

Pandemic response strategies

Lessons from Asia-Pacific and European economies for healthcare sectors in the EBRD regions



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Abbreviations and acronyms

Abbreviation/acronym	Description
COPD	Chronic obstructive pulmonary disease
Covid-19	Disease caused by the novel coronavirus SARS-CoV-2
'flu	Influenza virus
GDP	Gross domestic product
HIV	Human Immunodeficiency Virus
ICU	Intensive care unit
IT	Information technology
MERS	Middle East Respiratory Syndrome
NHS	National Health Service
OECD	Organisation for Economic Co-operation and Development
PCR (test)	Polymerase chain reaction (test)
PPE	Personal protection equipment
SARS	Severe Acute Respiratory Syndrome
TTIQ	Testing, tracing, isolation and quarantine
USA	United States of America
WHO	World Health Organization of the United Nations

Executive summary

Covid-19 has been the largest pandemic in more than 100 years, leaving no country unscathed. Many countries faced challenges when responding, with uncertainty about what to do, inadequate stockpiles of equipment, and shortages of essential workers – a problem exacerbated by their greater exposure to infection. Some governments wrongly believed that there was a trade-off between controlling the spread of infection and protecting the economy. The impact of Covid-19 on health and the economy was greatest in the emerging economies, including those where the EBRD operates. This report offers lessons from the Covid-19 pandemic response in a number of economies, helping elucidate how the EBRD can best support the economies where it invests as they seek to build back better.

There is no single criterion that we can use to assess which countries responded to Covid-19 well. Data on the incidence of infection are affected by testing capacity, the quality of reporting, and other factors. The level of excess mortality is often considered the best measure but there are different ways of measuring it and it depends on the existence of high-quality, vital registration systems that report in a timely manner. It is also important to consider the indirect impacts of the pandemic, such as loss of jobs or income and missed educational opportunities. A further complication is that a country that performed well, however this is measured, in one wave of the pandemic may not have done so in another.

Our report begins by examining the response in South Korea, a country that is recognised as having performed well in the early stages of the pandemic. Its experience shows how well an effective testing and tracing system can operate during a pandemic. The report continues with a review of experience in six European countries plus Türkiye. Three performed relatively well in the first year of the pandemic, as measured by excess mortality: Germany, Denmark and Portugal. A further three performed less well: Bulgaria, Poland and the United Kingdom. To them we added Türkiye, for which comparable data were unavailable, but which is a major recipient of EBRD support.

There are several reasons why many Asia-Pacific economies were able to contain the spread of disease in the early phase of the pandemic. Initially, before vaccines became available, the response comprised measures to reduce

mixing in the population, often referred to as non-pharmacological interventions. These were implemented very rapidly and stringently in this region. In due course they were augmented by large-scale testing programmes, facilitated by the development of cheap lateral flow tests. By the end of the first year, vaccines were becoming available and, in some countries, were rolled out rapidly. However, the priority given to these different measures in each economy varied, in part reflecting their previous experience with Ebola and two other coronaviruses (SARS and MERS), which aided appreciation of the crucial role of airborne transmission and the importance of contact-tracing from the very beginning.

These economies, with South Korea, Taipei China, China, Japan, Australia and New Zealand among the most successful, used quarantine to buy time to scale up their testing and tracing capacity, using a combination of border closures and domestic lockdowns. In contrast, many Western countries failed to get on top of the pandemic early, so that their limited tracing systems were soon overwhelmed. Some Asia-Pacific economies were also helped by a high level of public trust in authorities, as well as their earlier investment in pandemic preparedness. Thus, South Korea was able to gather a large array of tracking data, for example from cellular phones, that would have been difficult elsewhere.

Most people who had to isolate did so at home, even though this was rarely the best place to be given often limited or no support. South Korea, Vietnam, China and New Zealand created makeshift facilities to isolate contacts in communities, which helped prevent transmission in families and beyond. Thus, all newly diagnosed Covid-19 patients were admitted to isolation facilities in South Korea and in Wuhan, China, including those with no or mild symptoms; while in Taipei China even patients with mild symptoms were admitted to general hospitals. These measures helped to keep transmission low, while providing financial support for dormitories and hotels, which had lost their usual clientele due to travel bans. These experiences showed that isolation can be effective, when coupled with high levels of adherence, and when adequately supported by household supplies and financial compensation for lost wages.

Effective isolation was also supported by early diagnosis. South Korea developed the polymerase chain reaction (PCR) test via a public-private partnership a few weeks after the pandemic began. Testing capacity was scaled-up and decentralised quickly and was never overwhelmed until the arrival of the Omicron variant. Testing was especially important in identifying those who should isolate but also played a part in “test to release”, allowing people to be discharged earlier than might otherwise have been the case.

Looking across the world, two main approaches can be identified. The first, in many of the Asia-Pacific economies, was elimination. The second, in Western economies, was mitigation. Mitigation sought to contain the spread to a level that would not overwhelm health systems and mainly relied on intermittent lockdown measures. The elimination strategy also included intensive contact-tracing to identify and manage the situations in which transmission was occurring, for example by improved ventilation. We now know that those economies that pursued elimination, even if they did not succeed, experienced lower loss of life and less economic damage; they were assisted by high-performance testing, along with tracing, isolation and quarantine (TTIQ), which, coupled with border checks, made it possible to minimise mobility restrictions and social distancing. This also avoided the approach taken in some countries pursuing mitigation that essentially confined those who were old or otherwise vulnerable to their homes for long periods. TTIQ remains important now that vaccines have become available as, although the vaccines greatly reduce the risk of severe illness, they do not provide 100 per cent protection, especially against new variants and for those for whom vaccine-induced immunity is waning.

As the pressures associated with the pandemic response accumulated, many countries started loosening their social restrictions. This happened in South Korea in autumn 2021. For example, isolation locations shifted from makeshift and temporary medical facilities to patients' homes. The requirement to quarantine was lifted for contacts who were vaccinated, even though vaccine efficacy was below 100 per cent, and contact-tracing ceased in early February 2022. These changes were associated with surging cases, exacerbated by the emergence of the highly contagious Omicron variant in South Korea. Eventually, one-third of the population was infected and Covid-19 deaths reached an unprecedented level.

The initial approach taken by South Korea meant that its health system sustained almost no collateral damage, while also preventing any appreciable rise in excess mortality, at least until November 2021. However, this situation changed after the government relaxed the earlier restrictions.

Turning now to the lessons learned from European countries and their neighbours. Germany, Portugal, Denmark and Türkiye had strong and effective political leadership, even though their systems of government, whether centralised or decentralised, differed. This made rapid action possible. Germany and Portugal also benefited from being able to see what was happening to their neighbours, Italy and Spain, which were hit first. In Germany, Portugal and Denmark there were examples of effective public engagement, facilitated by good communication. The head of the Robert Koch Institute, in Germany, was an exceptional role model in conveying trusted information to the public. In contrast, mixed messaging from politicians in Bulgaria, Poland and the United Kingdom contributed to mistrust.

Having a strong scientific base and public health system were clearly advantages. Germany's well-endowed health system, and in particular its intensive care unit (ICU) capacity, which had been criticised previously for being inefficient, was able to provide the capacity needed in a crisis. Bulgaria, Poland, Portugal and the United Kingdom had all suffered sustained periods of under-investment in their respective health sectors. Expertise in public procurement, coupled with transparency and the rule of law, allowed Denmark and Germany to increase capacity rapidly; while the situation in the United Kingdom was characterised by numerous scandals whereby inexperienced providers exploited political connections.

Strong social safety nets were very important in countries that performed well. Denmark and Germany provided generous financial support to employees and businesses, as did the United Kingdom, although with a programme of loans characterised by inadequate oversight and, in some cases, fraud. Bulgaria and Poland both struggled with weak social protection schemes.

In summary, economies that had strong and decisive leadership; high-functioning health systems, public health and research capacity; and strong social safety nets did best. Early recognition of the airborne transmission of Covid-19 was important, coupled with well-functioning TTIQ. In all cases, maintaining public trust was essential. Overall these experiences provide many lessons for those preparing for the next pandemic.

Introduction

Covid-19 is the largest pandemic in more than 100 years, impacting the entire globe. Many countries faced challenges during their fight against the disease, with shortages of resources and capacity in the health sector. A prevailing view of public health objectives and economic gains as a trade-off scenario tended to hinder early preventive actions in some countries. Covid-19 particularly impacted emerging economies such as those in which the EBRD operates. This report aims to draw lessons learned from the experience of the Covid-19 pandemic response in several economies for better preparedness for the next pandemic – particularly in the EBRD regions.

There are no simple criteria to assess which economies responded to Covid-19 well. Data on the incidence of infection are affected by testing capacity, quality of reporting, and other factors. The number of deaths reflects the situation of infection best, but the vital records and registration system can cause a time lag. Direct health outcomes but also the socio-economic impacts of the pandemic, such as reduction of income or loss of education opportunity, are part of the assessment

measure. However, none of these can capture the entire response which was needed. Another complication is countries' performances differ according to the stage of the pandemic. Although criteria matter, there has been little controversy that some Asia-Pacific economies successfully contained the disease compared with others.

Aim

The aims of the report are:

- to examine the experience of Asia-Pacific economies that had relatively low death rates during the Covid-19 response, with a primary focus on South Korea, plus China, Taipei China, Singapore and Japan
- to draw insights from a selection of European economies that experienced relatively good and relatively poor outcomes
- to identify lessons that can be applied to the economies in which the EBRD operates, both to alleviate the current pandemic and prepare for the next.

Lessons from South Korea and beyond

In theory one of the greatest contributors to preventing Covid-19 transmission should be a perfect barrier between those who are infectious and those who are susceptible. If this could occur without any disruption to ordinary daily activities, it would be a perfect solution for every infectious disease outbreak in its early phase. Vaccines are of course ideal, providing a complete bio-chemical shield for those who are vaccinated, and the earlier the better. However, this solution normally needs long months according to the previous vaccine history. In the meantime, people should be protected through alternative options. Another ideal solution is preventive isolation of all infectious sources. This option requires cessation of all ordinary daily activities and requires certainty of the sufficient length of preventive isolation, along with knowledge of who is infectious and what the fomites are. These extremely strict options are not merely theoretical but were implemented in the first year of the pandemic, when no vaccine was available. Lockdown for as long as possible (unless for “essential” mobilities), coupled with patience and hope regarding imminent vaccines, turned out to be one of the most popular pandemic response policies implemented in most of the world in 2020. The easing of lockdowns depends on success in efforts to resolve the following two uncertainties as early as possible: (i) who and what are infectious; and (ii) how long for. These two conundrums were disclosed eventually: people were infected mostly through respiratory microdroplets for about seven to ten days including two or three pre-symptomatic periods. However, this discovery took too long (several months) to prevent an unprecedented outbreak of the infection and the eventual pandemic.

