewhat across climatic zones, consistent with weather-induced behavioural changes influencing transmission. Political orientation appears to be an important factor contributing to geographic variations in the pandemic. In particular, the percentage of voters who supported the Republican presidential candidate in the 2020 election is strongly negatively correlated with states' vaccination rates and positively correlated with death rates. The political divide on vaccination contributes to interstate geographic differences in the outcomes of the pandemic and poses an ongoing challenge to combating COVID-19 in the USA.

Vaccines have been proven to be an effective public health measure in reducing the morbidity and mortality of many infectious diseases. The reduction in the occurrence of vaccine-preventable illnesses is one of the most noteworthy public health accomplishments of the past 100 years. Research in the USA by Michele Kekeh, Luisa Lucero and Muge Akpınar-Elci indicates that the current COVID-19 vaccines approved by the U.S. Food and Drug Administration are safe and effective; however, many young adults are still unvaccinated or are hesitant to get vaccinated. Many reasons, including myths and disinformation about vaccines, explain their hesitancy towards vaccination. To address COVID-19 vaccine hesitancy, it is crucial to understand what factors play into it and their sources. The Centers for Diseases Control and Prevention has developed strategies to assist public health professionals, community leaders, employers and providers in reducing vaccine hesitancy to help increase vaccine confidence and uptake. Many states have adapted these strategies based on their realities on the ground; however, others have taken unprecedented moves by passing legislation preventing vaccinations of any kind and refusing to apply any recommendations from the federal level, causing conflict regarding vaccines between states and the federal government.

Worldwide vaccination has reduced hospitalization and lethality of COVID-19. However, access to vaccines has not been homogeneous across regions and individual countries have shaped their own strategy for the distribution and application of vaccines. In Mexico, vaccination started in November 2020. This chapter on Mexico by María Eugenia Ibararán, Romeo A., Saldaña-Vázquez and Tamara Pérez-García reviews Mexico's vaccination strategy and its coverage in comparison with other countries and the impact of vaccination on mortality rates. The authors also analyse if vaccination may have been used as a political strategy given its application patterns before two major events, i.e. midterm elections and a public consultation. Finally, the authors evaluate socio-economic variables across states to predict the vaccination coverage state-wise. We found that as of January 2022 almost 60% of Mexicans have been vaccinated. Thus, mortality associated to COVID-19 has reduced compared with the three previous contagion waves. Finally, the socio-economic variable that better explain differences across states in terms of vaccination coverage was the percentage of rural population; that is, vaccination was lower where rural population was the highest. This result goes against the Mexican federal strategy of protecting the most vulnerable regions first, where rural population was the largest.

The objective of the work on Argentina, by Daniel Lipp, was to characterize the collateral effect that the pandemic has had on health systems in Argentina. Changes

in supply and demand in services, especially affected and related to non-COVID-19 situations, were analysed. The impact caused by COVID-19 in infectious and non-infectious disease care was evaluated, staff were surveyed regarding resulting problems in adjacent problems, and the vaccination campaigns carried out in the country were addressed. The purpose of this analysis was to alert health services about the collateral effects derived from the COVID-19 pandemic.

Finally, Brazil was one of the countries with the highest fatality rates, after the USA, during the SARS-CoV-2 pandemic, and this lethality within the country did not occur uniformly. According to Amanda Scofano de Andrade Silva and her colleagues, some areas, such as favelas, which normally already have structural difficulties, have been further damaged during the pandemic. In the city of Rio de Janeiro, there are 453,571 households and 2.2 million residents living in favelas. Even with so many people living in these territories, the production of official data on COVID-19 in the favelas was patchy or inconsistent. Based on this problem, the COVID-19 Unifying Panel in Favelas was created, using different sources to compose its methodology, reaching the number of 159,071 cases and 7,977 deaths in favelas in the city of Rio de Janeiro and some in the Metropolitan Region. These numbers are higher than those of 142 countries, including Denmark, Venezuela and Paraguay. With the advancement of vaccination in Brazil, the numbers of severe cases have decreased, but there is still a long way to go in terms of awareness and data production, especially in favela territories.

