

**WHITE PAPER ON
SINGAPORE'S RESPONSE TO COVID-19:
LESSONS FOR THE NEXT PANDEMIC**



TABLE OF CONTENTS

04

Introduction

08

How the Crisis Unfolded

Early Days of Fog: January 2020–March 2020

Fighting a Pandemic: April 2020–April 2021

Rocky Transition: May 2021–November 2021

Learning to Live With COVID-19: December 2021–2022

26

What We Did Well

51

What We Could Have Done Better

69

Learning from COVID-19: Preparing for the Next Pandemic

88

Conclusion

PREFACE

After three years battling the COVID-19 pandemic, things have finally returned to normal. It is timely to take stock and learn from the experiences we have been through.

This White Paper was prepared by the Prime Minister's Office. It draws on a review conducted by the former Head, Civil Service, Mr Peter Ho, which included interviews with key participants in the crisis, both ministers and civil servants. It also incorporates the findings of various reviews by government ministries and agencies, as well as the perspectives of the private and people sectors.

COVID-19 was a wicked problem on a grand scale. The situation was dynamic and fluid, with new information and developments unfolding daily. Many decisions and trade-offs had to be made in the fog of war, under conditions of incomplete information and uncertain outcomes. They often involved not binary choices, but gradations of options in shades of grey. We had multiple intense debates over the next course of action. Yet decisions had to be taken urgently. We acted based on our best judgement, and then dealt with the results and consequences.

Looking back, with the benefit of hindsight and the experience and knowledge we have since accumulated, we can reach some conclusions on what we did right, where we went wrong, and how we could have done better. But even

now, post-crisis, there will still be different perspectives on what transpired and what the best courses of action were. This is only natural. This White Paper attempts to synthesise and make sense of the breadth of perspectives gathered, weave them together with the known data and facts, and offer as balanced and objective an account as possible.

On the key events and major issues, the lessons to be drawn are quite clear. We need to learn them well, and make full use of our experience this time as we prepare Singapore for the next pandemic. But just as COVID-19 was different from SARS, the next pandemic will not be just like COVID-19. We must be prepared for new challenges and nasty surprises. We must learn from the past, but we must also be adaptable and flexible enough to recognise when existing playbooks do not work, and devise new solutions and strategies that work better.

The lessons captured in this review should therefore not be treated as rigid doctrines to follow, but as an account of the sort of issues we dealt with, how we weighed opposing considerations and concerns, and how things turned out this time. May it help those who will be dealing with the next pandemic to avoid some of the errors we made, and improve on what we have done this time, in order to protect the lives and livelihoods of Singaporeans.

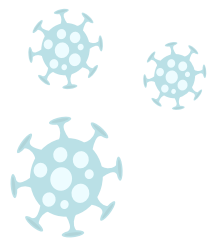
Introduction

COVID-19 is beyond doubt the crisis of our generation. It has claimed more than 6.6 million lives so far across the world.¹ The global economy came to a near standstill with far-reaching impact on all sectors and all segments of societies worldwide. In 2020, Singapore's economy contracted by 3.9%², its worst full-year recession since Independence. The pandemic demanded a whole-of-government response on an unprecedented scale, testing the mettle of Singapore's leadership and the resilience of its people.

COVID-19 also surprised us in many ways. The global outbreak resulted in prolonged border closures. This tested the limits of the government's contingency plans and the resilience of Singapore's supply chains. The crisis also featured all the classic elements of complexity, with a high level of uncertainty and unpredictability throughout. The government contended with several false starts in Singapore's re-opening as the emergence of new variants like Delta and Omicron forced it to pivot its plans.

Around the world, countries struggled to balance between lives and livelihoods. They adopted a spectrum of possible approaches. Some prioritised livelihoods and sought to open borders as quickly as possible, accepting enormous pressure on the healthcare system and higher fatalities. Others opted for aggressive containment to minimise the spread of the virus, but at greater cost to the economy.

Relative to other countries, we have done well in protecting both lives and livelihoods. Singapore's vaccination rates are among the highest in the world. Our overall case fatality rate is one of the lowest globally, standing at less than 0.1%,³ compared with the average of about 1.0% worldwide.⁴ The economy, initially badly impacted by COVID-19, was

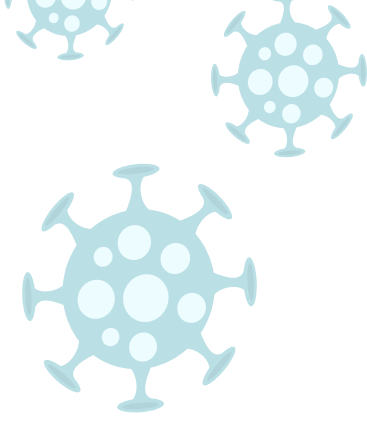


¹ "WHO Coronavirus (COVID-19) Dashboard," World Health Organization, accessed 31 December 2022.

² As at 13 February 2023

³ MOH data, accessed 31 December 2022.

⁴ "WHO Coronavirus (COVID-19) Dashboard."



strongly supported by government support measures, financed by an unprecedented draw on our Past Reserves, with the President’s concurrence. By the end of 2021 the economy had revived, with unemployment rates recovering to pre-COVID levels in 2022.⁵ Our air hub took a significant hit with passenger traffic through Changi — at the lowest point falling to less than 0.5% of pre-COVID traffic. Despite this setback, recovery has been strong, with air travel volumes expected to recover to pre-COVID levels by 2024.

The whole nation came together to fight the pandemic. Many stepped up to contribute in courageous and inspiring ways. From healthcare workers to safe distancing ambassadors, from personnel deployed at the

dormitories to volunteers conducting house visits, there were numerous heart-warming stories of people, both Singaporeans and non-citizens, going above and beyond the call of duty. We want to put on record our appreciation for the selfless dedication and sacrifices made by many in our multi-year fight against COVID-19.

Singapore has moved into a new normal of living with COVID-19. This review crystallises the government’s reflection of the important lessons to be drawn after grappling with the pandemic for three years. Where we have done well, we should cement these gains for the future. Where there have been shortcomings in our response, we should identify and tackle them, to be better prepared for the next pandemic.



⁵ MTI and MOM data, accessed 31 December 2022

COVID-19 IN NUMBERS

IMPACT ON SINGAPORE



2,202,214
COVID-19 cases



1,711
deaths



ECONOMY

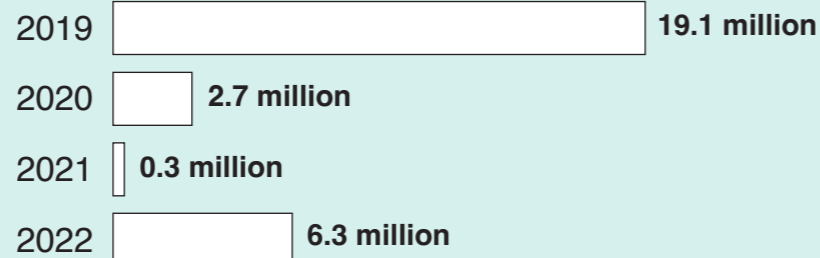
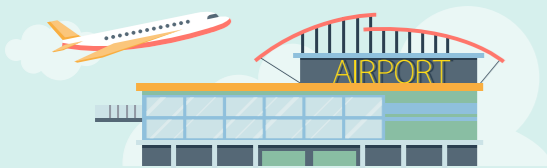
Singapore's GDP **shrank 3.9%** in 2020 but **grew 8.9%** in 2021*



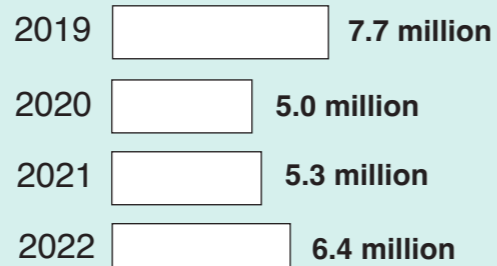
EMPLOYMENT

Total employment in 2020 **shrank by 181,000** but **grew 242,100** across 2021 to Sep 2022

Total international visitor arrivals



Average daily ridership on public transport



*As at 13 February 2023

HOW WE RESPONDED

ECONOMY



\$72.3 billion spent on our fight against COVID-19 over FY2020 and FY2021



As at April 2022, about **200,000** places taken up under the jobs and skills programmes and initiatives of the SGUnited Jobs and Skills package



As at May 2022, over **744,000** jobseekers have been hired with support from the Jobs Growth Incentive

PUBLIC HEALTH



82% of population eligible for vaccination have minimum protection



92% received at least one dose



41,121,400 Antigen Rapid Test (ART) swabs conducted



6.2 million users registered on TraceTogether application



6,400 Safe Distancing Ambassadors by the public sector, government-funded institutions or private sector medical service providers, as at April 2022



Over **120,000** beds sourced for COVID-19 facilities

SOCIAL AND COMMUNITY SUPPORT

\$539 million disbursed to around **480,000** unique beneficiaries across COVID-19 support scheme*

*includes Temporary Relief Fund, COVID-19 Support Grant, COVID-19 Recovery Grant – Temporary, and COVID-19 Recovery Grant

Over **57 million** ART kits distributed to more than 1.5 million households

Over **288** non-governmental groups and ground ups partnered the government to support the community and the vulnerable

20,000 computing devices loaned to students lacking digital access for home-based learning in 2020



Figures as at Dec 2022

The background is a light teal color with a hand-drawn style illustration. A large hand is shown holding a flashlight, with the beam of light shining upwards. The hand and flashlight are drawn with thick, dark teal outlines. The background is filled with various abstract shapes, including circles, lines, and wavy patterns, all in shades of teal. The overall style is clean and modern.

HOW THE CRISIS UNFOLDED

Safes

Throughout the past three years, Singapore faced many ups and downs in its battle against COVID-19. Our operating mindset had to shift multiple times in response to new situations and new information about the virus. With each new stage, we had to move quickly and adapt. Each time we thought we had the pandemic under control, the virus surprised us.

This section summarises our key experiences during this COVID-19 battle. We have segmented our journey into the following four stages, each highlighting the global situation at the time as well as our strategies to fight the virus:

“Early Days of Fog” covers the period when the virus was first discovered, and the initial response to a global pandemic of unprecedented scale;



a



b

“Fighting a Pandemic” recounts Singapore’s journey through the Circuit Breaker, and early hopes of reopening as infections stabilised, only to be dashed when the Delta variant struck;

“Rocky Transition” describes the challenges and dilemmas at play as Singapore strived to reach a new normal and live with endemic COVID-19;



c



d

Finally, **“Learning to Live with COVID-19”** covers the actions since December 2021, including our progressive reopening and resumption of activities.

