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A country-level pandemic response toolkit: Enabling lessons learned



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About this report

A country-level pandemic response toolkit: Enabling lessons learned is a report by Economist Impact. The report reflects the findings of country research in 12 countries and the insights of an Advisory Panel of six international experts in pandemic response. The programme is sponsored by Sanofi. The Economist Impact research team comprised Elly Vaughan, Marcela Casaca and Keven Sew. Alexandra Bhatti, Lecturer in Public Health at Macquarie University, acted as an invited external peer reviewer for the report.

Economist Impact would like to thank the Advisory Panel who generously offered their time and insights.

- Professor Michael Baker, Professor of Public Health, University of Otago; Member of the New Zealand Ministry of Health Covid-19 Technical Advisory Group; Director, Health Environment Infection Research Unit (HEIRU); Co-Director, He Kainga Oranga/Housing and Health Research Programme.
- Professor Chen Chien-Jen, Distinguished Professor, Genomics Research Centre Academia Sinica, former Minister of Health and Vice President of Taiwan.
- Dr Catherine Duggan, CEO, International Pharmaceutical Federation (FIP).

- Dr Amgad Elkholy, The WHO Regional Office for the Eastern Mediterranean.
- Professor Olga Jonas, Senior Fellow, Harvard Global Health Institute (2017-present) and Coordinator of responses to avian and pandemic influenzas at the World Bank (2006-2016).
- Prof Jeffrey Lazarus, Associate Research Professor, ISGlobal, and Associate Professor, University of Barcelona, Spain. Member of the Lancet Commission on COVID-19 Public Health Taskforce.
- Dr Miguel O’Ryan, Professor, Faculty of Medicine, University of Chile, Member of the Chilean Ministry of Science Advisory Board for Covid19 Vaccines.
- Mariano Votta, Director, Active Citizenship Network/Cittadinanzattiva, Italy.
- Professor Yik Ying Teo, Dean of the Saw Swee Hock School of Public Health, National University of Singapore.

The findings and views expressed in this report are those of Economist Impact and do not necessarily reflect the views of the Advisory Panel or the project sponsor.

Executive summary

Why this topic and why now?

The covid-19 pandemic has reshaped the world in many ways, leading to millions of deaths and socio-economic consequences globally. Different organisations and governments, international agencies and the scientific community are now trying to understand what could have been done differently and what we should do to prevent this from happening again.

“How do we get out of this pandemic in as safe, quick and equitable way as possible?”

Yik Ying Teo, Dean of the Saw Swee Hock School of Public Health, National University of Singapore

One thing is for sure: the world needs to learn how to respond better, since most experts debate when, rather than whether, a new pandemic will emerge.

“What’s missing is **accountability**, people won’t learn lessons unless they know that there are consequences for not learning them.”

Olga Jonas, Senior Fellow, Harvard Global Health Institute

What this research adds and our methods

Investigating what could be learned from covid-19 is essential to create a more effective response in future. This Economist Impact report contributes to that global effort by exploring responses to the covid-19 pandemic in twelve selected countries. The countries included in the research are: Australia, Canada, Chile, Denmark, Germany, Israel, New Zealand, Portugal, South Korea, Taiwan, United Arab Emirates and the United States.

The covid-19 response within these countries was analysed to identify interesting and successful aspects of their response that others could learn from, rather than attempt an exhaustive analysis or examine only those with an “exemplary” approach.

Economist Impact convened an Advisory Panel of nine international experts. The Panel provided feedback on the desk research, advised on practical considerations and identified aspects of response that were suboptimal or missing during covid-19 and how these could be addressed in future pandemic responses.

Developing a country-level pandemic response toolkit to support the implementation of lessons learned

Based on our country research and expert insights, we identified a number of key mechanisms for an effective pandemic response (see Figure 1), which we then translated into a country-level pandemic response toolkit.

The toolkit explores a raft of measures implemented in studied countries and measures that could improve future pandemic response, based on key international documents and expert insights.

The toolkit is designed to work across a wide range of different countries. As such, it is a top-level toolkit that identifies key measures that our evidence-based research indicates need to be in place for an effective future pandemic response. While we have informally prioritised items within the toolkit according to expert advice, it is designed to be adaptable to suit an individual country’s needs. Individual countries

Toolkit structure:

National response (government, public health system, healthcare system – public & private sector)
Coordination within and outside government
Evidence-based coordination
Coordination of response capacity
Support measures
Communication and community engagement
National contribution to the international response
Coordination

Figure 1: Key mechanisms for effective pandemic response



can identify and apply their own priorities when using the toolkit to design a country-level implementation roadmap.

The toolkit is divided into two top-level domains, covering national response and the national contribution to the international response (see Toolkit structure).

By identifying lessons learned from the response to the covid-19 pandemic in twelve countries and expert insights, we aim to support policymakers in applying these

lessons learned to improve future pandemic response. The actions identified in the toolkit include the “successful” response elements observed during covid-19 and responses that were either not seen during covid-19 or were underutilised: which our desk research and advisory panel indicated should be included as elements within future pandemic response.

“Covid-19 is a dramatic illustration of why pandemic plans should never be tied to a particular virus with particular dynamics.”

Michael Baker, Professor of Public Health, University of Otago; Member of the New Zealand Covid-19 Technical Advisory Group

The toolkit is designed to be useful and actionable for policymakers; it highlights the stakeholders involved and includes policy exemplars that demonstrate the implementation of the toolkit element.

Implementing lessons learned: what next

Our analysis has shown the value of response elements that have been implemented during covid-19, such as the redeploying and reconfiguring of existing infrastructure, employing a visibly science-led approach and building public trust. Additionally, we have also identified where the response could be improved in future; for example, through strengthening the role of international organisations like the World Health Organization and considering equity and access issues to diagnostics, treatment and vaccination. Together, these elements provide the building blocks to improve the global and national-level response to future pandemics (see Figure 1).

The next steps require the humility to **learn** difficult lessons, the **vision** to imagine and **implement** improved response measures, and a financial and political **commitment** to make for a better response next time.

Introduction

Infectious outbreaks have been on the rise for the past several decades, with public health experts warning of the increasing threat of a highly lethal global pandemic that we were not prepared for. The Global Preparedness Monitoring Board reported in 2019 that the world's preparedness for such an event was grossly insufficient.¹ Coronavirus (covid-19) was first reported toward the end of 2019 and declared a global pandemic by the World Health Organization (WHO) on March 11th, 2020.² It continues to be an ongoing global threat at the time of writing.

Worldwide, countries have responded differently to the virus outbreak with varying levels of success. While some countries have experienced devastating amounts of illness and death due to covid-19, others have put in place more successful strategies to contain infection. However, the severity in many countries has changed over time with infections surging in some places that saw early success. Many countries that appeared well prepared were still caught off-guard when the virus struck. Why was this? And what are the early lessons for the future? These are not straightforward questions and there are no easy answers.

Understanding more about how different countries have responded to the covid-19 crisis and the factors that have contributed to where they have achieved success can assist with how countries strengthen, co-ordinate and refine any future pandemic responses. Much has been learned from the experiences of previous infectious disease outbreaks including the 2009 H1N1 influenza pandemic and the 2014-16 Ebola outbreaks in West Africa. There remain vast opportunities for the global community to further learn from experiences with covid-19 as the pandemic continues to evolve globally and there looms the unknown impact that new variants may have in future. The imperative for learning lessons is further strengthened as most experts debate when, rather than whether, a new pandemic will emerge.

Methods

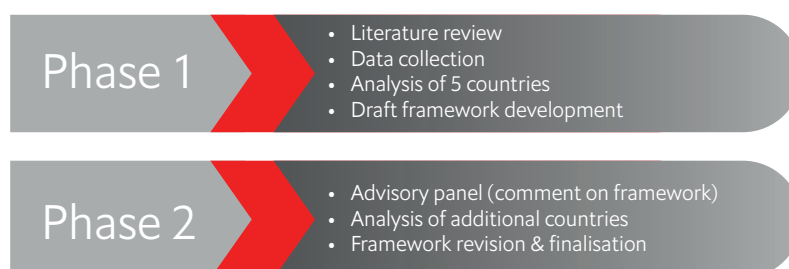
The research was divided into two phases. In Phase 1, five countries were selected and a literature review was conducted to serve as the basis for the development of a country-level toolkit of pandemic response. In Phase 2, an additional seven countries were analysed and a brief search of international frameworks for future pandemic preparedness and response was conducted to provide further input for the toolkit development. The effectiveness of overall country responses or of individual responses was not measured in Phase 1 or 2. The research, together with the inputs and feedback of an Advisory Panel, led to the final version of a country-level pandemic response toolkit.

Advisory Panel

An Advisory Panel, composed of nine global experts with a variety of specialities across pandemic responsiveness was assembled and met toward the end of Phase 1. The Advisory Panel reviewed and fed into development of the toolkit, and made recommendations about which countries to include in Phase 2.

- Professor Michael Baker, Professor of Public Health, University of Otago; Member of the New Zealand Covid-19 Technical Advisory Group; Co-Director, He Kainga Oranga/ Housing and Health Research Programme; Director, Health Environment Infection Research Unit (HEIRU).

Figure 2: Methods overview



- Professor Chen Chien-Jen, Distinguished Professor, Genomics Research Centre Academia Sinica, former Minister of Health and Vice President of Taiwan.
- Dr Catherine Duggan, CEO, International Pharmaceutical Federation (FIP), UK.
- Dr Amgad Elkholy, The WHO Regional Office for the Eastern Mediterranean.
- Prof Olga Jonas, Senior Fellow, Harvard Global Health Institute (2017-present) and Coordinator of responses to avian and pandemic influenzas at the World Bank (2006-2016).
- Prof Jeffrey Lazarus, Associate Research Professor, ISGlobal, and Associate Professor, University of Barcelona, Spain. Member of the Lancet Commission on COVID-19 Public Health Taskforce.
- Dr Miguel O’Ryan, Director of the Faculty of Medicine at the University of Chile, Member of the Chilean Ministry of Science Advisory Board for Covid19 Vaccines.
- Mr Mariano Votta, Director, Active Citizenship Network, Italy.
- Professor Yik Ying Teo, Dean of the Saw Swee Hock School of Public Health, National University of Singapore.

Country selection and analysis

Phase 1

The rationale for choosing the five countries included in Phase 1 was based on selecting a range of countries that had different approaches to handling the virus with widely applicable findings. The country analysis of Phase 1 was the initial proof of concept to

build the toolkit. The countries selected for Phase 1 were: Denmark, Germany, South Korea, Taiwan and the United States. The in-depth research of Phase 1 was developed mostly during 2020 when countries were having the first and second waves of covid-19 and virus variants were limited. Because this was a phased project, Phase 1 reviewed countries up to March 2021.

The brief rationale for inclusion of these countries:

- **Denmark:** early rapid response with decisive leadership/decision-making
- **Germany:** track and trace development efforts
- **South Korea:** comprehensive, multi-stakeholder decision-making
- **Taiwan:** repurposing and redeploying existing infrastructure
- **United States:** the role of the Biomedical Advanced Research and Development Agency (BARDA) in vaccine development

Phase 2

The Advisory Panel assisted in the identification of a further seven countries to be analysed in Phase 2 and included in the toolkit. The research team then explored responses to covid-19 within these countries and additionally carried out a search of notable international organisations’ frameworks on response and preparedness for future pandemics. Phase 2 was carried out during the second half of 2021.

Countries studied: Australia, Canada, Chile, Israel, New Zealand, Portugal and United Arab Emirates (UAE).

The brief rationale for inclusion of these countries:

- **Australia:** decentralised public health response, focus on vigilant testing, tracing and quarantine
- **Canada:** initial slow response, but then fast vaccination rates
- **Chile:** early vaccination when compared with other Latin American countries
- **Israel:** exemplary vaccination programme, early negotiations with pharmaceutical companies and efficient vaccine roll-out
- **New Zealand:** fast and aggressive lockdown measures alongside strong political leadership
- **Portugal:** rapid response in declaring a state of emergency
- **UAE:** use of innovative technologies in controlling the virus and early openness to tourism

The Advisory Panel highlighted during its first meeting that international collaboration and co-operation is crucial for an effective global response to a global pandemic, something they felt had been lacking during the covid-19 pandemic. Alongside the country-level analysis, we also examined some documents from key international organisations to provide insights on international-level action:

- WHO's *Strategic Preparedness and Response Plan for Covid-19*, that set out the key actions at national, regional and global levels needed for the covid-19 response.³
- The G20 report on *The global deal for our pandemic age*, that proposes how finance can be organised to reduce the globe's vulnerability to future pandemics.⁴
- *Covid-19: Make it the last pandemic*, part of the Independent Panel for Pandemic Preparedness and Response.⁵
- Frieden TR, Buissonnière M, McClelland A. The world must prepare now for the next pandemic. *BMJ Global Health* 2021.²⁴²

Table 1: Inclusion and exclusion criteria

Inclusion	Exclusion
<ul style="list-style-type: none"> • Country in scope 	<ul style="list-style-type: none"> • Country out of scope
<ul style="list-style-type: none"> • Description of covid-19 response measures: policies, public health and economic interventions. Including details about the measures, dates of introduction (and easing, where applicable), implementation information 	<ul style="list-style-type: none"> • Papers focusing on transmission and disease understanding • Impact of covid-19 on individuals (eg mental health), the economy or other parts of the health system (eg routine care) • Knowledge, awareness, attitudes of various groups

Search approach

To identify relevant documents, Embase and MEDLINE were searched alongside grey literature sources. For Phase 1 these databases were searched using the Embase.com platform, whereas for Phase 2 the OvidSP platform was used. As such, there are differences in the precise syntax and structure of the search strategies to reflect the differences between the two platforms. The search strategy combined the concepts of covid-19/pandemic, public health/response and the selected countries. The search results were sifted using the following criteria:

Phase 1

The search period covered up to February 1st 2021. The literature search retrieved 909 results. These results were sifted by an Information Specialist to give a final total of 37 included papers.

Phase 2

The search period covered up to August 6th 2021. The literature search retrieved 17 results. These results were sifted by an information specialist to give a final total of 2 included papers.

We anticipated that not all information about the covid-19 pandemic response would be captured in the scientific literature, owing to the rapidly changing environment and immediacy of events. Additional grey literature and Google searches were performed to supplement the search and provide more robust data, where relying on published data alone may have provided an incomplete picture.

Data collection

Phase 1

Data was collected on the number of confirmed covid-19 cases per 100,000 population for each included country using the Our World in Data database, as of February 19th 2021.⁶ We used this data to develop a timeline of responses for each country, against which we plotted the introduction date (and easing, where applicable) of key government interventions and policies. The primary source for data on policy implementation was the Oxford covid-19 government response tracker—as this provides consistent methodology and definitions across countries—with ad hoc desk research as needed.⁷ The purpose of the timelines is to give an at-a-glance overview of the outbreak dynamics and key policy measures for each country.

The timelines focus on key containment and health system policies. Containment policies include the closure of schools and universities, closure of workplaces, cancellation of public events, restrictions on gatherings, closure of public transport, stay at home requirements (lockdowns), restriction on internal travel and international travel controls. Health system policies include covid-19 testing and facial covering policies. The Oxford covid-19 government response tracker further segmented the policy responses into levels depending on the severity of the interventions (see Table 2).

Table 2: Definitions and levels of implementation for key government interventions and policies from the Oxford covid-19 government response tracker—interventions included in covid-19 timelines highlighted in red.

Policy	Description	Levels	
Stay at home requirements	Record orders to "shelter-in-place" and otherwise confine to the home	0	No measures
		1	Recommend not leaving house
		2	Require not leaving house with exceptions for daily exercise, grocery shopping, and 'essential' trips
		3	Require not leaving house with minimal exceptions (eg allowed to leave once a week, or only one person can leave at a time, etc)
Restriction on international travel	Record restrictions on internal movement between cities/regions	0	No measures
		1	Screening arrivals
		2	Quarantine arrivals from some or all regions
		3	Ban arrivals from some regions
Testing policy	Record government policy on who has access to testing	0	No testing policy
		1	Only those who both (a) have symptoms AND (b) meet specific criteria (eg key workers, admitted to hospital, came into contact with a known case, returned from overseas)
		2	Testing of anyone showing Covid-19 symptoms
		3	Open public testing (eg "drive through" testing available to asymptomatic people)
Facial coverings	Record policies on the use of facial coverings outside the home	0	No policy
		1	Recommended
		2	Required in some specified shared/public spaces outside the Home with other people present, or some situations when social distancing not possible
		3	Required in all shared/public spaces outside the home with other people present or all situations when social distancing not possible
		4	Required outside the home at all times regardless

For the purpose of this briefing paper, Economist Impact included only strict implementation of policies, ie Level 2 and above for stay at home requirements (lockdowns), restrictions on international travel, testing policy and facial coverings (mask mandates). The exception is the stay at home requirements for Denmark, which the Oxford tracker defined as Level 1, but Economist Impact has classified it as a national lockdown to reflect its description by the Danish government and media.

Data for Phase 1 countries covers 2020 and was not updated as part of Phase 2.

Phase 2

Data was collected on the number of confirmed covid-19 cases per 100,000 population and vaccination rates for each included country using the Our World in Data database as of August 9th 2021.⁶ Phase 1 focused on 2020 interventions, whereas Phase 2 spanned 2020 and 2021, hence we included vaccination rates as this was an important intervention introduced in 2021. All other methods followed those of Phase 1.