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About the Editor



Prof. Rais Akhtar has taught at the Jawaharlal Nehru University, New Delhi, University of Zambia, Lusaka, and the University of Kashmir, Srinagar, J&K. He is the first geographer who published his research in medical geography and climate change and health in national and international journals including the prestigious medical journal *The Lancet*. He has to his credit more than 100 research papers and 20 books published from India and abroad including Greenwood Press, New York, Harwood Academic publisher, London, and Springer. The books entitled *Health and Disease in Tropical Africa: Medical and Geographical Viewpoints* (London, 1987), *Health Care Patterns and Planning in Developing Countries* (Greenwood Press, New York, 1990), *Malaria in South Asia* (Springer, 2010), *Climate Change and Human Health Scenario in South and Southeast Asia* (Springer, 2016), *Climate Change and Air Pollution* (Springer, 2018), *Extreme Weather Events and Human Health* (Springer, 2020) and *Coronavirus (COVID-19) Outbreaks, Environment and Human Behaviour* (Springer, 2021).

International Fellowships

He was awarded a number of international fellowships including Leverhulme Overseas Visiting Fellow (University of Liverpool), Henry Chapman Fellow University of London, Commonwealth Secretariat Fellowship, Institute of Commonwealth Studies, London, Visiting Fellow, University of Sussex and London School of Hygiene and Tropical Medicine, Royal Society short Visiting Fellowship, University

of Oxford, Visiting Professor, University of Paris, Nanterre, Paris-10, Visiting Fellowship, Free University of Brussels, Belgium, French Government Visiting Fellowship, MSH Visiting Fellow, Paris, and Visiting Fellow Welcome Trust, London, and Visiting Lecturer, University of Akron, USA.

Lecture Visit Abroad

He delivered invited lectures in more than 55 universities, geography departments and medical institutes globally including, in the USA, Japan, Hong Kong, The United Kingdom, Belgium, France and Italy. World famous medical institutes where he lectured include Johns Hopkins University School of Hygiene, Baltimore, School of Public Health, Honolulu, Hawaii, London School of Hygiene and Tropical Medicine, Liverpool School of Tropical Medicine, and Institute of Medical Sciences and Hospital, Bologna, Institute of Pathology, University of Pisa, Pisa, Institutes of Hygiene Universities of Camerino and Academy of Sciences, Perugia, Italy, Institute of Hygiene, University of Bonn, Germany, Nuffield Institute For Health, University of Leeds, UK, and National Cheng Kung University Medical College, Tainan, Taiwan. He was invited to lecture at Bologna Hospital, Italy twice in 1980 and again in 1987.

IPCC Lead Author

He is the only Geographer from India who was Lead Author on the Third and Fourth Assessment Reports of Intergovernmental Panel on Climate Change (IPCC) during 1999–2007. In the year 2007, IPCC shared Nobel Peace Prize. He is a recipient of Nobel Prize Memento. Prof. Akhtar was awarded ICSSR National Fellowship in 2007, and he is first Geographer who was awarded CSIR Emeritus Scientist fellowship in 2009 and only Geographer elected as Fellow (Corresponding Member) of Italian Geographical Society, Rome. He is one of the three Indians (including Prof. Goverdhan Mehta former IISc Director, elected Fellow of Royal Society of Overseas Sciences, Brussels (2003), and he is also Fellow of Royal Geographical Society, London (1981).

Government of India Assignments

He was Member, Ministry of Health and Family Welfare/Planning commission's Working Groups on

Population Projections, Health and Family Planning and on communicable Diseases, Government of India, New Delhi, 1988–1989. His suggestion on the need for locational healthcare planning was incorporated in the Ministry of Health and Family Welfare/Planning Commission's Eight Five-Year Plan Document. He was also nominated by the Ministry of Health and Family Welfare, Government of India, on the Expert Panel for the preparation of Population Paper for the Cairo International Conference on Population, held in 1993. He was also nominated in January, 2016, as Expert on the National Expert Group on Climate Change and Health, Ministry of Health and Family Welfare, Government of India, New Delhi.

Resurgence COVID-19 in Indonesia: Response to the Critical Waves of Pandemic



Budi Haryanto , Henry Setiawan, Rita Kusriastuti, and Ririh Yudhastuti

Abstract Indonesia has experienced the third wave of the COVID-19 pandemic. The number of people who have been confirmed positive has now approached 5,505,000 with the number of deaths approaching 148,000 people per February 26, 2022. About 52% out of more than 208 million targeted people had completed the 2nd vaccination. Our paper aims to provide detailed reporting and analyses of the present rapid responses to COVID-19 up to the end of February 2022 in Indonesia. We particularly highlight responses taken by the governments, non-government organizations, and the community. We outline gaps and limitations of Indonesia's responses to the development of the COVID-19 pandemic and the success stories to overcoming it. We present some strategies and recommendations toward more rapid, effective, and comprehensive current responses as well as for post-epidemic.