Early Days of Fog

January - March 2020



March 2020

- Safe distancing measures are introduced
- Border measures are enhanced from restricting entry of travellers from specific countries to restricting entry of travellers from all countries
- WHO declares COVID-19 outbreak a pandemic
- TraceTogether is launched
- First two deaths from COVID-19 are reported in Singapore
- The Resilience Budget is announced
- First cluster in a migrant worker dormitory is discovered at S11 Dormitory @ Punggol



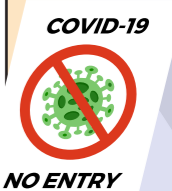
February 2020

- Local clusters of infection are detected
- DORSCON level is raised from Yellow to Orange
- Stay-Home Notice (SHN) regime is introduced
- The Unity Budget is introduced



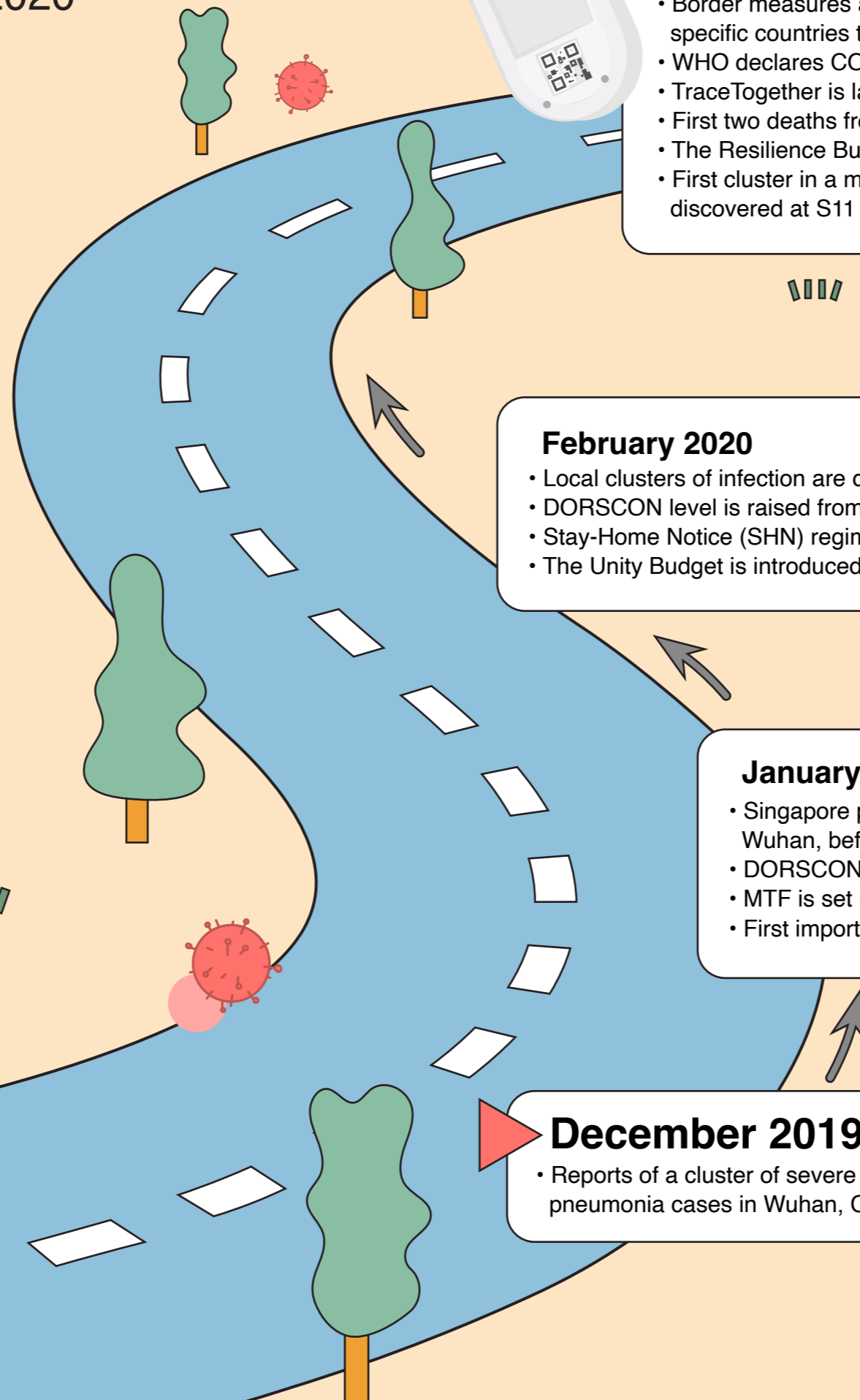
January 2020

- Singapore places border measures on travellers from Wuhan, before expanding it to all travellers from China
- DORSCON level is raised from Green to Yellow
- MTF is set up and HCEG convenes
- First imported case in Singapore is confirmed on 23 Jan



December 2019

- Reports of a cluster of severe pneumonia cases in Wuhan, China

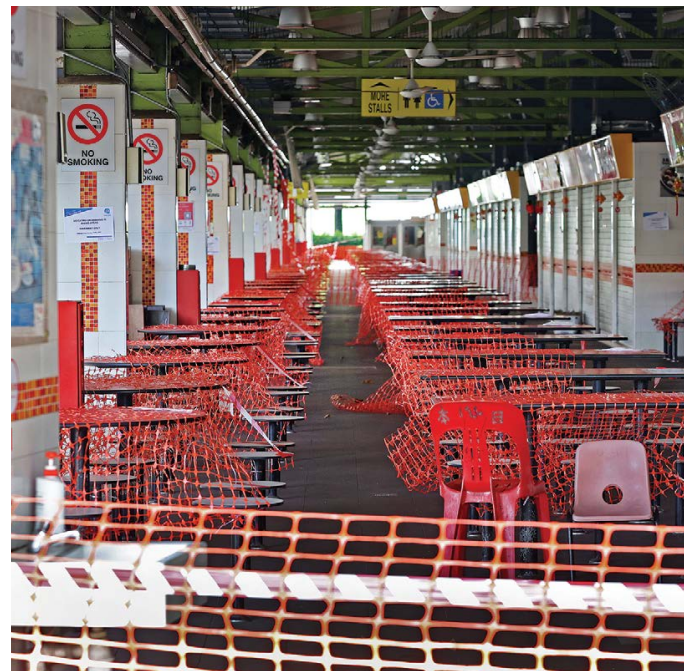


Early Days of Fog (January–March 2020)

On 31 December 2019, the Ministry of Health (MOH) picked up on open-source media reports of a cluster of severe pneumonia cases in Wuhan, China. China subsequently provided information on the cluster to the World Health Organization (WHO). Such clusters were not uncommon, and alerts were sent out to emergency departments and infectious disease specialists to look out for unwell persons with travel history to Wuhan, China. MOH monitored the developing situation and, as a contingency, activated the Crisis Management Group for Health and introduced temperature screening for inbound travellers from Wuhan, China.

Soon after the new year, the situation worsened. The outbreak spread beyond Wuhan, China, with cases emerging in Thailand, Japan, and South Korea. We raised Singapore’s Disease Outbreak Response System Condition (DORSCON) level from Green to Yellow on 21 January 2020, and stood up the ministerial-level Multi-Ministry Taskforce (MTF) and the civil service-led Homefront Crisis Executive Group (HCEG) on 22 January 2020 to coordinate the work across government. We wanted to be ready to respond to a pandemic, even though we did not know at the time the extent and severity of the outbreak. Our fears were confirmed as the situation escalated and Singapore saw its first case of COVID-19 on 23 January 2020.

In response, the government tightened Singapore’s border measures and began to do systematic contact-tracing to detect clusters and prevent the spread of the virus. Restrictions on incoming visitors and returning residents were progressively imposed, starting with arrivals from Wuhan, then the rest of China, then selected countries, and finally all countries from 23 March 2020.



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

In addition to the border closures, a Stay-Home Notice (SHN) regime was introduced on 17 February 2020 to quarantine travellers and “ringfence” risk while limiting economic impact. Our early contact-tracing efforts successfully contained a wide transmission

of the virus and prevented deaths. Globally, countries began taking similar actions to lock down their borders, prompting more Singaporeans and residents overseas to return home.

While there were initial reservations as to whether we were overreacting, it soon became clear that the world was dealing with an unknown but dangerous virus. Unlike SARS in 2003 which caused serious illnesses but did not spread quickly, or the H1N1 flu virus in 2009 which was difficult to contain but mild, COVID-19 caused severe illness in high-risk individuals and appeared to be fairly contagious.

As more unlinked cases surfaced, we raised the DORSCON level from Yellow to Orange on 7 February 2020. In the same month, we rolled out Singapore's first wave of safe distancing measures, suspending events and gatherings involving large groups and closing retail venues like bars, cinemas, and entertainment outlets. Religious gatherings were cancelled, and food and beverage (F&B) outlets were required to ensure sufficient separation between customers in dine-in areas.

Despite these efforts, new cases continued to increase. At first, these were mostly returning overseas Singaporeans. However, community

cases also grew in tandem with imported ones, and by the end of March, exceeded imported cases.⁶ Singapore recorded its first two deaths from the virus on 21 March 2020 and its 1,000th case on 1 April 2020.

Next, clusters began to emerge in the migrant worker dormitories. On 5 April 2020, two dormitories were locked down and gazetted as isolation areas. However, these actions failed to contain the transmission. Infections among migrant workers grew exponentially as the virus swiftly spread to at least nine more dormitories over the next three days. Multiple infections were also discovered at a nursing home. This was an alarming development, given the community living conditions in both dormitories and nursing homes, where people lived in close proximity with one another. Absent decisive action, the situation could have easily spiralled out of control, causing mass casualties in the dormitories with potentially massive spillover to the wider population. Hence, the MTF announced that Singapore would enter a "Circuit Breaker" on 7 April 2020, with significantly stricter measures imposed. A new stage in Singapore's battle against COVID-19 had begun.

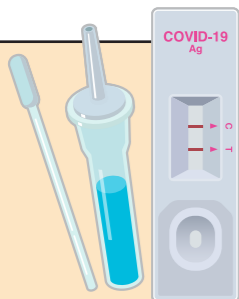
⁶ COVID-19 case numbers from data.gov.sg, accessed 16 December 2022.