Analysis and toolkit development

The included papers and supplemental material were reviewed and summarised by the research team for each country. The draft toolkit of evidence-based policy takeaways was developed based on a thematic analysis of these findings in Phase 1. The toolkit was then presented to the Advisory Panel and refined in light of their feedback. The process of further developing the toolkit was continued based on the country analysis carried out in Phase 2, with items within the toolkit added and edited. The final toolkit was presented to the Advisory Panel for comment.

Limitations

We took a pragmatic approach to this project by including an initial five countries in Phase 1 and a further seven countries in Phase 2. Phase 1 and 2 included only high-income countries, which is an acknowledged limitation as well as the lack of African countries. We acknowledge that while this toolkit contains a variety of responses to covid-19 from 12 countries, there are approaches to handling the virus from other countries that are not captured here. We did not select a globally representative sample of countries, but rather purposively sampled countries with positive elements of response that have an interesting angle to add to the toolkit and collective learning. Please note that the scale used on the y axes of country timelines varies.

Analysis of country-level responses to covid-19

Phase 1 analysis

Denmark

**“Act fast and act with force”⁸
to capitalise on high levels
of trust among the general
public**

Overview

Denmark responded quickly to the virus and introduced a number of early measures. Denmark's initial covid-19 cases were mainly amongst skiers returning from Italy and Austria. As such, initially low rates of confirmed covid-19 cases and deaths were seen, with a peak in April and an increase in cases towards the end of 2020. Various measures were relaxed from mid-April 2020 through August and September 2020 including offices reopening, increased public transport use and schools reopening. There followed a large increase in the number of cases. In response to the rising case numbers, hospitalisations and deaths, Denmark's prime minister introduced a second national lockdown in mid-December 2020. Initially this lockdown was due to end in early January 2021, but was extended to February and then March 2021.

Key policy initiatives/public health measures/economic initiatives

Overall, the early response to covid-19 in Denmark was characterised by its speed and comprehensiveness.⁸ The country acted fast and introduced a raft of interventions and policies designed to reduce the spread of covid-19. These early measures included quarantine, a national lockdown, banning large public gatherings, discouraging non-essential internal travel, closing all childcare and educational facilities, implementing social distancing and imposing severe restrictions on international travel.⁸ Denmark was the first European country to reopen its schools, with preschools and elementary schools reopening in mid-April 2020 to limited numbers of students (around half).⁹

A number of factors may have contributed to the Danish government's ability to implement such measures and the general willingness of citizens to comply. This includes Denmark's high quality and equitable publicly-funded health system that offers universal access to health services, which showed resilience in the face of pressures from the pandemic. It has been praised for the pace at which it was able to prioritise and reorganise health

services in a co-ordinated fashion, following recent restructuring to centralise and reconcile hospital infrastructure into larger facilities.^{8,9} Existing primary care infrastructure designed for influenza outbreaks was redeployed

“Samfundssind – which is loosely translated as “community spirit” or “social mindedness” – has become the buzzword of the coronavirus crisis.”

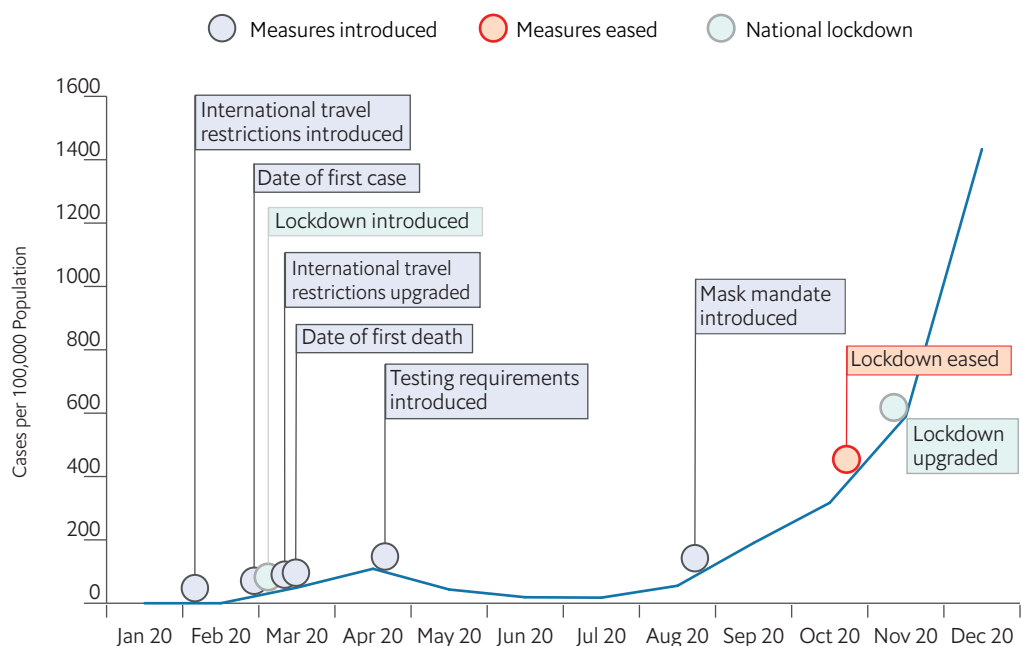
BBC¹¹

to enable wider testing as part of ongoing surveillance.⁹ Denmark’s test, track and trace plan was launched in May 2020, to specify protocols and a tracing app that integrates

(as of November 2020) with other European tracing apps to provide cross-border tracing.¹⁰

High levels of trust in politicians among the public is also thought to have positively contributed to Denmark’s response. The government capitalised on this existing trust by including a range of experts and public leaders at press briefings, and also utilised trusted public figures such as the Danish Queen to reinforce public health messages.⁸ Early opinion polls in April 2020 indicated that the majority of Danish people (86%) agreed with the government’s approach to tackling the virus and 80% reported trusting government decisions.⁹ Polling also revealed that the government’s approval rating increased by 2.5% and the prime minister’s personal approval rating soared by 40% (from 39% to 79%).⁹ The government introduced

Figure 3: Timeline of early response and pandemic dynamics in 2020
(see Table 1 for included responses)



Source: Our World in Data,⁶Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

early financial aid packages in April 2020 totalling €60bn (2.6% of GDP) to support companies and the self-employed in an effort to provide a comprehensive approach.⁹

The government and public health agencies attempted to align pandemic-related policies with existing social concepts. The Danish culture of *hygge*, or cosiness, was emphasised in the literature in an attempt to make spending time indoors and with family during early lockdowns feel more like an exaggeration of normal life, rather than a significant deviation from it.⁸ The concept of *samfundssind*, which loosely translates into English as “community spirit” became a

buzzword associated with of the pandemic after it was invoked by Denmark’s prime minister in March 2020 to encourage Danes to follow the measures introduced to control covid-19.¹¹ This indicates the potential success of leaning in to established cultural concepts.

Denmark’s early positive response was also aided by its limited land borders (one small border with Germany).⁸ However, it does share an open border with Sweden via the Øresund Bridge. Despite this, the government’s swift action in introducing quarantine measures appears to have positively contributed to containing community transmission.^{6,7}

Germany

A comprehensive response with an exemplary test and trace system

Overview

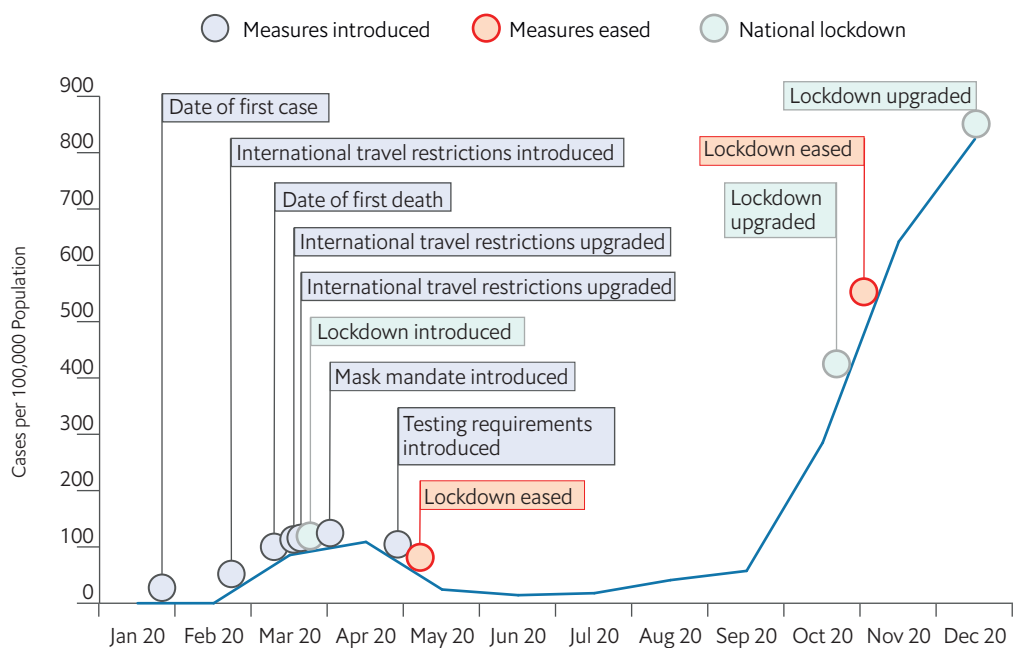
Similar to Denmark, Germany’s initial covid-19 cases were predominantly due to holiday makers returning from the ski slopes, primarily from Austria and Italy. There has been some debate about the effectiveness of Germany’s early response, with some commentators accusing the country of being slow to respond in terms of introducing travel bans from areas with known infections such as China, Austria and Italy, as well as allowing carnivals in early March that led to significant spreading.¹²

However, measures introduced by the German government from February through to April 2020 helped to flatten the curve. The reopening of schools as well as allowing large gatherings of up to 100 people in August 2020 led to a spike in cases in September 2020, prompting a second and then a third national lockdown.

Key policy initiatives/public health measures/economic initiatives

Although Germany’s response in the early weeks of the outbreak has been criticised, once underway its response was swift and comprehensive. All day care and educational facilities were closed in mid-March 2020, with further measures coming into effect later in March, including limiting social contacts, social distancing, avoiding non-essential travel, and closing restaurants and non-essential shops.¹²

Figure 4: Timeline of early response and pandemic dynamics in 2020 (see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

Germany's high ratio of intensive care beds to population head and large laboratory testing capacity meant that the system was not overwhelmed.¹²

Germany has received particular praise for its test and trace efforts, including intensive contact tracing, widespread testing of suspected cases and quarantine measures. These processes have been considered critical in controlling the outbreak, particularly in light of super spreading events that took place.

Civil service personnel were redeployed to test and trace, with additional staff recruited as needed.¹³ The test and trace programme built on existing infrastructure, where considerable decision-making was

delegated to regional bodies via centralised co-ordination and support.¹³ A test and trace mobile app has been the centrepiece of Germany's programme of technological solutions. In response to public concerns about data protection, data collected by the app was anonymised and decentralised in order to improve acceptance rates.¹³

There is a lack of consensus about whether the federal structure of Germany's government and health authorities helped or hindered the covid-19 response. Some commentators have judged the regionalised structure to have made it more difficult to co-ordinate the response, while others have praised its ability to respond to localised outbreaks with regional responses.^{12, 13}

South Korea

A “global golden standard” showing good governance, technical proficiency and agility¹⁴

Overview

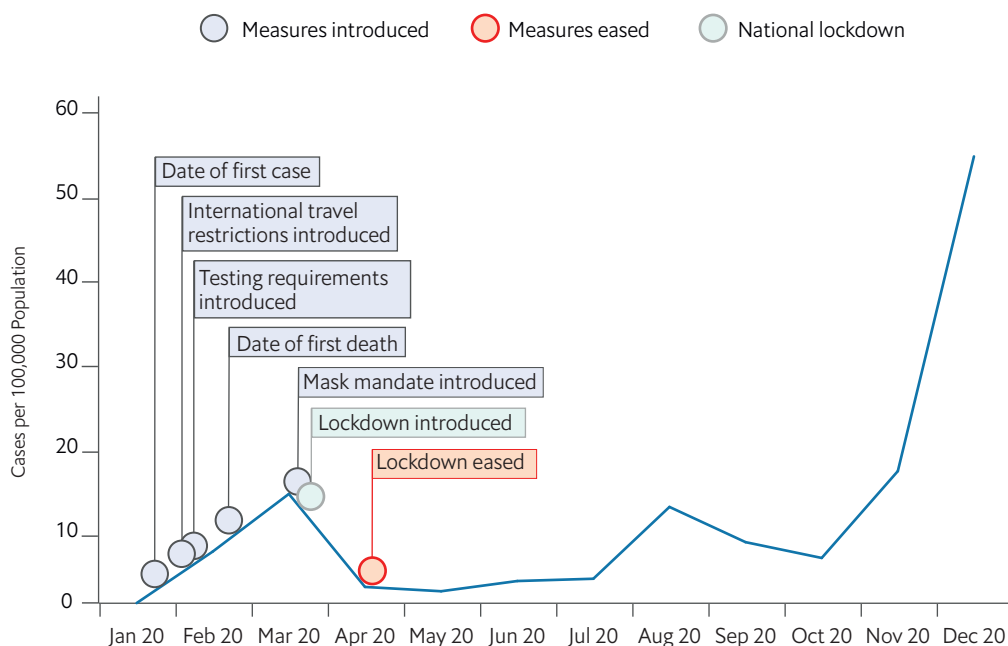
South Korea has been widely hailed as a success story in the response to covid-19. Despite South Korea having the second highest number of cases globally in the first two months of the pandemic, the country was able to dramatically lower the number of cases and deaths, without stringent lockdown measures.^{14,15} An initial peak of cases occurred in early March 2020, and a smaller second peak was observed in July 2020 due to an

influx of cases, but this was swiftly contained.¹⁶ Despite this, there was a significant increase in cases after several measures were relaxed toward the end of October 2020, including permitting mass gatherings of up to 1,000 people, reopening offices and resuming public events.

Key policy initiatives/public health measures/economic initiatives

The success of South Korea’s overall response has been attributed to its rapid decision-making and its test and trace programme (including widespread testing), as well as citizens’ compliance with less strict controls such as strong social distancing measures and wearing face coverings, which meant that stricter controls such as lockdowns were not required.^{14,17} Other distinctive features of

Figure 5: Timeline of early response and pandemic dynamics in 2020
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

South Korea's response include its diagnostic capacity and alert texting, communication with the public, face mask distribution and quarantine care.¹⁷

The South Korean government implemented lessons learned from its 2015 MERS-CoV outbreak, with legislation passed in 2016 that enabled expedited authorisation during national emergencies. These legislative changes facilitated the rapid approval and implementation of the South Korean covid-19 testing programme.^{14,17} The South Korean Center for Disease Control and Prevention was able to authorise diagnostic testing in early February 2020, with the roll-out of the test, trace and quarantine programme just six days later.¹⁷

“What we’ve seen work very well, is where it’s a simple message, clearly articulated by everyone, where there’s no wiggle room.”