Keywords Indonesia COVID-19 · COVID-19 waves · Vaccination · Strategies · Live with COVID-19

Current Situation of COVID-19 in Indonesia

Indonesia, among other countries that are mostly experienced with the fourth, fifth, sixth, and even seventh waves, at the nearly two years since the discovery of the COVID-19 case in March 2020. Nowadays, Indonesia has just experienced the third

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wave of the pandemic, and it seems just passing the peak with its number of daily-confirmed cases' range of 45,000 to 60,000 out of more than 276 million population. The peak of the 1st wave in Indonesia occurred on January 31, 2021, with the number of daily cases reaching 12,721 positive cases (46.03 per million people), which then gradually decreased to about 4500 positive cases per day on May 19, 2021 (12.87 per million people). It was reported that since June 19, 2021, there was a spike in daily positive cases which increased rapidly to reach more than 60,000 positive cases per day (181.03 per million people) in just one month, before then gradually decreasing up to less than 200 cases per day (0.38 per million people). Among ASEAN countries, Indonesia now has experienced 3 waves COVID-19 spike as well as Singapore and Malaysia. Meanwhile, in global, the USA has experienced 5–6 waves, and the UK experienced 7th wave (Fig. 1). It is interesting to observe the situation occurred when daily cases increased dramatically from June 2021 to the peak of the second wave in July 2021 and the third wave in January to February 2022. Then, what has been done by Indonesia to stem the increase in daily cases? Likewise, how can government maintain a low number of daily positive cases at a relatively low level? How does it relate to vaccination strategy and outcomes? This paper provides Indonesia's response in overcoming and controlling the COVID-19 pandemic nationally.

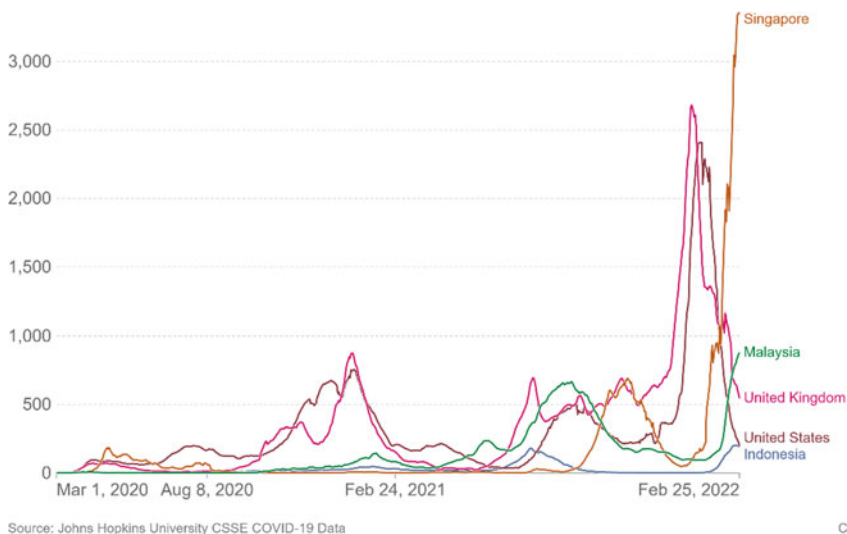


Fig. 1 Experience of Indonesia's COVID-19 pandemic waves among several countries per February 26, 2022

Social and Cultural Impacts

It was reported that there were four provinces consistently as the largest contributors to the spike in national COVID-19 cases namely DKI Jakarta, West Java, Central Java, and East Java both in the first and second waves of the pandemic in Indonesia. The National COVID-19 Task Force noted that the distribution of areas that fall into the red zone category or areas with a high risk of COVID-19 climb up very rapidly to 60 districts/cities in the second wave on 27 June 2021. However, after 15 weeks of Public Activity Restriction (PAR or *PPKM*, *Pemberlakuan Pembatasan Kegiatan Masyarakat*) implementation since the first peak, the cases decrease up to 244%. It gave a great successful achievement because in the beginning *PPKM* is targeted to decrease confirmed cases by below 10,000 cases per day.