Fighting a Pandemic

April 2020 - April 2021

June 2020

- Circuit Breaker is lifted
- In Phase 1 of Safe Transition, schools reopen, students return in batches
- In Phase 2, most businesses allowed to reopen, subject to Safe Management Measures
- Parliament is dissolved and Writ of Elections is issued



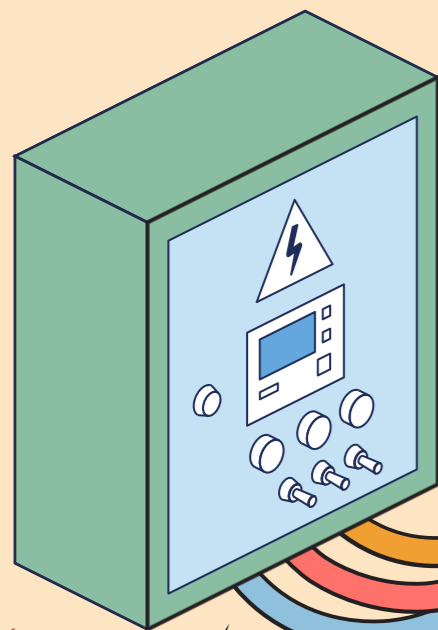
May 2020

- The Fortitude Budget is announced



April 2020

- Singapore enters Circuit Breaker on 7 Apr; schools transit to home-based learning
- Interagency Task Force is set up to manage situation in the migrant worker dormitories
- The Solidarity Budget is announced
- Mask-wearing is made mandatory



July 2020

- All patients aged 13 and above with symptoms of acute respiratory infection will be swabbed for COVID-19
- Singapore General Elections is held

August 2020

- Testing of all migrant workers in dormitories is completed and all dorms are cleared
- Cross-border travel with Malaysia is restored with the Reciprocal Green Lane and Periodic Commuting Arrangement
- The government unveils an additional \$8 billion worth of support measures



January 2021

- A cap on visitors per household is introduced in light of an increase in local cases
- Border measures are further tightened due to emergence of new variants; on-arrival testing is required for travellers entering Singapore

February 2021

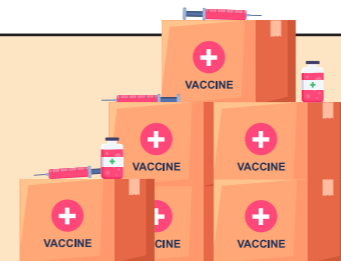
- Emerging Stronger Together Budget is announced
- Covid-19 (Temporary Measures) (Amendment) Bill restricting use of TraceTogether data is passed

April 2021

- First case linked to the Tan Tock Seng Hospital cluster is reported
- Singapore further tightens Safe Management Measures
- Borders tightened to restrict entry of travellers with travel history to the Indian subcontinent

December 2020

- Singapore enters Phase 3 of reopening
- First shipment of vaccines arrives in Singapore
- Singapore commences its vaccination programme, starting with healthcare workers



September 2020

- First easing of border measures; travellers from selected countries (e.g., Brunei and New Zealand) can enter Singapore without serving SHN
- Singapore Tourism Board launches pilots for selected large-scale events with Safe Management Measures in place
- Nation-wide distribution of TraceTogether tokens commences



October 2020

- Expert Committee on COVID-19 Vaccination is appointed
- Border measures are further relaxed



November 2020

- Border measures are tightened in response to rise in cases in other countries



Fighting a Pandemic (April 2020–April 2021)



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

During the Circuit Breaker, the city slowed to a standstill. Singaporeans adjusted to life indoors, as well as to working from home for those who could do so. Singaporeans cooperated with the government and followed the Safe Management Measures (SMMs). The community came together to support one another — buying groceries for neighbours who were susceptible to the virus, holding group fitness classes, and social events virtually. Food establishments like restaurants and hawker centres remained open, but on-premise dining was prohibited. Hawkers, chefs, and restaurateurs had to quickly pivot their businesses towards deliveries and takeaways. They had to stock up on disposable packaging, implement ordering and delivery mechanisms, and tweak menus to ensure that their food travelled well. Religious organisations also adapted, suspending congregational worship and moving religious services online.

As a result of the Circuit Breaker, the number of community cases tapered off and fatalities stayed low. Concurrently, the government rolled out three Budgets from February 2020 to April 2020, to provide social support for the vulnerable and significantly increase cashflow to businesses to protect livelihoods.

By June 2020, the outbreak in Singapore appeared to have stabilised. On 1 June, around 40,000 migrant workers in dormitories were cleared of COVID-19 and were able to return to work. The Circuit Breaker was lifted one day later on 2 June 2020 and students started to return to school. Restrictions were further lifted as Singapore entered Phase 2, with retail, F&B, personal health and wellness, and home-based services allowed to resume. Social interactions and family visits were also relaxed further, with small-group gatherings of up to five persons allowed. Households could receive up to five visitors a day. More people could return to the office.

While Singapore progressively resumed domestic activities, border controls remained tight. We permitted carefully calibrated numbers of business travellers and long-term work pass holders to enter Singapore, while Singaporeans and permanent residents could return home without restrictions. However, all incoming persons were subject to strict quarantine to prevent transmission to the community.

Meanwhile, vaccines were being developed rapidly across the world. In December 2020, the MTF announced that Singapore would move to Phase 3. Gatherings of up to eight people

were allowed in all public places, while live performances and congregational and worship services for up to 250 people were permitted. The Health Sciences Authority approved the Pfizer-BioNTech vaccine and, on 21 December 2020, our first shipment of this vaccine arrived in Singapore. We rolled out vaccinations for our healthcare workers, who began receiving the vaccine on 30 December 2020, just before the turn of the year.

After the Moderna vaccine received approval for use in February 2021, both vaccines were progressively made available to more Singaporeans, starting with older age groups. MOH rapidly scaled up operations to vaccinate most of the population within months, and made exceptional efforts to prioritise and target seniors for vaccination. Twenty-four vaccination centres were set up within four weeks from February 2021. By late August 2021, there were a total of 40 vaccination centres islandwide, in addition to 20 polyclinics and more than 60 Public Health Preparedness Clinics (PHPCs) that also provided COVID-19 vaccinations.

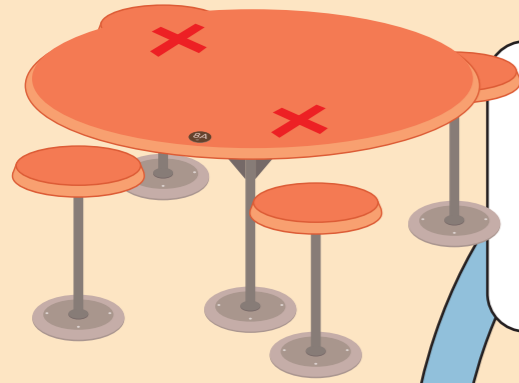
With Singapore's national vaccination drive in full swing by the early part of 2021, the mood turned optimistic. However, new elements would soon enter the picture, throwing a spanner in the works.

Rocky Transition

May 2021 - November 2021

July 2021

- Singapore reports a rise in community cases with new clusters detected at KTVs and Jurong Fishery Port
- Singapore returns to Phase 2 (Heightened Alert) with tightening of Safe Management Measures



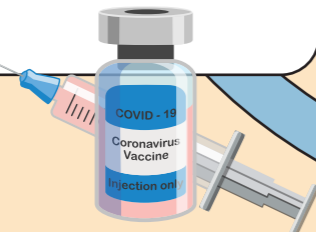
August 2021

- Singapore postpones the National Day Parade to 21 Aug and a ceremonial parade is held on 9 Aug
- MTF announces a four-stage transition to living with COVID-19 – the Preparatory Stage, Transition Stage A, Transition Stage B and COVID-19-resilient Nation
- Phase 2 (Heightened Alert) measures are relaxed
- 80% of the population have received two doses of COVID-19 vaccines
- Singapore introduces Vaccination-Differentiated Safe Management Measures (VDS) and “Vaccinate or Regular Test” regime for selected sectors
- MOH launches the pilot for home recovery for suitable patients
- Vaccination-Differentiated border measures are introduced with countries classified into Category I, Category II, Category III, and Category IV



June 2021

- Given a drop in local cases, Singapore returns to Phase 3 (Heightened Alert) with gradual relaxation of Safe Management Measures
- Launch of vaccination drive for students aged 12 and above
- MTF co-chairs release op-ed setting out Singapore’s roadmap to COVID-19 becoming endemic



September 2021

- Vaccination Booster Programme is rolled out
- Home recovery scheme is further expanded to suitable patients aged between 12 and 69
- Singapore opens Vaccinated Travel Lanes (VTLs), starting with Germany and Brunei
- Amid growing number of local cases, Singapore enters Stabilisation Phase with tightened measures to help our healthcare system cope – groups of two, default work-from-home
- Home-based learning is implemented for primary schools and Special Education schools



Departures
Flight
CANCELLED

May 2021

- MOH detects new virus variants in Singapore and Changi Airport cluster is reported
- Border measures are further tightened including extending Stay-Home Notice period by an additional 7 days
- Singapore enters Phase 3 (Heightened Alert) on 8 May but quickly shifts into a tighter Phase 2 (Heightened Alert) on 16 May
- Schools shift into full home-based learning from 19 May till end of term
- TraceTogether is made mandatory for check-in at malls and schools
- PM Lee announces Singapore’s plans to live with endemic COVID-19

October 2021

- Home recovery becomes default care arrangement model
- Streamlined processes for home recovery (i.e., Protocol 1-2-3) are introduced
- Stabilisation Phase is extended till 21 Nov
- Home-based learning ends and students return to schools in a phased manner
- Testing protocols and procedures for travellers entering or transiting Singapore are further streamlined

November 2021

- Stabilisation Phase ends with calibrated easing of Safe Management Measures
- The Singapore-Malaysia land VTL is launched, Singapore further expands VTLs with more countries
- Pilots for selected MICE, spectator sports and live performance events using VDS+Test protocol are launched
- With threat of the Omicron variant, testing protocols for travellers and precautionary measures for border frontline workers are enhanced



Rocky Transition

(May–November 2021)



SOURCE: CHANGI GENERAL HOSPITAL

With vaccinations progressing well, we felt ready to begin Singapore’s transition towards a new normal. Other countries too had begun to accept that COVID-19 was here to stay. In May 2021, Prime Minister Lee told Singaporeans in a national broadcast that we would have to learn to live with endemic COVID-19. A month later, on 24 June 2021, co-chairs of the MTF published an op-ed to outline a new direction in Singapore’s COVID-19 strategy. Vaccination would be the way for society to open up and live with endemic COVID-19. We expected there would be some infections in the community, but very few cases would require hospitalisation.

However, the emergence of a new COVID-19 variant confounded our expectations. The new variant was more infectious than the original strain. Vaccinations did protect individuals against serious illness, but a large increase in the number of infected cases could still overwhelm our hospital system. We were especially concerned about the many unvaccinated seniors who would likely become severely ill or even succumb to the infection if they were to catch the virus.

The new strain was named the Delta variant by the WHO on 31 May 2021. Singapore's first large Delta clusters were discovered at Tan Tock Seng Hospital in late April, and at Changi Airport's Terminal 3 a week later. To buy time to vaccinate more of the population, Singapore entered Phase 2 (Heightened Alert). It seemed for a while that these targeted measures short of another full-scale Circuit Breaker would be sufficient to keep the Delta variant in check. Unfortunately, more clusters subsequently emerged in wet markets and hawker food centres that were linked to cases from the Jurong Fishery Port, as well as among KTV lounges.