Catherine Duggan, CEO, International Pharmaceutical Federation (FIP)

Another reported success factor in South Korea's response has been the rapidity of its decision-making. Strong leadership underpinned by the approach of “collaborative governance” brought together diverse and multiple stakeholders as part of the overall public health response.^{14, 18-21} This is another example of the direct implementation of lessons learned from the SARS and MERS outbreaks, which had featured disjointed responses, that improved South Korea's response to covid-19. The government response implemented co-ordination between local and national government, and between local government institutions, enabling a more agile response that was able to redeploy and share resources across municipal borders.^{14, 18, 20}

Civil society groups, such as non-government organisations (NGOs), were also cited as playing an important role in disseminating information to the public.¹⁴

Despite South Korea's overall success, significant “super spreader” events led to localised outbreaks, including a large religious gathering in February 2020, a series of workplace outbreaks in March (at a call centre and a logistics facility) and another involving numerous bars and nightclubs in May 2020.¹⁷ South Korea's test and trace system proved effective in responding to these events despite challenges such as reluctance to comply with testing amongst those attending the religious event and poor record-keeping in the affected bars and nightclubs.¹⁷ Public health authorities also responded to concerns raised about the impacts of publicising individual details of confirmed cases and their movements, by announcing anonymous testing in mid-May 2020 which saw an increase in testing numbers shortly after.¹⁷ Covid-19 testing and treatment are free in South Korea, meaning that healthcare expenses are removed as a potential barrier to seeking care. Although this has not been without controversy among both tax payers and policymakers, it is cited as contributory factor for South Koreans being more likely to voluntarily consult public health authorities about their symptoms and contacts.^{14, 17}

The South Korean government again capitalised on lessons learned from previous outbreaks where availability of testing kits has been an issue by leveraging domestic manufacturing and distribution capacity, to create a public-private partnership.^{14, 17, 19, 21} “Drive through” testing stations were implemented by the government to increase the efficiency of testing, highlighting how

South Korea also learned lessons and implemented changes iteratively during the pandemic response.¹⁷

People with confirmed covid-19 were required to report their symptoms and submit detailed contacts for the preceding days to public health authorities. Additionally, authorities used other data in their technology-driven approach, such as mobile phone data, credit card statements and security camera footage to trace contacts.^{17,20} This technology-driven approach required significant co-ordination and co-operation between different stakeholders to create a meaningful and actionable dataset from disparate sources.¹⁴ Although the general perception has been that South Koreans were accepting of these measures, they did raise questions about infringements on their privacy.¹⁷ The government tried to assuage these concerns by building trust through transparency with the population about what data was being collected and how it was being used.^{14,19}

Utilisation of this approach offered additional benefits. When an outbreak occurred amongst

venues popular with LGBT people and venues had captured insufficient tracking data, the multifaceted contact tracing approach meant that the sexual orientation of the super spreader didn't need to be revealed (LGBT people in South Korea can face legal challenges and discrimination not experienced by non-LGBT people).¹⁷

In their response to the pandemic, the government built on trust in the government and its policies by framing citizens as “co-partners”, engendering a sense of individual and collective responsibility to protect their own health and that of others.¹⁴ Public health campaigns capitalised on the “sensitisation” of the South Korean people to infectious disease countermeasures following SARS and MERS.²¹ Such campaigns also tried to incorporate measures that prevent the spread of covid-19 into daily life, such as hand washing, and describing social distancing as “routine distancing” to encourage this behaviour change to become habit.¹⁹

Taiwan

Learning lessons from SARS, acting fast and utilising existing infrastructure

Overview

Despite its proximity to the epicentre of the initial covid-19 outbreak and with large numbers of Chinese residents known to travel regularly between mainland China and Taiwan, the country has been widely regarded as having one of the best covid-19 responses globally.²² Taiwan has recorded extremely low numbers of covid-19 cases and deaths overall and no locally transmitted cases of covid-19 from April to December 2020, all without the need to impose a formal lockdown.^{6, 15,}

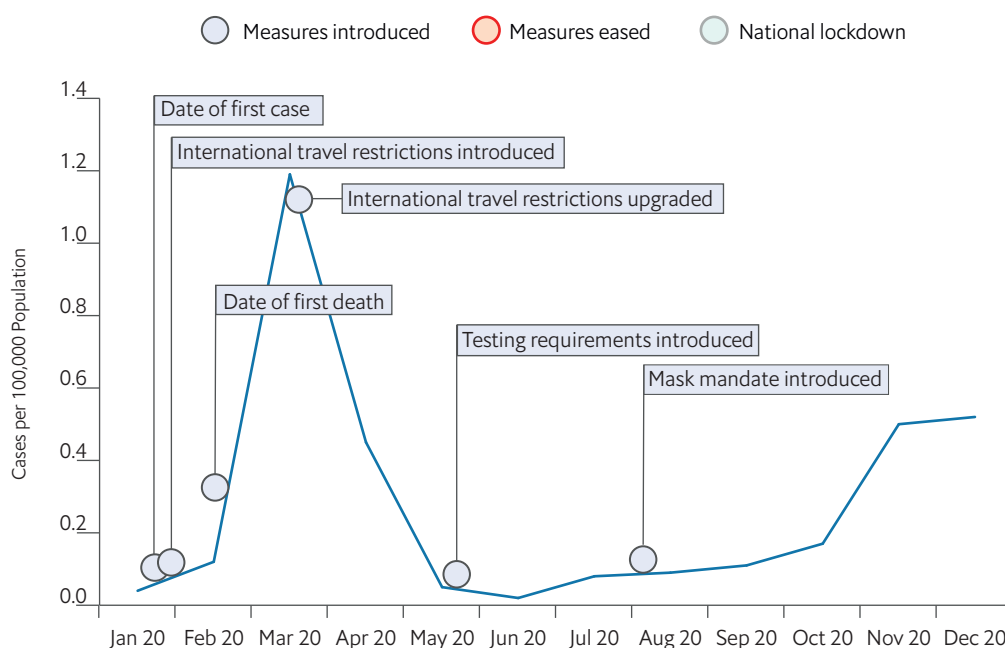
²³ Taiwan is considered to have co-ordinated

a rapid response, particularly in the areas of early screening, isolation and quarantine measures, utilisation of digital technology for case identification and mass mask use.²⁴

Key policy initiatives/public health measures/economic initiatives

Taiwan responded to the covid-19 outbreak by capitalising on its experience with the SARS pandemic in 2003. Lessons learned were implemented in both pandemic planning and how the response was activated.²⁴⁻²⁷ Extensive pandemic planning ensured there was a robust framework in place to respond to covid-19, supported by the necessary technical and legislative mechanisms, developed in such a way that it was adaptable to other pathogens.^{24, 27} For example, the established Taiwan Centers for Disease Control (CDC)

Figure 6: Timeline of early response and pandemic dynamics in 2020 (see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

in collaboration with the Central Epidemic Command Center (CECC), set up in mid-January 2020, took the lead in managing the covid-19 pandemic as directed by a pre-covid-19 pandemic plan.^{24, 28} The CECC inter-agency taskforce enabled a centralised response effort spanning public health, healthcare, civil and law enforcement, and other agencies.²⁶

“If there isn’t trust in the National Health Command Center, people won’t follow their guidelines.”

Chen Chien-Jen, former Minister of Health and Vice President of Taiwan

Existing guidelines for outbreak response—based on the 2003 SARS outbreak—were activated by the Taiwan CDC, including border checks, quarantine and enhanced hospital infection control practices.²⁶ The significant travel between Taiwan and China meant monitoring of the outbreak in the early stages of the pandemic and detection of cases were important to enable a proportionate and rapid response.^{26, 28} Border management measures were introduced on the day the WHO informed of the outbreak in Wuhan, with more extensive border screening introduced in late January 2020.²⁴ Wider entry restrictions to non-Taiwanese citizens were introduced in March 2020 and lasted until June 21st; these early restrictions have been cited as a factor influencing the low case numbers seen.²⁴ Restrictions on travel and quarantine requirements remained in place throughout 2020. Temperature checks in airports were possible using infrared scanning devices installed during the 2003 SARS outbreak.²⁶

The 2003 SARS experience had highlighted

the importance of laboratory capacity.²⁸ In the response to covid-19, the Taiwanese CDC was able to rapidly co-ordinate the set-up of a network of laboratories for covid-19 testing use.^{26, 28} The key was not just the number of laboratories, but how well they were connected and activated.²⁸

In addition to lessons learned from experiences with SARS, in 2017 Taiwan set up a new contact tracing system (TRACE), using experiences gained from contact tracing efforts during the Ebola outbreak in West Africa. Prior to utilisation of TRACE for covid-19, the system had been used to trace contacts regarding measles, rubella and avian flu.²⁹ The contact tracing process blended human interaction (telephone interviews with confirmed cases) and digital methods (eg telecommunications companies’ data).^{26, 29} Close contacts of confirmed cases were required to complete a 14-day home quarantine period, where two distinct methods of health monitoring were used: twice daily check ins, either via a telephone call or in-person visit from public health officials, and self-reporting via a two-way messaging system.²⁹ This system was further refined when the government enabled real-time monitoring of contacts to detect if they broke quarantine.²⁹ The nation’s existing national health insurance system also acted as a near real-time platform to further support track and trace efforts, by offering a centralised database of health records that was already integrated with other government databases and could support logistical co-ordination.^{26, 27}

Clear public health messages about the indications for mask wearing and hand washing were regularly and widely disseminated to the public, capitalising on the

public's existing knowledge following SARS in 2003 and maximising the community's role in reducing the spread of infection.²⁶ This built upon high levels of trust in the government to enable co-operation and a sense of partnership between the government and the public in the overall covid-19 response.²⁶ Following the 2003 SARS outbreak, mask wearing had become commonplace during influenza season among those at increased risk from respiratory illness or in crowded spaces.^{24, 26}

As a prolific manufacturing and exporting nation, Taiwan, like all nations, has had to carefully balance the need to protect public health with other economic and social factors. The Taiwanese government took the step of banning the export of face masks and respiratory protective devices (N95 respirators) to ensure domestic needs could be met.^{26, 28} It was not alone in taking these steps, with Germany and South Korea among those nations who did the same.³⁰ The government implemented a domestic mask rationing system, linked to individuals' national health insurance cards, to ensure equitable distribution and avoid shortages.²⁶ The government also funded, through a public-private partnership, an app showing real-time availability of masks in the local area.²⁶ In May 2020 the Taiwan CDC launched a chatbot within Google Assistant that would provide the public with reliable information about covid-19: from information about the current number of cases and symptoms, to current travel advice.³¹

The government delayed schools and universities' reopening in February after the lunar new year at the height of the outbreak.³⁰ Following this decisive national action, further decisions on school closures were taken at a local level to enable rapid, yet proportionate, action.

Taiwan implemented emergency funding to support people affected by covid-19 to support compliance with isolation procedures; this policy was again based on the country's experience during SARS.²⁶

Reflecting on its overall performance, the Taiwanese government identified its key success factors as:³⁰

- Capitalising on its SARS experience,
- The centralised command centre,
- Information transparency,
- Resource allocation,
- Timely border control,
- Using technology to control community transmission,
- Enabling the rapid development and deployment of medical technologies such as tests,
- The "etiquette" of its citizens in wearing face coverings and observing social distancing.

United States

A confused and confusing response, but a positive story in vaccine research and development funding

Overview

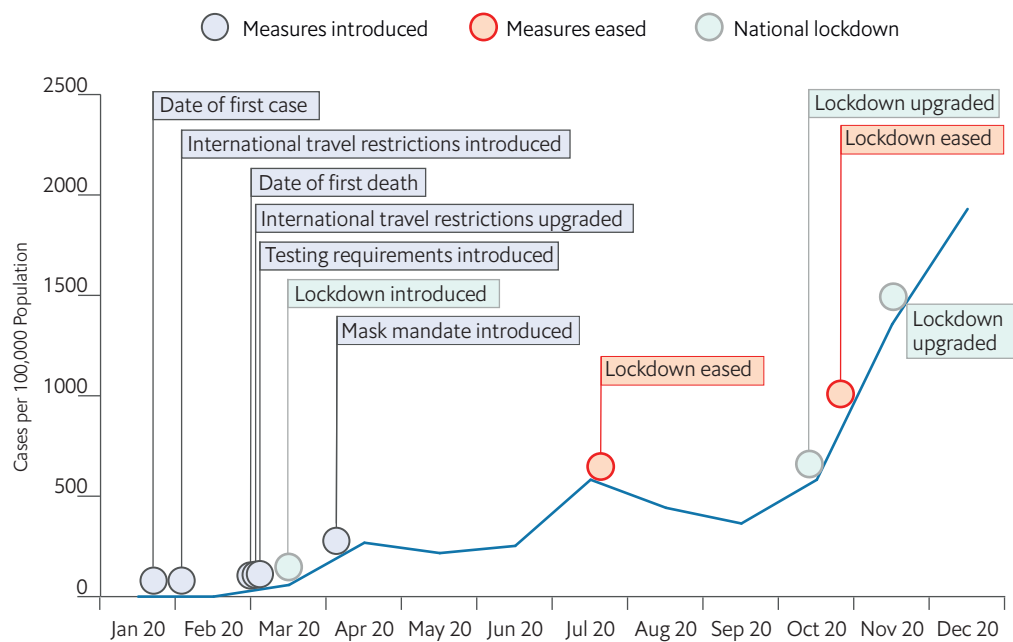
Of the selected countries covered in this briefing paper, the United States (US) recorded the highest cases and deaths per 100,000 population at the time of writing. While there exists significant variation in the covid-19 response of each state within the country, on aggregate, the measures imposed (screening measures, travel restrictions, stay home orders) helped to smoothen the curve of the first wave.³² Stay at home orders are listed as

“lockdowns” in the timeline below; see Table 1 for the definitions of included responses. Mass gatherings up to 100 people were allowed in September 2020 and Thanksgiving celebrations (late November) are thought to have contributed to the dramatic spike in cases from October through to December.³²

Key policy initiatives/public health measures/economic initiatives

The US Centers for Disease Control and Prevention’s early approach was to “flatten the curve”, by spreading the peak of infections over time to prevent a sudden peak in cases that would overwhelm the health system.³³The CDC’s anticipated role in the pandemic was to gather and analyse data about the pandemic, provide centralised advice on response measures and communicate high

Figure 7: Timeline of early response and pandemic dynamics in 2020 (see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

quality information to the public. However, the CDC's ability to perform was undermined by the Trump administration, with 47 specific incidents identified, including altering the language used and recommendations.³⁴

The US has a highly decentralised system of government. The federal government passed a number of laws around economic support packages for individuals including paid sick leave, increases to Medicaid funding and unemployment support.³⁵ Legislation also mandated and provided funds to enable free covid-19 testing.³⁵ State governments were responsible for co-ordinating much of the pandemic response; for example, deciding which response measures to implement and when, and introducing specific legislation.^{35, 36}

When necessary, states and the federal government can declare a state of emergency and subsequently activate emergency powers not normally within their jurisdiction so they can act quickly and protect human life and health.³⁷ For example, a state's declaration to be in a state of public health emergency (PHE) permits the governor to suspend state regulations and alter the functions of state agencies.³⁸ As of late March 2020, all 50 states and the federal government had declared states of emergencies due to covid-19, with all but five states implementing some level of stay at home order (lockdown).^{37, 39}

State authorities took measures to control the pandemic by closing schools, universities and non-essential businesses, and introducing stay at home policies.³³ This decentralised decision-making can act as an opportunity for agile policy that responds to local outbreak dynamics; however, there is evidence of differences in responses depending on the governance structure of state health departments.⁴⁰⁻⁴² Several commentators

have suggested that greater federal support would have been beneficial to enable consistent policy and messaging to the public.^{37, 40} Cultural factors also impact on the response to covid-19; the US has a strong libertarian culture, leading to resistance to following government advice and edicts.⁴⁰ For example, the US has had challenges enforcing lockdowns, with people in several states publicly protesting the public health measures put in place to curb covid-19 transmission.⁴²

In January 2020, the US's CDC introduced enhanced risk assessment and screening for incoming visitors from selected countries with widespread, sustained virus transmission.⁴³ The CDC then shared contact information about screened travellers via its Epidemic Information Exchange (Epi-X) for 68% of data that had been captured for travellers. Reasons for not all data being shared included incomplete contact data and some states opting out of receiving data because of competing response priorities.⁴³ This process involved labour-intensive manual data collection and saw low case detection rates, highlighting that this was not the most effective way to collect data. From September manual data collection was suspended and replaced with data collection based on airline and federal traveller datasets.⁴³

The United States' Department of Health and Human services established the Biomedical Advanced Research and Development Authority (BARDA) in 2006 to aid in stabilising the United States during events such as pandemic influenza and emerging infectious diseases.⁴⁴ One of the key roles of BARDA is to support the transition of medical countermeasures such as vaccines, drugs, and diagnostics from research to advanced development towards consideration for

approval by the FDA and inclusion into the Strategic National Stockpile.^{44,45} To that end, BARDA has helped to fund Moderna in their development of a mRNA coronavirus vaccine by granting two funding awards worth a total of US\$955 million. The funds were awarded to support Moderna's early stage trial conducted by the United States' National Institute of Health as well as their late-stage clinical development.⁴⁵ BARDA has also provided funding support to a number of other vaccine manufacturers to aid their development of a coronavirus vaccine.⁴⁵ The positive impact of BARDA in co-ordinating and delivering funds to support covid-19 vaccine development has prompted the European Union to set out a roadmap to develop the European Health Emergency Preparedness and Response Authority (HERA)

that will offer similar infrastructure and co-ordination.⁴⁶ The US Federal Government also established Operation Warp Speed in response to covid-19, specifically to deliver funding to and manage procurement contracts with vaccine manufacturers; as of January 2021, it has invested around US\$18 billion.⁴⁷ Beyond financial support, the Public Readiness and Emergency Preparedness Act (PREP) facilitated innovation in the production of vaccines and other covid-19 countermeasures, by providing immunity from liability to manufacturers.⁴⁸

It is worth noting that the covid-19 crisis was unfolding in an environment of political turmoil that included political protesting around US elections and protests for the Black Lives Matter movement in May and June 2020.