A study on socio-cultural impacts of COVID-19 pandemic among population during the *PPKM* implementation was conducted in East Java province. It includes students, adults/parents, local community, government, and health workers. It was found that mostly negative impacts socio-cultural occurred among the population. The problems faced by children are as follows: limitations of mastery of information technology experienced of online schooling; not all children have adequate facilities and infrastructure to support the online learning process such as not having a smartphone and Internet access; the level of stress or psychological disorders of children increases due to lack of understanding of online learning methods, learning processes that are considered difficult, tasks that accumulate, difficulties in accessing assigned tasks; and the process of social interaction with friends becomes more limited and even tends not to occur because of the prohibition to go to school face-to-face. The social impacts on adults/parents are as follows: an increase in the number of unemployed due to the enactment of termination by factories and companies (54% male and 56% female workers); many parents complain the online learning which is almost 80% of students' tasks need the parents' supervision especially among primary school children; the divorce rate is increasing at least 2 thousand divorce cases in City of Surabaya due to economic problems; the lack of social interaction between communities. The cultural impacts of local community are as follows: changing the way of teaching and learning to online by utilizing various social media applications; changing of conventional business dominantly online shopping especially when the closure of shops or cafes is enforced; changing of gatherings to online contracts even a wedding reception; panic buying and anxiety experienced due to fear the spread of COVID-19 transmission includes in providing medical devices such as body temperature detectors, masks, and COVID test kits; and decreasing level of public consumption either due to a lack of income to meet daily needs or as a precautionary measure of food crisis. Socio-cultural impacts on the Government are as follows: changing the way of works which is more limited time and in-person face-to-face communication; increasing stress levels when developing new policies and implementing it right away; extra works to handle the emergence of hoax news or disinformation; generating a good response to public opinions regarding the distrust to the government policy; and establishing of a public service institution to assist

the community in dealing with various complaints or problems caused by pandemic. Socio-cultural impacts for health workers are as follows: difficulty to have social relations with family due to having more potential risk to transmit the virus from the health services; deal with local community stigma that often triggers isolation or rejection to communicate to health workers; and changing of work patterns with longer working hours (Anung, 2020).

Indonesia Response and Challenges

Just after experiencing the sharply increased confirmed COVID-19 positive cases due to the fast-spreading Delta variant in the second wave across the country, Government of Indonesia continues to continuing efforts to handle COVID-19 cases to prevent another spike.

Since the beginning of November 2021 to the end of January 2022, it has shown a gentle slope in Indonesia's cumulative confirmed COVID-19 cases compared to ASEAN countries, except Cambodia, which means that the daily increase in new cases is relatively very small. The Philippines has shown the same trend started early December 2021, meanwhile, a large daily increase in new cases is still occurring in Vietnam, followed by Malaysia, Thailand and Singapore, respectively (Fig. 2). However, Indonesia cannot avoid the spread of Omicron variant, as already occurred worldwide, since the end of January. The sharply increased daily new cases of COVID-19 in Indonesia took only about two weeks to pass the peak number of the second wave cases, 64,718 cases at February 16, 2022.

In the global, Indonesia's daily new confirmed COVID-19 cases per million people ranked at 177 (0.72 per million) out of all exposed countries per December 13, 2021,

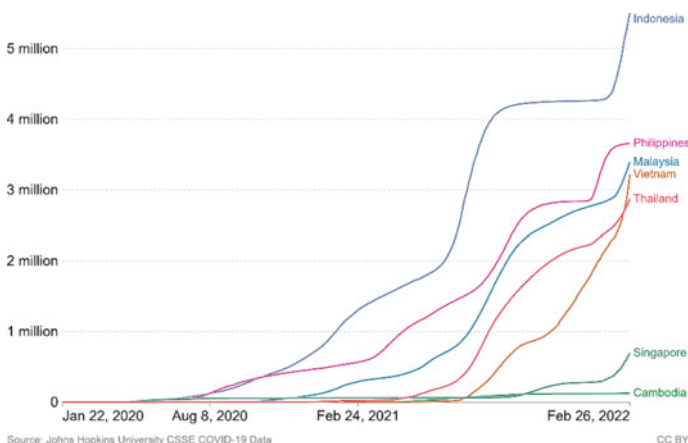


Fig. 2 The slope of cumulative confirmed COVID-19 cases in ASEAN countries per February 26, 2022