During this early phase, with insufficient scientific knowledge to enable an effective and efficient response, every nation had to choose its response policy option based on its previous outbreak history, which did not necessarily mean the same diseases across different countries. Most of the high-income countries stood on their influenza (‘flu’) experience, while some of the other high-income countries relied on their Severe Acute Respiratory Syndrome (SARS) or Middle East Respiratory Syndrome (MERS) experience (mostly in Asia). Few low- and middle-income countries in the Sub-Saharan region used their experience of Ebola or Human Immunodeficiency Virus (HIV), nor the SARS experience in China.

The latest outbreak history-based policy choice was neither equal nor random. Mostly it gave an advantage to some countries which had experienced more direct contact-based transmission such as SARS, Ebola or HIV than other countries with more airborne infectious diseases such as ‘flu’. The former transmission control normally included tracing the infections from person to person to break the circuit, while the latter transmission control did not, partly because it seemed not possible or practical when the ‘flu’ vaccine was available through advanced preparation using seasonality between the northern and southern hemispheres. A greater exposure to contact-tracing in some countries owing to their previous infection control experience with Ebola, Tuberculosis, SARS, MERS and HIV (path dependency) became an advantage and turned out to be strongly effective and efficient later on, compared with the experience of peer countries, which were not exposed to such diseases previously.

Trace-based quarantine and isolation

Isolation was adopted in most of the profiled economies despite a diverse level of stringency options and support regarding logistics and finance. If the isolation was implemented more strictly, transmission rates were fewer. More supported isolation could maintain stringency in terms of completeness of the barrier between infected and uninfected people. However, infectivity was established not only by the symptomatic patients but also during the asymptomatic or pre-symptomatic periods of the patients. Therefore, merely isolating the patients who are mostly symptomatic, which gave them diagnosis opportunities, is insufficient to stop the transmission route.¹ Isolating the patients who are asymptomatic is required to effectively break the circuit. The way to detect or diagnose pre-symptomatic patients in advance was by tracing their contacts as early as possible, that is, when the patient is diagnosed and before some of their contacts infect other people.²

1 F.C. Fang, C.A. Benson, C. Del Rio, K.M. Edwards, V.G. Fowler, D.N. Fredricks, et al. (2021), “COVID-19-Lessons Learned and Questions Remaining”, *Clinical Infectious Diseases*. 15 June; 72 (12), pp. 2225-2240.

2 J.K. Lee, C. Bullen, Y.B. Amor, S.R. Bush, F. Colombo, A. Gaviria, et al. (2021), “Institutional and behaviour-change interventions to support COVID-19 public health measures: a review by the Lancet Commission Task Force on public health measures to suppress the pandemic”, *International Health*, Vol. 13, Issue 5, pp. 399-409.

Tracing the contact routes allows contacts to be isolated as a precautionary measure, that could be either restriction of their mobility or mandatory restriction during the infectious period. Those countries who based choices on their ‘flu experience did not adopt trace-based quarantine as a default policy, while those countries who had experience of SARS, MERS, Ebola or HIV, did. However, the underlying reason of this incidentally correct choice was not based on the similarity of the disease transmission mechanism between Covid-19 and previous outbreaks of its nature. It was more dependent on the nature of pre-symptomatic transmission; unlike other previous outbreaks, the transmission was airborne, a characteristic shared between Covid-19 and ‘flu. In other words, it was not the transmission route (air-respiration) but the transmission period (pre-symptomatic) that engendered the incidental choice of trace-based quarantine with common isolation as the main response policy in some economies. This turned out to be more successful across some economies.

Policy choice towards trace-based quarantine in some economies began even before pre-symptomatic transmission was discovered. Thus these economies were able to eliminate or suppress their community transmission towards a low level of outbreak. Meanwhile, other economies, which did not choose trace-based quarantine, mostly due to their lack of recent experience, used only isolation tactics, which lost the pre-symptomatic transmission blocking opportunity.

Enablers and barriers to adopting trace-based quarantine

Some economies, such as New Zealand, rapidly developed a trace-based home quarantine combined with other responses, although their original protocol was mostly based on ‘flu, which did not use tracing. The closure of the national border blocked a potential influx of pathogen from other countries, especially early outbreak countries such as China. The United Kingdom attempted to develop or scale-up its trace-based quarantine capacity several times but this wasn’t sufficient to prevent rapid transmission of the virus. Vietnam also adopted and developed trace-based quarantine with national border closures in the early phase of the pandemic, with incoming travellers prohibited.

National border closures and domestic lockdowns bought time to prepare a pandemic response and this strategy was used in these economies. Such a strategy was successful to prevent outbreaks for a long time: more than a year for both Vietnam and New Zealand. Taipei China adopted a similar strategy, with border

closures for incoming travellers from China, while, unlike Vietnam and New Zealand, a domestic lockdown was not implemented, partly because of a highly organised trace-based quarantine capacity based on previous experience with SARS. Mainland China, Hong Kong, Japan and South Korea also maintained trace-based quarantine. Completeness of the tracing system was maximised in two ways: first for the layers of the contact network, for example more than four layers of contacts were traced from a newly infected case in Vietnam. The other dimension was a date for the upstream of the contacts: Japan traced contacts as early as two weeks before a newly diagnosed case.

One of the reasons for the lack of development of a well-functioning trace-based quarantine capacity in many European economies and the United States of America (USA) was the late onset of capacity development effort when the Covid-19 outbreak itself overwhelmed such efforts. Tracing requires linear person-time per number of contacts, be they infected or susceptible, and the prevalence of contacts on average was too large to catch up. Lockdown reduces the number of contacts on average through generally curtailing people’s mobility, while increasing the number of infectious people proportionally increases the required number of qualified tracers even in the infancy of the capacity development stage.

Trust between the tracer or government and the contact or lay person is also one of the key elements to establish well-functioning tracing, since people’s contact history is highly personal information.³ Privacy concerns should be well compensated by a high level of trust or a high level of technical advancement guaranteeing privacy-protecting tracing. Potentially this was not achieved in many European economies and the USA. On the contrary, either or both were achieved and improved over time in many economies of the Asia-Pacific region, including Australia and New Zealand, where privacy mattered at a cultural level more than in comparison to the communal culture of neighbouring Asian counterparts. South Korea improved its anonymous tracing capacity over time by quickly addressing societal concerns or critiques on privacy protection issues at an initial stage. In Taipei China the population accepted privacy disclosures in some senses via a trade-off between public safety and privacy protection, again based on its communal culture. Success in the pandemic response may influence public

3 D. Lewis (2020), “Why many countries failed at COVID contact-tracing – but some got it right”, *Nature*, 14 December, Vol. 588, pp. 384–387.

acceptance or sensitivity during the development of tracing capacity with interim limitations on privacy protection. The aforementioned trade-off between public safety and privacy in some economies was positively reinforced during tracing, compared with public reluctance in those poor-response economies with growing outbreaks, where conversely more active trace-based quarantine was necessary. The public in these poor initial response economies initially denied privacy violations as part of tracing activities but eventually permitted them in exchange for freedom of mobility by the government.

Cellular phone-based technology using Bluetooth or GPS inevitably caused privacy concerns in terms of misuse of the recorded mobility history information beyond the outbreak control effort. This limitation led to only voluntary utilisation of information technology (IT)-based tracing technology for the public. When sufficient information about the latest mobility information of the newly infected patients is available from the manual or digital tracing of the infected population, tracing application users can use the information as a reliable reference to check whether they were in contact with an infected person or not. In this case, IT tracing can be potentially maximised when nearly all of the population has the tracing app. Even before this level of coverage, the system is incrementally performing contact-tracing.

However, when there is no available information on the infected person's mobility in the recent days before their diagnosis, the infectious person's information is only available internally within the same digital tracing app, as many countries experienced. This means that those who voluntarily downloaded any tracing app(s) before being infected can serve as the reference. When the extent of users is low, the reference of the infectious people is partial or insufficient, however once the extent increases enough, the reference reaches full information of the infectious pool.

This limitation of voluntarism makes IT tracing exponential, whereby poor coverage creates a low level of accuracy in notifying any potential contact (under-reporting), whereas high coverage makes for a sufficiently high level of accuracy exponentially (in other words, not the same level of accuracy across different coverage rates). In theory, if every infectious person used a tracing app in advance, all mobility contact information would then be available to notify people in a timely, individual, confidential (if needed) manner, with or without complete privacy protection. This exponential nature naturally has a threshold to contribute to effectively prevent transmission. It may also require either trust or perceived success to compensate for privacy concerns.

The most common venue for quarantine was the home of the contacts. Some people may not have sufficient space to keep distance from their cohabiting household members. In such cases, some societies operated makeshift public spaces for quarantine in community settings: for example, in Vietnam, Italy and New Zealand. This facility was also used for isolation of patients with no or mild symptoms. This measure meticulously prevented transmission within families, while preventing further transmission to other people beyond the household, such as colleagues or innocent bystanders in public recreational facilities such as restaurants and/or bars. Logistical support for daily living such as food, water and toiletries was provided in some countries. Financial support was also provided to compensate for a living income if remote work was not available in certain countries. Adherence to quarantine protocols was better in these supported populations. Isolation of patients was adopted in many countries even where trace-based quarantine was not undertaken. Isolation is described in more detail below.

Isolation

Infected persons are required or recommended to be isolated in most of the economies profiled, with varying degrees of stringency and support. All newly diagnosed Covid-19 patients have been admitted to isolation facilities in South Korea since the early phase of the pandemic, whereas other economies contained their Covid-19 patients at home unless their symptoms were severe.⁴ The patients with no or mild symptoms are also required to stay at makeshift hospitals, called "temporary medical facilities" similar to the Fangcang shelter hospitals in Wuhan, China, which contained those patients with mild or no symptoms; while severely ill patients were admitted to ordinary hospitals in both economies. These makeshift hospitals were operated by temporary recruits or staff contracted from other health facilities.

Decentralised governments were responsible for the operation of these facilities, which were mostly managed by subcontractors from nearby teaching hospitals. Wuhan's shelter hospital operated in such a way and the Nightingale Hospital in the United Kingdom adopted a similar approach later. Patients in these facilities are referred to ordinary hospitals when symptoms are aggravated or there are any signs of aggravation detected by the health professional.

4 J. Oh, J.K. Lee, D. Schwarz, H.L. Ratcliffe, J.F. Markuns, L.R. Hirschhorn (2020), "National Response to COVID-19 in the Republic of Korea and Lessons Learned for Other Countries", *Health Systems & Reform*, Vol. 6 (1), Article: e1753464.

This facility-based isolation policy compensated for vacancies in dormitories or hotels, which suddenly lost guests due to travel bans. Such extraordinary isolation contributed to maintaining low transmission rates.

The low number of Covid-19 patients in the early pandemic made it possible for Taipei China to admit even mildly symptomatic patients at ordinary hospitals, while New Zealand admitted these patients at their homes unless the latter were overcrowded.