Phase 2 analysis

Australia

Rapid, early control through test and trace, but slow roll-out of vaccination

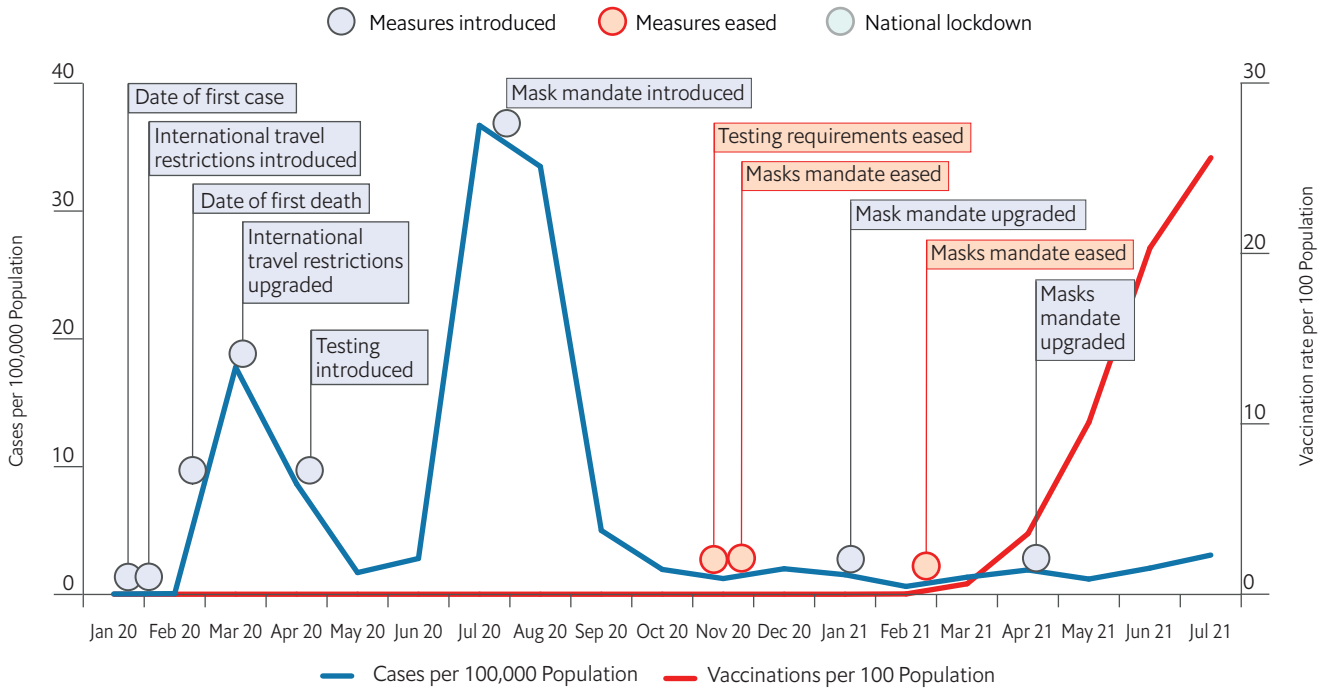
Overview

Australia had one of the success stories in suppressing the pandemic in 2020. The country was lauded for its forward-thinking, system-driven approach that led to a lower percentage of deaths compared with the rest of the world. Initially, Australia recorded only a few cases and outbreaks were quickly brought under control, aided by contact tracing, lockdowns and compliance with public health orders. However, vaccine procurement delays and limited availability have slowed uptake of vaccinations. With prolonged travel and border restrictions, and the reintroduction of local and state-level lockdowns have raised questions for some about the Australian government's management of the pandemic overall. Please note that the graph below does not include local/state-level lockdowns as we looked only at national-level policy.

Key policy initiatives/public health measures/economic initiatives

Australia responded rapidly to the WHO announcement declaring covid-19 as a virulent threat. The country's initial response was focused on containing the external threat of the virus by screening all arrivals from Wuhan to Sydney. Australia recorded its first confirmed case on January 25th 2020.⁴⁹ Initial travel bans to and from certain countries were introduced on February 1st 2020, ultimately closing borders to all non-residents and non-Australian citizens from March 20th 2020.⁵⁰ With limited exceptions, a ban was also imposed on Australians leaving the country.⁵¹ A mandatory, strictly enforced home isolation programme was implemented for returning Australian citizens.⁵² Police were dispatched to homes to check that returned travellers were complying with quarantine requirements.⁵³ Australia quickly moved to a mandatory hotel quarantine system (the costs of which were initially borne by the government), in which hotel rooms were often guarded by police, military, or private security contractors.⁵⁴ States and territories also temporarily sealed their borders.⁵⁵ Failure to self-isolate could result in a fine of AUD 11,000 (USD 8,100)

Figure 8: Timeline of response and pandemic dynamics 2020-2021
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

and a possible prison sentence, depending on the state.⁵⁶ Border closures and strict implementation of self-isolation impeded the rapid spread of the virus and allowed the government to build a test and trace system that was not immediately overwhelmed, and was effective at controlling the spread of the virus.⁵⁷

Lockdown restrictions and social distancing norms were put in place and enforced swiftly. Non-essential businesses were shut, although the definition of “essential” work was not defined and included most business operations such as construction, manufacturing and various retail categories.^{58, 59} The general population was at times allotted a limited radius that they were confined to, unless it was for essential work.⁶⁰ Despite case

numbers being relatively small compared with other countries, the lockdowns implemented were very strict, allowing the government to facilitate exhaustive contact tracing of new outbreaks.⁶¹ The lockdowns and countermeasures were implemented differently across states and cities. The capital of Victoria’s state, Melbourne, went through a strict 112-day lockdown in 2020 since it was considered the epicentre of Australia’s second wave.⁶² The city again entered a restrictive lockdown when the Delta variant worsened in the country.⁶³ Australian governments have agreed on strategies to reopen once the country reaches the target of 70 percent of the adult population double vaccinated.⁶⁴

Back to 2020, there were divergent views across states about the best response

strategy to adopt: an elimination strategy or suppression of the virus.^{62, 65} The country came to a consensus in July 2020, when the prime minister Scott Morrison announced the goal of “zero community transmission”, which meant that government efforts were aimed at an “aggressive suppression strategy”, but expecting that new outbreaks may occur^{62, 65, 66} Recruitment of a large number of “contract-tracing workers” contributed to the implementation of Australia’s trace-test-isolate policies.⁶⁷ Australia initially used a Bluetooth-based national contact tracing app COVIDSafe, but this was not very well received or particularly effective.⁶⁸ QR code-based contact tracing applications were made mandatory by different state governments which allowed more effective and streamlined contact tracing. These applications enable government health departments to reconstruct the presence and possible contacts of anyone visiting bars, restaurants or other public venues and using a supported and functional smartphone.⁶⁹

The Australian government’s economic response to the pandemic has been focused on supporting the transition to private sector-led growth, creating jobs and reducing the unemployment rate. The JobKeeper Payment programme introduced by the government in 2020 provided a wage subsidy to businesses impacted by covid-19, although this ended in March 2021.⁷⁰ There were also schemes for direct payment to people who have lost work because of the pandemic, with varying thresholds for eligibility.⁷¹ The government has allowed companies with turnover of up to AUD 5 billion (USD 3.7 billion) to offset losses against previous profits on which tax has been paid, generating a refund. From March 2020 to September 2020, eligible SMEs were able to receive a tax-free

cash flow boost of between AUD 20,000 (USD 14,500) and AUD 100,000 (USD 74,000).⁷² The government allowed individuals to withdraw their compulsory superannuation early, and personal taxes for individuals were substantially reduced.⁷¹

A major cause of Australia’s initial success in dealing with the pandemic was bipartisan unity in parliament. Early in the pandemic, the federal government introduced an AUD 130 billion (USD 95.5 billion) economic bailout, which included a six-month wage subsidy scheme. Various political leaders across parties in Australia met in March 2020 to streamline their approach in handling the pandemic, and multiple parliamentary committees were formed with members from all parties to share data and strategies.⁷³

Until April 2021, the pandemic was almost considered over in Australia by all accounts, with an almost negligible number of cases from September 2020 to April 2021, apart from a small outbreak in New South Wales (NSW) over the Christmas period that was contained with a short lockdown and aided by its geographical location being on a peninsula.⁷⁴ However, by late June/early July 2021, after three weeks of initial restrictions failed to quash the country’s biggest outbreak of covid-19 in 2021, there were infectious outbreaks in various clusters, notably in Sydney (NSW) and Melbourne (Victoria).^{75, 76} Initially, Sydney was hailed globally for having a “gold standard” of contact tracing infrastructure, and was touted as an example to be followed by governing authorities. Their contact tracing infrastructure was cited as the reason that, unlike other states, NSW managed to predominantly avoid regular snap lockdowns through the course of the pandemic up to mid-2021.⁷⁷

However, outbreaks of the new Delta variant in mid-2021 combined with slow national vaccine procurement strategies, subsequent low vaccination rates, changing vaccine safety advice, slow reporting, public complacency and lack of appropriate communications for priority populations, have been major factors contributing to ongoing outbreaks. In early August 2021, almost half of the country's population and most of the country's major urban centres were in lockdown and travel restrictions have continued since March 2020 with few exceptions.^{78, 79}

The most recent target from the federal document suggests that vaccinating 80% of the 16+ population could be possible by December 2021.⁸⁰ The country has now the National Plan to transition Australia's National Covid-19 Response that consists of different phases to ease restrictions, reduce lockdowns and open up of borders as vaccination advances in the country.^{80, 81}

Canada

A sluggish initial response, redeemed by an efficient and speedy vaccination programme

Overview

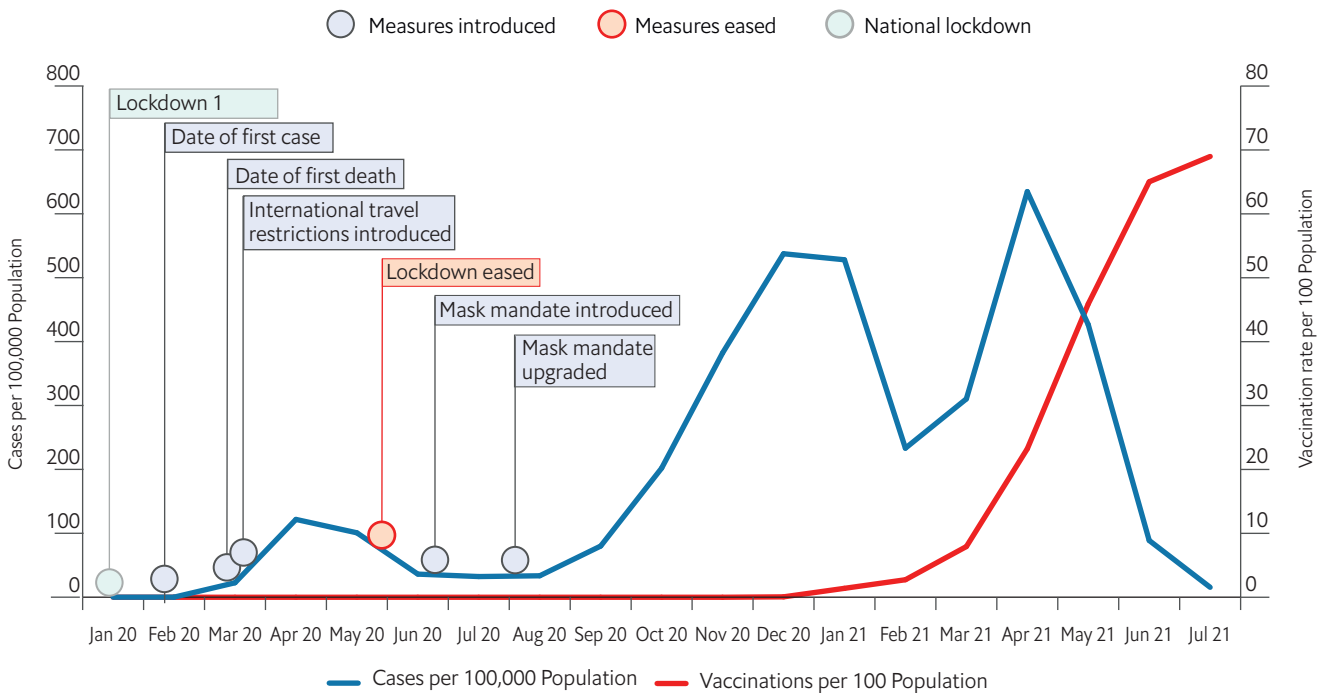
Canada’s initial response to the threat of the pandemic was slow: the first case was detected in January 2020, but the risk profile of the country was changed to “serious” by the health authority only in mid-March 2020. The first wave peaked in Canada in April 2020, with the second wave peaking in September 2020. Despite continued criticism of the Canadian government’s slow response to the pandemic

during the first wave, and a slow start to its vaccination drive in December 2020, Canada currently has one of the fastest rates globally of vaccinating its population.

Key policy initiatives/public health measures/economic initiatives

Considering Canada’s wealth and robust public health system, its response to the covid-19 pandemic was initially slow. The Public Health Agency of Canada (PHAC) is responsible for assessing the risk threat posed by an epidemic. By the time the PHAC changed its assessment of the threat posed by covid from “low” to “serious” on March 16th 2020, Canada had already reported more than 400 cases since the first case was detected in January 2020.^{7,82,83} When the first wave peaked, many

Figure 9: Timeline of response and pandemic dynamics 2020-2021
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

people experienced backlogs in testing due to the magnitude of the pandemic, the need to develop new technical methodologies, a subsequent shortage of testing kits, delays in planning for conducting the testing, and limited analytical capacity. Because of these challenges, public health authorities focused on testing those who were ill, with limited roll-out of testing to those without symptoms, undermining the initial public health response significantly.⁸⁴ Masks were recommended only in June 2020, and were only mandated in July 2020 in a small number of states including Quebec, Nova Scotia, and parts of Ontario and Alberta.⁸⁵

Once the threat of the pandemic became apparent, the Canadian government acted with more haste. Within two days of PHAC considering the threat “serious” on 16 March 2020, Canada’s minister of health signed an order to speed up access to covid-19 test kits, allowing provincial labs to increase testing.⁸⁶

“My two main messages are much more testing and everything that comes along with that, and support if you need isolation with particular attention to disadvantaged populations.”

Jeffrey Lazarus, Associate Research Professor, ISGlobal, and Associate Professor, University of Barcelona, Spain. Member of the Lancet Commission on COVID-19 Public Health Taskforce

In the initial stages of the pandemic, the government also funded 96 research projects, with the aim of “developing and implementing measures to detect, manage and reduce the transmission of covid-19”.⁸⁷ Public service announcements on radio and television encouraged the public to follow the relevant personal hygiene precautions, practise social

distancing and avoid leaving their homes unless absolutely necessary.⁸⁸

Canada’s initial approach was manual and decentralised with variation across provinces, resulting in inefficient testing and failure to effectively prevent transmission of the virus.⁸⁹ Canadian provinces, responsible for decisions and measures regarding the pandemic, primarily focused on strategies for containment and mitigation.⁹⁰ These provincial public health authorities worked closely with regional public health officers and local governments for effective contact tracing and streamlining public health policies and regulations. The federal government focused on issues like international border closures and managing federal stockpiles of personal protective equipment, test kits, and ventilators.⁹¹

The federal and territorial governments encouraged the public to stay at home, but did not initially make it mandatory.⁹² Lockdowns were subsequently introduced. Depending on the region, the number of people allowed to meet in public spaces was initially limited to between 5 and 10 people, with physical distance requirements applying for such gatherings. Hefty fines were imposed on people caught flouting government norms and regulations.⁹³ Combined, these measures substantially reduced mobility across public transport (reduced by 80%) and walking and driving (reduced by 60%) as well as a 46% reduction in travel to workplaces.⁹³ Depending on provincial rules, visitors travelling to and from certain provinces were still required to follow a 14-day quarantine period before or after their arrival.^{94,95} International travel for non-nationals is still prohibitively difficult, with only a few exceptions given under the guidelines for entry into Canada.⁹⁶

Enforcement of covid-19 regulations has been largely successful due to stringent fines and the very real possibility of criminal prosecution for violations.⁹⁷

The Canadian government rolled out a series of economic measures, which benefitted affected stakeholders across almost all demographics. In March 2020, the federal government announced a CAD 82 billion response package to deal with the effects of the pandemic.⁹⁸ Various income support programmes were instituted: Canadian residents facing unemployment due to the pandemic were given CAD 2,000 per month until September 2020, fresh high school graduates facing unemployment were given CAD 1,250 per month from May until September 2020, and there was a weekly CAD 500 benefit for people who could not work for a period of 2 weeks.⁹⁹⁻¹⁰¹ Many programmes to support affected employers and businesses were also instituted. The federal government provided emergency interest-free loans to small businesses and non-profit organisations, wage subsidy programmes to prevent large layoffs, government guaranteed commercial loans to businesses in need, rent and mortgage support for certain businesses, and government-backed bridge financing to large Canadian employers.¹⁰²⁻¹⁰⁴ Canada's response

to the economic impact of covid-19 has been globally praised, with the International Monetary Fund stating that measures implemented by the government will likely trigger a rebound of its economy.¹⁰⁵

Canada's vaccination drive was initially slow, due to delayed and incomplete delivery of vaccines by manufacturers. Between December 14th 2020 (when vaccination first began in Canada) and February 2021, only 2.63% of the population received the first dose of a covid-19 vaccine.¹⁰⁶ However, the pace of vaccination picked up in the second week of May 2021, with the per capita rate of vaccination among the highest in the world as of July 2021.¹⁰⁷ By June 1st 2021, less than 6% of the country was fully immunised, increasing to more than 42% by mid-July 2021, including 49% of those aged 12 or older, and 53% of adults.¹⁰⁸ If Canada's orders for vaccines are fulfilled by the end of September 2021, and accounting for enough doses to vaccinate the remaining population, the country is estimated to have approximately 20 million extra doses.¹⁰⁹ There have been growing calls from some commentators to donate extra vaccines instead of hoarding or discarding the surplus supply that was ordered by the Canadian government during a US ban on exporting vaccines.¹¹⁰

Chile

Swift procurement strategy for vaccines, but existing socioeconomic inequalities hamper attempts to mitigate virus spread