From mid-May, measures were repeatedly tightened and then eased, as we strove to limit the spread of the virus while keeping our sights on the eventual landing point of living with COVID-19. In response, customer-facing businesses had to re-adapt repeatedly to the changing regulations, and people needed to calibrate their social interactions according to the evolving conditions.

In August 2021, a four-stage plan was drawn up to facilitate Singapore's transition to endemicity. As vaccination rates climbed, we believed that this plan would be facilitated by vaccination-differentiated SMMs, with fully vaccinated individuals resuming normal activities safely.

However, the new variant had been seeded in the community by then, and transmission continued to gain ground. The MTF announced plans to ease measures in mid-August, only to have to tighten them again in September as the daily number of COVID-19 cases rose

exponentially — exceeding 5,000 daily cases at its peak in October 2021. Singapore's healthcare system came under severe pressure. Despite efforts to beef up our healthcare workforce and reallocate lower-risk cases and non-urgent and non-life-threatening care treatments to the private hospitals, we were forced to introduce a Stabilisation Phase from 27 September 2021 to ease the strain on healthcare workers and preserve healthcare capacity.

Meanwhile, the Home Recovery Programme (HRP) was made the default mode for managing COVID-19 cases from 15 September 2021. Fully vaccinated individuals aged 12 to 50 with no or mild COVID-19 symptoms were advised to recover at home, without needing to visit a hospital or a community care facility. This transition proved frustrating for many Singaporeans. Some were unable to get through to MOH's hotline for instructions, while others who were not suited for home recovery faced delays in conveyance to recovery facilities. The situation eased only after healthcare protocols were simplified, and Singapore Armed Forces (SAF) personnel were mobilised to support the HRP. MOH roped in PHPCs and mainstream telemedicine services, including community paediatricians, to support home recovery and reduce the impact on our healthcare system. By late November 2021, overall infection numbers had stabilised, the hospital situation had improved, and Singapore exited the Stabilisation Phase. Having ridden through the ups and downs of this rocky transition, Singapore was finally back on the path towards endemicity.

Learning to Live with COVID-19

December 2021 - Present

December 2021

- Singapore reports first two imported cases of the Omicron variant
- Singapore steps up border measures with more countries being placed in Category III and enhanced ART protocol for travellers on VTL
- Safe Management Measures are further tightened including expansion of Vaccination-Differentiated measures to more places
- Launch of vaccination drive for children aged 5 to 11 as first shipment of paediatric doses of Pfizer-BioTech/Comirnaty COVID-19 vaccine arrives
- With updated understanding of the Omicron variant, Singapore allows Omicron cases to follow Protocol 1-2-3

January 2022

- Protocol 1-2-3 is further streamlined; primary care doctors can make immediate diagnosis via ART and continue to care for low-risk patients with mild symptoms under Protocol 2
- VTL testing regime is simplified
- MOH announces that individuals are required to get booster shots in order to maintain fully vaccinated status

November-December 2022

- Singapore comes off the crest of XBB wave
- Bivalent vaccines are offered to those aged 12 and above

February 2023

- Singapore enters a new normal of living with endemic COVID-19

February 2022

- Healthcare protocols are further adjusted, primary care doctors can manage a widened age group of patients under Protocol 2
- Singapore shifts focus towards protecting the vulnerable and managing severe cases
- Singapore announces plans to simplify safe management measures but implementation date is postponed as number of local cases remains high
- Border measures are streamlined and Stay-Home Notice period is standardised to 7 days across all countries
- Singapore launches VTL (Sea) with Batam and Bintan and VTLs with more countries

October 2022

- VDS is lifted fully
- Omicron XBB variant drives spike in local cases
- Bivalent vaccines are rolled out to healthcare workers and those aged 50 and above

September 2022

- Increase in infection cases driven by BA.2.75 variant with rise in reinfections observed

Aug 2022

- Mask-wearing is no longer mandatory indoors, except in selected settings, e.g., public transport
- Border measures are further relaxed; non-vaccinated travellers are no longer required to serve SHN

June 2022

- Singapore records a rise in cases driven by the BA.4 and BA.5 variants

March 2022

- Safe Management Measures are eased including expanding group size of gatherings from 5 to 10
- Border measures are further relaxed; travellers on VTL or from Cat I countries can take an unsupervised ART within 24 hours of entry into Singapore
- Rostered routine testing is ceased for all sectors

April 2022

- Singapore launches the Vaccinated Travel Framework
- DORSCON level is stepped down from Orange to Yellow
- Safe Management Measures are further relaxed including removal of all group size limits and VDS for all settings including workplaces except selected higher-risk venues
- TraceTogether and SafeEntry are stepped down at most venues

May 2022

- Singapore detects first few cases of BA.4 and BA.5 infection



Learning to Live With COVID-19 (December 2021–Present)

Singapore reported its first few imported cases of the COVID-19 Omicron variant in early December 2021. Preliminary data suggested that it was at least as transmissible as the Delta variant with potentially a higher risk of re-infection. To limit community exposure to imported Omicron cases, travel restrictions were extended to countries experiencing spikes in Omicron infections, and vaccinated travel lane bookings were temporarily frozen. This was to buy us time to better understand the variant and develop our responses. Concurrently, we pressed on with the vaccination booster programme, extending it to individuals aged 18 to 29 from mid-December. Vaccination-differentiated measures were extended to more settings to protect the vulnerable and at-risk groups, while MOH made contingency plans to ramp up healthcare capacity to cope with an anticipated rise in local Omicron cases.



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

By late December, it was clear from international experience as well as our own that the Omicron variant would result in more infections but proportionately fewer severe cases or deaths, due to the lower severity of the variant and protection from vaccinations and boosters. With this understanding, the MTF shifted its approach to managing Omicron cases with the prevailing Protocols 1-2-3. Omicron cases would no longer be isolated in dedicated facilities by default and could be placed on the HRP under Protocol 1 or self-managed under Protocol 2.

Singapore's healthcare system withstood the peak of the Omicron wave, even as it came under considerable stress. We stuck to the strategy of protecting healthcare capacity and focusing resources on severe cases. Health protocols and SMMs were further simplified, so that everyone could understand the rules, focus on what mattered, and do their part to make sure these few safeguards were effective. We also continued to push for boosters and vaccinations as a critical limb of Singapore's COVID-19 strategy, adopting the Expert Committee on COVID-19 Vaccination's recommendation that, from 14 February 2022, a booster dose was required before one could be considered fully vaccinated.

Rather than declare a "Freedom Day", the government lifted SMMs progressively over a few months as the situation gradually stabilised. On 24 March 2022, Prime Minister

Lee announced in a national address that Singapore would take a decisive step forward in living with COVID-19. Key changes included the removal of mask requirements in outdoor settings, and an increase in permissible group size from five to 10. Border measures were also eased; all fully vaccinated travellers could now enter Singapore without needing to use vaccinated travel lanes or serve Stay-Home Notices. One month later, on 22 April 2022, the DORSCON level was stepped down from Orange to Yellow. Remaining community SMMs were eased, and TraceTogether and SafeEntry were no longer required at most venues.

Despite new infection waves brought on by Omicron subvariants in 2022, we stayed the course and pressed on with making Singapore a COVID-19 resilient nation. Singapore weathered successive infection waves with a low number of severe cases that required hospitalisation. We did not need to re-tighten the country's borders or impose stricter SMMs. With the situation continuing to stabilise, Prime Minister Lee announced at the National Day Rally that indoor mask requirements would be removed except on public transport and in healthcare settings. Vaccination-differentiated measures were subsequently lifted on 10 October 2022. Since then, we have rolled out bivalent vaccines and vaccinations for young children to reinforce Singapore's first line of defence against COVID-19. Slowly, but surely, Singapore was learning to live with COVID-19.



WHAT WE DID WELL

WHAT WE DID WELL

COVID-19 demanded much of the leadership, the government, and the people. In Total Defence, every Singaporean plays a part, individually and collectively, to build a strong and secure Singapore. This philosophy was put to the test with the existential threat of a pandemic that was the crisis of our generation. With fast-changing circumstances, and faced with imperfect knowledge, we made quick decisions and improvised as we went along. Everyone did their part by adapting and responding as needed. This section details a few triumphs amongst our many tribulations.



01. Maintained the Resilience of Our Healthcare System



SOURCE: NATIONAL HEALTHCARE GROUP

Singapore started the COVID-19 crisis with a “SARS mindset”. The SARS experience allowed us to avoid a cold start and hit the ground running. We were psychologically conditioned for the pandemic, and a good number of our medical professionals had personal experiences with SARS. SARS had given us the impetus to strengthen Singapore’s readiness to deal with future outbreaks of infectious disease. One critical outcome from SARS was the establishment of the National Public Health Laboratory (NPHL) in 2009 and the National Centre for Infectious Diseases (NCID) in 2019. These establishments contributed significantly to our COVID-19 response. Specifically, the NPHL developed a polymerase chain reaction (PCR) test based on the genome sequence of the COVID-19 virus released

by China early in the pandemic. The NCID established protocols and best practices for dealing with COVID-19, while handling a significant share of the caseload.

Singapore's response to COVID-19 involved not only the public hospitals, but also the broader healthcare eco-system. During the Circuit Breaker in 2020, MOH quickly ramped up different levels of healthcare facilities to support COVID-19 patients. Medical teams from the hospital clusters and private healthcare groups were deployed to dormitories to provide care on-site. Public hospitals repurposed and converted wards into isolation rooms. Plans were made to increase ICU beds. Community care and recovery facilities were set up in double-quick time to look after patients who only had mild symptoms or were already recovering, so as not to overwhelm our healthcare system. Swab isolation facilities were built for those awaiting their PCR swab results.

The healthcare system came under immense stress again during the Delta wave in 2021. Once again, MOH worked with public,

community and private hospitals, as well as the SAF Medical Corps, to set aside more beds for COVID-19 patients. The Ministry also expedited the graduation of healthcare students into the workforce⁷ and formed a volunteer SG Healthcare Corps, which attracted good response. Healthcare protocols were remodelled to move lower-risk cases to community care facilities. Screening of patients was also devolved to primary care PHPCs. Non-urgent and non-life-threatening care treatments were deferred to alleviate pressure on public hospital capacity and manpower.

Despite our best efforts, manpower staffing was extremely challenging. Whilst the NCID and other hospitals were built with some additional infrastructural capacity, the prolonged crisis led to fatigue and burnout. Our healthcare workers shouldered the massive responsibility of treating and caring for the infected. From the moment the virus reached Singapore's shores in January 2020, frontline workers had to handle multiple waves of COVID-19 patients while managing their usual workload. The absence of staff who were themselves ill with COVID-19 made matters worse.

⁷ Students from both the Yong Loo Lin School of Medicine (National University of Singapore) and Lee Kong Chian School of Medicine (Nanyang Technological University) started their first postgraduate year of postings one month earlier than usual. MOH Holdings also deployed several overseas students who had finished their courses early as first-year postgraduates. These were conducted with the Singapore Medical Council's assent and added supervision by healthcare clusters.