Isolation is adhered to well when it is supported by the provision of living materials, along with a financial subsidy to compensate for lost wages. Hard law may mandate with ease but may not necessarily maintain strict isolation unless there are strong policy or administrative human resources to monitor adherence. However, there are few comparative study results comparing soft measures, with support for isolation, versus hard measures, such as penalty fines, for isolation violation.

Isolation of the entire infectious population may end transmission in the early phase of a pandemic. However, time to diagnosis matters. If the beginning of isolation were to be delayed due to stalls in diagnosis, the period of infectivity and the lack of isolation during the undiagnosed phase could contribute to further transmission. Early diagnosis requires sufficient testing capacity and may minimise leakage related to delayed diagnosis.

Using triage processes, the moderate or severe Covid-19 patients were sent to mostly government-owned hospitals, designated as Covid-19 hospitals or called “Hospital infection assured hospitals”. In South Korea, hospital infections were prevented by mandatory PCR screening tests for all patients presenting with fever and those with respiratory symptoms, who were triaged in an outside area before entering the treatment facility building. It took several hours to await the results, although this shortened over time. All Covid-19-confirmed severely ill patients were prioritised for accommodation in negative pressure rooms. Functionally this mandatory isolation for all patients at clinical facilities kept community transmission low, together with quarantine measures. All other hospitals including private hospitals were eventually encouraged to prepare and assign ICUs for Covid-19 patients in advance from autumn 2021, when the fourth outbreak began to overwhelm the health system in South Korea.

Hospital infection through cross-contamination between patients and hospital staff was pervasive during the early pandemic, partly because of the lack of personal protection equipment (PPE), even in high-income economies such as the USA and Italy.

Testing

The PCR test capacity was developed very early on by public-private cooperation within a few weeks of the start of the outbreak in China. Korea Disease Control and Prevention Agency gathered the diagnosis industry together to collaborate on a solution. Test capacity was rapidly scaled-up towards a decentralised distribution for early diagnosis everywhere by minimising travel time for the specimen. Fees for tests were fully covered by the government through tax or national health insurance. Daily testing capacity rose steadily over time such that daily PCR capacity was not overwhelmed until the Omicron variant outbreak, at which time new antigen-based diagnosis was eventually introduced as the official diagnosis even with its insufficient sensitivity. Testing capacity aids early diagnosis, which enhances early onset of isolation, which is crucial to minimise community transmission. Also, testing may help quarantine, which is applied to the contacts of those infected; however, testing is not a crucial part of trace-based quarantine since negative test results during the early phase of quarantine do not influence the decision as to whether quarantine should be applied or not for contacts.

Test results may help to officially shorten the quarantine period by testing during the middle of the period. It may reduce social activity disruption on a personal level, which collectively influences the extent of socio-economic disruption as well. Taipei China did not have high testing capacity, but it increased over time; however, it achieved one of the best performances regarding pandemic response. Japan was also criticised due to low testing capacity by the international experts although it turned out to be one of the best-performing economies in the world.

This example tells us that testing capacity is important but not a critical element, especially for quarantine performance. In some cases the importance of testing was overestimated, for example, universal testing of the whole population was attempted in some countries such as the Slovak Republic,⁵ but it was not repeated for the long term to contain the virus nor was it scaled to other countries since it did not show more than short-term effectiveness nor any cost-effectiveness. The Slovak Republic adopted all adult testing from October to November 2020, but a huge mortality rate followed for the coming half-years (daily 2 to 18 deaths per million; more than 10 per million during the period late December 2020 until 25 April 2021)

5 E. Holt (2020), “Slovakia to test all adults for SARS-CoV-2”, *The Lancet*. Vol. 396, Iss. 10260, pp. 1386–1387.

even after this mass testing.⁶ Mass testing alone reduces transmission to some extent for some weeks without other concurrent measures such as isolation and quarantine, but is not an effective measure to control the pandemic. Repeated mass testing in some weeks is inevitable despite the huge burden in implementation.⁷

Interpersonal hygiene measures

The wearing of face masks, washing of hands, and indoor ventilation reduce the community transmission of Covid-19. It was not well known in the early days of the pandemic that respiratory microdroplets were a crucial means of transmitting the virus between people until the aerodynamic study disclosed it.⁸ At the start of the pandemic, macrodroplets were suspected of being the transmission vehicles in the same way that the influenza virus transferred from infected persons to susceptible persons. When the macrodroplet hypothesis was accepted, indoor ventilation was not stressed while hand washing was encouraged to prevent fomite-based transmission.

However, the so-called superspreading event, which is more common than with the 'flu virus, was explained by this new concept of microdroplets from the lower respiratory tract in the case of Covid-19 rather than via macrodroplets from the upper airways in the case of 'flu. Microdroplets, which remain for a longer distance and duration in the air after expiration of the infected person, may infect groups of people simultaneously when indoor ventilation is poor.⁹ Face masks are not much different in their effectiveness with these two different pathways since both droplets can be filtered by conventional N95 face masks (even by some cloth face masks despite less effective filtration). Hand washing also helps reduce viral loads.

These personal hygiene measures benefited the transmission of other infectious diseases. South Korea showed a huge decrease in health service utilisation for pneumonia and diarrhoeal diseases. This may reflect lower service utilisation due to other reasons such as discouraged mobility including that towards health facilities. However,

this is less likely to be the case since there have also been concurrent mortality rates decreasing beyond secular trends in these diseases compared with pre-pandemic. Service utilisation volume for asthma or chronic obstructive pulmonary diseases (COPD) also decreased compared with the pre-pandemic probably because of face masks protecting patients from external stimuli, as well as lowered stimulus due to cleaner ambient air than previously due to discouraged industrial activities. During the early phase of the pandemic improved ambient air quality was reported in many economies including Italy, as well as South Korea.

Face mask wearing was not adopted early on as the World Health Organization (WHO) did not recommend their use in the community until it changed its face mask policy. This was due to cultural reluctance in Western countries compared with Asian nations. However, the face mask eventually became a global mode of approach across all continents.

Compared with personal hygiene measures, indoor ventilation procedures were not advanced in detail. Thus, no standard protocol for maintaining effective ventilation to prevent community transmission or monitoring measures has been established as yet.

Social distancing through mobility restrictions

One way to isolate all infectious sources is by discouraging meetings or gatherings, thereby reducing the number of contacts between infected people and the uninfected. A fewer number of contacts in general may help reduce the probability of transmission in the community. This policy does not need capacity for TTIQ implementation and thus is a conveniently usable policy option regardless of preparedness. One of the most common measures is school closure, which was adopted during an aggravated 'flu outbreak similar to the Spanish 'flu pandemic a century ago. The banning of mass public gatherings beyond a certain cap is another example, including closure of mass sporting events, cultural events, and small, retail businesses, and recreational activities such as amusement parks and cafés.

However, this mobility restriction generally induces a huge economic downturn. Most of the economies profiled adopted a *mitigation strategy* to contain the viral transmission below that which the health systems had capacity, relying more on lockdown and less on completeness of isolation and trace-based quarantine, while some economies such as Japan, South Korea, New Zealand and Australia adopted an *elimination strategy* to minimise community transmission through isolation and trace-based quarantine. The latter

6 Our World in Data (2020), "Coronavirus Pandemic (COVID-19)". Available at: <https://ourworldindata.org/coronavirus> (last accessed on 8 August 2022).

7 P. Bosetti, C.T. Kiem, Y. Yazdanpanah, A. Fontanet, B. Lina, V. Colizza, et al. (2021), "Impact of mass testing during an epidemic rebound of SARS-CoV-2: a modelling study using the example of France", *Euro Surveillance*, Vol. 26, Iss. 1, pii=2001978.

8 K.A. Prather, C.C. Wang, R.T. Schooley (2020), "Reducing transmission of SARS-CoV-2", *Science*, Vol. 368, Iss. 6498, pp. 1422–1424.

9 C.C. Wang, K.A. Prather, J. Sznitman, J.L. Jimenez, S.S. Lakdawala, Z. Tufekci, et al. (2021), "Airborne transmission of respiratory viruses", *Science*, Vol. 373, Iss. 6558.

economies achieved better health outcomes and economic outcomes measured by lives lost and gross domestic product (GDP) performance.

The common elements among the *elimination strategy* economies consisted of isolation, trace-based quarantine and testing as priority measures, rather than lockdown or severe mobility restrictions. These characteristics were the main cause of minimal GDP loss as well as high level of lives saved during the first year of the pandemic. A group of experts standing with the so-called Great Barrington Declaration insisted that economic recovery amid the pandemic was a trade-off between saving lives and saving the economy. However, focusing on the economy showed neither improved economic growth nor an increase in the numbers of lives saved. Conversely, economies focusing on saving lives (the *elimination strategy* economies) showed the best outcomes in both respects: lives and livelihoods, especially during the first year of the pandemic.

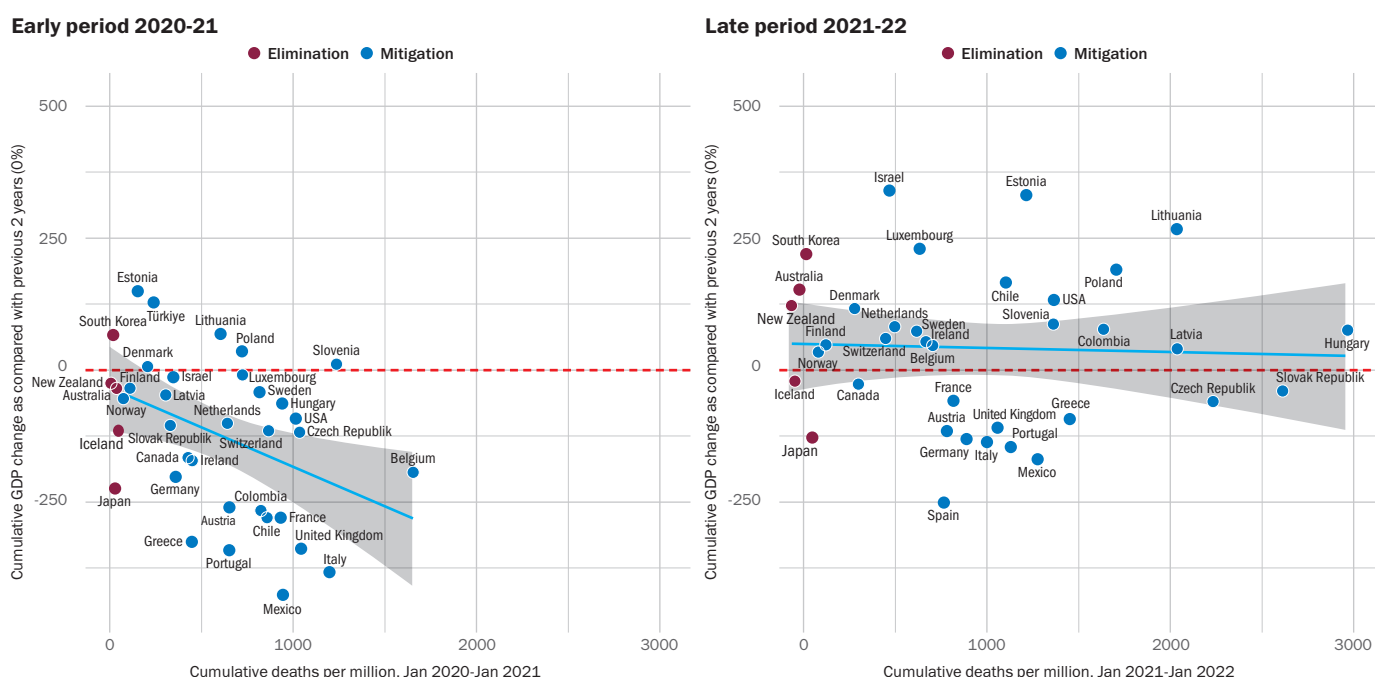
For the second calendar year of the pandemic, lockdown was a less prominent policy such that the concept of saving lives was independent of the concept of preserving economies, which differed from the first year when both savings behaved synergistically. Nevertheless there has been no evidence of an inverse correlation between saving lives and saving the economy despite there being no relationship between these elements in the second year and a positive relationship in

the first year (see Figure 1 below). If this is the case in coming years, with long-term follow-up, there should be no wrong policy choice nor debate over pursuing the economy more than underestimating the importance of saving lives.