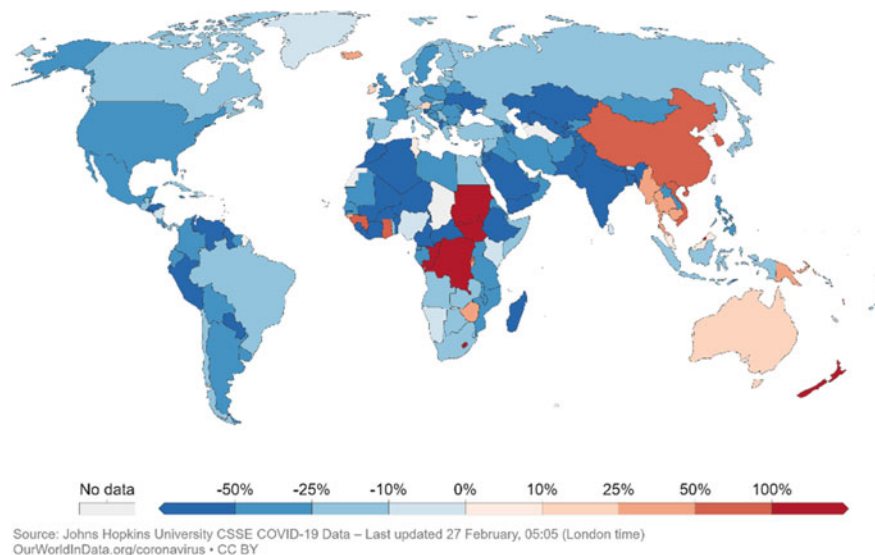


Fig. 3 Week-by-week change in confirmed COVID-19 cases per February 26, 2022

a far decrease compared to the previous few months, which was in the order of biggest 20–30. Week-by-week change in confirmed COVID-19 cases in Indonesia, the weekly growth rate confirmed on any given date measures the percentage change in the number of new cases over the last seven days relative to the number in the previous seven days, December 13, 2021, is -15.8% , i.e., a change of about 16% continues to decrease every week. This shows the success of efforts to control second wave of COVID-19 in Indonesia (Fig. 3).

To curtail the spread of COVID-19 cases from getting more massive, considering that the Delta variant is a variant of COVID-19 that is very easily transmitted, the Government implements *PPKM* which is also applied periodically, especially in red zone areas with a high number of COVID-19 cases, especially in Java and Bali since July 3, 2021. The earliest iteration of a public activity restriction was named the *PSBB* (large-scale social restriction) implemented on April 17, 2020. On February 2021, the government introduced another name for its restriction with slightly different enforcements that came in the Micro *PPKM* and lastly the Emergency *PPKM* which is meant to reduce the growing number of COVID-19 cases following the Eid al-Fitr holidays and mass-exodus tradition. Micro approach aims to apply *PPKM*, starting from the levels of village and neighborhood (*RT* and *RW*), and by involving the central task force until the smallest units of the COVID-19 task force. Indonesian government has classified regions in the country into four levels—with level 1 being the safest and level 4 showing the highest levels of transmission. Several directives regarding *PPKM* had been published by Ministry of Home Affairs from June to February 2022 started with number 22/21, 47/21, 48/21, and many others and the latest is number 13/22.

PPKM Level 4 is enacted when there are 30 cases of coronavirus hospitalization out of 100 thousand people within one week, 5 deaths out of 100 thousand, and 150 active cases for every 100 thousand within two weeks. This is in accordance with the World Health Organization (WHO) guidelines that 50 confirmed cases daily per 100,000 people would be classified as level 4. People's movements are restricted according to the sectors they work in, and only employees in critical sectors such as energy and health are allowed to go back to the workplace. Traditional markets that sell daily basic necessities may be open as usual under strict health protocols. Traditional markets that sell other than daily basic necessities may be open with a maximum capacity of 50% until 3 p.m., and further arrangements will be made by the local government. Street vendors, grocery stores, mobile phone voucher agents or outlets, barbershops, laundromats, hawkers, small automotive repair shops, car wash, and similar small businesses are allowed to open under strict health protocols until 9 p.m. Further arrangements will also be made by the local governments. That food stalls, street vendors, hawkers, and other similar outlets that are operating outdoors or in an open space can stay open for business until 8 p.m., with each patron allowed to visit for a maximum of 20 min.

PPKM Level 3 is enacted when there are 10–30 cases of coronavirus hospitalization out of 100 thousand people within one week, 2–5 deaths out of 100 thousand, and 50–100 active cases for every 100 thousand within one week. Export-oriented industries are allowed to open in shifts, and each can operate with a maximum of 50% capacity under strict health protocols. If there are two shifts, it can operate 100% in the production facility. Malls in cities and regencies can also operate with a maximum capacity of 25% until 5 p.m. Furthermore, places of worship in cities and regencies can also open with a maximum capacity of 25% or a maximum of 20 people.