We also had to ramp up testing nationally, at an unprecedented scale and pace and under constantly changing conditions. Initially, tests for COVID-19 were not yet commercially available. Only 10 public sector hospital laboratories had the capability to test for COVID-19, at about 100 PCR tests per day each, and this could not be scaled up. Similarly, while primary care clinics had the capability and capacity to do PCR swabs for their patients, they could not do so at sufficient scale. In May 2020, the government set up national swabbing centres and organised more than 1,000 swabbing teams to perform PCR swabs in the community, dormitories, and workplaces. To further expand the testing volume, a new modality of pooled testing was developed. More than 5,900 layperson swabbers and supporting staff were trained to support the nationwide testing operations. Within a year, MOH had ramped up testing capacity and capability to approximately 60,000 PCR tests per day.

In the end, it was the solid teamwork across the public, private and people sectors that prevented the healthcare system from being overwhelmed. All our healthcare workers and volunteers worked tirelessly throughout the pandemic while accepting the stress and risk of being infected and being away from their loved ones. The brightest spot in Singapore's crisis response was the selfless dedication of our frontline fighters, who rose to the challenge and went the extra mile.

02.

Embarked on a Nationwide Vaccination Campaign

We recognised very early on that vaccines were our most promising exit strategy. We worked closely with the scientific community and industry partners to source for, assess, and secure early access to COVID-19 vaccines. Countries like the US were pre-ordering doses in the hundreds of millions. The only way a small country like Singapore could gain timely access to the vaccines was to sign advance purchase agreements and make early down payments on the most promising candidates.

Singapore had to place bets, at substantial cost, on potential game-changers. Waiting to purchase vaccines only after they were approved would put us, with our low volume of orders, way down the queue. Accordingly, in April 2020, the government established a planning group for vaccine and therapeutics. The group promptly launched horizon scans to identify vaccines with the potential to move quickly from bench to bedside. It took a portfolio approach, choosing two candidate vaccines from each of the five vaccine technology platforms.

In June 2020, to get nearer the front of the queue, we took a risk on Moderna's novel messenger ribonucleic acid (mRNA) technology that was



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

still undergoing Phase 2 trials. Twelve weeks later, based on our expert panel analysis of the data of more than 35 potential COVID-19 vaccine candidates, we signed a second advance purchase agreement for a vaccine from Pfizer-BioNTech, which had not yet completed Phase 3 trials. These advance purchase agreements paid off several months later, when the US Food and Drug Administration approved emergency use of both these vaccines. The Health Sciences Authority (HSA) approved the vaccine rollout on 14 December 2020. We had taken calculated risks on promising vaccine candidates across different technologies, effectively buying multiple insurance because we saw this as a worthwhile price to pay to protect Singaporeans and facilitate economic re-opening. Our strategy paid off.

Rolling out vaccinations to the entire population was yet another major undertaking. We had to persuade the public of the importance of vaccination and reassure everyone that the vaccine was safe. Vaccination centres were set up rapidly, in a matter of weeks. Given the stringent storage requirements of the mRNA vaccines, backend logistics needed to be robust, especially in the management of the ultra-cold chain process. On the ground, digital technology enabled and enhanced vaccination operations. An SMS-based appointment booking system was set up to increase the efficiency and throughput for vaccinations. Automated SMSes with personalised links were sent to eligible individuals to book their slots. The appointment system supported the administration of over 10 million vaccine doses nationwide. By late August 2021, 80% of the population had been fully vaccinated.

We then simplified the process by allowing walk-ins without prior booking. Mobile vaccination and home vaccination teams were deployed to HDB blocks and homes to reach homebound unvaccinated seniors, as well as to temporary shelters for rough sleepers and eldercare facilities such as nursing homes across Singapore.

By making COVID-19 vaccines readily available to the population, backed by clear and sustained public communications on the benefits of vaccination, Singapore achieved one of the highest vaccination rates in the world. This reduced the number of severe illness and deaths among our population.

03.

Stayed Open and Ensured Supply Chain Resilience

COVID-19 challenged our planning assumptions for a public health crisis. When the outbreak began, it was assumed that the pandemic would last for only a few months. We also assumed global supply chains, or at least regional supply chains, would remain intact. Reality proved otherwise. Early in the crisis, we encountered difficulties securing critical medical supplies like test kits, reagents and PCR machines, face masks, and personal protective equipment. Some of these disruptions reflected real supply shortages, while others resulted from nationalistic and protectionist reactions to the pandemic, and panic buying and hoarding.

Throughout the crisis, we maintained our connectivity to the world. This was crucial to our supply chain resilience. The government succeeded in maintaining our supply of essential goods through various measures such as enhancing pre-emptive stockpiling and securing the availability of sea shipping. Emergency procurement measures were activated and long-standing networks tapped, to quickly secure pandemic response-related imports and our food supply. Singapore was able to do this because of the strong network of government and business connections it had built up over the years.

With air cargo capacity restricted — until underused passenger aircraft could be reconfigured for cargo operations — most food, particularly protein and meat supplies, had to be shipped by sea. The Ministry of Transport worked hard to keep port and land links open for the flow of goods, despite transmission risks. The Maritime and Port Authority arranged for crew transfers in bubbles under tight operational control, including via a floating hotel that was set up to house crews in transit. Pacific International Lines deployed ships to ports in the region and beyond, and continued to ply routes that kept food supplies flowing to Singapore. When Malaysia issued a Movement Control Order and closed land links with Singapore, we ensured the continued flow of essential goods, supplies, and workers across the border, which included strict “bubble-wrapping” arrangements for Malaysian cross-border delivery workers. We also worked closely with private sector partners, such as the PSA, to step up warehousing capacity to house enhanced stockpiles. In parallel, Changi Airport stayed open for business throughout the pandemic as Singapore was a key node in global supply chains. This kept essential goods and services flowing to Singapore as well as elsewhere in the region and beyond.

At the same time, Singapore continued to allow manufacturers and distribution centres based locally to export goods to global markets. Even at the height of uncertainty, with the threat of supply shortages, the government never imposed export controls. We showed through our actions that Singapore could be relied upon to remain an open hub for international business. When production capacity for pharmaceuticals and medical equipment was stretched and disrupted worldwide, companies in Singapore, such as 3M, were able to continue fulfilling global demand of such essential items.

The government also took important steps to diversify Singapore’s food supplies during the crisis. For instance, in May 2020, we

agreed to enhance economic cooperation and connectivity with Poland, paving the way for shipments of Polish eggs, frozen vegetables, and frozen chicken.

Overall, Singapore’s supply chains withstood the test of COVID-19. Despite severe challenges, we managed to maintain Singapore’s supply of essential goods and services. We could not have done this without the support of our businesses.



04. Supported Businesses, Jobs, and Workers

The Circuit Breaker was a difficult time for many businesses. Non-essential businesses had to cease on-site operations and pivot overnight to operating online, where feasible. Singapore's economy took a big hit, contracting by 3.9%⁸ in 2020. The worst-hit sectors included construction, retail and food services, and travel-reliant industries. To cushion the blow, the government introduced a suite of temporary relief measures including rental rebates, bridging loan programmes, and deferment of loan repayments.

This was reinforced with a series of COVID-19 legislations rolled out by the Ministry of Law over 2020 and 2021, which granted businesses temporary relief from their contractual obligations, mandated equitable co-sharing of Small & Medium Enterprises' (SMEs) rental obligations between the Government, landlords and tenants, and significantly raised the monetary threshold for corporate insolvency. An Assessor panel of volunteer lawyers was set up to help businesses resolve disagreements quickly and amicably without the need for litigation. There were additional measures to assist construction companies and the travel and events industries, which were particularly hard hit by the pandemic. This included legislation to grant construction companies



extensions of time, so they would not have to pay liquidated damages for delays materially caused by COVID-19. These measures brought relief to at least \$100 billion worth of SME contracts across the economy, working in tandem with the Government's intervention of \$72.3 billion over the four Budgets.

IMDA and Enterprise SG also provided support for companies, such as via the Hawkers Go Digital and Heartlands Go Digital outreach programmes, to speed up their digital transformation efforts and help them pivot to e-commerce and reach customers online. The Food Delivery Booster Package benefitted more than 10,000 Food and Beverage establishments and helped them continue operating when dining-in was not allowed.

⁸ As at 13 February 2023

Eventually, however, the financial support rendered had to be scaled back, and contracts had to be honoured. Businesses that were unsustainable had to reconsider their longer-term plans. The simplified insolvency programme helped such small businesses to restructure their debts and wind up quickly and cheaply.

As businesses struggled to stay afloat, Singaporeans faced uncertainties over their jobs and incomes. This worsened as the pandemic became a prolonged fight. The many COVID-19 phases threw businesses into a flurry. Enterprise Singapore handled more than 200,000 calls and email inquiries related to COVID-19 in 2020 alone. At the same time, fresh tertiary graduates and retrenched individuals struggled to find jobs. Across the board, the pandemic cast a dark shadow over the economy. Our overarching challenge was to preserve livelihoods in the first instance, while helping people and companies prepare for a stronger restart when Singapore emerges from the pandemic.

To reduce job losses, the government introduced a Jobs Support Scheme (JSS) that helped employers pay a portion of their workers' salaries. The initial rollout was broad-based to avert a deeper economic crisis, preserve jobs, and maintain key corporate capabilities.

We then extended JSS in response to tightened SMMs during the Phase 2 Heightened Alert and Stabilisation Phases. JSS is estimated to have saved 165,000 jobs during the initial months of the pandemic, and reduced the resident unemployment rate in both 2020 and 2021. A separate scheme, the Self-Employed Persons Income Relief Scheme, or SIRS, was introduced to support self-employed persons, including private hire and delivery workers and hawkers. Our tripartite partners, including MOM, the National Trades Union Congress (NTUC) and the Singapore National Employers Federation (SNEF), were critical in ensuring that employers carried out wage adjustments and retrenchment exercises responsibly, and that workers were fully informed of the latest support schemes they were eligible for. NTUC, in particular, also worked with the MOM to administer SIRS, and engaged business leaders in industries hard hit by COVID-19 on how to retain their workers, and retrain them for the eventual upturn.