Overview

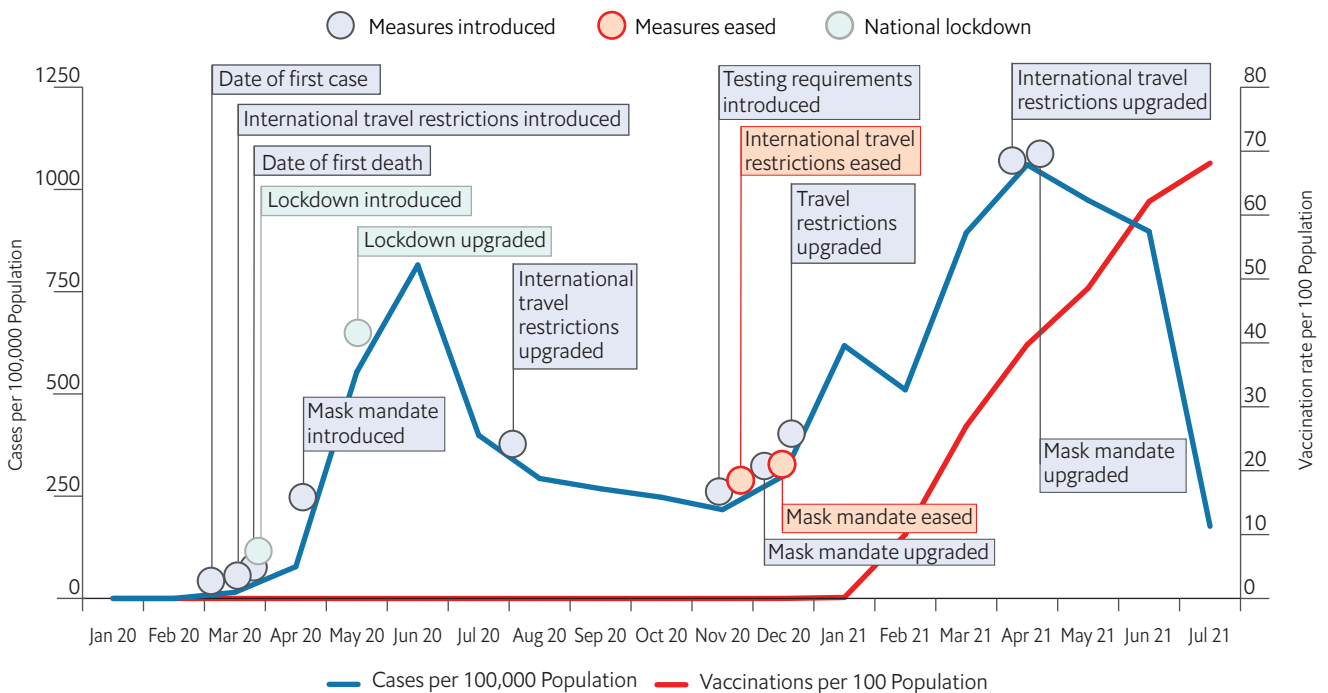
Chile’s response to the covid-19 pandemic has been defined by efforts to prevent multiple threats from materialising at once, which has led to mixed results. Chile attempted to combine intensive testing with localised quarantine measures in order to fight the spread of infections and mitigate the economic consequences of a national lockdown,

including unemployment and food shortages. The country saw covid-19 waves peak in mid-June 2020 (7,000 new cases per day) and again in April and June 2021 (8,000-9,000 new cases per day). Its handling of the pandemic faced criticism for failing to be sensitive to the population’s huge socioeconomic inequalities and for unclear reporting on covid-19-related deaths.

Key policy initiatives/public health measures/economic initiatives

In the months before the pandemic reached Chile, the country had been experiencing civil unrest over economic inequality and the need for institutional reforms since October 2019, and had announced a state of emergency as well as curfews in Santiago and Chacabuco.¹¹¹

Figure 10: Timeline of response and pandemic dynamics 2020-2021
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

¹¹² After the first covid-19 case was recorded on March 3rd 2020, Chile responded quickly by prohibiting large gatherings from March 13th, and by closing educational institutions on March 16th and the country's borders on March 18th.¹¹³ Furthermore, a nightly curfew commencing on March 22nd and continuing until July 2021 was combined with local lockdowns, particularly focused in the Santiago Metropolitan Region, where the unrest continued over the restrictions and was exacerbated by food shortages.¹¹⁴⁻¹¹⁶ Other measures taken by the government included Latin America's highest testing rate, mandatory use of masks, "sanitary residences" provided for those without the resources to self-isolate, restricting internal domestic mobility, and 10-day quarantines for international travellers.¹¹⁷⁻¹¹⁹ As a result of these measures, until the end of April, Chile succeeded in keeping its incidence lower than in neighbouring countries, temporarily flattening the curve in April 2021.¹¹³

The initial success of Chile's pandemic response was attributed to its relatively developed healthcare system, intensive testing and prompt quarantine measures for neighbourhoods where the virus was first located (particularly higher income districts of Santiago).^{119, 120} Chile's minister of health championed a "dynamic lockdown" style of policy which restricted movement in specific neighbourhoods rather than entire cities. When cases nonetheless spiralled in May 2021, after restrictions were relaxed in late April, the government ordered a citywide lockdown for Santiago.¹²¹ The method of localised lockdowns had not sufficiently reduced mobility and prevented the spread of the virus throughout the country; it was criticised for failing to curb movements such as upper-class citizens visiting their summer homes and domestic

labour and service personnel commuting between districts.^{119, 122-124} Scientists noted that considering "Chile's history of technocratic governance" and its "comparatively strong system of public health", it would be reasonable to expect a "sustained reliance on medical and public health expertise to justify or legitimise [the Piñera administration's] decision-making", yet such a reliance was "notably absent".¹²² The government's panel of experts was convened too late and was not sufficiently included in policymaking, and members of the panel and the wider scientific community publicly criticised government decisions and lack of access to public health data.¹²²⁻¹²⁶

Facing criticism for the government's response to the rising covid-19 cases, refusal to impose a national lockdown, and the aborted "immunity pass" project (which was criticised both for ethical and virological reasons), the national health minister resigned in mid-June and was replaced.^{121, 127} Critics suggested that the government had followed wealthy nations in its policymaking while ignoring people from lower socioeconomic groups and failing to protect their livelihoods.¹¹⁹ Public health communication had focused on returning to normal and incentivising economic activity too soon and had conveyed conflicting messages about collective and individual responsibilities.^{122, 128} ^{117, 129} To some, it appeared symptomatic of this that the former health minister had claimed that the country's health system was among the best in the world, whereas the covid-19 pandemic laid bare the inequality regarding healthcare access and the divide between the public and private health systems, in particular the access to intensive care unit beds and ventilators.^{117, 129} Additional scepticism arose over the government reporting of covid-19 deaths not including people with symptoms who did not have a positive PCR test: while

the country's reports to the WHO included these, the figures given in Chile only included deaths of patients who had tested positive. The communication of a different number of deaths to the population from what was being reported to WHO had a very negative impact on the government's credibility.¹²¹

Measures to restart life in a safe way were announced as early as April 2020 with the "Safe Return" plan, while the first wave peaked only in June 2020. The government announced its Gradual Return to School Plan from May 2020, which detailed protective and sanitary measures, and presented economic initiatives in the context of establishing a "new normality" that would last at least two years.¹³⁰ Measures included a bill to regulate home working in the public sector, and a platform for e-learning for students from 5 years old.^{130, 131} In July 2020, the "Paso a Paso nos cuidamos" ("Step by Step We Take Care") programme was introduced,

Initially, the government faced criticism for offering insufficient aid to groups affected by the restrictions that forced parts of the population to continue going out to work.^{115, 116, 119} This aid included food disbursements and deferred tax payments. At the end of May 2020, the government announced a three-month emergency basic income for approximately 25% of Chilean citizens (1.8 million recipients from 30 May 2020 and another 3 million from June 10th 2020).¹³⁶ In mid-June, more covid-19 stimulus payments followed—with a total value of USD 12 billion—toward improving the earnings of poor households, creating jobs and cutting taxes for SMEs.¹³⁷

Through a swift procurement strategy, Chile managed to secure good quantities of vaccines early on, signing contracts with Pfizer-BioNTech, AstraZeneca, Johnson & Johnson and Sinovac. By the end of March 2021, a quarter of Chile's population had already received the first dose of the covid-19 vaccine; the procedure was described as accessible and quick, with no need to make individual reservations thanks to a calendar allocated to very specific groups and their designated vaccination days.¹³⁸ Chile's already existing national immunisation programme for flu and childhood vaccines, as well as an effective information campaign encouraging vaccination, were also cited as contributing to the success.^{138, 139} By the end of July 2021, more than 57% of Chile's population had received two doses of the vaccine, and the country had already acquired third vaccine doses for its population.¹⁴⁰

Nonetheless, at the beginning of 2021, Chile saw cases rise again, with restaurants and schools opening, and a domestic "vacation permits system" lacking control or tracing

"You have to address inequalities in any effective response."

Michael Baker, Professor of Public Health, University of Otago; Member of the New Zealand Covid-19 Technical Advisory Group

reversing confinement measures in areas that allowed for it.¹³² The programme involved five steps: quarantine, transition (weekend quarantine), preparation, initial opening and advanced opening.¹³³ Initially scheduled for March 24th 2020, but postponed due to the surges in cases, a constitutional referendum was held on October 25th 2020, despite a stable number of 15,000 active cases through the preceding month, and without postal voting or early voting options.¹³⁴ A second vote was held together with municipal and regional elections on May 15th-16th 2021, in between the peaks of the second and third waves.¹³⁵

of travellers spreading the virus around the country.¹³⁹ The high vaccination rate and insufficient public health communication by the government were said to have created a false sense of security among the population. An additional concern for Chileans is that the country's inequality is also reflected in the reach of its vaccination programme, with poorer areas showing up to 30% lower coverage than high-income areas, defining the country's major challenge for the coming months.¹³⁸

Israel

Rapid introduction of national lockdown with subsequent reintroduction as needed; a world first to vaccinate its entire population

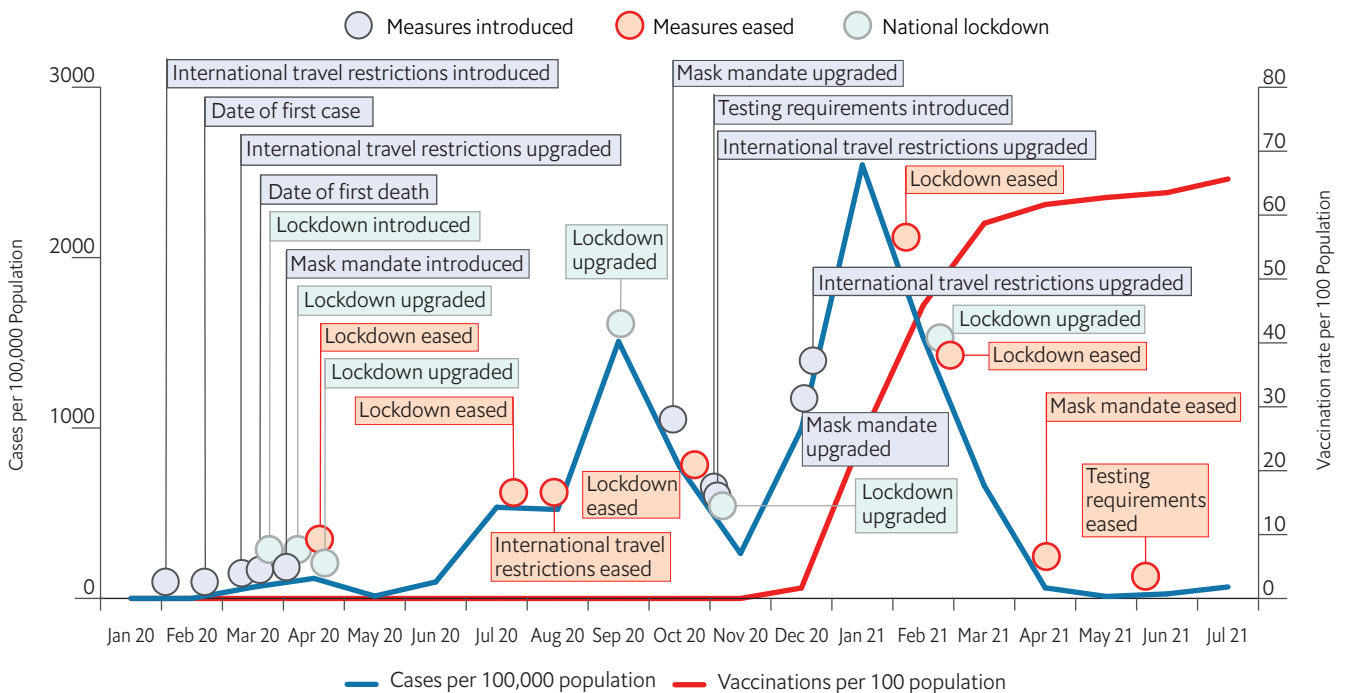
Overview

Israel has received acclaim for its rapid vaccination programme, despite there being initial protests and dissatisfaction with the way the pandemic was handled in the country. Israel has also experienced some of the world's strictest and longest national lockdowns, with

residents largely confined to their homes for a cumulative four months. Israel has a robust healthcare system, a strong economy and an advanced research sector, factors that helped the country to successfully manage the pandemic. Despite the initial failure of the government to respond and prevent the third wave, it has had one of the fastest vaccination programmes in the world demonstrating that vaccines greatly reduce mortality even among largely infected populations.

Israel has implemented a number of national lockdowns with varying levels of restrictions; this changing policy landscape means that it has not been possible to plot all of these onto the graph below.

Figure 11: Timeline of response and pandemic dynamics 2020-2021 (see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

Key policy initiatives/public health measures/economic initiatives

Israel's initial response to the first wave was swift. The government imposed travel restrictions almost a month before the first confirmed positive case was identified in late February 2020, when it suspended all flights from China on January 30th 2020.¹⁴¹ On February 17th, visitors from Thailand, Hong Kong, Macau and Singapore were barred from entering Israel.¹⁴² By March 9th, the prime minister declared that all people entering Israel were required to follow a mandatory 14-day quarantine.¹⁴³ Rescue flights were dispatched to Peru, India, Australia, Brazil, and Costa Rica to bring home hundreds of Israelis who were stranded around the world.¹⁴⁴ In December 2020, when the third wave peaked in Israel, visitors from the United Kingdom, South Africa and Denmark were banned from entering the country.¹⁴⁵

Along with a public health order to close most public places, the Israeli Ministry of Health released a set of guidelines aimed at ensuring appropriate social distancing be followed by the general public.¹⁴⁶ A national state of emergency was declared on March 19th 2020.¹⁴⁷ Further restrictive guidelines were announced on March 31st 2020, including a ban on public gatherings and requirements to wear protective masks when outdoors.¹⁴⁸ However, there were multiple protests attended by hundreds of thousands in the country to show their dissatisfaction with the incumbent government's handling of the pandemic.¹⁴⁹ There were also instances of government ministers resigning in protest at the laws and regulations passed.¹⁵⁰

The country had entered the first wave of the pandemic amidst great political uncertainty. Following two consecutive elections before

the pandemic struck and a third that was held immediately after its initial outbreak, the previous coalition, composed of extreme right-wing and ultra-Orthodox religious parties, fell short of winning the majority needed to form a new coalition government. The situation was further worsened by Benjamin Netanyahu (then head of the caretaker government), having to appear in court on March 17th 2020, on charges of "fraud, bribery, and breach of trust".¹⁵¹

Israel imposed multiple strict lockdowns throughout the course of the pandemic, with restrictions further tightened during religious holidays posing a risk of increased infections.¹⁵² Despite the beginning of a swift and ambitious vaccination drive in December 2020, cases steadily increased (reaching over 3,000 new cases daily with over 5% of tests resulting in positive cases), causing the government to impose a lockdown for the third time commencing on December 27th 2020.¹⁵³ Due to an alarming number of cases in January 2021 (during the first week of January 2021, there were over 8,000 new cases daily), a two-week, complete nationwide strict lockdown was imposed, lasting until February 5th 2021.¹⁵⁴ Public backlash along with the economic impact of almost successive lockdowns was so great that despite a fourth wave starting in the last week of June 2021, only mask requirements in public were reinstated, with talks of a further lockdown dismissed by government spokespeople.¹⁵⁵

The Israeli government introduced a variety of measures to deal with the socioeconomic effects of the pandemic. Grants were given to self-employed people to help them cope with the loss of customers caused by lockdowns. Businesses were provided with stimulus packages to deal with fixed expenses and to counteract the effect of loss of revenue. The government deferred and exempted payments

of government taxes, electricity bills and water bills for the general public. No-interest loans were provided for micro, small and medium enterprises when the economy slowly started reopening. Statutory reporting requirements for businesses and individuals were relaxed until lockdowns were lifted.¹⁵⁶

“It’s a false dichotomy that you have to choose between protecting public health or the health of the economy. They can and should go together.”

