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Observations and Conclusion

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COVID-19 has been a humbling experience. Many experts from around the world have written about the large number of lessons that could be drawn from the pandemic. The most obvious overarching lesson is that authorities around the world need to do the right things and do them right very quickly whenever there is an infectious disease outbreak. Speed is important because of the mathematics of exponential spread.

COVID-19 was a shock to the world, but a pandemic should not have been a surprise. Many countries had pandemic plans on the shelf—the risk of a pandemic is a 'known known'—but having plans is one thing, rolling them out successfully is another matter altogether.

A new coronavirus, named SARS-CoV-2, was first identified in China at the very end of 2019 and by 20 January 2020, China was going all-out to fight this highly transmissible disease. A number of countries and jurisdictions took early effective action by closing borders and imposing testing, tracing, and various social distancing restrictions to cut the spread of the virus. Many others did not. Once the World Health Organization (WHO) declared COVID-19 a pandemic in mid-March 2020, communities around the world went into lockdowns with enormous social and economic consequences. The speed and magnitude of the 'big pause' were disconcerting—there was nothing like it in living memory.

COVID-19 became more than a public health threat—it was an economic threat, as most people became homebound; and a social threat, as family life and many work and social activities had to adapt, in-person events were cancelled, and social gatherings discouraged or even disallowed. Schools were closed for an extended period and children all around the world lost many months of education. Tensions increased, particularly in places where the population was divided between those who stressed protecting the society from the pandemic (by lockdowns and other stringent public health measures), and those stressing individual freedom. COVID-19 was a political threat too. The emergence of a new disease accompanied by high fatalities and deaths, the scale and speed of its impact, and the myriad terrifying unfolding outcomes in real time tested every leader and health system—many failed in controlling transmission when

the opportunity was there in the early days. Cases and fatalities continued to mount. Governments had to step in with massive subsidies to help people through tough times as economies collapsed. COVID-19 went into a second year and new variants emerged, creating renewed havoc. Vaccines became available at the start of the second year in richer economies and were crucial to bringing about a certain level of immunity and reducing mortality rates as public health measures were progressively relaxed. The pandemic recovery was interrupted by subvariants of Omicron in the third year of the pandemic in 2022 that continued to disrupt lives, business, travel, and global supply chains.

This concluding chapter provides insights from the authors of this book. While some of the chapters contain specific recommendations relevant to the topic under discussion, the purpose of this chapter is to pull key general insights together. COVID-19 was and remains a deeply personal experience. We all know people whose lives were disrupted by the pandemic. Indeed, our own lives had been disrupted.

Choices Are Political

The COVID-19 pandemic provided examples from around the world of what to do and what not to do. Chapters 9 to 12 show the diversity of the responses to the pandemic in Greater China (Mainland China, Hong Kong, Macao, and Taiwan), the United States, Europe, and the United Kingdom. Those chapters seek to explain through the lens of good governance why various countries reacted so differently. Chapter 7 looks at the socio-economic consequences of COVID-19—the pandemic was extremely expensive for the world.

A number of factors were at play: firstly, the concept of the 'social contract' had a role in the governance practices of a jurisdiction. An element of good governance is that governments are supposed to be at least somewhat prepared for known risks ahead of time. People will often accept constraints and inconveniences for the greater good, especially in emergencies. Chapter 6 provides a discussion about the concept of the social contract and its relevance in good governance and political decision-making (although it is unclear that at this stage what contribution the pandemic may make to the concept of the social contract), while Chapters 9 to 12 discuss how it manifested itself in various jurisdictions in light of COVID-19.

Second, political trust was important too (see Chapter 1). Those societies where the people trusted the government's performance and/or trusted each other to act in the public interest were more willing to abide by restrictions in crises. Research showed the level of political trust was a useful indicator of a successful response to COVID-19. On the whole, the Greater China and Asia-Pacific jurisdictions had higher political trust in governments and/or within society. In Europe, some countries had higher political trust than others and those with higher trust tended to do better in their pandemic response, as government and citizens were better aligned. Societies with low political trust were more polarised and less accepting of pandemic restrictions. The lesson here

is political and socio-cultural systems that encourage the reduction of division would help in emergencies, such as dealing with a pandemic.