Japan, South Korea, New Zealand, Australia and Taipei China were good examples of both aspects. These economies lost a very low number of lives cumulatively (lower than 500 cumulative deaths per million) compared with certain Organisation for Economic Co-operation and Development (OECD) members such as the USA or the United Kingdom (more than 1,500 cumulative deaths per million) as of 5 June 2022.¹⁰ South Korea showed positive weekly GDP growth on average during the first and second years of the pandemic and New Zealand and Australia showed around zero growth on average, whereas the United Kingdom recorded negative GDP on average during the same period. Japan relied less on testing capacity than other well-performing economies. It did, however, achieve outstanding savings of lives, relying more on mobility restriction, and recorded a similar performance in GDP growth compared with the United Kingdom. If Japan had used more TTIQ with less social distancing, it might have helped improve the economy.

10 Our World in Data (2020), "Coronavirus Pandemic (COVID-19)". Available at: <https://ourworldindata.org/coronavirus-data-explorer> (last accessed on 8 August 2022).

Figure 1. Relationship between Covid-19 mortality and GDP loss during the pandemic response (first year versus second year)



Source: Quynh Long Khuong and Juhwan Oh.

One of the reasons for incorrectly choosing between these two strategies would be misunderstanding or ignoring the success in Asia-Pacific economies: the importance of trace-based quarantine and isolation in the era of non-pharmaceutical response before the vaccine era, and during the incomplete vaccine era. The reason for the lack of active adoption of TTIQ in Western societies has not been fully investigated – whether because of technically overwhelmed states or political choice, alongside technical capacity development issues.

More freedom of mobility through TTIQ

Better epidemiologic circumstances can be achieved through the combination of testing, isolation and trace-based quarantine and mobility restriction. The ideal combination can be achieved with higher TTIQ performance even with complete mobility maintenance.¹¹ However, insufficient TTIQ performance due to lack of capacity would yield a better result in saving of life only when accompanied by mobility restriction. Otherwise, it will translate into a high mortality rate. If there is no performing TTIQ function in a country, mobility restrictions such as lockdowns are the only response measure to prevent deaths unless a completely curative drug of choice were to appear. A political choice to maintain economic development with no lockdown amid a scenario of lesser TTIQ function could not prevent onward transmission with ongoing deaths over time. This policy would be an example of unethical age discrimination (biased toward younger age groups) or chronic condition discrimination (biased toward the already-healthy population), maintaining the economy by sacrificing the health of the ageing population.

Vaccination programmes

South Korea rolled out vaccines later than other high-income economies. This was criticised in the domestic political arena despite very low Covid-19 mortality and incidence. Eventually, expedited vaccination based on a designated priority list such as the elderly and health professionals, along with a digital vaccination app, were accomplished. Maximum utilisation of vaccines was achieved by using the app to inform the community of any remaining vaccines at the last vial of the day, which would be discarded if unused, and so were to be given to anyone on a first-come-first-served basis regardless of the priority list at that time.¹² This app attracted people as if it were a lottery. Vaccine protests were relatively lower in South Korea than in other economies.

Misinformation was also very low partly because government risk communication officers were diligent in removing any faulty news. Eventually, rapid catch-up of vaccination coverage was achieved. However, due to the suboptimal transmission prevention capability of vaccines (about 50 per cent transmission protection)¹³ people's perception of the vaccine's real benefits were diminished since Covid-19 incidence was contradictorily increasing alongside rising vaccination coverage. Lowered mortality rates (one-eighth to one-ninth lower than normal) as well as fewer numbers of people in a severe condition were steadily announced by the government and were seen as an incentive to get vaccinated. Vaccination rates were still higher than in other economies. High vaccination coverage would be enough to get back to normal life if vaccination protection were perfect. However, the inability of the vaccine to sufficiently prevent transmission was not able to navigate society towards freedom of movement with safety. Various types of social distancing as well as TTIQ were still required.

11 C. Kerr, D. Mistry, R.M. Stuart, K. Rosenfeld, G.R. Hart, R.C. Núñez, et al. (2021), "Controlling COVID-19 via test-trace-quarantine", *Nature Communications*, Vol 12, 2993.

12 S.L. Kwon and J. Oh (2022), "COVID-19 vaccination program in South Korea: A long journey toward a new normal", *Health Policy and Technology*, Vol. 11, Iss. 2, 100601.

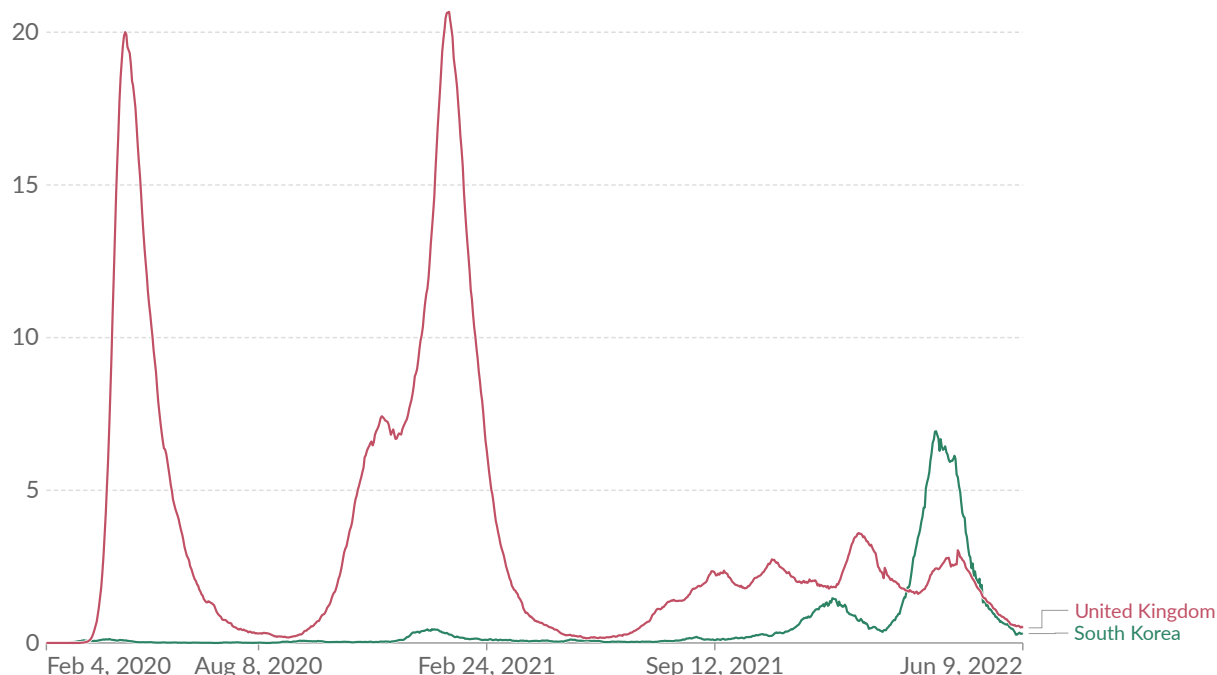
13 H.N. Altarawneh, H. Chemaitelly, H.H. Ayoub, P. Tang, M.R. Hasan, H.M. Yassine, et al. (2022), "Effects of Previous Infection and Vaccination on Symptomatic Omicron Infections", *The New England Journal of Medicine*, Vol. 387, Iss. 1, pp. 21–34.

Collateral damage to health systems during the pandemic response

South Korea's single-payer national health insurance system enables accurate assessment for collateral health service utilisation. Outpatient service utilisation for major chronic non-communicable diseases such as diabetes, hypertension and congestive heart failure showed almost no disruption during the entire two calendar years after the onset of the pandemic, compared with the two pre-pandemic years, even considering seasonal variations and secular trends over time. In South Korea, preventive service assessment data (which was only available until the end of 2020) such as health check-ups were disrupted during the first outbreak period (March to May 2020) and still somewhat during the third outbreak (December 2020), with no analysed information for health check-up disruption available for the fourth and fifth outbreak as yet (see Figure 2 below). National cancer screening service utilisation such as breast, cervix, stomach or colon cancers showed a similar pattern of disruption. However, health check-ups for infants and children under five years of age showed slight disruption in March 2020, but catch-up utilisation appeared after the first outbreak (May to July 2020) and there has been no more disruption since then.

Outpatient service utilisation decreased in general. However, age-group-specific patterns showed no disruption for the adult population. In particular, the population aged 65 and over showed almost the same utilisation pattern before and after the pandemic during 2018 to 2021, while the population age group between 20 to 64 years showed a slight decrease during the first and third outbreak in 2020 and almost no disruption in 2021. However, the population age group of below 19 years of age showed a huge decrease after the pandemic appeared. The service volume utilised almost halved mainly because of a huge decline in infectious diseases such as diarrhoea and pneumonia. Considering that these diseases showed lower mortality compared with secular trends over the years, declined service utilisation was not a service disruption but rather a lowered service need due to a decrease in the incidence of infection – probably because of improved interpersonal hygiene measures such as face masks and frequent hand washing. These diseases may also have driven a lower volume of service utilisation in this age group's outpatient care use. Asthma and COPD, as previously mentioned, showed decreases in incidence, which might have been caused by less external stimuli due to cleaner ambient air via less pollution and/or more face mask wearing.

Figure 2. Epidemic curve of Covid-19 deaths (per million) over time on South Korea compared with the United Kingdom: February 2020 to July 2022



Source: Our World in Data.