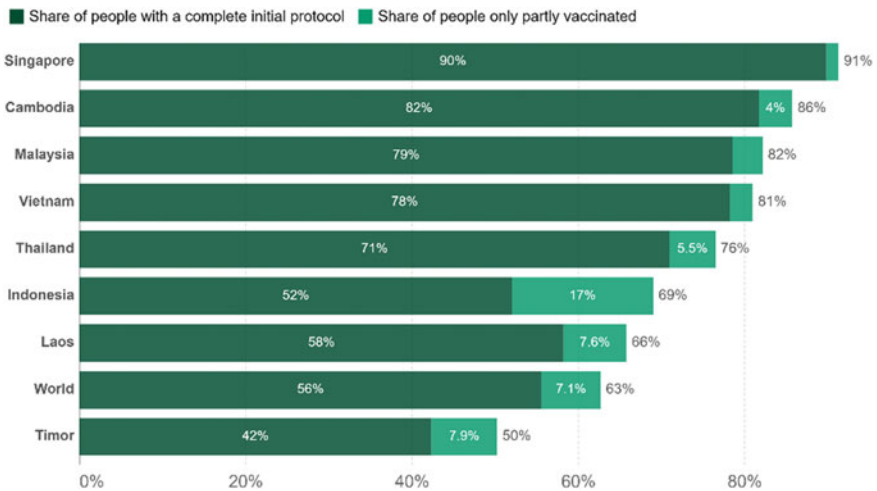
There are several additional restrictions to some sectors regarding capacity for the area with the rule of *PPKM* Level 2. In the non-essential sector, the capacity in offices has been reduced from 75 to 50%. Physical attendance in the essential sector, which includes the financial sector and banks, applied a maximum of 75%. The 75% capacity is also applied to supermarkets, traditional markets, hypermarkets, and grocery stores. People's markets selling non-essential commodities have been allowed to operate with a maximum capacity of 75%. Food stalls, small restaurants, street vendors, and businesses that operate on streets have been permitted to remain open until 9 p.m., and their capacity has been capped at 50%. Restaurants and cafes, indoors or outdoors, and malls have been allowed to stay open until 9 p.m. at the latest with 50% capacity.

Under the *PPKM* Level 1 rule, malls are permitted to accommodate 100% of their total capacity but under strict health protocols and must already be vaccinated. The instructions stated the aforementioned locations are permitted to open until 10 p.m. under strict health protocols. However, there will be no extended operational hours for restaurants or cafes that only start to open in the evening, take example of a "bar and resto" establishment that starts opening at 6 p.m. and closes at 12 a.m., these types of business are still limited to 10 p.m. under 75% capacity.

Vaccination Program (Progress and Distribution)

Believing that vaccination has a central role in handling COVID-19 and recovering the national economy, the government is now racing to roll out national vaccination programs targeted to reach herd immunity immediately. At the same time, the government also continues to boost 3 T (Tracing, Testing, Treatment) followed by urging people to always do disciplined health protocols (wearing masks, washing hands, and maintaining social distancing). The health program focuses on diagnostic testing and case tracing, costs and accommodation for treating COVID-19 patients, as well as other healthcare programs including the implementation of the Vaccination Program. Currently, Indonesia’s COVID-19 vaccination rollout has hit around 108 million people. On average, the Government does 900,000 vaccinations every day in the period from June 26 to July 3, 2021. About 52% out of more than 208 million targeted people had completed the 2nd vaccination, and 69% people had got the 1st vaccination. Among other ASEAN countries, this vaccination achievement is quite low as shown in Fig. 4 where Singapore is as the top (91%) followed by Cambodia (86%), Malaysia (82%), Vietnam (81%), Thailand (76%), and then Indonesia (69%).

In accelerating COVID-19 vaccination, the government has been working closely with multiple stakeholders, including the private sector. On the other hand, the Government is also working with state-owned pharmaceutical company, Biofarma, to develop an Indonesian-made vaccine, named “Red and White Vaccine.” Indonesian President Joko Widodo kicked off a mass COVID vaccination, in program by getting the country’s first shot of China’s Sinovac Biotech, in 21 January 2021. President’s instruction on COVID-19 Vaccination program included: vaccine for



Source: Official data collated by Our World in Data
 Note: Alternative definitions of a full vaccination, e.g. having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries. CC BY

Fig. 4 People vaccinated against COVID-19 cases in ASEAN countries per February 26, 2022

Indonesia population is provided by Indonesia Government; health workers and front-lines to be prioritized vaccination program in 2021 budgeting year; encourage public to continue followed the health protocols, such as wearing masks, maintaining physical distancing, and hand washing. Vaccination program is targeted to be finished in 15 months, from January 2021 to March 2022 with the stage as follows: Stage 1, January to April 2021 for 1.4 million health personnel throughout Indonesia, 17.4 million public service sector groups (susceptible to infection) and government employees, 21.5 million of population 60 years old and above; and Stage 2, April 2021 to March 2022, 63.9 million population in high risk transmitted areas, and 77.4 million population based on cluster and availability of vaccine. Vaccination is carried out at an early stage for ages 18–59 years to control co-morbidity.