Third, leaders and governments have to make political choices when facing several waves of outbreaks with respect to COVID-19. The quality of leadership affected the response. Chapter 5 shows transmission of a disease needs to be contained quickly; otherwise, exponential growth can become unstoppable. Reducing the rate of spread at an earlier point in an epidemic cut the incidence of the disease dramatically. Those who acted early reaped the benefits in both public health and socio-economic terms. Staying vigilant for over three years tested every jurisdiction and its leaders. Chapter 7 notes rich economies threw money at the problem to provide massive subsidies that often did not reach those most in need. Poor economies had few options.

Preparedness vs. Leadership

The quality of leadership and governance practices at the time of crisis made the difference. COVID-19 showed a new infectious disease outbreak requires the immediate application of very tough actions from governments. Acting decisively and mobilising available resources, even in lower-income economies and irrespective of the type of political system, made a measurable difference in terms of infections and deaths.

The Global Health Security Index 2019 (GHSI 2019), published on the eve of the COVID-19 outbreak, noted that the world as a whole was poorly prepared (see Chapter 1). According to its ranking method, the United States and the United Kingdom came out as the top two countries with respect to the potential they had to deal with a pandemic. That potential may have been there, but preparedness simulations carried out by those two countries in recent years showed how unprepared they were. The United Kingdom's *Exercise Cygnus* in 2016, and America's *Crimson Contagion* in 2019, identified serious failures in many areas of pandemic preparedness. The United States and the United Kingdom turned out to be among the worst performers in the first two years of the pandemic. The GHSI continued to use the same assessment method after COVID-19 had already emerged for its 2021 report (GHSI 2021). The United States remained in first place, while the United Kingdom dropped to seventh place, still ranking ahead of others who did very much better. The countries that did well were in the Greater China and Asia-Pacific regions of diverse political systems and cultures, encompassing rich and middle- and lower-income countries. The designers of the GHSI acknowledged in GHSI 2019 and GHSI 2021 that their ranking systems could not assess the quality of leadership needed in times of emergency, which is understandable for such an index—but going forward, it may be better if the GHSI did not rank countries against each other and focused instead on how a country progresses without reference to others. High scores may give leaders an unrealistic sense of confidence.

Case for a Strong Initial Reaction

During the SARS outbreak in 2003, Dr Henk Bekedam, then the director of Health Sector Development, WHO, Western Pacific Regional Office, made it clear that to fight an infectious disease outbreak, one cannot be just 100 per cent ready, one needs to be 300 per cent ready. COVID-19 reminded us that with every outbreak, it is challenging to have a fully accurate risk assessment at the start of the outbreak. It is, therefore, prudent to act quickly and be ready for the worst—that is, the disease could be a highly transmissible and virulent disease. However, governments may not want people to panic and there can be resistance to applying tough restrictions in the early stages of a new outbreak, as the disease may not turn out to be of great concern. Stringent actions may turn out to be an overreaction. This is a universal phenomenon albeit with different cultural manifestations. The problem is no one knows at the start of an outbreak what the disease would be like. If COVID-19 taught us anything, it is that we do need to be prepared to react strongly.

Therefore, preparedness should surely mean having the governance capacity and capability to react aggressively at the beginning of an outbreak. Closing borders or reducing travel intensity initially can buy time for a more complete risk assessment. Other preparedness measures that would be important in the early days of the next pandemic—if not before—include building capacity in advance of an outbreak for testing and tracing, having sufficient personal protective equipment (PPE) for frontline health workers, and providing consistent messaging that gives information that helps people to stay calm because they are informed about what to expect and do rather than to tell people they don't need to worry—'it's just the flu'. The COVID-19 experience showed many examples at the start of the outbreak of what to do and what to avoid in diverse political systems and richer and poorer economies. Leaders in Greater China, Singapore, South Korea, Thailand, Vietnam, Australia, and New Zealand provided good examples of acting quickly and messaging clearly, while leaders in the United States and the United Kingdom took considerable time to acknowledge the seriousness of the outbreak and acted late.