There has been no socio-economic disparity in outpatient service utilisation across the poor and the wealthy populace before and after the onset of the pandemic (2018 to 2021). Disabled people's service utilisation trends were also not disrupted after the pandemic in terms of outpatient services.

Inpatient services showed a mixed pattern of disruption. Major operations recorded no disruption after the onset of the pandemic, while ICU utilisation showed a slight decrease during the first outbreak period (March to May 2020) and the fifth outbreak (December 2021). Emergency room utilisation markedly decreased in terms of the number of visits due to injury and accidents since the pandemic began, while disease-oriented visits only decreased during the 12 months after the pandemic began (from March 2020 to February 2021) and a higher number of visits resumed from September 2021 than previously. Mental health and psychiatric service utilisation, including outpatient services for anxiety and inpatient service utilisation for depression, showed a slightly increased volume in February and March 2021 compared with increasing secular trends over previous years. This was considered the third outbreak period.

There were almost no excess mortality rates during the first 20 months, with the exception of November and December 2021.¹⁴ This slight increase in excess mortality towards the end of 2021 was aligned with decreased utilisation of ICUs compared with secular trends. This period showed

markedly increasing incidence and mortality compared with previously. There continued to be a marked increase of Covid-19 incidence and deaths during the first half of 2022. However, the South Korean authorities did not scale-up the TTIQ capacity after autumn 2021, at the same time continuing to ease social distancing. Social distancing at that time was only applied to a small business area in South Korea with the banning of gatherings greater than four or six people in a group at restaurants or cafés, with operation time limits until 21.00 or 22.00 hours. This lack of scaling-up of TTIQ capacity derailed South Korea from its successful trajectory of Covid-19 response. It eventually experienced a markedly increased number of deaths per day and week and excess mortality eventually compared with the previous 20 months of the pandemic.

The level of disruption in South Korea's healthcare system during the first year of the pandemic seemed to be lower than that of other economies.¹⁵ This minimal disruption is considered to have been because of the Covid-19 response policy, in particular, the TTIQ-based response rather than lockdown. Economies that relied more on lockdown, and which discouraged health facility visits in various ways, experienced much more disruption of their healthcare systems. Minimised social distancing or lockdowns, with the maximising of TTIQ, helped other health systems to concurrently operate well during the pandemic response.

14 A. Karlinsky and D. Kobak (2021), "Tracking excess mortality across countries during the COVID-19 pandemic with the World Mortality Dataset", *eLife*, Vol. 10: e69336.

15 C. Arsenault, A. Gage, M.K. Kim, N.R. Kapoor, P. Akweongo, F. Amponsah, et al. (2022), "COVID-19 and resilience of healthcare systems in ten countries", *Nature Medicine*, Vol. 28, pp. 1314-1324.

Lessons from South Korea's derailed performance since autumn 2021

South Korea was not able to maintain its outstanding performance from autumn 2021 because it gradually followed other economies' easing of social distancing. The rest of the world began to normalise its socio-economic activities from the middle of 2021 to secure everyday life after repeated lockdowns, all with the hope of less lethal variants ahead and/or the vaccination effect to protect lives. The period of the "living with Covid-19" policy began worldwide with the abandonment of social distancing or lockdown, alongside an acceptance of increased mortality or misunderstanding of mortality in the coming months. South Korea, which did not implement lockdown and thus did not experience any side effects of such a policy, was needlessly influenced by outside forces in easing most of its social distancing measures.

Loosening of isolation and quarantine

The "living with Covid-19" strategy of many economies was translated into "recovery of everyday life" in South Korea as revealed by the easing of various pandemic responses. One of the most marked changes appeared with the isolation policy, which was one of the most effective measures until that point. Since autumn 2021, the isolation venues were diverted from the temporary medical facilities to patients' homes as other countries had been doing already. The previous strategy prevented in-house transmission between family members due to overcrowding. The policy change in South Korea, without preparing a strategy to prevent family transmission, would be one of the slippery policy transitions. In fact, after this change, infections among children began to surge, partly because of cross-infections among family members due to a household member being infected and isolated at home. This transmission in turn crossed over to kindergartens and schools. This complication appeared partly because children were the remaining cohort to be vaccinated at that time. The quarantine policy at the time of this policy change exempted contacts if they were vaccinated although it was known that half of vaccinated persons were still susceptible (and thus infectious to others). This policy was an incentive to increase vaccination rates.

This systemic leakage as a result of the policy change, which was aligned with the government's willingness to promote recovery towards normal life by vaccination, led to an ever-increasing incidence of mortality rates from Covid-19 and excess mortality from other diseases from November to December 2021. Loosening of TTIQ continued such that trace-based quarantine was ceased officially on 7 February 2022. This again translated into another surge in cases, coupled with the complications brought by the highly contagious characteristics of the Omicron variant. Eventually the high demand for ICUs caused the president to urgently call for hospital directors to prepare ICUs for Covid-19 patients. The capacity of ICU beds in terms of available beds increased rapidly again, such that there was no single day officially beyond the national ICU capacity limit at any Covid-19 treatment facility.

However, the highest daily mortality statistics were renewed every day from late February until 26 March 2022 (6.88 deaths per million). It is crucial that the number of ICU beds available needs to be aligned with appropriately trained and available staff. Before abandoning trace-based quarantine in early February 2022, South Korea was maintaining its performance as one of the lowest countries in terms of Covid-19 mortality and other excess mortality. There are known conditions for the easing of strict social distancing: public health capacity, health system capacity, community engagement, epidemiologic situation, and national border control.¹⁶ Future studies about this policy easing are needed to disclose more results in detail.

¹⁶ E. Han, M.M.J. Tan, E. Turk, D. Sridhar, G.M. Leung, K. Shibuya, et al. (2020), "Lessons learnt from easing COVID-19 restrictions: an analysis of countries and regions in Asia Pacific and Europe", *The Lancet* Vol. 396, Iss. 10261, pp. 1525–1534.

Over a three to four month period one-third of the population was infected, with incidence and mortality figures gradually stabilising, at which point another surge began. As previously discussed, only half of the vaccinated population were protected and the other half were not. In theory, the latter half should be susceptible until reaching herd immunity, which eventually stops transmission or other effective protection strategies appear. If there were an effective herd immunity level of around 80 per cent, the South Korean population with about 90 per cent vaccination coverage, which is about 45 per cent protection capacity considering, is close to the theoretical herd immunity, yet lacks about 35 per cent to reach this level of immunity. This extent of the population infected or with vaccine-induced immunity needs further investigation regarding effective herd immunity in the future. During this period the annual number of 'flu deaths decreased every day for a month except in South Korea. The other economies that kept active TTIQ-based elimination strategies, such as Japan, New Zealand, Australia and Iceland, still maintained their outstanding performance with their lowest mortality over the same period, that is, November 2021 to February 2022.

Conclusion: Lessons from South Korea and other Asia-Pacific economies

During the Covid-19 pandemic, TTIQ measures facilitated safety and freedom of movement. Ordinary socio-economic activities could be maintained in this scenario. This was an essential element of some economies with outstanding results in the Asia-Pacific regions such as South Korea, Japan, New Zealand, Australia and Taipei China. However, if the pandemic response policy relies on lockdowns or severe social distancing, ordinary social lives cease, even while the populations are safe. This is a common characteristic from most of the other economies beyond these aforementioned economies who pursued an elimination strategy. On the other hand, if economies maintain everyday life without TTIQ, a surge in infections is inevitable. Based on the South Korean and Asia-Pacific experience during the Covid-19 pandemic, TTIQ is the core value to sustain everyday life.

In fact, TTIQ is one of the most important applicable approaches and public health interventions from Asia-Pacific economies to the economies in the EBRD regions. In order to support such EBRD economies, which are facing challenges in response to Covid-19 and need to rehabilitate and rebuild resilient and fair healthcare systems by proper investment, steady preparation of TTIQ capacity should be the most reliable policy for the next pandemic, unless the mechanism of it is different from the coronavirus TTIQ. Further questions to be investigated are long-term sequelae of poor response in terms of health and economy, accurate collateral damage during the Omicron phase in South Korea, and effective responses for future pandemics.

Lessons from Europe

Similar to the USA with its 50 states, the European region of the WHO, with its 53 countries, provides a rich natural laboratory in which to study responses to the Covid-19 pandemic.¹⁷ Some of the differences in the first wave of the pandemic reflect when each country had its first imported cases. No country could be certain what the most appropriate response would be in the very early days of February 2020. Since then, differences in outcome across the successive waves of infection that were driven by emerging variants reflect, to a considerable degree, differences in how countries have responded.

There are a number of challenges in drawing lessons from their experiences. First, we must decide which outcome measures to use. In theory, measures related to the numbers of Covid-19 cases, such as cumulative incidence, speed of increase in cases, or duration of the particular wave, would seem the most appropriate. Other related indicators would include admissions to hospitals or ICUs, or deaths. There are inevitable problems with all of these measures.

Data on the incidence of infection are influenced by levels of testing and reporting. Early in the pandemic, testing capacity was extremely limited in all countries. Later, when some had implemented large-scale testing programmes, this was less of a problem. But even so, some areas with the greatest capacity were overwhelmed at certain times.

It is also important to consider the quality of reporting. Some countries have shifted from reports based on PCR tests, either alone or alongside a positive rapid antigen test, to reliance on the latter alone. As these are often undertaken at home, the affected individual may or may not report the results. In some countries these tests must be paid for, creating a barrier to their use, especially among disadvantaged groups who are at greatest risk. The use of Covid-19 mortality data can also be problematic, although it has the advantage of capturing elements of the response, such as the provision of antivirals and optimal inpatient care, that would be overlooked by simply looking at disease incidence.

The optimal source of mortality data would be death certificates, assuming that there is a well-functioning vital registration system in place; and bearing in mind that such data are often only published after a delay. If the data are completed correctly, they would accurately capture those cases in which Covid-19 caused or was a major contributor to death. To overcome the problem of delay, several countries have created a parallel system that records all deaths in people within a specified time period after a positive test result. However, this will exclude those who remain alive for longer than that period, but still die from Covid-19, while it will include those who have a positive test but then die from something else within the period. These differences mean that the two measures are poorly correlated. However, regardless of which measure is used, it is clear that the pandemic has led to a massive death toll, with each death associated with a loss of about 10 years of life.

Given the challenges of monitoring data on infections, we have seen growing use of what is termed “excess mortality”, measured as the difference between observed deaths over a particular time period and what would be expected based on the situation over the five years before the pandemic typically.¹⁸ This too is problematic, because death rates in the previous period may be atypical, for example because they may have been increased by a particularly bad influenza season.

Other measures, although less widely used, seek to capture the indirect or unintended consequences of the pandemic and responses to it. Their use is based on the principle that a comprehensive response should not merely reduce the spread of infection but should also protect the population from any adverse consequences of the measures that must be adopted.¹⁹ These include

17 L. Villani, M. McKee, F. Cascini, W. Ricciardi and S. Boccia (2020), “Comparison of Deaths Rates for COVID-19 across Europe During the First Wave of the COVID-19 Pandemic”, *Frontiers in Public Health*, Vol. 8, 620416.