Michael Baker, Professor of Public Health, University of Otago; Member of the New Zealand Covid-19 Technical Advisory Group

The Israeli government, through the Israeli Security Agency (ISA), approved a non-voluntary emergent mass surveillance programme allowing the location tracking of citizens as part of a national effort to slow the spread of covid-19 in March 2020. The ISA did not require a court order for its surveillance.¹⁵⁷ However, the surveillance programme was suspended by the High Court of Justice in Israel in April 2020, stating that there was no legislation to support the constitutionality of this programme.¹⁵⁸ Due to the rising number of cases in July 2020 during the pandemic’s second wave, the Israeli parliament passed legislation allowing the surveillance to be continued for a temporary period of six months, which was again extended in January 2021.¹⁵⁹ This move was challenged multiple times in the Israeli High Court of Justice, ultimately leading the court to pass an order restricting the programme only to people who refused to co-operate with government authorities in “epidemiological investigations”.¹⁶⁰ The programme received much criticism from civil society organisations and there were multiple reports that people

had been wrongly quarantined on the basis of the surveillance programme.^{161, 162}

Israel has a comprehensive universal healthcare system which contributed quietly but substantially to its efforts in grappling with public health issues. Israel’s national health insurance system grants every resident access to free healthcare through four non-profit health funds, their medical institutions and other infrastructure.¹⁶³ The health system, which is financed through a statutory health tax on all income, is praised for its centralised handling of information and its close-to-community healthcare. It is well-staffed and highly trusted by the population.^{163, 164}

Israel’s vaccination drive has been hailed as one of the best in the world.¹⁶⁵ Beginning December 19th 2020, Israel vaccinated 20% of its total population within three weeks of the programme’s roll-out.¹⁶⁶ As of July 18th 2021, Israel has the highest per capita vaccination rate in the world, with 60% of the entire population fully vaccinated.¹⁶⁷ For people who are “immunocompromised,” (ie prone to comorbidities limiting the efficacy of the vaccine after two shots, through limiting antibody production in their bodies), the government rolled out a “booster shot programme” to ensure the population is adequately protected against the virus.¹⁶⁸ Even amidst rising cases after restrictions were lifted, Israel demonstrated that the vaccination reduces case incidences and mortality rates.¹⁶⁹ Along with targeted government action, various factors contributed to the success of the vaccination programme, including an active and politically engaged civil society, a relatively young and small population, high urban population density and a robust social healthcare programme.¹⁷⁰ Israel has received almost universal praise as an example to be followed globally in terms of vaccine roll-out.¹⁷¹

New Zealand

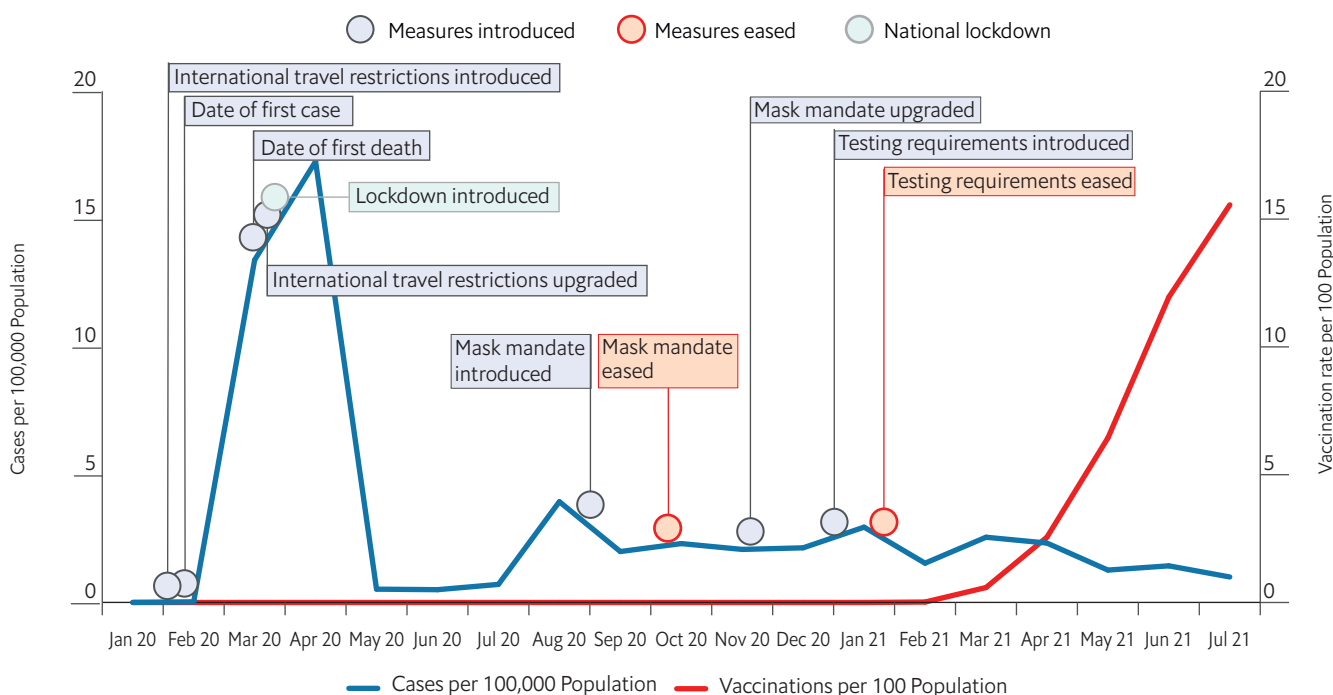
Go hard and go early, with effective policymaking rooted in scientific evidence

Overview

New Zealand has executed one of the world’s most effective responses to the covid-19 pandemic, defined by its clear, early and sustained focus on elimination as opposed to mitigation or suppression.^{172, 173} The country’s management of the pandemic has been attributed to widespread and early testing, clear communication around public health

measures, and a test-trace-isolate system established early on. New Zealand adopted a science-backed systemic approach in dealing with all aspects of the pandemic and its effects. Resources available to the government were utilised in an optimal way, and high trust in the government ensured co-operation between the government and the population. The limited number of covid-19 related deaths in the country between May 31st and 27 July 27th 2021 (four) is a clear indicator of the effectiveness of the country’s response, aided by its geographic isolation. New Zealand has received glowing praise from various stakeholders for its comprehensive management of the crisis.

Figure 12: Timeline of response and pandemic dynamics 2020-2021
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

Key policy initiatives/public health measures/economic initiatives

The four pillars of the country's elimination strategy have been border management, detection and surveillance, quarantine and community support.¹⁷² New Zealand responded swiftly to the WHO's notification listing covid-19 as a deadly virulent disease, with the government setting up a National Health Coordination Centre (NHCC) on January 28th 2020 in response to the pandemic, with a plan that included preparing hospitals for an influx of patients.¹⁷⁴⁻¹⁷⁶ Medical practitioners were required by law to immediately report any suspected cases.¹⁷⁷ Travel restrictions for visitors from China were imposed on February 3rd 2020, and a covid-19 helpline was set up by the government on February 7th.^{178, 179} An important factor, believed to be the primary reason for New Zealand's success in dealing with the pandemic, was the government closing the country's borders to non-citizens and non-residents on March 19th 2020.¹⁸⁰ The borders are still largely closed to the world, with non-residents and non-nationals only allowed to enter the country in a few exceptional cases.^{181, 182}

On 21 March, the New Zealand prime minister introduced a nationwide alert level system to deal with the coronavirus outbreak, similar to the existing fire warning systems, consisting of four risk levels. The alert level was set to 2 on that same day, and people over 70 years and those with compromised immune systems were asked to stay at home.¹⁸³ On March 23rd, the prime minister raised the alert level to 3 and announced it would rise again to Level 4 on March 25th 2020, instituting a nationwide lockdown. All public events as well as non-essential services were required to close

within 48 hours, while essential services such as supermarkets, petrol stations and health services could continue to remain open.¹⁸⁴

Lockdowns and restrictions were implemented strictly. In March 2020, the government announced that foreign tourists already present in the country who flouted self-quarantine restrictions would be deported, and on the day of the announcement, two foreign tourists were placed into forced quarantine for defying government requirements to self-quarantine for two weeks, after which they were deported.¹⁸⁵ The New Zealand Police launched an online form on their website for people to report violations of the covid-19 alert Level 4 restrictions.¹⁸⁶

The economic impacts of the pandemic were taken into consideration by the government even before the first lockdown began. On March 17th 2020, the finance minister announced an NZD 12 billion (USD 8.5 billion) covid-19 business package that included NZD 8.7 billion (USD 6 billion) for businesses and jobs, NZD 2.8 billion (USD 2 billion) for income support, NZD 500 million (USD 350 million) for health, and NZD 600 million (USD 420 million) for the aviation sector and to support supply chains. The country also avoided a huge increase in unemployment through the provision of significant wage subsidies to businesses.¹⁸⁷ Tax relief measures introduced by the government in May 2020 were the largest ever introduced in its history, and included a NZD 3 billion (USD 2.1 billion) tax relief package for businesses, NZD 25 million (USD 17.5 million) for further business support in 2021, NZD 10 billion in wage subsidies (USD 7 billion), NZD 4.27 billion (USD 3 billion) to support 160,000 small businesses, and NZD 1.3 billion (USD 0.9 billion) for 8,900 medium-sized businesses.¹⁸⁸ The interests of New

Zealand's indigenous Māori communities were taken into consideration, and the government announced NZD 56.4 million (USD 39 million) in funding to aid Māori communities and businesses affected by the pandemic.¹⁸⁹

“Clear communication, that’s easy to access and in in the necessary language.”

Jeffrey Lazarus, Associate Research Professor, ISGlobal, and Associate Professor, University of Barcelona, Spain. Member of the Lancet Commission on COVID-19 Public Health Taskforce

The “Work and Income New Zealand” division of the Ministry of Social Development deals with welfare payments, and it switched from physical services to remote services, introducing physical distancing measures at its contact and processing centres.¹⁹⁰ Before the first lockdown, the government negotiated with banks “to ensure that nobody would lose their homes as a result of defaulting on mortgage payments during the pandemic”.¹⁹¹

The various social and economic support measures implemented by its government resulted in soaring public approval numbers. In February 2021, almost 80% of the population rated the government’s response to the

pandemic as “excellent” or “good” in news media polls.¹⁹²

Another important factor in New Zealand’s handling of the pandemic was cross-party support for the government’s policies and decisions. Before adjourning the parliament in light of the impending lockdown, three bills were passed with cross-party support: one regarding emergency funding for pandemic management, one dealing with tax measures for the public, and one preventing no-cause evictions and freezing rents for six months.¹⁹³

The government had a scientific, expert-driven macro-level approach to dealing with the pandemic. In all its public communications, the government adopted a precautionary approach informed by “the best available science and health advice”.¹⁹⁴ Clear and regular public communication by the government to inform the public of government plans and strategies, best health practices, and maintaining a general stance of preparedness greatly enhanced the population’s co-operation with the government.¹⁹⁵ Science-backed government action and outstanding communication created the social licence needed for an effective response.

Portugal

Health system vulnerabilities revealed by increase in case numbers during second wave

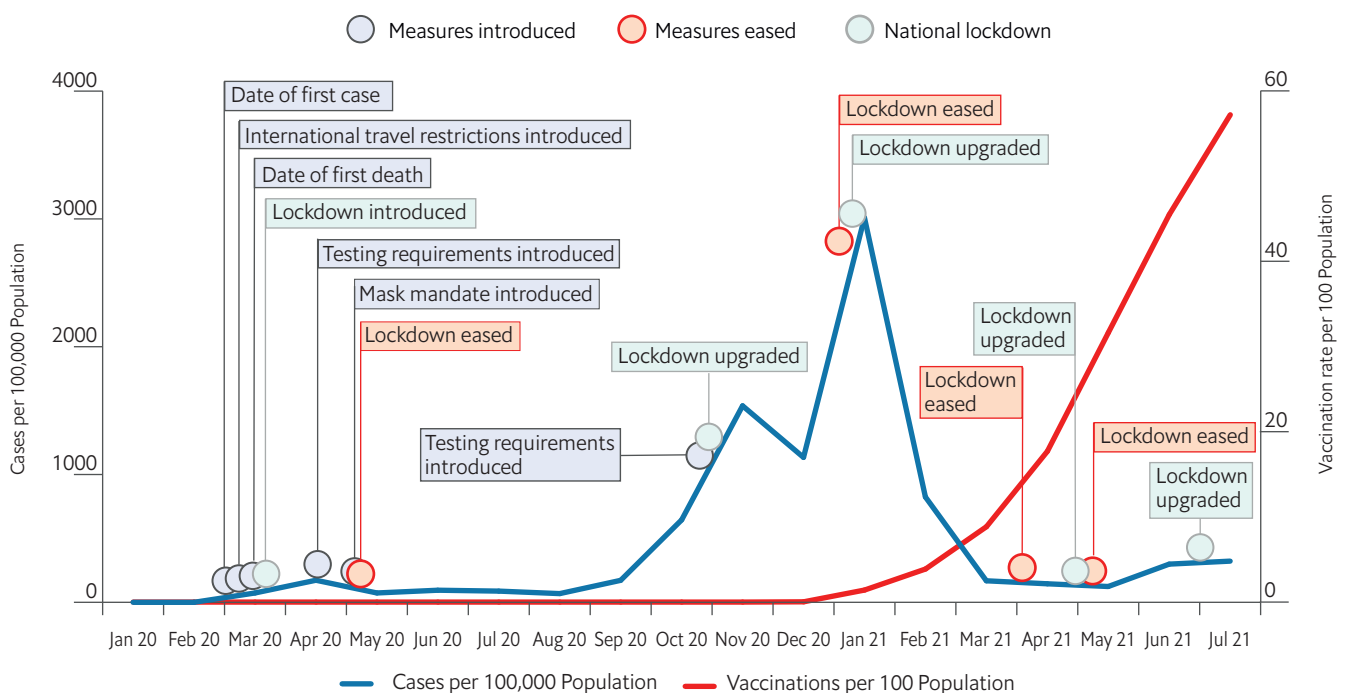
Overview

With the help of early and strict lockdown measures, Portugal succeeded in keeping infections low during the first wave of the covid-19 pandemic across Europe and was praised for its pandemic response.¹⁹⁶ In the autumn and winter of 2020-2021, however, the measures were less effective, with the second wave (in November 2020) peaking at almost 8,000 new cases per day and the third (in January 2021) at 16,000. Portugal's underfunded health system came under significant pressure.

Key policy initiatives/public health measures/economic initiatives

Healthcare and social expenditure cuts in the decade following the 2011 financial crisis meant Portugal had limited institutional preparedness for the covid-19 pandemic and its impact on the health system and on social and economic resilience.¹⁹⁷ The country's number of ICU beds per 100,000 inhabitants is the lowest in Europe.¹⁹⁸ In March 2020, Portugal aimed to prevent the spread of the virus through containment measures including mandatory masks from March 1st and mobile contact tracking apps.¹⁹⁹ On March 24th 2020, the government announced the country had entered the epidemic's mitigation phase, with the main policy focus switching from containment to preparing the healthcare system to deal with

Figure 13: Timeline of response and pandemic dynamics 2020-2021
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

cases in medical institutions throughout the country.¹⁹⁸ Learning from Italy, Portuguese citizens were still asked to consult the hotline upon symptoms rather than visit healthcare institutions, and to quarantine at home as long as the symptoms were mild.²⁰⁰

A state of emergency declared from March 18th 2020 allowed the government to narrow individual rights for the sake of public health, including partially suspending freedom of movement, mandating public-sector workers and businesses to switch to home working, close shops and restaurants, require social distancing, require protective masks to be worn in indoor public places, limit indoor

secondary schools reopened, along with restaurants, cafés, medium-sized stores and some museums.²⁰¹ Home working remained the norm and employers were asked to check the body temperatures of employees.²⁰¹ In the education sector, Portugal made efforts through a ministerial action plan to secure the quality of education through technical solutions for distance education and by running a “Telescola” television programme for all levels of primary and secondary education.^{202, 206} From May 18th 2020, the final two grades of secondary education were allowed to return to school, and the school year was extended to June 26th.²⁰²

Portugal reintroduced a “state of calamity” and then a state of emergency and accompanying restrictions again in October and early November 2020 respectively due to virus surges, with restrictions lasting until March 2021.²⁰⁷⁻²⁰⁹ In mid-January, a strict national lockdown was introduced just as the health system was reaching capacity particularly regarding ICU beds.²¹⁰ The adopted measures were less stringent than the previous measures but additionally included night and weekend curfews.²¹¹ The measures were less effective this time, with the second wave peaking in November at almost 8,000 new cases per day and the third, in January, at 16,000 daily cases. Restrictions were briefly eased over the Christmas period between December 23rd and 26th 2020 with domestic travel and family gatherings allowed and no limits on the size of private gatherings.²¹² Assistance was offered to Portugal from other European countries, when the country recorded the world’s then highest 7-day incidence rate. This was at a time when ambulances sometimes had to queue outside hospitals and refrigerator space for the deceased became scarce.²¹³ The rise in cases was attributed to the Alpha

“Global solidarity is very important.”