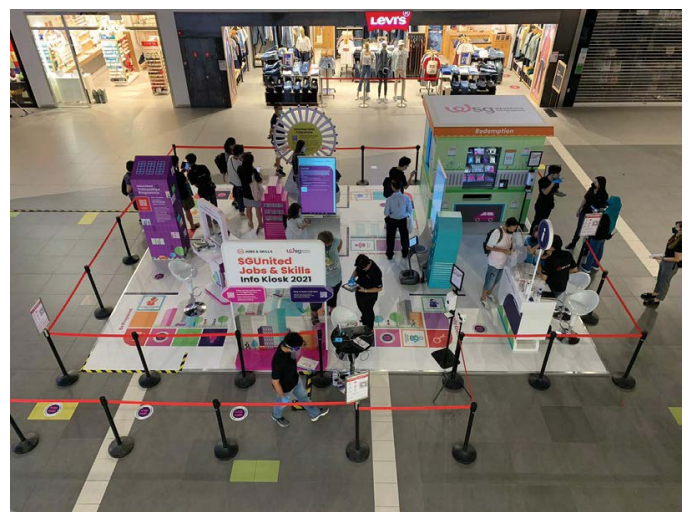
At the same time, the National Jobs Council, including veteran business leaders from industries and union leaders, was convened from 3 June 2020 to focus on identifying and developing jobs, traineeships and skills opportunities for Singaporeans. Among the priority areas the Council discussed was the implementation of the SGUnited Jobs

and Skills Package to place jobseekers in short-term jobs to handle COVID-19 related operations, as well as in longer-term jobs in the public and private sectors. One positive by-product of the crisis was that more workers, especially those who were older and less IT-savvy, were motivated to pick up new skills. From April 2020 to April 2022, about 200,000 places under the jobs and skills programmes and initiatives of the SGUnited Jobs and Skills Package were taken up.

Students in our institutes of higher learning, especially those in their final year, were concerned about graduating on time and securing jobs upon graduation. Free modular courses were extended to these students to help them learn valuable skills, while initiatives such as the SGUnited Traineeships Programme provided them with paid traineeship opportunities amid a COVID-hit labour market.

These support measures were rolled out quickly. Speed was critical to prevent interruption of cashflow for businesses and incomes for workers. Together with financing schemes and other measures such as the Rental Relief Framework for businesses and the Singapore Tourism Board (STB)'s SingapoRediscovered (SRV) scheme⁹, businesses received liquidity support that helped them defray costs and stay afloat. The timely intervention also prevented

unemployment from rising further. Through the efforts of MOM, NTUC, SNEF and other partners, resident unemployment rate stayed below 5% throughout 2020, even when the economic conditions were at their worst. By December 2020, resident employment had returned to pre-COVID levels.



SOURCE: WORKFORCE SINGAPORE

⁹ 460 tourism businesses participated in this scheme, and close to \$300 million in SRV transactions were recorded.

05. Supported the Vulnerable

The pandemic disrupted everyone's lives. Many people experienced severe life stressors at home and at work, including changes to care arrangements and job and income loss. The crisis also caused emotional, psychological, and financial distress for many. Of greatest concern were vulnerable individuals and families who faced acute problems.

The government's first priority was to minimise the social impact on and suffering of those who had been hard hit financially. We established temporary assistance schemes to help the vulnerable tide over financial challenges, including the Temporary Relief Fund, COVID-19 Support Grant, SIRS, and the Grocery Vouchers scheme. We also exercised more flexibility in providing immediate assistance to affected individuals through ComCare Interim Assistance, and lengthened the duration of ComCare Short-to-Medium term assistance for households in need. Students from low-income families continued to receive meal subsidies, with funds credited to their school cards for food and grocery purchases at hawker centres and supermarkets. Both public and private institutions made renewed efforts to reach out to lower-income and vulnerable households. There were also many ground-up initiatives led by volunteers to visit these households and offer assistance.

The Social Service Agencies (SSAs) stepped up to rally their own networks of partners, volunteers, and benefactors to address increased needs on the ground. Food charities and other community groups helped to deliver essential aid and food to households in need. Charities serving disadvantaged families worked with corporate partners to equip children with devices for home-based learning. With support from The Invictus Fund (started by the National Council of Social Service, and with top-ups from the Government), SSAs were quick to pivot their service delivery models to better serve their users, for example, delivering remote counselling, and conducting online engagement sessions with persons with disabilities, while complying with appropriate SMMs to safeguard the health of residents, clients, staff and volunteers.

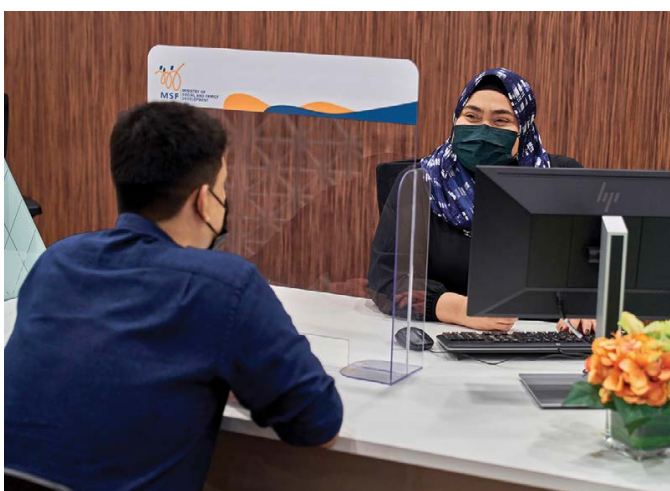
In addition, COVID-19 proved to be most life-threatening for our seniors, whereas children and adolescents were generally at lower risk of infection and likely to have mild to no symptoms if infected. Singapore's death rate was much lower than that of other countries in part because we made extensive moves to protect our seniors. When the first cases appeared in January 2020, MOH and the Agency of Integrated Care (AIC) enacted a series of protective measures in our nursing homes by stepping up the use of Personal

Protective Equipment, restricting visitors, testing regularly and introducing additional staff accommodation guidelines. AIC also pre-emptively conducted on-site infection prevention and control checks in nursing homes and swiftly worked with service providers on improvements. When cases emerged, we undertook extensive contact tracing and investigative testing. MOH and AIC sent special teams to isolate and treat infected residents and their close contacts, to stave off further spread amongst this vulnerable segment of our population. Residents in our nursing and elderly homes were also the first to get vaccinated and boosted.

The crisis also had an impact on the mental well-being of the population, particularly vulnerable groups like seniors and adolescents. The seniors especially faced greater social isolation, even more so when activities

for seniors were suspended, and they were encouraged to self-isolate at home as much as possible. The People's Association and the Silver Generation Office (SGO) under AIC checked regularly on seniors and delivered essential items to them, while the Ministry of Communications and Information (MCI) rolled out special programmes, such as the 30-minute television programme *Get Fit with Me: Overcome COVID-19*, with exercise segments, nutritional tips, home-based activity suggestions, cooking demonstrations, and *getai* singalongs that would appeal to our seniors. Under the SGUnited banner, the “Brave the New” campaign was launched to raise awareness of mental wellness, encourage those who needed help to seek it, and provide information on the various support schemes and programmes available. A COVID-19 Mental Wellness TaskForce was set up to tackle mental health needs arising from the pandemic. The National CARE Hotline provided members of the public in distress with psychological first aid, emotional support, empathic listening, and practical advice.

This exercise has reinforced the importance of building a strong network of partners, including social service organisations, community groups, and volunteers, to support the needs of the community during a crisis.

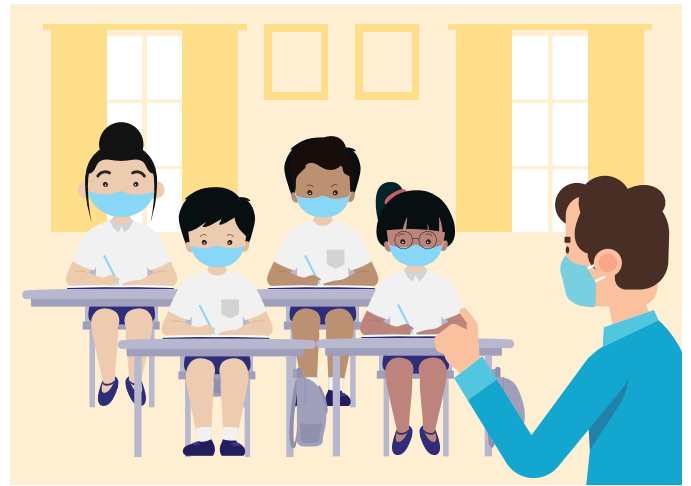


SOURCE: MINISTRY OF SOCIAL AND FAMILY DEVELOPMENT

06. Continued Our Students' Education

While many students around the world faced lengthy school closures, education disruptions, and learning loss, Singapore managed to ensure the continuity of education throughout the pandemic, even during the Circuit Breaker with full home-based learning (HBL). The COVID-19 experience also accelerated the shift towards digital and hybrid learning. This has opened up new opportunities for teaching and learning, and made Singapore's education system more resilient and ready for future crises.

At the start of the pandemic, once it became evident that COVID-19 affected seniors far more than young people and children, we decided to make schools safe and keep them open for as long as possible, by moving early to minimise the risk of school-based transmission. Larger-scale and higher-risk activities like assemblies, learning journeys, and inter-school co-curricular activities were suspended. Recess and dismissal times were staggered to thin out crowds. Even before the national implementation of SHN measures, as the global situation worsened, the Ministry of Education (MOE) and the Early Childhood Development Agency (ECDA) placed students and staff on a leave of absence if they had just returned — or had household members who



had just returned — from overseas travel during the 2020 March holidays.

By mid-March 2020, more than 100 countries had closed their schools. We remained reluctant to do so given the negative impact this could have had, not just on learning but also on the mental health and social development of students, especially those from disadvantaged backgrounds. Nevertheless, to prepare for the possibility of a lockdown, MOE decided to implement HBL in all schools in April 2020. MOE hoped to address potential teething and operational issues, including the provision of devices for students lacking digital access.¹⁰

Days later, Singapore entered the Circuit Breaker, and all schools shifted to full HBL. This was challenging for students, parents, and

¹⁰ In 2020, schools loaned over 20,000 computing devices and more than 1,600 internet-enabling devices to students lacking digital access for learning. In 2021, schools loaned over 15,000 computing devices and more than 800 internet-enabling devices.



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

teachers. Students faced multiple stressors as they had to cope with self-directed learning online, fatigue from excessive screen time, and disrupted routines. To support students, especially their mental well-being, additional resources were provided to teachers to conduct regular check-ins with their students. Schools remained open for students who had no care arrangements (e.g., because their parents were essential workers) or who lacked conducive home environments for HBL. High-risk students who did not return to school were closely monitored. This ensured that those who required more support continued to receive it. MOE also supported parents with kits containing resources on how to teach children to learn and explore independently, how to reinforce structures and routines, and how to use screen time meaningfully. For teachers, the sudden shift to full HBL meant having to adjust quickly to teaching remotely and adapting resources for online use. MOE made a significant effort to accelerate the provision of educational resources on its digital learning platform — the Student Learning Space (SLS).

Teachers supported one another by sharing SLS lesson plans in an online community gallery.

When Singapore exited the Circuit Breaker, school resumed, but in a cautious and calibrated manner. HBL remained a feature of curriculum time. SMMs were put in place to ensure that national examinations could proceed, as these important milestones affected students' progression. Special arrangements were made for certain groups of candidates — such as those who were well but were placed on quarantine — to still sit for examinations but in separate classrooms. To help pace curriculum coverage, students were not assessed on some topics in the national and school-based examinations in 2021. With these measures, we avoided much of the COVID-19-induced anxieties witnessed in other countries, including exam anxiety and uncertainty among students, and controversy over the perceived fairness of teacher-assessed grades in place of cancelled exams.