18 V. Kontis, J.E. Bennett, T. Rashid, R.M. Parks, J. Pearson-Stuttard, M. Guillot, et al. (2020), “Magnitude, demographics and dynamics of the effect of the first wave of the COVID-19 pandemic on all-cause mortality in 21 industrialized countries”. *Nature Medicine*. Vol. 26, pp. 1919–1928.

19 M. Douglas, S.V. Katikireddi, M. Taulbut, M. McKee, G. McCartney (2020), “Mitigating the wider health effects of covid-19 pandemic response”, *The British Medical Journal*, Vol. 369, m1557.

a range of socio-economic indicators, such as income or employment, food insecurity, and loss of educational opportunities. Lastly, there are a set of indicators that numerically capture different aspects of the process of the response to the pandemic, such as the volume of tests undertaken or vaccine uptake more recently. Again, these are only partial measures and fail to capture the spectrum of responses that are needed.

The implication that flows from these considerations is that there is no single measure that can fully capture the performance of a country during the pandemic. There is also the added complication that a country that did well during one wave may not have done well in another. For example, an assessment at the end of the initial wave, undertaken in June 2020, would have concluded that the countries of central and eastern Europe performed very well. A subsequent assessment, undertaken in March 2021, would have reached a very different conclusion.

Given the strengths and weaknesses of the different data sources and in addition the need to use some criteria to select countries for further study, it seems reasonable to use excess mortality as the broadest indicator of success or failure. These data have been calculated for 40 industrialised countries, the majority of which are from Europe, for the pre-vaccine period (note that rankings vary among source data due to some methodological differences, as well as the time period selected).²⁰ From this pool we have selected six for further study that have differing characteristics. Germany and Denmark have done well. Bulgaria, Poland and the United Kingdom have not. Portugal is also included as a country that did well initially, with a very low excess mortality in the first months of the pandemic, but this changed later, placing it in a poor position overall. In addition, at the request of the EBRD, we have included Türkiye, a country where the Bank has been especially active.

Germany

Although the first case of Covid-19 was reported in Germany on 27 January 2020, there was relatively little transmission in the subsequent four weeks. Thus, the authorities had some time to prepare for the main part of the first wave of the pandemic. Throughout this period, politicians and the public were able to observe the rapidly deteriorating situation in neighbouring Italy.²¹ This, combined with a well-resourced public health infrastructure, gave the country a significant advantage. Before the pandemic, Germany had the highest number of intensive care unit beds per capita in the European Union. In fact, some commentators have long argued that Germany's hospital capacity is excessive and wasteful.²² Nevertheless, it did mean that policymakers were much less concerned about the health system being overwhelmed unlike in many other countries.

A full understanding of the pandemic response in Germany involves appreciation of its decentralised system of governance.²³ The post-war constitution gave substantial powers to the regions, or *Länder*, now numbering 16 following reunification. Consequently, many of the major decisions, such as when to impose lockdowns, were made at the regional level. Within days, however, growing public dissatisfaction with the regional differences in what was permitted gave rise to calls for the federal government to play a more active role. It could only do so in agreement with the regional governments, and the initial negotiations were successful. Within a few days nationwide restrictions were implemented and, as the pandemic progressed, tightened. By contrast, the later decisions to relax restrictions were largely made by the individual regional governments. This process gave rise to some debate about the roles of the different tiers of government. It was agreed that the federal government could intervene when rapid action was needed in a national emergency. However, speed was less important when deciding when to relax restrictions, so the normal arrangements would apply.

20 V. Kontis, J.E. Bennett, R.M. Parks, T. Rashid, J. Pearson-Stuttard, P. Asaria, et al. (2022), "Lessons learned and lessons missed: impact of the coronavirus disease 2019 (COVID-19) pandemic on all-cause mortality in 40 industrialised countries and US states prior to mass vaccination", *Wellcome Open Research*, Vol. 6, pp. 279.

21 S. Boccia, F. Cascini, M. McKee, and W. Ricciardi (2020), "How the Italian NHS Is Fighting Against the COVID-19 Emergency", *Frontiers in Public Health*, Vol. 8, 167.

22 Bertelsmann Stiftung (2019), "SPOTLIGHT Gesundheit: Neuordnung der Krankenhaus-Landschaft". Available at: <https://www.bertelsmann-stiftung.de/en/publications/publication/did/spotlight-gesundheit-neuordnung-der-krankenhaus-landschaft> (last accessed on 8 August 2022).

23 University of Michigan Press (2021), "Coronavirus Politics: Three approaches to handling the COVID Crisis in Federal Countries: Germany, Austria, and Switzerland", pp. 295–319. Available at: https://www.press.umich.edu/11927713/coronavirus_politics (last accessed on 8 August 2022).

Similar to the United Kingdom, Germany benefited greatly from its strong scientific base. It developed one of the two mRNA vaccines and the first PCR test for SARS-CoV-2, while its extensive network of public and private laboratories meant that testing could be scaled-up rapidly. At the same time, while the decentralised laboratory system responded to the increasing demand, there were some initial challenges in aggregating the data they generated to provide a national epidemiological picture.

Germany also benefited from a strong system of social protection. The system of short-time work benefit (*Kurzarbeit*) that had protected jobs successfully following the global financial crisis was expanded. Those unable to work were given up to 80 per cent of their former net income, and even more if they had children. Other provisions were made for the self-employed. Yet there were some problems. Three decades after reunification, there are still large socio-economic differences between the east and the west of the country. This is a factor in the support, albeit from a relatively small minority of the population, for a populist party in parts of the former German Democratic Republic that would later campaign on an anti-vaccination platform. This was associated with relatively high levels of vaccine hesitancy in those areas where the party drew its support.²⁴

Germany also benefited from the quality of its political leadership. It was widely recognised that the Chancellor, Angela Merkel, a trained scientist, had a high level of understanding of the nature of the pandemic and necessary responses. She did not, however, play a leading role in providing information about the course of the pandemic. This was left to the Robert Koch Institute, the national public health authority, with a prominent role also taken by Christian Drosten, a virologist who was part of the team developing the first PCR test. A charismatic communicator, he became a highly trusted figure. The situation, however, was complicated by Angela Merkel's decision to step down, leading to competition among a number of the regional governors from her party. This, at times, gave rise to mixed messaging and a degree of public confusion. Yet while the political structures in place at the beginning of the pandemic allowed for rapid and effective action, a degree of inertia was apparent in the period running up to the federal election in 2021, with the reluctance to take difficult decisions lest they influence the electorate.

In summary, Germany had everything going for it. There was strong and trusted political leadership, albeit complicated by the need to reach agreement between the federal and regional governments. It had a very high level of capacity in its scientific community, its health system and its laboratory network. It also had a very strong system of social protection. Meanwhile, there were problems in the more disadvantaged parts of the country and a vacuum of political leadership around the time of the federal elections, with unfortunate consequences for the control of the pandemic.

Portugal

Portugal, similar to many countries, has performed better at some stages during the pandemic than at others. Here we focus on the initial period, when excess mortality was relatively low, although it increased in the summer of 2020.

The first cases of Covid-19 in Portugal were recorded on 2 March 2020, in individuals with links to northern Italy. Although this was relatively early, Portuguese politicians could already see the impact of the pandemic in Spain, and, especially, in Italy, where hospitals were being overwhelmed.²⁵ The initial advice from the National Public Health Council was to do nothing, but this was overruled by the prime minister, who progressively implemented a series of restrictions, leading to a total lockdown on 16 March, before the first death from Covid-19 was registered. The pandemic took a different form in Portugal than in Spain and Italy – southern European countries that are otherwise broadly comparable. This is thought to be because the Portuguese cases were concentrated within some disadvantaged areas around Lisbon, characterised by relatively large migrant populations working in factories with unsafe environments.²⁶ In addition, the Portuguese public health system, weakened by a decade of austerity,²⁷ was unable to put in place a well-functioning test and trace system. The reduction in mobility was also somewhat less than in comparable countries and restrictions were

24 Foreign Policy, L. Staiano-Daniels (2022), "The Far-Right Has Turned East Germans Against Vaccines". Available from: <https://foreignpolicy.com/2022/02/12/germany-vaccines-soviets-afd/> (last accessed on 8 August 2022).

25 University of Michigan Press (2021), "Coronavirus Politics: A Tale of Two Pandemics in Three Countries: Portugal, Spain, and Italy", pp. 295–319. Available at: https://www.press.umich.edu/11927713/coronavirus_politics (last accessed on 8 August 2022).

26 A. Gama, J.V. Rocha, M.J. Marques, S. Azeredo-Lopes, A.R. Pedro, and S. Dias (2022), "How Did the COVID-19 Pandemic Affect Migrant Populations in Lisbon, Portugal? A Study on Perceived Effects on Health and Economic Condition", *International Journal of Environmental Research and Public Health*, Vol. 19, Iss., 3, pp. 1786.

27 H. Legido-Quigley, M. Karanikolos, S. Hernandez-Plaza, C. de Freitas, L. Bernardo, B. Padilla, et al. (2016), "Effects of the financial crisis and Troika austerity measures on health and health care access in Portugal", *Health Policy*, Vol. 120, Iss. 7, pp. 833–839.

lifted earlier. When they were, the government issued a raft of complex advice, much of which it later agreed was almost impossible to follow. As a consequence, while the incidence of Covid-19 did not rise to the levels seen in the other economies, a relatively high level of community transmission in and around the worst-affected areas continued for some time. In addition, the pandemic exposed serious weaknesses in the governance of long-term care for older people, revealing large numbers of unregulated long-term care facilities that posed major problems for those responsible for infection control.

Having avoided a high initial peak in cases, the Portuguese health system was not in danger of becoming overwhelmed. This was fortunate, because it too had been weakened by the aforementioned austerity measures, and had much less capacity than in comparable countries, particularly in its intensive-care facilities. Portugal also suffered from a weak welfare state and struggled to put in place the financial support that already existed in, for example, the Nordic countries.

Given all these problems, why did Portugal fare better initially than the other southern European countries? One analysis has concluded that Portugal benefited greatly from its centralised administrative structure, although, as a smaller country, the organisation of government would almost inevitably be easier.²⁸ Thus, while the Portuguese government could act rapidly, this was not possible for the central governments in Spain and Italy, where considerable responsibility for health and other sectors was devolved to regions. For example, Lombardy in Italy, one of the worst-affected regions, defied requests from Rome to impose restrictions, with serious consequences for the spread of the pandemic. In Spain, the distribution of additional financial resources from Madrid became bogged down in a complex bureaucratic tangle.²⁹

An additional factor was the high level of public trust in the Portuguese government, irrespective of the political allegiance of those surveyed. There was widespread acceptance of measures that impinge on personal privacy, such as tracking mobility using cell phones, and very high levels of adherence to personal protective measures such as wearing face masks and avoiding enclosed indoor areas. More recently, Portugal has stood out from other European countries because of the success of its vaccine rollout, achieving some of the highest rates of coverage anywhere.