Perhaps something similar to extreme weather warning systems could be developed for infectious diseases, where people become familiar with what to do as signals are issued. Hong Kong's typhoon warning system is an example of a successful, long-standing system where residents understand what to do as higher signals are posted alongside well-practised explanations about the likely trajectory of the typhoon, and what people should be aware of and be ready for. The Hong Kong signalling system is designed by meteorological experts and signals are raised in accordance with set conditions and not by politicians. Once a signal is posted, institutions and the public know what they need to do. Obviously, an infectious disease outbreak communication system would have to be designed differently, but once there is a system, people can get used to it and a standardised governance system can be developed. The advantage of such a system is that it is managed by subject experts.

Bringing the COVID-19 Pandemic to an End

As noted in Chapter 4, investing in COVID-19 vaccines and antiviral drugs was worthwhile. Having effective vaccines and drugs that became available in the second year of the pandemic meant that public health measures could be used more sparingly. Many higher-income countries achieved high levels of vaccination uptake in adults by early 2022, with third and even fourth and fifth doses being offered to maintain those high levels of protection. When breakthrough infections do occur in vaccinated individuals, they tend to be mild, and the high levels of population immunity conferred by vaccinations and also natural infections in most parts of the world meant that COVID-19 posed much less of a threat from 2022 onwards than it did earlier in the pandemic. However, when the Omicron variant emerged in late 2021, although it was seen as a milder variant, its increased rate of transmission and ability to evade prior immunity led to many infections occurring in a very short space of time. Even though each of those infections was—on average—milder, there were so many infections that the number of serious cases requiring hospital care at the epidemic peak still reached or exceeded levels in previous epidemics in some locations.

As time goes by, ensuring that vaccine coverage remains high will be a priority. One of the challenges for governments is to get the most vulnerable groups vaccinated early—this was far from easy in the light of the vaccine hesitancy experienced in many jurisdictions. In economies where vaccines are available, instead of monitoring the proportion of the population with two doses, three doses, or four doses, attention might instead switch to monitoring the proportion of older adults who have had a vaccination dose within say the last six months and encouraging regular booster doses to keep immunity at higher levels. It is likely that COVID-19 will continue to circulate; what is less clear is how frequently new variants or subvariants will emerge. We cannot rule out the possibility that some public health measures will have to be re-instituted to deal with resurgences in COVID-19 transmission perhaps in upcoming winters in temperate locations. In other words, in fighting infectious diseases, vaccines are not necessarily the silver bullet—they become part of a package of political, social, and economic measures that are needed in the arsenal.

Mathematics for Policy-makers

Chapter 5 provides a thorough discussion of the mathematics of infectious diseases, including the use of mathematical epidemiological models to predict the effects of alternative policies to contain the spread of the disease. In the early stage of an outbreak, reducing the rate of spread cuts the number of cases, which lowers the pressure on hospitals and reduces fatalities—and also reduces adverse economic impacts. In the later stages of the epidemic, especially if a vaccine or a medication is developed that reduces infectiousness, the models forecast a slowdown in growth and eventually dwindling numbers of cases. In this phase, the same models help to decide which segment of

the population should be vaccinated first, where hospital facilities, healthcare workers, and medical equipment need to be increased (or can be decreased) and other actions.

Even more important than deploying mathematical models during an epidemic should be deploying them before the next epidemic. Running mathematical models without the stress of having to keep up with a concurrent pandemic and benefiting from the robust data sets obtained from the last pandemic and those before it, should enable the models to be more accurate than they could be while a pandemic is raging. Alternative public policy scenarios can be tested, including branching decision processes constructed in a kind of a flow chart, in which a public policy is tried early when disease parameters are not well known yet, and responses both from the disease and the public can be gauged—and alternative paths of the branching process taken depending on the response of the disease and the public. Giving as much attention to this process in advance of the next pandemic as was paid to it during the last one should enable the world to be much better prepared for the next one.

Managing PPE Supplies and Emergency Products

Chapter 8 emphasises the vital importance of having adequate PPE supplies for health workers during a pandemic as a matter of good governance. If health workers are not adequately protected, it can lead to the breakdown of the healthcare system at a time of massive demand. The authors used the United States, the world's richest economy, for their investigation, which holds a lesson for many other economies, especially those that do not produce PPE domestically or have little production capacity to do so. While the chapter focuses on PPE, the same could be said for other products vital in health emergencies.