Our experience with COVID-19 has given schools a glimpse of the future of learning. In particular, full HBL helped push through and accelerate changes in educational technology, including equipping secondary students with personal digital devices, which would have normally taken years. MOE will continue to support schools and educators through the provision of more professional development opportunities in e-pedagogy¹¹. It will also continue to emphasise strong teacher-student and peer relationships in schools, and prioritise regular check-in efforts to ensure students' well-being is monitored and supported.

¹¹ E-pedagogy leverages digital technology to deepen students' learning.

07. Maintained Effective Communications and Public Trust



PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

Public communications was vital in the COVID-19 crisis. Accurate information was put out in a timely fashion through trusted channels such as the regular MTF press conferences and a dedicated Gov.sg WhatsApp channel. We were upfront in outlining the uncertainties and risks we faced, and in putting out new information — even if it was bad news — to prepare the population for difficulties ahead. There was always a risk that communicating the possibility of negative outcomes would cause unnecessary panic and counterproductive behaviours. But it was the right thing to do, and it maintained trust between the government and the population.¹²

Besides providing the latest updates, the government also stepped-up efforts to counter misinformation, scams, and foreign influence operations. Correction directives were issued by

¹² According to the Spring 2022 Global Attitudes Survey conducted by Pew Research Center, 88% of Singaporeans say that Singapore dealt well with the pandemic, with 74% agreeing that Singapore effectively handled the outbreak in ways that showed the strengths of its political system.



PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

the Protection from Online Falsehoods and Manipulation Act (POFMA) Office against sources making false statements, to prevent these falsehoods from spreading unchecked, causing panic, and sapping public confidence in Singapore’s efforts to combat COVID-19.

Our public communications officers had built a strong network of working relationships over the years. This facilitated coordination across communication set-ups within government, in-time sensing of ground sentiments, and effective campaigns to explain the importance of SMMs, and later, vaccination. These system-level capabilities were vital tools in actively combating disinformation and putting out reliable information, and ensuring the successful execution of crisis communications during the pandemic.

We also experimented with innovative ways to reach different segments of the population. Social media platforms such as Instagram and TikTok were used to debunk COVID-19 myths, while video resources were developed in different dialects to reach out to the older generation. For example, MCI collaborated with local production houses to develop a series of “Vaccinate Already?” music videos in different languages and dialects. These videos helped create awareness among seniors on the importance of vaccinations and encourage them to not delay getting their shots.

Effective communication was critical to maintaining public trust. Indeed, the key to our handling of the crisis has been the trust of the people — trust that the government is competent and will make the right decisions with the best interest of Singapore and Singaporeans at heart; trust that the government is on the level with the population; trust that if there was a shortcoming or incorrect decision, we would acknowledge and rectify it; trust that each of us will act responsibly and do what we can to keep others safe; and trust within the community that we have one another’s backs.

Print and Digital
Display Panel Ad

Health Protocols

as of 18 Feb 2022

1 You are unwell
See a doctor. If positive:
● Inform close contacts
● Recover at home, COVID-19 treatment facility or hospital, depending on your GP's advice

2 You are well, but test positive
Inform close contacts
● First 72 hours: Isolate at home. No need for MC if well
● Thereafter, take ART. End isolation when negative
● Or if still positive, end isolation on
- Day 7, if fully vaccinated or aged below 12
- Day 14, if not fully vaccinated
● If at risk (e.g. elderly, pregnant) or feel unwell, see **1**

3 Received Health Risk Notice, or informed by infected person of exposure
● Take ART. Go out only if negative
● If negative after Day 5, no further test needed
● If ART is positive, see **2**

More information at: covid.gov.sg

E-Getai



I Got My Shot Campaign

Onward Singapore Music Video



Sing Together Singapore



Vaccinate Already Music Video



Experts Explain



Mediacorp Interstitials Featuring Minister

08. Rallied Together as a Nation



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

No one battled this crisis alone. Throughout the pandemic, the community rallied in support of one another. SGUnited became shorthand for the society we wanted to be. The slogan was spontaneously embraced by Singaporeans, and was displayed on buildings, tagged on social media, and even sewn on masks that were worn as a mark of solidarity. Through the SGUnited exercise and beyond, private companies, philanthropic foundations,

and citizen groups stepped up to help the vulnerable, engage seniors, and support migrant workers. Religious Organisations guided their followers to adapt their rituals and practices to the exigencies of the pandemic, implemented SMMs in their respective places of worship, and live-streamed sermons and services. We also saw many acts of kindness within our communities. Volunteers came together to sew cloth masks, while ordinary people provided refreshments to essential workers, patronised hawker stalls affected by dining restrictions, and opened their homes to those stranded by Malaysia's Movement Control Order. Although there were isolated incidents of discrimination against groups such as frontline healthcare workers, the public was quick to denounce such behaviour. As a result of the strong partnerships that developed in this crisis, Singapore's social capital — the intricate network of bonds linking us together — was strengthened and deepened.

The government was also able to develop and build upon existing partnerships with stakeholders from the public and private sectors to respond to demands on the ground. We were already addressing challenges such as senior isolation and support for the vulnerable before

the pandemic. We could therefore intensify outreach to these groups during the COVID-19 pandemic through partners such as the SG Cares Community Network, Partners Engaging and Empowering Rough Sleepers (PEERS) Network, and volunteer centres. The strong network of People's Association grassroots volunteers was also roped in to support the nationwide mask distribution exercises, encourage seniors and vulnerable groups to get vaccinated, and provide other forms of help to the community such as delivery of food to quarantined individuals and families.

Numerous companies also stepped up, taking on important roles such as housing recovered workers. Companies like PIL Logistics, PSA International and Singapore Airlines enabled Singapore's continued access to vital supply chains during the pandemic, while SATS lent their expertise in cold chain management to ensure competent handling of the COVID-19 vaccines. Temasek Foundation distributed more than 31 million reusable masks to the public by the end of 2021. It enlisted the support of its portfolio companies — PSA International, SingEx, Certis, and Surbana Jurong — to get the massive community care facilities at Changi

Expo and Changi Exhibition Centre up and running in record time. While Temasek's main goal remains to deliver long-term returns on its assets, it plays a unique role in supporting a robust portfolio of local companies that can anchor important capabilities for Singapore in a crisis.

Many volunteer-led groups came forward to address other societal challenges. HealthServe, a charity dedicated to helping migrant workers, had helped many thousands through medical consultations, its mental health and counselling hotline, and social assistance. Be Kind SG rallied volunteers from over 45 schools, organisations, and agencies to put together care packs for healthcare workers. Engineering Good stepped in to improve disadvantaged communities' access to technology during the pandemic by collecting, refurbishing, and distributing used laptops to families and individuals who lacked such devices to stay

digitally connected, whether for learning, work, or staying in touch with loved ones.

The strong cooperation and deep trust among the tripartite partners were also pivotal in mitigating the impact of the pandemic. The tripartite partners worked closely to formulate and disseminate guidelines and advisories, such as on wage adjustments, responsible retrenchments, and SMMs in the workplace, which considered the needs of both workers and employers. With NTUC and SNEF rallying the ground for support, there was good compliance among employers and employees even when the advisories were not legislated.

The Trade Associations and Chambers of Commerce (TACs) also played a key role in supporting businesses and preserving jobs. Many TACs and business groups took it upon themselves to provide support for their members. For example, the Singapore

Business Federation established a series of industry-led funds to address enterprises' cash flow problems, help members push on with transformation efforts, and support employees needing financial assistance.

In the public service, a shared sense of mission prevailed. Everyone stepped up to tackle new challenges without fuss. Many agencies that were not built expressly for pandemic operations chipped in, working hand-in-hand with private sector partners. The Home Team Science and Technology Agency worked with Veredus Laboratories to develop a COVID-19 test kit that was used early on to detect imported cases, and provided support to process the collected samples. DSO and A*STAR provided laboratory processing capacity for the large number of COVID-19 tests that we carried out daily later in the pandemic. Behind the scenes, officers devoted long hours and sacrificed weekends to develop and implement

policies to deal with the crisis. Agencies took on functions that were far from their normal missions. The Singapore Tourism Board ensured hotels' compliance with stipulated SMMs, while Enterprise Singapore did the same with small and medium enterprises. With borders closed and checkpoints no longer busy, Immigration and Checkpoints Authority officers were redeployed from checkpoints to carry out other duties such as coordinating Stay-Home Notices, entry appeals, and the movement of essential goods from Malaysia. Officers from many departments volunteered to support ground operations, including in migrant worker dormitories, as safe distancing ambassadors or as call centre agents. These vital responses came almost instinctively and validated the decades-long effort to build a whole-of-government mindset and approach.

The background is a light teal color with various dark teal line-art illustrations. At the top, there are three stylized buildings of varying heights and widths, each with a grid of small squares or circles representing windows. Below the buildings is a large, dark teal, rounded shape that serves as a backdrop for the text. The bottom half of the page is filled with abstract, flowing teal lines and shapes, including a prominent syringe illustration in the lower right quadrant. The overall style is clean, modern, and graphic.

WHAT WE COULD HAVE DONE BETTER



WHAT WE COULD HAVE DONE BETTER

Many of our responses to the pandemic were built upon crisis response plans that we had developed and practised over the years. Necessarily, we had to adapt them along the way to meet unexpected challenges. Examples include efforts to diversify Singapore’s food sources, and setting up facilities overnight to accommodate Malaysian workers when Malaysia’s borders were suddenly closed. The simultaneous activation of many crisis scenarios throughout these three years considerably stretched our crisis response system, both in the government and in partner organisations and businesses. We had to improvise at speed to come up with new measures and procedures, and build new capabilities to respond to a pandemic that took many surprising, unexpected and even alarming turns. This section reflects on some of these turns, and considers what— with the benefit of hindsight — we could have done differently and better.

01. Outbreak in Migrant Worker Dormitories

The outbreak in the migrant worker dormitories, with the acute phase lasting between April and August 2020, was a crisis within a crisis. It began with the discovery of a series of clusters within the span of a week at the end of March 2020, leading to a chain of lockdowns in our migrant worker dormitories to contain the outbreaks.

When the first dormitory case was detected on 8 February 2020, our initial response followed procedures instituted following the SARS crisis in 2003. We believed that these would be adequate and the situation would be manageable, as the prevailing view was that asymptomatic transmission was not possible. We also lacked a consolidated picture of migrant workers who may have sought treatment for Acute Respiratory Infection (ARI) symptoms from different service providers, for instance, from non-governmental organisations (NGOs). As a result, we could not rely on the usual early warning indicators. Without a clear picture of the health risks, we were unable to justify taking the drastic step to restrict movements from and within dormitories.