The Indonesian government is determined to administer the vaccines to 208,265,720 citizens. The task force, however, encourages all vaccinated people to remain disciplined in complying with the health protocols in an effort to prevent virus transmission. To support the implementation of COVID-19 immunization services, the Ministry of Health uses the same distribution facility system as the routine immunization services that are already running where the provision of vaccines and immunization logistics (such as Auto Disable Syringe—ADS and Safety Box) which then distributed to the Provincial Health Office vaccine warehouse, then proceed to the District/City Health Office and lastly forwarded to the Sub-district Public Health Services (PHC or *PHC*), according to the availability of vaccines and the capacity of the vaccine storage refrigerator facilities at the service level. To increase the service network, PHC can collaborate with other health service facilities in their working area (government hospitals, private hospitals, clinics, etc.). The provision of COVID-19 immunization is carried out by implementing the health protocol at: (1) PHC and other health facilities with immunization services (hospitals, clinics) and have been registered by the local Health Office (District Health Office). It involves more than 10 thousand health centers, 2877 hospitals and clinics; and (2) 49 Port Health Office (Kantor Kesehatan Pelabuhan) and health service facilities in their working area. More than 90% of PHC have at least one good condition cold chain which is confirmed by WHO prequalification standards. The cold chain capacity to store vaccines for routine immunization services requires 35% of the volume of the vaccine refrigerator so that there is still 65% of the volume that can still be filled with the COVID-19 vaccine. The addition of the vaccine refrigerator will be increased in government health service facilities (government hospitals/clinics) in order to increase access and service coverage. The government also provides online registration through *Peduli Lindungi* application for people to register first and then get vaccination schedule in health centers or appointed vaccination locations, and electronic ticket. The number of Indonesian people who have received the complete COVID-19 vaccination dosages continues to increase. As of Friday, February 26, 2022, about 108.1 million people (52%) had got the second dose of vaccination out of 143.5 million people (69%) with the first dose of the vaccine. They are 52% and 69% of the targeted population to be vaccinated, respectively. Additionally, there were 3.6% targeted people have got their booster vaccine.

The Ministry of Health developed the National COVID-19 vaccination strategic implementation roadmap in 3 phases: (1) Preparation phase includes: (a) Conducting a public perception survey for the COVID-19 vaccine in September 2020 which more than 115 thousand people involved. Resulting 70% people aware of government's COVID-19 vaccination plan and nearly 65% accept the vaccination. About 27% people still in hesitancy or doubted and 7% reject it; and (b) Assessing Cold Chain readiness among all levels of health services that resulting the capacity is sufficient to accommodate the storage of COVID-19 vaccines without disrupting the distribution of vaccines for routine immunization services. (2) Implementation phase includes to provide cold chain maintaining vaccine quality, to manage vaccine distribution process and logistics by following the existing system of routine immunization, to implement the existing system for waste management, and to operate an integrated information system (One Data Vaccination Information System for COVID-19) for registration and recording the vaccination results. (3) Monitoring and Evaluation phase include to report the COVID-19 vaccination coverage in real time, to monitor pre-post vaccination implementation, to monitor Adverse Event Following of Immunization (AEIF), to do Post Marketing Surveillance as part of vaccine safety surveillance, to conduct a coverage survey to validate the coverage report data and the impact on surveillance, and to conduct Cost-Effective Analysis (CEA) is needed to determine the effectiveness of the COVID-19 vaccination intervention. The type of vaccines administered in Indonesia is Sinovac, Novavax, COVAX/GAVI, AstraZeneca, Moderna, and Pfizer. At recent situation, the vaccination is given to children at 12 years old above and to pregnant women (Table 1; Fig. 5).