Chen Chien-Jen, former Minister of Health and Vice President of Taiwan

gatherings to a maximum of five people per 100m², suspend face-to-face education and cancel religious ceremonies.²⁰¹⁻²⁰³ The country imposed a full national lockdown which lasted till May 2nd.²⁰⁴ In this period, people were only allowed to leave their homes for a limited number of reasons, such as buying essential supplies, and from April 9th to it was entirely prohibited for people to leave the municipality in which they resided.²⁰¹

Some public institutions and shops were able to open from May 4th 2020 if they could ensure customers wore protective masks (or receive fines of EUR 120-350), and from May 18th bigger shops, restaurants and museums followed with this directive.²⁰³ Through “state of calamity”, “state of contingency” and “state of alert” legislation, the government kept a fine-grained repertoire of measures and restrictions from June to September 2020.²⁰⁵ From May 18th 2020, nurseries and

variant, but Portugal's prime minister did acknowledge that relaxing restrictions around Christmas had proven a fatal mistake and that public health communication had not been consistent enough.²¹⁴

Economically, the government presented a package of direct support, loans and tax relief in mid-March 2020 with a total value of EUR 9.2 billion.²¹⁵ An important financial tool was wage subsidies to support businesses temporarily reducing their employees' work hours rather than letting them go. These subsidies were maintained after the first lockdown in order to prevent a sudden rise in unemployment, and were successful in keeping unemployment at 6.9% in 2020.²¹⁶ The government also provided financial

support to various groups affected by the virus, such as the self-employed, unemployed, those forced to stay home to care for children, and for people who were sick or in isolation due to the virus.²⁰¹ In October 2020, Portugal submitted its draft Recovery and Resilience Plan to the European Commission (EC), and in April 2021 it presented the final version, which envisaged EUR 16.6 billion in financial support from the European Union (EU) between 2021 and 2026, including measures to modernise the health system and improve access to social services.²¹⁷ On June 16th 2021, Portugal's plan became the first EU post-covid-19 Recovery and Resilience Plan to be endorsed by the EC, and the first payment of EUR 2.2 billion was made by the EC on August 3rd.^{218, 219}

United Arab Emirates

High tech and rapid response reopened the borders to economy, boosting tourism

Overview

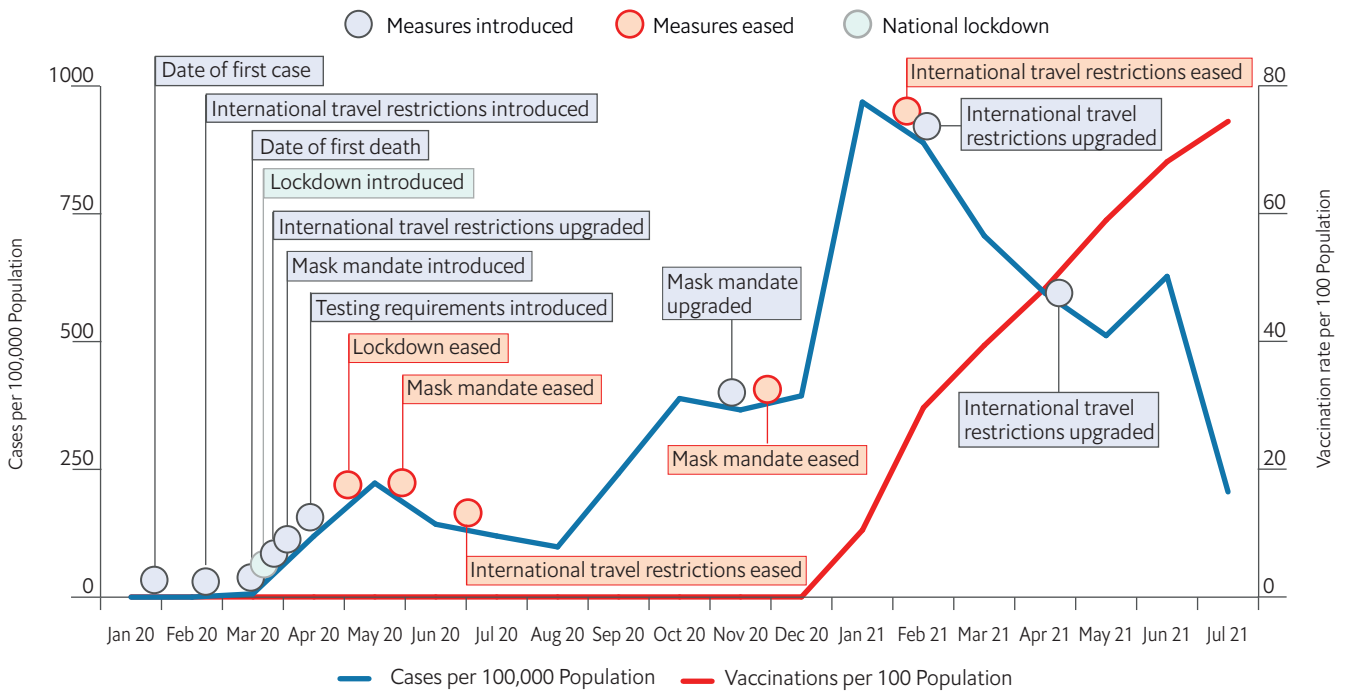
The United Arab Emirates' (UAE's) highly developed healthcare system broke various records in its vaccine roll-out and became an exemplar for its use of innovative technologies in controlling the virus. The UAE experienced its first wave of infections in May 2020, although stringent lockdown measures and intensive testing formed a successful general "disinfection campaign" allowing the country to open for tourists in July 2020. Cases

initially rose again during the beginning of the vaccination drive between December 2020 and March 2021, but the vaccine together with prolonged public health measures seem largely to have contained the virus, including the Delta variant.

Key policy initiatives/public health measures/economic initiatives

At the beginning of the UAE's covid-19 epidemic, personal protective equipment and testing kits were scarce in the country.²²⁰ From the end of March 2020, however, the UAE adopted swift and radical measures to contain the spread of the virus. On March 26th, the country imposed a night curfew between 8pm and 6am and mandated parts of the private sector to switch to home

Figure 14: Timeline of response and pandemic dynamics 2020-2021
(see Table 1 for included responses)



Source: Our World in Data,⁶ Oxford Covid-19 Government Response Tracker,⁷ Economist Impact analysis

working.²²¹ Dubai's densely populated district of Al Ras went into a strict lockdown on March 31st, with the neighbourhood fully closed off and the Dubai Health Authority providing essential supplies to citizens.²²² From April 7th, the entire city of Dubai went into a lockdown where only essential trips outside of the home were allowed, and a Dubai Police permit (online application) was required to leave one's home.²²⁰ These measures were part of a nationwide "disinfection campaign" conducted by the government, which included intensive use of sanitisers on public transport and in cities, dispensed by cleaning teams using trucks and drones.^{223, 224} Furthermore, the government relied on the country's abundant speed enforcement cameras for curfew surveillance; trespassers were fined USD 544 or even prosecuted in court.^{220, 225} Violators of testing and quarantine rules could be fined more than USD 13,000, and a penalty was introduced specifically for spreading "misinformation" about covid-19 on social media.^{225, 226}

UAE has wide availability of covid-19 tests with many tests being conducted per day. Authorities issued several policies to incentivise and force the population to get tested. The cost of a PCR test has been capped several times to ensure affordable prices and clinics were required to deliver test results within 24 hours. In August 2021, tests for students began to be free.²²⁵⁻²²⁷ Until September 2021, a negative PCR or antigen test was required to travel between the two most populous emirates Abu Dhabi and Dubai.²²⁸ All those policies were responsible for workplaces, schools, and public events getting back to normal and maintaining the low number of cases.²²⁷

The UAE authorised emergency use of the

Sinopharm vaccine for frontline healthcare workers in September 2020, and claimed it had 86% effectiveness in early December after Phase 3 trials. However, this contradicted China's estimate of 79% effectiveness for the same vaccine and led to confusion over its actual efficacy, not helped by a lack of transparency of Phase 3 trial data.^{229, 230} The ruler of Dubai, vice president and prime minister of the UAE took part in the trials in early November 2020, together with the UAE's minister of foreign affairs and other officials, to increase trust in the upcoming vaccination drive.²³⁰ In December 2020, the UAE Fatwa Council declared a fatwa (Islamic ruling) which approved the vaccine, and its chairman was vaccinated in public.^{231, 232} Also, from January 2021, the 14-day rule obligates all government employees that have not received the vaccine, and do not have any vaccine contraindication, to undergo a mandatory PCR test every 14 days, at the employees' expense. These government actions and policies were judged to have significantly helped the vaccination campaign in the country.^{231, 232}

The Ministry of Health and Prevention (MoHaP) approved the Sinopharm vaccine on December 9th 2020—the first country after China to do so—and then approved the Pfizer/BioNTech vaccine on December 23rd 2020, with AstraZeneca and Sputnik V following approved afterwards.²³³ The vaccination programme was open to all UAE citizens and foreign residents and available in public and private clinics across the seven emirates.²²⁹ Registration was possible through a hotline, as well as an automated WhatsApp account; the vaccine roll-out received praise for its effectiveness and high quality healthcare.²³⁴ By January 19th 2021, 17.4% of the population had received at least one dose of the vaccine.²³⁵ By May 2021, the UAE was leading

the world's ranking of vaccinations per 100 inhabitants, having vaccinated over 78% of the population over 16 years old with at least one dose of covid-19 vaccine.^{236, 237} In June 2021, the MoHaP started vaccinating 12-15 year olds with the Pfizer/BioNTech vaccine.²³⁸ From June 6th 2021, it was a requirement to be vaccinated in order to attend all cultural, social and sports events, in addition to presenting a negative PCR test.²³⁷

“Pandemics of respiratory diseases are unique as disasters because they affect all people. So every economic sector is affected, almost everywhere, almost at the same time.”

Olga Jonas, Senior Fellow, Harvard Global Health Institute

Reasons for the success of the UAE's vaccination drive were cited by scientists as the country's universal health insurance programmes, its strong stakeholder management, quality outreach and clear public communication including real-time monitoring of the campaign's progress, as well as effective procurement and cold chain

logistics.²³⁵ One caveat made by experts was that the country's broad eligibility criteria may have supported the speed of the vaccination drive, but might have prevented groups most at risk from receiving the vaccine first.²³⁵

The UAE's economic response to the pandemic was relatively rapid and targeted various sectors. Employers were allowed to implement measures towards their employees such as reduced working hours, enforced vacation and unpaid leave, temporary reduction of wages, restricting access to offices and workplaces and mandating home working.²³⁹ The government announced a USD 70 billion stimulus package for the UAE economy, representing approximately 20% of GDP, including interest-free loans to banks by the Central Bank of the UAE, reduced bank fees for SMEs and suspension of work permit fees.^{239, 240} Another USD 7.2 billion fiscal package included increased spending on infrastructure projects, subsidies on water and electricity, and credit guarantees.²³⁹ The UAE prime minister also announced a restructuring of the government, merging ministries and agencies, accelerating digitisation and closing service centres.²⁴¹

Painting a picture across twelve countries: what our country analysis and expert insights tell us

The world has the capacity to limit pandemic risks and respond more effectively to future threats than it has with covid-19.⁴ Our research included country analysis and the insights of a panel of experts. From this we identified **seven key mechanisms for effective pandemic response** (see Figure 15), which informed the development of our country-level toolkit.

Figure 15: Key mechanisms for effective pandemic response



Presenting a country-level pandemic response toolkit

Toolkit overview

This toolkit focuses on enabling policymakers to apply the lessons learned from the response to covid-19 when preparing for and responding to future pandemics. It explores a raft of measures implemented in a selection of 12 countries by summarising some of the key areas for an effective national response. The toolkit is grounded in learning from the responses to covid-19 in the twelve included countries outlined in this report, the reflections of an Advisory Panel and a selective review of key documents.

The toolkit is a top-level document as it needs to work across a wide range of countries with differing priorities for future pandemic response. To make it as useful as possible to policymakers wanting to identify and implement lessons learned, we have informally prioritised elements within the toolkit, specified the stakeholders to involve and included policy exemplars that demonstrate implementation.

The toolkit is divided into two top-level domains, covering national response and the national contribution to the international response. Within these domains, specific action items are included for different stakeholders. The response elements included in the toolkit reflect what happened during covid-19 and actions that our Advisory Panel and the literature indicated were either not seen during covid-19 or were underutilised.

Toolkit structure

National response (government, public health system, healthcare system – public & private sector)
Coordination within and outside government
Evidence-based coordination
Coordination of response capacity
Support measures
Communication and community engagement
National contribution to the international response
Coordination

We also reviewed selected lessons learned documents that emerged from key organisations:

- The WHO's Strategic Preparedness and Response Plan for Covid-19 that set out the key actions at national, regional, and global levels needed to covid-19 response.³
- The G20 report on The global deal for our pandemic age, that proposes how finance can be organised to reduce the globe's vulnerability to future pandemics.⁴
- The Independent Panel for Pandemic Preparedness and Response's report Covid-19: make it the last pandemic.⁵
- Frieden TR, Buissonnière M, McClelland A. The world must prepare now for the next pandemic. *BMJ Global Health* 2021.²⁴²

Country-level pandemic response toolkit

Toolkit summary

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)						
	Key stakeholders:					Strategic concepts
	1	2	3	4	5	
Coordination within and outside of government						
Adopt an all-of-government structured approach to plan, coordinate, finance and monitor the pandemic response. Multidisciplinary and multiagency across human and animal health (one health).		•				Horizontal coordination across government
Establish structured working groups for pandemic response with national and local agencies that can be mobilised in the event of a pandemic. Ensure that national plans cascade down to individual states and community level with localised adaptation.		•	•			Vertical coordination across levels of government
Rapid adoption of international guidelines and recommendations, adapted to national context e.g. Public Health Emergency of International Concern (PHEIC) issued by WHO.	•	•				Coordination of national and international response
Assure cross-party consensus to develop a non-politicised approach to pandemic response.		•	•			Coordination across political parties
Evidence-based response coordination						
Establish evidence-based policymaking through strong cooperation between government and the scientific community.		•				Coordination between government and scientific community
Assure active and coordinated monitoring and surveillance systems that can detect emerging diseases across animal and human health, and in the event of a pandemic can provide transparent, detailed and timely data to: <ul style="list-style-type: none"> • Inform an evidence-based response at the national, regional and international level • Improve resource allocation by predicting then monitoring how the pandemic develops • Predict future supply demand (e.g. intensive care bed usage, vaccine and medical supplies) 	•	•	•	•		Coordination of disease monitoring and surveillance systems
Rapid, early decision-making and policy development based on guidance from international agencies, such as the WHO.	•	•				Evidence-based decision-making
Ability to enact new and adapt existing legislation, policies and pandemic plans to respond to the changing dynamics of an evolving pandemic.		•	•			Evidence-based response coordination
Implementation and enforcement of evidence-based and proportionate countermeasures e.g. implementation of test and trace systems, social distancing, face masks, vaccine uptake and border controls.	•	•				Evidence-based response coordination
Ability to learn lessons during a pandemic and implement rapidly to improve response during the outbreak. Learn lessons that can be implemented after the current outbreak to inform future response.	•	•	•	•		Lessons learned identification and implementation

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)						
	Key stakeholders:					Strategic concepts
	1	2	3	4	5	
Coordination of response capacity						
Ensure adequate national baseline capacities and infrastructure are in place, through appropriate assessment and investment. Capacities include those within healthcare (e.g. intensive care beds, laboratory capacity), and pandemic detection (disease monitoring and surveillance).	•	•	•			Coordination of response capacity
Ability to rapidly reconfigure and redeploy existing capacities and facilities to priority areas as needed throughout the response. Including: <ul style="list-style-type: none"> Physical infrastructure, such as hospitals and labs across public & private sector Well-trained and flexible workforce that can be redeployed Data infrastructure, such as existing electronic health records systems 		•	•	•		Coordination of response capacity
Mobilise public and private sector capabilities and resources during pandemic response to maximise resources.		•	•	•		Coordination of response capacity
Assure equitable access to: diagnostics, therapeutics and vaccines for all social groups within the country.	•	•	•	•		Coordination of response capacity
Support measures						
Appropriate support for the population to mitigate the socio-economic impacts of the pandemic: <ul style="list-style-type: none"> Income support packages, e.g. sickness pay to cover quarantine/isolation Provision of adequate infrastructure for social isolation and quarantine e.g. hotels, water, sanitation and food 		•		•		Financial support
Appropriate support for business: <ul style="list-style-type: none"> Deferred tax payments and credit lines Fiscal support to enable compliance with pandemic response measures e.g. furlough schemes, sickness pay to cover isolation period 		•		•		Financial support
Appropriate support (financial, legislative, regulatory and other resources) for research and development capacity during and outside of and during a pandemic to ensure a rapid response and enable the discovery of novel countermeasures such as diagnostics and vaccines.		•		•		Financial support
Communication and community engagement						
Involve communities and civil society in co-design plans and solutions.	•	•	•		•	Community engagement
Consistent, transparent, clear and timely public communication with context- and culturally-appropriate information.		•	•			Communication
Designation of a single “go-to” trusted source for reliable health information, co-ordinated across all stakeholders to ensure consistent messaging.		•				Communication
Engage with social and traditional media, community leaders, NGOs to spread evidence-based information and develop two-way communication with communities.		•	•	•		Communication
Consider measures to build and maintain trust in government, politicians and institutions among the general public.		•				Building community trust
Implementation of nationwide alert level systems to deal with the new outbreaks during a pandemic, similar to the existing fire warning systems, for instance.		•				Communication
Investment in the population’s health literacy and digital skills to build trust in health institutions and mitigate misinformation, in order to maximise adherence to pandemic countermeasures and reduce vaccine hesitancy.		•	•			Communication

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)						
	Key stakeholders:					Strategic concepts
	1	2	3	4	5	
National contribution to international response						
Coordination						
National government support for global governance and globally coordinated response through funding for and engagement with international agencies like the WHO. For example: • National governments could strengthen the global governance role of international agencies by enabling them to hold countries accountable for adhering to and implementing international policies.	•	•				International response coordination
National government investment in global funds to enhance response capacity in all countries, especially low- and middle-income countries (e.g. supporting COVAX).	•	•				International capacity coordination
National government support for the global development, regulatory assessment, manufacture, procurement and equitable distribution of diagnostics, countermeasures (e.g. masks), therapeutics and vaccines.	•	•		•		International distribution coordination
National government data and knowledge sharing with global agencies such as the WHO and among the global community of scientists.	•	•	•	•		International knowledge coordination