In summary, while Portugal faced many of the same challenges as Spain and Italy, it benefited greatly from a few additional weeks of warning before the first cases arrived and a system of governance that enabled rapid action. These, to a considerable extent, counterbalanced the substantial weaknesses in its health systems and public health capacity and its social safety nets, especially in the most disadvantaged areas. However, these problems did make it difficult to maintain the initial achievements.

Denmark

Denmark has fared well during the pandemic.³⁰ In the first wave, it responded rapidly, progressively locking down its economy between 10 to 18 March 2020, when case numbers were still low. This was accompanied by a wide-ranging economic assistance programme to alleviate the unintended consequences. Although it reopened the economy earlier than most other countries, in mid-April, it had by then put in place an extensive testing and contact-tracing infrastructure. That, at least initially, managed to keep the pandemic under control.

While the initial response was rapid, it was not particularly strict in comparison to other countries. The restrictions were focused on settings where large numbers of people might mix indoors, such as elementary schools, daycare facilities, and restaurants and shopping centres. On the other hand, many businesses were allowed to stay open and there were no restrictions on people mixing outdoors.

Although initially slow in scaling-up its testing programme, by April 2020, it had entered a partnership with the country's largest pharmaceutical firm, Novo Nordisk, and by July it had one of the highest testing capacities in relation to population of any country in the world. Denmark also developed a world-leading programme of genomic sequencing. Unlike many other countries, it was able to maintain a high level of contact-tracing, taking advantage of its strong public health infrastructure. At no time during the early stages of the pandemic was the healthcare infrastructure in danger of becoming overwhelmed.

28 University of Michigan Press (2021), "Coronavirus Politics: A Tale of Two Pandemics in Three Countries: Portugal, Spain, and Italy", pp. 295–319.

29 H. Legido-Quigley, J.T. Mateos-García, V.R. Campos, M. Gea-Sánchez, C. Muntaner, M. McKee (2020), "The resilience of the Spanish health system against the COVID-19 pandemic" *The Lancet Public Health*, Vol. 5, Iss. 5, e251–252.

30 University of Michigan Press (2021), "Coronavirus Politics: Denmark's approach to COVID-19: A Participatory Approach to Policy Innovation", pp. 249–263. Available at: https://www.press.umich.edu/11927713/coronavirus_politics (last accessed on 8 August 2022).

These measures were taken with a high level of political consensus. The minority Social Democrat government worked with other parties and social partners to achieve agreement. For example, some economic responses originated with the Danish trade unions and employers. In this respect, a notable feature of the Danish response was the way in which the government engaged with a wide range of actors to ensure that its proposals were practical and feasible. In a number of cases, politicians went beyond the advice of their public health advisers, adopting a more cautious approach. Some of those advising them had supported a more *laissez faire* approach such as that adopted in neighbouring Sweden, and which would ultimately lead to much worse outcomes than in its Nordic neighbours. Throughout, the Danish response attracted a high level of popular support.

It is, of course, necessary to recognise that Denmark is a relatively small country, with a population of 5.8 million, and is among the wealthiest in Europe. Yet governments can choose to spend their money in different ways, and successive Danish governments have invested heavily in social protection. This meant that the need for special provisions to protect the most vulnerable was less than in many other countries but, even so, the Danish authorities did adopt a number of additional measures, such as a scheme whereby the government covered most of the salary of furloughed workers. Perhaps because of this, there was very little popular opposition to the restrictions imposed. It also has high-quality housing, with relatively low occupancy levels, thus avoiding the overcrowding that created conditions for disease transmission in some other countries.

In summary, Denmark's response can be characterised by strong consensual political leadership, high levels of trust, well-resourced public health and health system capacity, and strong social safety nets.

Bulgaria

On all measures, Bulgaria has performed poorly during the pandemic.³¹ This is not especially surprising as it had entered the pandemic with many disadvantages. To begin with, it is one of the poorest countries in the European Union, with high levels of poverty. It has an ageing population, especially in rural areas, reflecting large-scale emigration, especially of young people seeking employment in western Europe. This emigration has also further weakened its health system, with its inheritance of large but often obsolete facilities that have few health workers. Its public health infrastructure has suffered from many years of under-investment and, in the 2019 evaluation by the Global Health Security Index, a measure of pandemic preparedness, it was ranked 61st, one of the lowest in the European Union.³² The government was weakened by infighting and faced popular protests, although not directly related to the pandemic, and very low levels of public trust.

In spite of the above disadvantages, initially, the results seemed good. Bulgaria locked down quickly, on 13 March 2020 when there had been only 24 cases. The restrictions put in place were among the strictest in Europe; people were not allowed into parks, gardens or playgrounds even to take exercise. Those violating the rules faced jail sentences of up to three years and very heavy fines. Yet while the government was able to implement, and enforce, restrictions, it lacked the capacity to provide support for the population. A public testing system was established but was very limited. Those with symptoms could obtain a PCR test reimbursed by the public insurance system, but only after referral from a general practitioner to an infectious disease specialist, both of whom one had to see in person. As a consequence, many people paid for private tests, each typically costing €30 to €75, beyond the reach of many. Contact-tracing, managed by depleted public health laboratories, was largely ineffective.

Other measures often appeared confused. A mask mandate was adopted, only to be reversed and then implemented once more. An order to close nightclubs was also rescinded following popular discontent. In part this was a consequence of the prime minister creating two separate advisory bodies: one favouring strict restrictions

31 University of Michigan Press (2021), "Coronavirus Politics: "COVID-19 in Central and Eastern Europe: Focus on Czechia, Hungary, and Bulgaria", pp. 413–435. Available from: https://www.press.umich.edu/11927713/coronavirus_politics (last accessed on 8 August 2022).

32 GHS Index (2021), "The 2021 Global Health Security Index". Available at: <https://www.ghsindex.org/> (last accessed on 8 August 2022).

while the other contained individuals who favoured lifting restrictions to enable herd immunity. The media frequently pitted both sides against each other, as did the prime minister on occasion, creating widespread public confusion. This facilitated the spread of online disinformation, which was widely followed. Furthermore, the already-weakened health system was unable to obtain supplies of PPE. In some places this led to mass resignations of health workers, with health authorities appealing for volunteers to replace them.

While many characteristics of Bulgaria's response were similar to those of its eastern European neighbours, themselves characterised by limited public health capacity, it differed in one important aspect. While the others closed their borders early, with the Czech Republic even preventing anyone from leaving, Bulgaria allowed large numbers of people to travel to western Europe as seasonal agricultural and care workers. Inevitably, many brought infections back on their return. More recently, the very low levels of public trust in government have manifested in high levels of vaccine hesitancy, with the country achieving the lowest vaccine coverage rate in the European Union.

In summary, Bulgaria entered the pandemic with many disadvantages and, despite good results in early 2020, the country's Covid-19 response lacked cohesion and support.

Poland

As with other countries in central Europe, Poland benefited from Covid-19 arriving late. The first case was identified on 4 March 2020, over a month later than countries such as Italy or Spain. The Polish government then responded rapidly.³³ Testing centres were established within a matter of days, although capacity never reached the levels seen in many western European countries. This was, however, compensated for by the imposition of restrictions on population mixing, on 10 March 2020, when only 22 cases and no deaths had been recorded. Initially relatively mild, the restrictions intensified rapidly, culminating in a comprehensive lockdown by 24 March. By comparison, this lockdown occurred when Poland had recorded 10 deaths, while, in the United Kingdom, with a population almost 80 per cent larger than Poland, the initial lockdown was imposed at a time when there had been 331 deaths. Poland also went beyond the international guidance in place at the time, by requiring face masks to be worn in all public places. The WHO, which was late in recognising the airborne nature of Covid-19, only issued guidance to this effect on 5 June 2020. Poland also closed its

external borders, including those with other European Union member states, despite opposition from the European Commission.

Poland, again, similar to its neighbours, had a number of natural advantages at the onset of the pandemic. First, its population was slightly younger than that in western Europe, an important factor given the close association between age and risk of severe illness and death. Second, its population density is much lower than in western Europe, with 40 per cent of the population still living in rural areas, compared with 16 per cent in the United Kingdom. The country is also less well connected than many European countries, both internationally and internally, with most journeys in rural areas taking place by private car. Lastly, care for older people is more likely to be by families at home than in care homes, which in many other countries were the setting for high levels of transmission and deaths.

Given these early successes, the inevitable question is what went wrong? The measures that had successfully contained the pandemic were diluted or removed between May and June 2020. This was mainly in response to the severe economic crisis caused by the pandemic. A further factor was the forthcoming presidential election, scheduled for 10 May 2020. The ruling party was committed to that date. Yet, following opposition from one of its coalition parties, the date was postponed until 28 June. Although public health experts cautioned against lifting these measures, there was no immediate spike but cases began to rise by the end of the summer, by which time the Polish government was very reluctant to reintroduce the earlier restrictions, only reaching a level of stringency similar to the first period by October 2020. By this time cases were rising rapidly. Meanwhile, there was evidence of a loss of public support for the measures, with adherence to some, such as the wearing of face masks, falling.

Poland has been hit hard by subsequent waves of the pandemic. It entered the pandemic with a much lower health system capacity, measured in terms of health workers and facilities, than other European countries and, by autumn 2020, hospitals were being overwhelmed. This happened again in autumn 2021.³⁴ A further concern has been its inability to scale up its vaccine programme as

33 L. Gruszczynski, M. Zatoński, M. McKee (2021), "Do Regulations Matter in Fighting the COVID-19 Pandemic? Lessons from Poland", *European Journal of Risk Regulation*, Vol. 12, Iss. 4, pp. 739–757.

34 Notes From Poland, A. Wądołowska (2021), "Patients wait hours for ambulances as Polish hospitals struggle amid Covid surge". Available at: <https://notesfrompoland.com/2021/11/30/patients-wait-hours-for-ambulances-as-polish-hospitals-struggle-amid-covid-surge/> (last accessed on 8 August 2022).

effectively as many of its Western neighbours. By February 2022 only 58 per cent of its population was fully vaccinated compared with 91 per cent in Portugal.

Poland was very successful in managing the initial phase of the pandemic but a combination of political factors and weak health system infrastructure meant that it struggled greatly subsequently, leading to a high number of excess deaths.

United Kingdom

In theory, the United Kingdom should have performed very well during the pandemic. In 2019 it ranked second globally in the Global Health Security Index.³⁵ Scientifically, it is one of the leading countries in the world, with a strong record of achievement in health research. Yet on any of the possible outcome measures, it performed extremely badly, with one of the highest overall death rates and largest hits to its economy.