Good governance in public health security must include policies that identify the range of goods that are required for a pandemic because that is when there is massive global demand for the same goods at the same time. Therefore, having some capacity for domestic production that could be ramped up quickly represents good governance. Hence, policies are needed for governments to work with reliable domestic producers even if they are of higher cost than imports. This approach involves elements of an industrial policy, as developing manufacturing capacity requires enabling an 'ecosystem' of designers, R&D centres, engineers, production engineers, and technicians that can be deployed to scale up production in times of need.

In the United States and others in similar situations, where domestic brands produce PPE overseas, governments could also consider policies to encourage companies to create hybrid supply chain structures to support domestic firms to sustain their global supply chains that serve the healthcare markets around the globe. Policies could also consider encouraging companies to bring back at least some of their offshore manufacturing capacity. It would not be practical to massively reshore manufacturing operations, as reshoring requires companies to develop many capabilities at scale, but they would benefit from hybrid supply chains with the flexibility to operate their supply

chain in a cost-effective or time-efficient manner. Even if capacity is created domestically, raw materials and/or intermediate products may still have to depend on imports. A possible solution is for policies to provide R&D support to develop new materials and innovative production processes to ensure a shorter domestic supply chain. In addition, most economies have some sort of PPE stockpiling arrangement to determine the amount of inventory needed in case of a future pandemic. The procurement process should consider the value of the product (e.g., quality, whole lifecycle cost, and environmental cost). Doing so can create incentives for domestic companies to develop and produce innovative PPE products.

A lesson from COVID-19 is that governments must consider how citizens can help curb the spread of future viruses. The availability of affordable at-home rapid test kits can make individual responsibility easier to bear, as people could test themselves at home and take steps to avoid spreading the virus. Hence, easy-to-use home-testing kits could be another essential pandemic product. Policies should also include a communication strategy with online platforms to enable a coordinated response to quickly identify and match supply sources and demand locations on the one hand, and allow individual citizens and citizen groups to coordinate on the other hand.

Importance of Global Health Governance

A vital part of global health security and governance is provided by the WHO. As the author of Chapter 2 asks: If not the WHO, then who? Chapter 2 provides an extensive discussion of recommendations that have been made before and during the COVID-19 pandemic—as many ideas relating to improving the WHO are not new. Reforms will not come immediately, but if the discussion is delayed, then the danger is that the momentum and urgency might wane, as it has in the past.

There is a strong case to be made for strengthening the existing WHO, which operates by consensus of its member states who come together at regular meetings to review matters. One measure is to agree on a new pandemic treaty under the WHO. Issues that are on the table include:

More open governance: The governance of the WHO could be reformed to include more voices as non-voting non-state actors in the WHO's governing body, such as from non-government and philanthropic institutions.

Widen expertise: The WHO could maintain its technical focus but could broaden its expertise to include more input from political scientists, urban designers, lawyers, logisticians, philosophers, economists, and information technology specialists.

Reporting system: There are many practical suggestions regarding future pandemic outbreaks, such as defining a pandemic more precisely, and using a gradient of warnings to encourage countries to share information.

Financial resources: Funding the WHO represents value for money—for every US$1 invested in it, the WHO provides a return of US$35 in societal value. Member states are in principle agreeable to improving the WHO financing model and giving it more flexibility to deliver on its mandate.

The next step in creating a new pandemic treaty involves more negotiations and consultation hearings with a progress report to be delivered to the WHO's 2023 World Health Assembly, and an outcome document for the assembly in 2024.

Protect Public Health Policy from Harmful Industries

Beyond infectious diseases and pandemics, non-communicable diseases (NCD) are growing in relevance, currently causing 60 per cent of global deaths. Some voices have called for the role of the WHO to be cut back to focus on infectious diseases, which would limit global governance on NCDs and other threats to wellbeing. It became clear during the COVID-19 pandemic that harmful industries, most notably tobacco, took advantage of the situation to promote their businesses that related to NCDs. Chapter 3 provides an in-depth discussion of that exploitation and hence its relevance in a book about the experience of COVID-19. The key message is that governments should have a whole-of-government approach to protect public health policy against tobacco and other harmful industries, especially during epidemics and pandemics.