Full toolkit

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Coordination within and outside of government								
Adopt an all-of-government structured approach to plan, coordinate, finance and monitor the pandemic response. Multidisciplinary and multiagency across human and animal health (one health).		•				Horizontal coordination across government	Country Analysis	New Zealand – established the National Health Coordination Centre (NHCC). The structure allows the Ministry of Health to nationally coordinate and manage the health responses. Taiwan – established a Central Epidemic Command Centre (CECC) to co-ordinated a centralised response effort spanning public health, healthcare, civil and law enforcement, and other agencies.
Establish structured working groups for pandemic response with national and local agencies that can be mobilised in the event of a pandemic. Ensure that national plans cascade down to individual states and community level with localised adaptation.		•	•			Vertical coordination across levels of government	Country Analysis	Canada – clear lines of responsibility between the federal and province-level governments were established early. With provincial public health authorities focus on containment and mitigation, whereas federal government focused on border controls and managing federal stockpiles of essential equipment like personal protective equipment and test kits. South Korea – implemented coordination between local and national government, and between local government institutions, enabling a more agile response that was able to redeploy and share resources across municipal borders.
Rapid adoption of international guidelines and recommendations, adapted to national context e.g. Public Health Emergency of International Concern (PHEIC) issued by WHO.	•	•				Coordination of national and international response	Country Analysis	Australia – responded rapidly to the WHO’s announcement declaring covid-19 as a virulent threat. Border closures and strict implementation of self-isolation impeded the rapid spread of the virus and allowed the government to build a testing and tracing system that was not immediately overwhelmed.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Coordination within and outside of government								
Assure cross-party consensus to develop a non-politicised approach to pandemic response.		•	•			Coordination across political parties	Country Analysis / Expert Insight	<p>Australia – early meetings established bipartisan unity from leaders across political parties. Political committees managing different aspects of the pandemic included members from all parties.</p> <p>New Zealand – cross-party support for the government’s policies and decisions. Before adjourning the parliament in light of the impending lockdown, three bills were passed with cross-party support: one regarding emergency funding for pandemic management, one dealing with tax measures for the public, and one preventing no-cause evictions and freezing rents for six months.</p>
Evidence-based response coordination								
Establish evidence-based policymaking through strong cooperation between government and the scientific community.		•				Coordination between government and scientific community	Country Analysis	New Zealand – adopted a science backed systematic approach in dealing with all aspects of the pandemic and its effects.
<p>Assure active and coordinated monitoring and surveillance systems that can detect emerging diseases across animal and human health, and in the event of a pandemic can provide transparent, detailed and timely data to:</p> <ul style="list-style-type: none"> • Inform an evidence-based response at the national, regional and international level • Improve resource allocation by predicting then monitoring how the pandemic develops • Predict future supply demand (e.g. intensive care bed usage, vaccine and medical supplies) 	•	•	•	•		Coordination of disease monitoring and surveillance systems	International documentation	The G20 report on the global deal for our pandemic age recommends that the WHO establish a new global surveillance system, including animal and environmental health surveillance to detect future threats.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Evidence-based response coordination								
Rapid, early decision-making and policy development based on guidance from international agencies, such as the WHO.	•	•				Evidence-based decision-making	Country analysis	Taiwan – border management measures were introduced the day the WHO informed of the outbreak in Wuhan. New Zealand – the government set up a National Health Coordination Centre (NHCC) on 28 January 2020, after WHO published a comprehensive package of guidance documents for countries, covering topics related to the management of an outbreak of a new disease on 10 January 2020.
Ability to enact new and adapt existing legislation, policies and pandemic plans to respond to the changing dynamics of an evolving pandemic.		•	•			Evidence-based response coordination	Country analysis	South Korea – in response to MERS-CoV in 2015, the government introduced new legislation for pandemics, particularly expediting authorisation – directly facilitating the rapid approval of covid-19 diagnostic tests then the implementation of the test and trace programme just days later. Taiwan – rapidly activated its pandemic plan that had been updated based on lessons from the 2003 SARS outbreak.
Implementation and enforcement of evidence-based and proportionate countermeasures e.g. implementation of test and trace systems, social distancing, face masks, vaccine uptake and border controls	•	•				Evidence-based response coordination	Country analysis	Australia – strict border controls on entry to and exit from the country were implemented early, enforced through police checks, fines and potential prison sentences. Canada – covid-19 policies enforced through fines and potential prison sentences. Denmark’s test, track and trace plan was launched in May 2020, to specify protocols and a tracing app that integrates with other European tracing apps to provide cross-border tracing. Taiwan – a test and trace system was established in 2017 based on experiences of SARS and Ebola. It had already been used to monitor measles, rubella and avian flu, but was refined as the outbreak continued.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
	•	•						UAE – vaccination certification and negative test status became a requirement to attend public events, providing an indirect compulsion to comply.
Ability to learn lessons during a pandemic and implement rapidly to improve response during the outbreak. Learn lessons that can be implemented after the current outbreak to inform future response.	•	•	•	•		Lessons learned identification and implementation	Country analysis	South Korea and Taiwan – identified lessons learned from the SARS and MERS outbreaks, implementing those in advance of covid-19, ensuring that appropriate legislation and infrastructure (laboratory networks, centralised response coordination) was in place and could be mobilised quickly as covid-19 emerged.
Coordination of response capacity								
Ensure adequate national baseline capacities and infrastructure are in place, through appropriate assessment and investment. Capacities include those within healthcare (e.g. intensive care beds, laboratory capacity), and pandemic detection (disease monitoring and surveillance).	•	•	•			Coordination of response capacity	International Documentation	The WHO's Strategic preparedness and response plan for Covid-19 and The G20 report on The global deal for our pandemic age, agree that pandemic preparedness and early response capacity should be thought of as critical infrastructure elements which cannot be allowed to fail, requiring stable and reliable financing in the same way as other critical international systems such as finance and banking, or security and peacekeeping.
Ability to rapidly reconfigure and redeploy existing capacities and facilities to priority areas as needed throughout the response. Including: <ul style="list-style-type: none"> Physical infrastructure, such as hospitals and labs across public & private sector Well-trained and flexible workforce that can be redeployed Data infrastructure, such as existing electronic health records systems 		•	•	•		Coordination of response capacity	Country Analysis	Chile – used the existing infrastructure for its national immunisation programme for flu and childhood vaccines to deliver covid-19 vaccines. Denmark – repurposed its seasonal influenza testing infrastructure to enable widespread testing and outbreak surveillance. Germany – redeployed civil service personnel to test and trace. Taiwan – rapidly activated a network of laboratories – lessons from SARS indicated that the connectedness of laboratories was more important than the baseline number. UAE – used traffic speed cameras to enforce curfew, fining and prosecuting those who broke the rules.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Coordination of response capacity								
Mobilise public and private sector capabilities and resources during pandemic response to maximise resources.		•	•	•		Coordination of response capacity	International Documentation	The G20 report on the global deal for our pandemic identified significant scope to catalyse and maximise private sector participation during pandemics through public-private partnerships, foremost for critically-needed supplies, from vaccines to oxygen cylinders.
Assure equitable access to: diagnostics, therapeutics and vaccines for all social groups within the country.	•	•	•	•		Coordination of response capacity	Country Analysis	Taiwan – launched an app showing real-time availability of masks and linked their distribution to individuals' national health insurance cards to ensure equitable access and avoid shortages.
Support measures								
<p>Appropriate support for the population to mitigate the socio-economic impacts of the pandemic:</p> <ul style="list-style-type: none"> Income support packages, e.g. sickness pay to cover quarantine/isolation Provision of adequate infrastructure for social isolation and quarantine e.g. hotels, water, sanitation and food 		•		•		Financial support	Country Analysis	<p>Canada – unemployment and isolation funding support offered to individuals.</p> <p>Chile – “sanitary residences” provided to individuals who were unable to self-isolate at home. Emergency basic income to support approximately 25% of the population.</p> <p>Israel – deferred and exempted payments of government taxes, electricity and water bills for the general public.</p> <p>Portugal – financial support to various groups, including those who had to stay at home to care for children or people who were sick/in isolation due to covid-19.</p> <p>Taiwan – implemented emergency funding to support individuals required to isolate, with policy based on SARS experience.</p> <p>US – the federal government passed laws to enable individuals to access support including paid sick leave, Medicaid funding and unemployment payments.</p>

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National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Support measures								
<p>Appropriate support for business:</p> <ul style="list-style-type: none"> • Deferred tax payments and credit lines • Fiscal support to enable compliance with pandemic response measures e.g. furlough schemes, sickness pay to cover isolation period 		•		•		Financial support	Country Analysis	<p>Australia – Job Keeper Payment programme provided wage subsidies to companies affected by covid-19, tax relief was introduced for businesses and small-medium enterprises received a tax-free cash flow boost.</p> <p>Canada – interest free loans to businesses and non-profits, wage subsidies to prevent large-scale layoffs, rent and mortgage support where needed.</p> <p>Israel – stimulus packages provided to help companies cope with fixed costs, interest-free loans provided to businesses when the country began reopening and statutory reporting requirements were relaxed to ease administrative burden.</p> <p>New Zealand – covid-19 business support package including supporting businesses and jobs, wage subsidies, with targeted support for the aviation sector and to support supply chains. Specific packages were created to support indigenous Maori communities and businesses affected by the pandemic.</p> <p>Portugal – introduced wage subsidies to prevent job losses, maintaining unemployment at 6.9%.</p> <p>UAE – businesses were allowed to implement reduced working hours and enforced leave to control the financial impact of covid-19, and mandate teleworking to enable compliance with government restrictions.</p>

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Support measures								
Appropriate support (financial, legislative, regulatory and other resources) for research and development capacity during and outside of and during a pandemic to ensure a rapid response and enable the discovery of novel countermeasures such as diagnostics and vaccines.		•		•		Financial support	Country Analysis	<p>Canada – funded 96 research projects to detect, manage and reduce the transmission of covid-19.</p> <p>New Zealand – introduced legislation that prevented no-cause evictions and froze rents for six months.</p> <p>US – the Biomedical Advanced Research and Development Authority (BARDA) facilitated the funding of the development of novel diagnostics, vaccines and drugs for covid-19.</p> <p>US – the Public Readiness and Emergency Preparedness Act (PREP) facilitated innovation in the production of vaccines and other covid-19 countermeasures, by providing immunity from liability to manufacturers.</p>
Communication and community engagement								
Involve communities and civil society in co-design plans and solutions.	•	•	•		•	Community engagement	Country Analysis	Israel – along with targeted government action, various factors contributed to the success of the vaccination programme, including an active and politically engaged civil society.
Consistent, transparent, clear and timely public communication with context- and culturally-appropriate information.		•	•			Communication	Country Analysis	<p>Chile – mounted an effective communication campaign to encourage high rates of vaccine take up.</p> <p>South Korea – government policies framed citizens as “co-partners” to create a shared sense of responsibility to adhere to covid-19 policies.</p> <p>Taiwan – built upon the population’s knowledge following SARS in 2003 to create a sense of partnership in tackling the outbreak, encouraging hand washing and mask wearing.</p>
Designation of a single “go-to” trusted source for reliable health information, co-ordinated across all stakeholders to ensure consistent messaging.		•				Communication	Country Analysis	New Zealand – agreed on cross-party support for all government policies and decisions for pandemic response.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Communication and community engagement								
Engage with social and traditional media, community leaders, NGOs to spread evidence-based information and develop two-way communication with communities.		•	•	•		Communication	Country Analysis	<p>Canada – public service announcements on radio and television to inform the public about relevant personal hygiene precautions, social distancing and current restrictions on movement.</p> <p>South Korea – trusted civil society groups were helpful in disseminating information to the public. They framed citizens as “co-partners”, engendering a sense of individual and collective responsibility to protect their own health and that of others.</p> <p>UAE – a penalty was introduced specifically for spreading “misinformation” about covid-19 on social media.</p>
Consider measures to build and maintain trust in government, politicians and institutions among the general public.		•				Building community trust	Country Analysis	<p>Denmark – capitalised on existing trust, multidisciplinary press conferences and use of trusted public figures like the Danish Queen.</p> <p>UAE – the Emirates’ rulers, high profile members of government and UAE Fatwa Council publicly received their vaccinations to build public trust in the vaccination programme.</p>
Implementation of nationwide alert level systems to deal with the new outbreaks during a pandemic, similar to the existing fire warning systems, for instance.		•				Communication	Country Analysis	New Zealand – established a nationwide alert level system, similar to those used for natural disasters with defined levels of risk that have been used throughout the pandemic.
Investment in the population’s health literacy and digital skills to build trust in health institutions and mitigate misinformation, in order to maximise adherence to pandemic countermeasures and reduce vaccine hesitancy.		•	•			Communication	Country Analysis	Israel – the country’s largely community-based healthcare system is highly trusted by the population. Which supported acceptance of pandemic countermeasures and vaccine uptake.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
National contribution to international response								
Coordination								
National government support for global governance and globally coordinated response through funding for and engagement with international agencies like the WHO. For example: <ul style="list-style-type: none"> National governments could strengthen the global governance role of international agencies by enabling them to hold countries accountable for adhering to and implementing international policies. 	•	•				International response coordination	International documentation	The G20 report on the global deal for our pandemic emphasises that collective action and investment is needed to assure global security from future pandemic threats.
National government investment in global funds to enhance response capacity in all countries, especially low- and middle-income countries (e.g. supporting COVAX).	•	•				International capacity coordination	International documentation	The WHO's Strategic preparedness and response plan for Covid-19 recommends that all countries prioritise support for the ACT-Accelerator to enable it to reach its targets by sharing doses, funding the COVAX mechanism and supporting WHO.
National government support for the global development, regulatory assessment, manufacture, procurement and equitable distribution of diagnostics, countermeasures (e.g. masks), therapeutics and vaccines.	•	•		•		International distribution coordination	International documentation	The Independent Panel for Pandemic Preparedness and Response's report discusses the possibility of a pre-negotiated system to achieve the development, regulatory assessment, manufacture, procurement and equitable delivery of vaccines, therapeutics, diagnostics, and essential supplies. They mentioned ACT-A, launched in 2020 as a valuable model that could serve as the basis of a permanent platform that can stand in readiness for any future pandemic. The G20 report on the global deal for our pandemic cites the African Union's 'African Vaccine Acquisition Task Team' as an example of an initiative to overcome regional barriers to effective vaccine procurement.

Key stakeholders: 1. International agencies 2. National agencies 3. Local agencies 4. Private sector 5. General public

National response (government, public health system, healthcare system – public & private sector)								
	Key stakeholders:					Strategic concepts	Primary Source	Policy Exemplars
	1	2	3	4	5			
Coordination								
National government data and knowledge sharing with global agencies such as the WHO and among the global community of scientists.	•	•	•	•		International knowledge coordination	Country analysis	Lack of data transparency can compromise pandemic response and vaccination campaigns: The UAE authorised emergency use of the Sinopharm vaccine for frontline healthcare workers in September 2020, and claimed had 86% effectiveness in early December after phase-3 trials, although this contradicted China’s estimate of 79% effectiveness for the same vaccine and led to confusion over its actual efficacy not helped by a lack of transparency of phase-3 trial data.

Discussion

This is a pragmatic research project, designed to identify successful elements of the covid-19 response from a selection of countries to draw on lessons learned and assist in being better prepared for future threats. The structured country analysis identified key literature by searching bibliographic databases and grey literature. This country analysis informed themes for the draft toolkit, which was then reviewed by an Advisory Panel of international experts and further refined through additional country analysis. Phase 1 country analysis reviewed countries up to March 2021 while Phase 2 reviewed selected countries up to August 2021.

Included figures (Figures 3 to 14) map the number of covid-19 cases against the introduction/easing of pandemic response measures and indicate that none of these included countries got it entirely “right”. Hence, the analysis highlights a number of factors that have positively contributed to the covid-19 response in the selected countries, rather than attempting to tie specific response measures to outcomes. These findings were synthesised into a country-level pandemic response toolkit designed to support and guide policymakers globally to implement these lessons learned based on national priorities.

Limitations

Covid-19 is a rapidly evolving situation meaning that new insights and literature are being reported and published continually including amendments to advice based on scientific data. It is likely that some aspects of the included countries’ responses have not been included in the databases of scientific literature that we searched. We have attempted to mitigate this through grey literature searching and the engagement of experts, but acknowledge this as a potential conceptual limitation. Search results were not restricted to English language only, but the searches were carried out in English, which may have limited the results.

We also acknowledge that pandemic response is dependent on a complex interplay of different factors. Existing country and population characteristics, including baseline healthcare capacity and socioeconomic factors, impact a country’s responses to pandemics⁴² Therefore it is important that policymakers bear their own national and local context in mind when using this toolkit.

Next steps: Enhancing future pandemic response after covid-19

The global humanitarian and health crisis the world has experienced during covid-19 has highlighted deficiencies in the ability of individual countries and the international community to respond to pandemics.

Effective responses are based on long-term investments in public health, the overall resilience of healthcare systems, the ability to mobilise appropriate response infrastructure and political competence. No single element included in the toolkit will be sufficient to mitigate a pandemic, but each one provides a crucial building block for nations to pursue better future outcomes.

Our goal is that the toolkit enables countries to improve their future pandemic response by providing a set of exemplary practices that can be adapted to a country's individual context, within a unified global approach.

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