As in all countries, there were some things that went well and others that did not. Compared with many countries, the United Kingdom was very well placed to respond to the pandemic. Healthcare is provided in each of the four constituent countries by a largely integrated National Health Service (NHS). This facilitated coordination of effort and, although the health service had suffered from the consequences of a decade of austerity, health professionals and managers worked effectively to increase capacity, for example, by repurposing facilities and extensive use of task shifting. Mechanisms were established to ensure the rapid exchange of information on the management of this new disease. The existence of an integrated system, which, unusually, included a strong research and development function, the National Institute for Health and Care Research, made it possible to gather and analyse large-scale data, through the OpenSAFELY project, to provide insights into the impact of the pandemic and generate observational data to shed light on the effectiveness of treatments. This infrastructure also facilitated the RECOVERY trial, a study of treatments for Covid-19 all over the world. The United Kingdom also led the development of one of the successful vaccines. It had a robust genomic sequencing programme, with some of the highest proportions of viral isolates sequenced of any country. Taken together, it was scientifically very strong.

Although pandemic planning exercises had been undertaken, their findings were not implemented.³⁶ In addition, the decision to lock down was taken later than

in other European economies and this delay is estimated to have accounted for about half of the deaths occurring in the first wave of the pandemic.³⁷ Once the decision was made, however, things did move relatively quickly, as television coverage from northern Italy was engendering concerns that the health service might soon be overwhelmed.

Later in the pandemic, it became apparent that there was a continuing tension between the scientific advice the prime minister was getting, which urged caution, and pressure from some of his parliamentarians to remove restrictions as soon as possible. As a consequence, there were a number of contradictory messages, with the public being advised to stay alert, while, at the same time, being offered a subsidy to eat out, with the latter decision believed to have contributed substantially to the spread of infection.³⁸ Throughout the pandemic the reaction (in England at least, as some policies are devolved to the governments in Scotland, Wales and Northern Ireland) was characterised by a failure to engage with those on the frontlines of the Covid-19 response, especially in local government, the health service and education.

The country also suffered from constraints in its capacity to react. The rate of growth in funding of the NHS had slowed markedly in the decade since the financial crisis and the service was struggling to meet its agreed performance standards.³⁹ It had traditionally recruited staff from abroad, with large numbers coming from the European Union in recent years, but that changed following Brexit. Stockpiles of emergency supplies had been allowed to run down. The public health system had been weakened by a problematic reorganisation in 2012 and subsequent budget cuts.⁴⁰ The government responded with a massive procurement exercise, seeking supplies of PPE, ventilators, testing and tracing services, and hospital facilities (from both existing private hospitals and new facilities in conference centres and the like). Unfortunately, this was characterised by multiple problems, including purchase

35 GHS Index (2021), "The 2021 Global Health Security Index". Available at: <https://www.ghsindex.org/> (last accessed on 8 August 2022).

36 M. McKee (2021), "The UK government tested the response to a coronavirus—why are we only discovering this now?", *The British Medical Journal*, Vol. 375, n2485.

37 UK Parliament (2020), "Coronavirus: lessons learnt: Committees". Available at: <https://committees.parliament.uk/work/657/coronavirus-lessons-learnt/news/> (last accessed 8 August 2022).

38 T. Fetzner (2022), "Subsidising the spread of COVID-19: Evidence from the UK's Eat-Out-to-Help-Out Scheme", *The Economic Journal*, Vol. 132, Iss. 643, pp. 1200–1217.

39 L. Hiam, D. Dorling, M. McKee (2020), "Things Fall Apart: the British Health Crisis 2010–2020", *British Medical Bulletin*, Vol. 133, Iss. 1. Available at: <http://dx.doi.org/10.1093/bmb/ldz041> (last accessed on 8 August 2022).

40 G. Scally, B. Jacobson, K. Abbasi (2020), "The UK's public health response to covid-19", *The British Medical Journal*, Vol. 369, m1932.

of equipment that was unusable and overpriced, often in cases where suppliers, many of whom had no experience with the products involved, exploited connections with politicians without public tenders.⁴¹ At the same time, existing capacity, for example in the health service and government laboratories and local public health teams, was marginalised.

The United Kingdom benefited from good information systems including, almost uniquely, recording of ethnicity. Consequently, it was possible to observe that the impact of the pandemic, both in health and economic terms, was distributed unequally. In some communities, especially those with high shares of people from minority ethnic populations, there were many people living in multigenerational households, with few financial reserves, and often engaged in public-facing roles, a combination that made it difficult to isolate when infected. These communities, and certain ethnic groups, such as South Asians, were especially hard hit throughout the pandemic.⁴² As in several other countries, residential social care facilities were very badly affected, reflecting their low policy priority.⁴³

Lastly, the United Kingdom got off to a very rapid start with its vaccine programme, initially leading the European rankings. This reflected effective leadership of the programme, something that was lacking in the highly problematic test and trace system,⁴⁴ but progress slowed so that, by early 2022 it had been overtaken by many other European countries.

In summary, therefore, the United Kingdom had outstanding scientific capacity but lacked political leadership and public health capacity and a substantial share of the population was vulnerable on account of their socio-economic disadvantage and precarious existence.

Türkiye

Although Türkiye was not included in the analysis used to select the countries for this overview, on other metrics, such as the death rate from Covid-19 per 100,000 population, it has done relatively well, with a figure below that of Germany. Even so, for the reasons discussed earlier, comparisons outside detailed research studies should be interpreted with caution.

After the first recorded case on 11 March 2020, the Turkish government moved quickly to impose restrictions. However, the public health authorities had by then been taking measures for several weeks, from the time that the first reports were emerging from Wuhan. These included, from early February, restrictions on international travel, a vital move because Istanbul is a very important flight connection hub. However, all did not go smoothly. On 10 April the Interior Ministry announced a curfew, to start at midnight the following day. This delay led large numbers of people to buy provisions in crowded shops, likely contributing to the spread of infection.

The Turkish response has been characterised as engaging with a wide range of stakeholders. Early in the pandemic a Coronavirus Scientific Advisory Board was established, bringing together leading medical experts, although it was not clear that its advice was always followed. There was also close coordination among ministries. The speed of the response has been attributed to the concentration of power centrally.

Türkiye benefited from a sustained programme of investment in health services within the framework of the Health Transformation Programme that began in the early 2000s (including a national health insurance scheme and a major investment in hospitals), although from a relatively low base in the 1990s.⁴⁵ It seems to have coped initially, although faced pressure in the major cities. The government did invest in additional capacity to respond to the pandemic such as construction of field hospitals and purchase of equipment and medicine through the EBRD and AIIB COVID-19 Emergency Equipment Project. It also ensured that treatment for Covid-19 was free regardless of insurance status.

41 M. McKee (2020), "England's PPE procurement failures must never happen again", *The British Medical Journal*, Vol. 370, m2858.

42 R. Mathur, C.T. Rentsch, C.E. Morton, W.J. Hulme, A. Schultze, B. MacKenna, et al. (2021), "Ethnic differences in SARS-CoV-2 infection and COVID-19-related hospitalisation, intensive care unit admission, and death in 17 million adults in England: an observational cohort study using the OpenSAFELY platform", *The Lancet*. Vol. 397, Iss. 10286, pp. 1711–1724.

43 S. Rajan, A. Comas-Herrera, M. McKee (2020), "Did the UK Government Really Throw a Protective Ring Around Care Homes in the COVID-19 Pandemic?" *Journal of Long-Term Care*, pp. 185–195.

44 A. Crozier, M. McKee, S. Rajan (2020), "Fixing England's COVID-19 response: learning from international experience", *Journal of the Royal Society of Medicine*, Vol. 113, Iss. 11, pp. 422–427.

45 R. Atun, S. Aydın, S. Chakraborty, S. Sümer, M. Aran, I. Gürol, et al (2013), "Universal health coverage in Turkey: enhancement of equity", *The Lancet*, Vol. 382, Iss. 9886, pp. 65–99.

On the other hand, the restrictions were difficult to sustain. They had a severe impact on the Turkish economy, especially its important tourism industry. This was against a backdrop of declining economic growth over several years. The government introduced economic stability and social protection packages but these were relatively limited. There was also growing distrust of the published data.

In summary, Türkiye was able to respond rapidly, anticipating the problems before they emerged. In the meantime, it struggled to maintain progress as the pandemic continued.

Table 1. Excess mortality in six economies before the population has been vaccinated

Economy	Number of excess deaths (95% confidence interval)	Number of deaths assigned to Covid-19 as underlying cause
Bulgaria	18,200 (12,800 to 23,500)	9,854
Denmark	2,400 (-170 to 5,100)	2,343
Germany	64,100 (-1,870 to 135,400)	67,903
Poland	82,300 (62,500 to 101,400)	42,171
Portugal	20,700 (14,100 to 27,200)	15,962
United Kingdom	102,100 (75,300 to 128,600)	128,077

Source: Modified from the following: V. Kontis, J.E. Bennett, R.M. Parks, T. Rashid, J. Pearson-Stuttard, P. Asaria, et al. (2022), "Lessons learned and lessons missed: impact of the coronavirus disease 2019 (COVID-19) pandemic on all-cause mortality in 40 industrialised countries and US states prior to mass vaccination", Wellcome Open Research, Vol. 6, pp. 279.

Note: Data for six economies were collected between mid-February 2020 and mid-February 2021. Türkiye did not have data on excess mortality.

Conclusion

When seeking to understand how countries have performed in a pandemic, three main elements can be distinguished.⁴⁶ The first is political leadership. Heads of government set the broad direction for a pandemic response, balancing the often-competing influences that they face. They decide when to act in changing situations, often on the basis of incomplete information. A government headed by someone who understands the evidence (and accepts the science underlying it), who is engaged with the threat, who can act decisively, instilling trust and confidence in those who must implement their decisions, and who has created effective governance arrangements, is more likely to succeed. The second is the capacity to respond, most obviously in the health and social care sectors, including those in the public health system, but also in other areas, such as other emergency services, procurement, and logistics. Countries will be more likely to succeed if they have a trained and equipped workforce in place and where all of those involved in the pandemic response are working together to achieve a shared goal. The third is a population that is supported by strong safety nets. A pandemic requires people to change

their lives in many ways. Lockdowns prevent them from undertaking many types of work, especially those roles that are public-facing. They reduce people's earning capacity, especially where they are in informal employment or are dependent on a flow of customers, as in hospital venues or retail outlets. In several of the economies included in this review migrant communities were especially vulnerable. Children may be unable to attend schools. Those affected will require support. This can come in many forms but, broadly, people living in countries with strong social safety nets, such as income replacement during a crisis and strong employee rights, and where there is high-quality infrastructure, for example homes that are not overcrowded and have access to fast broadband, are more likely to survive a pandemic.

⁴⁶ M. McKee, M.C.I. van Schalkwyk, N. Maani, S. Galea (2020), "A new year's resolution for health workers", *The British Medical Journal*, Vol. 371, m4602.

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