Chapter 3 provides specific recommendations that include governments being aware that they must stop interactions with those negative industries and reject their corporate social responsibility activities, as those are a form of promotion and/or method to gain influence in a crisis. Needless to say, governments must reject any form of agreement to collaborate, and there should not be any incentives or preferential treatment given to those industries. State-owned tobacco enterprises should be treated like any other tobacco company, and governments should divest from the tobacco industry. It would be helpful for governments to implement a code of conduct with clear guidance on interactions with the tobacco industry. Indeed, there is no reason why the tobacco industry should not be compelled to provide information about its business, marketing, lobbying, and philanthropic activities in order to enhance transparency for greater accountability. Non-government organisations must continue to be encouraged to research and expose industry interference with public health policy. While they can research and expose the industry, it is the governments that are ultimately responsible for curtailing unhealthy industries and their influence on public health policy.

Finger Pointing Is Unhelpful

There has been too much unhelpful politicising and moralising. COVID-19 tested every leader and government. Humility and cooperation are needed to deal with the various Omicron subvariants, which are continuing to spread. Hence, the post-pandemic

picture was murky as this book went to print at the end of 2022. The Russia-Ukraine war that started on 24 February 2022 has created many more disruptions and uncertainties, and it has also heightened geopolitical tensions that are affecting relations between the major powers in the world. The temptation to use COVID-19 to finger-point at opponents should be resisted, as it would be unhelpful. We need to call upon our better angels to enhance the potential for cooperation.

US-China Cooperation Is Better Than Conflict

Chapter 9 asked what level of cooperation may still be possible at a time of intensifying conflict between China and the United States. The very poor state of relations between them has a major spill-over effect on the world, as they are the two major powers with enormous capabilities in many areas of technology and production. They have a combined share of about 45 per cent of the world's GDP.

The two countries have a history of collaboration that has fallen by the wayside in the light of deteriorating relations. Notably, the experience of SARS in 2003 led to expanded health cooperation between China and United States, and between China and the wider international community. China and the United States forged a multi-year partnership through the Chinese Ministry of Health, renamed the National Health Commission in 2018, and the US Department of Health and Human Services (HHS). The United States established a health attaché at its embassy in Beijing in 2003, which was the main point of contact for health diplomacy.

The year 2005 was particularly noteworthy: China and the United States established a Joint Initiative on Avian Influenza, they inaugurated the Collaborative Program on Emerging and Re-emerging Infectious Diseases, and they also established the US–China Health Care Forum to address bilateral commercial, trade, and policy issues relating to health. In 2006, the then Ministry of Health and HHS further expanded their collaboration on biomedical research with a memorandum of understanding on research, technology, training, and personnel exchange, as well as cooperation on HIV/AIDS. Cooperation between the two countries also moved beyond bilateral governmental cooperation to the participation of non-governmental philanthropic organisations that funded health projects. With respect to the H1N1 pandemic in 2009, China and the United States shared information and technology to facilitate national monitoring of influenza spread and vaccine development, and China became the first country to roll out an H1N1 vaccine. In 2009, the two countries pledged to 'deepen cooperation on global public health issues, including human and avian influenza prevention, surveillance, reporting and control, and on HIV/AIDS, tuberculosis, and malaria'. The outbreak of the Ebola virus in West Africa in 2014 posed a new global health challenge for the world community. The cooperation between China and the United States was helpful beyond their own borders, including their expert teams collaborating on the ground in Africa, and it led to further mutual pledges to 'leverage our respective strength and work with the rest of the international community to help affected

countries to strengthen capacity-building on health and epidemic prevention so as to place the epidemic under control as soon as possible'.

The current concern is that while much can be done through cooperation, COVID-19 could be further politicised, and this will stand in the way of cooperation. Some obvious steps in a positive direction include reviving the US-China Health Care Forum and the Collaborative Program on Emerging and Re-emerging Infectious Diseases to help with identifying the origin of COVID-19, collaborating on biosecurity laboratory standards, and the mass production and distribution of COVID-19 vaccines in low-income economies, just to name a few.