Indonesia Strategy to Enter the Endemic Stage COVID-19

Indonesia will enforce tightened COVID-19 restrictions soon. The new measures, which forbid large gatherings and requires venues to operate at reduced capacity with fewer hours, are set to expire on the 2nd of January 2022. They come amid concerns that mass gatherings during the Christmas and New Year's Period could increase the spread of the virus. Additionally, the Omicron variant was detected in the country on December 18. Daily COVID-19 case numbers in Indonesia have remained relatively low compared to a peak of more than 350,000 cases between July 5 and 12. However, vaccination rates remain low, with 49.5% of the population fully vaccinated and nearly 62% with one shot. Likewise, rolling out the vaccine has been fraught and is not likely to pick up significant speed in the short term. Provided no surge in case numbers, the restrictions are likely to expire without extension. The Indonesian government is however likely to maintain baseline restrictions to curb the spread of the virus. Additionally, Indonesia may tighten rules for the unvaccinated to incentivize them to get vaccinated. In the medium-term, the Omicron variant is likely to take hold in the country, leading to harsher restrictions. Four steps of strategy were developed as the followings: the first step is to achieve a high vaccination rate among

Table 1 Indonesia COVID-19 vaccination by group per February 28, 2022

Vaccination numbers by group							
Group	Target	First dose		Second dose		Third dose	
		Total	%	Total	%	Total	%
Health professionals	1,468,764	2,010,906	136.91	1,944,330	132.38	1,380,690	94
Public officers	17,327,167	19,362,047	111.74	17,464,016	100.79	636,240	3.67
Elderlies	21,553,118	16,191,283	75.12	11,626,301	53.94	1,382,343	6.41
Susceptible and general public	141,211,181	108,334,262	76.72	81,184,394	57.49	6,764,389	4.79
Teenagers	26,705,490	24,682,755	92.43	20,064,793	75.13	23,751	0.09
Children	N/A	19,102,237	N/A	10,957,207	N/A	2	N/A
Private vaccinations	N/A	1,286,109	N/A	1,217,715	N/A	90	N/A
Total	208,265,720	190,969,599	91.7	144,458,756	69.36	10,187,505	4.89

1. Elderlies are defined as anyone ages 60 or above
 2. Mostly include people age 18–59
 3. Teenagers are defined as anyone ages 12–17
 4. Children are defined as anyone ages 6–11
 5. Also known as the Gotong Royong vaccination program. Through this program, the government would seek help from private sectors and would be paid by the companies instead of individually
- Source Wikipedia 28 February 2022, 18:00 WIB

CAPACITY AND MANAGEMENT RESOURCES FOR COVID-19 VACCINATION

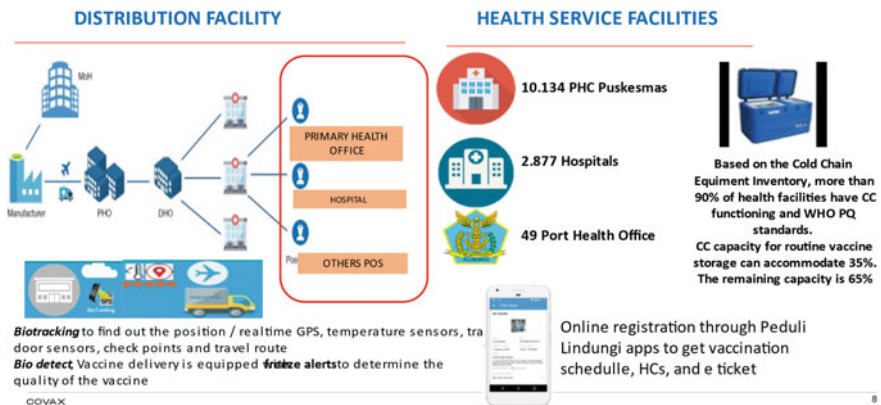


Fig. 5 Distribution facilities and Health Services facilities

vulnerable groups, such as the elderly and immunocompromised people who have a higher probability of getting infected and succumbing to the virus; the second step is to achieve nationwide herd immunity by expediting COVID-19 vaccination efforts so that 70% of the Indonesian population receives the first dose and 60% of residents complete their second jab soon; the third step is to ensure medicine and vaccine availability by encouraging research and development for domestic production of COVID-19 medicines and vaccines; and the fourth step is to enhance healthcare facilities and health workers' competency.

It has been developed as well the Indonesia strategy to live with COVID-19, they are: to balance healthy living and economic activities. In its implementation, people must be disciplined in complying with the predetermined health protocols; to generate collaboration with several associations to start compiling information technology-based health protocols. The PeduliLindungi app is used throughout the country to help implement the tech-based health orders; to strengthen targeted and non-mass testing and tracing. Both will only be applied to those who really need it, or what is known as epidemiological testing, not screening.

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