However, the situation in the dormitories turned out to be much more serious than believed. The speed and scale of outbreaks within the migrant worker community, plus concurrent clusters in nursing homes and other high-risk

settings, threatened to overwhelm Singapore's healthcare system and spiral out of control. To stem the surge in cases, the government instituted the nationwide Circuit Breaker in early April 2020.

The situation was particularly challenging due to the limited testing capability at that time, as well as the lack of integrated access to migrant workers' health records. Singapore was still reliant on PCR tests, which in the beginning required at least 12 hours of laboratory processing time. PCR machines were not readily available and there were too few healthcare workers to conduct testing at scale. Thus, we could not track the outbreak in a comprehensive and timely way. This hampered our ability to identify and isolate infected individuals before they infected others.

The Ministry of Manpower (MOM) worked with other agencies to halve the density of the dormitories by reallocating the migrant workers to other facilities. But lower density turned out to be insufficient to control COVID-19 transmission. The only effective way to do so was to identify infected individuals quickly and move them out of the dormitories into isolated recovery facilities. This was a massive logistics operation.



SOURCE: MINISTRY OF HOME AFFAIRS

Therefore, we had to work against the clock to ramp up testing capacity across public and private sector laboratories, and to set up quarantine facilities. The latter required extensive coordination across the government to develop and align isolation specifications, identify suitable properties that met the wide range of crisis-related requirements, and subsequently procure and manage a large number of isolation facilities. Digital technology was also an important enabler in transmitting COVID-19 test results promptly from the laboratory to the contact tracing and conveyance systems downstream, so that public health actions could be initiated rapidly.

The outbreak in the dormitories was eventually contained with additional resources from the SAF, the Home Team, and other government agencies, plus non-government resources, in particular the Temasek-linked companies. Together, they set up the command-and-control system to manage these large-scale complex operations; supplied the manpower to establish medical facilities within the dormitories; brought in supplies of food and basic necessities; carried out testing and isolation protocols; and conveyed workers who had tested positive to community facilities for treatment and recovery. Many NGOs stepped forward to contribute, for instance,

by providing meals to the dormitories, and coordinating and delivering donations from the general public. By the end of 2020, nearly half of the roughly 300,000 workers residing in dormitories had caught COVID-19, although many never showed any symptoms and were found to have had past infections only through serology testing. There were only two fatalities.

MOM formed the Assurance Care and Engagement Group to manage the situation in the dormitories and deliver quality care and support for migrant workers. Assurance teams were deployed to look after the migrant workers – making sure that their meals were delivered, and that they continued to be paid on time, had access to healthcare, and were provided with basic social amenities like phone cards and free Wi-Fi. The Project DAWN Taskforce was set up to promote good mental health practices among migrant workers and provide them with mental health services.

Having been through a major crisis with the dormitory outbreaks, we decided to maintain some level of restrictions on movement for migrant workers, which were gradually eased as the situation stabilised. We were concerned

that the workers living in the dormitories could catch the virus from the community when they headed back out to work, pass the virus back and forth, and cause new clusters to emerge across the dormitories and in the community. We rolled out vaccination for migrant workers, introduced a system of tokens and passes to facilitate the flow of workers to and from work, and ensured that worksites and processes were COVID-19 safe. Communal living in the dormitories required specific measures to be developed in tandem with broader measures instituted island wide, for instance, to support “home recovery” within such a setting. To meet migrant workers’ social and recreational needs, the government implemented staggered rest days and a dormitory exit pass system to spread out migrant workers’ visits to recreation centres (RCs) and the community across the week and protect migrant workers during their rest days. We also worked with NGOs to introduce activities at RCs and in dormitories, and organise excursions for vaccinated migrant workers to local attractions.

In retrospect, the early precautions we took in the dormitories were insufficient. Given the communal living environment, the

dormitory outbreak had every possibility of becoming a major disaster. We should have probed deeper and conducted better and earlier ground surveillance, such as by doing dipstick testing on sample populations to make the most of limited testing resources. We also had to make a difficult judgement call on when and how to relax movement restrictions on migrant workers living in dormitories. We could have eased some of the restrictions earlier, especially after most of the workers had been vaccinated and boosted. But there was still a risk of reinfection, and the nature of communal living in dormitories meant that any new infection would again spread quickly amongst residents. In the end, we decided to act with an abundance of caution to keep the workers and the broader community safe. But the extended restrictions did take a toll on their mental well-being.

There are several other takeaways from this episode. One is the need to maintain more reliable and accurate information on the migrant worker community, even in normal times. As specific data on housing was held by the dormitory operators, we did not know which dormitory block a foreign worker lived

in, let alone the room he was assigned to. We had even less information on workers living in temporary dormitories at construction sites. In addition, we need a more comprehensive medical support for migrant workers. MOM has since established a new primary healthcare system for migrant workers, with clinical teams equipped with multilingual translation capabilities, or healthcare workers who can communicate with migrant workers in their own languages.

02. Border Measures

Our borders are an important line of defence against infectious disease. In a pandemic, effective border measures will help delay the spread of the virus and buy us critical time — whether to build up more hospital bed capacity, to get more people vaccinated, or to wait for a new vaccine to be developed. Nevertheless, border restrictions also impose huge costs. Each time a new variant of concern emerged, difficult decisions had to be made around whether to close the borders, whom the restrictions should apply to, and thereafter when and how to reopen borders.

Reflecting on our COVID-19 experience, there were a few aspects of our border measures that we could have managed differently. When news of COVID-19 hit global headlines in January 2020, the government tightened border measures for travellers from China, as a defensive measure to impede the import of the virus into Singapore. As the global situation worsened through February and March 2020, we progressively restricted entry of travellers from other countries, but did so progressively, country by country. This was an attempt to protect our status as an air hub, and strike a delicate balance between saving lives and livelihoods. Similarly, our border tightening in response to the Delta variant was incremental. We closed our borders to India when infections

shot up there, but were slower to close off other countries in the Indian sub-continent and countries with high travel volumes from India. We only did the same for these countries more than a week later. This created the risk of leakage, and indeed Changi Airport saw a cluster in May 2021.

Border restrictions are especially difficult decisions to take for a small and open country like Singapore. Our country is highly reliant on the rest of the world for our living and supplies, with many Singaporeans and residents living and working abroad in normal times, who will urgently need to return home during a crisis. There were considerations: the impact of the border closures on the economy and jobs; whether we had built up sufficient tracing, testing and quarantine capacity to deal with the imported cases; how much risk we were prepared to take; and whether we were ready as a society to cope with the disease. In hindsight, at the beginning we should have built in a margin of safety and tightened border measures more aggressively the moment there were signs of the virus spreading across borders, even when there might have been some risk of us overreacting to these signals. In an attempt to optimise across many dimensions and to strike the delicate balance between saving lives and livelihoods, we might have placed



too much emphasis on livelihoods and been overly anxious about preserving the functioning of our economy and jobs, at least on the two occasions cited above.

At the start of the crisis, returning residents were allowed to come back to Singapore, but they were required to stay at home for 14 days to avoid spreading the disease in the wider community. We were worried that community outbreaks could still happen should some returnees not adhere to the requirements. Indeed, breaches were observed. The government then scrambled to find hotel rooms to serve as quarantine spaces for the returnees – starting with those returning from the United States of America and the United Kingdom, and eventually extending to returnees from all over the world. Unfortunately, by then,

the virus had taken hold in the community. The outbreak sparked by this wave of imported infections led to the eventual imposition of the Circuit Breaker. Given the large number of returnees, we should have anticipated the challenges and implemented upfront a tighter system of controls.

Border restrictions also had long-tail implications on different segments of our population. At various junctures when we were experiencing spikes in local infections, we temporarily suspended the entry of Long-Term Pass (LTP) holders into Singapore, because we were worried about coping with the potential surge of returnees. It was a judgment call we had to make at that time, not without reason. We had found that even with pre-departure testing, a high percentage of travellers from

some countries were still testing COVID-positive on arrival. Had we opened our borders to all LTP holders, the large numbers of infected persons could have overwhelmed our isolation facilities and healthcare capacity.

However, these broad movement restrictions created significant difficulties for some groups of LTP holders, such as Employment Pass holders who were abroad but had their families here, or vice versa. Some of them endured prolonged family separation and disruption to their work. Singapore incurred reputational cost and lost some goodwill from this segment of the community who also had their homes here. On reflection, we could have let the LTP Holders back in sooner, or at least prioritised entry for some groups, once we had stabilised the local infection situation. Learning from this experience, we should build up our capability to ramp up quarantine capacity at scale and as quickly as possible, to safely

accommodate those who will need to return to Singapore. This will allow us to keep faith with all segments of our community and to do our best to look after them.

Ultimately, border measures have their limits. They may delay but will not stop a highly infectious virus from entering Singapore and spreading in our communities. Once the virus starts spreading locally, border measures are no longer effective or relevant, though they may still provide psychological reassurance and be a useful signal of caution. So on the one hand, while we learn about a likely dangerous infectious disease, we must move quickly to impose suitable border measures in response to an initial outbreak. On the other hand, we should be objective and responsive in deciding when the virus or variant is already in our community, that the main danger is no longer from abroad, and border restrictions can and should be eased.

Indeed, we applied this approach when the Omicron variant emerged in countries in Southern Africa. We swiftly implemented Not-to-Land (NTL) to travellers from those countries, and applied a combination of hotel and home quarantine to a wider range of travellers depending on the risk levels of their countries of origin. This bought us some time to gather intelligence about the disease characteristics and mobilise our healthcare and community resources. But within weeks, as the evidence showed Omicron to be more infectious but less severe, we normalised our border measures.

It can be challenging though to reassure the public that Singapore can re-open its borders safely, while maintaining SMMs domestically and battling continuing community cases. We therefore need to educate the public on the role of border measures in infection control,

so that people can better appreciate what these measures can or cannot achieve, and we can implement border measures that better match the prevailing risk and public health situation.

03. Mask-Wearing Policy

The evidence for pre-symptomatic or asymptomatic spread did not emerge early enough for us to optimally manage the initial spread of the disease.

This issue was complicated by the shortage of masks at the time. When COVID-19 erupted globally, the surge in overall demand for face masks was overwhelming. In Singapore, people were understandably worried about their personal health, resulting in panic-buying of masks. Scarcity descended into chaos as other countries banned exports of face masks, further disrupting global supplies. Singapore's existing stockpile of surgical masks, sized for medical needs as well as emergencies like haze, was depleting rapidly. The stockpile was insufficient to allow daily use of masks by the general population. Because of this and the prevailing WHO guidance, the government

advised the public that face masks were not required unless individuals were feeling unwell.

To understand better the nature of the COVID-19 virus and how it was transmitted between individuals, we conducted extensive case and contact investigations. Once we found evidence that the transmission of the virus could occur before the onset of symptoms, or without any symptoms, we did not wait for further guidance from the WHO to institute mask-wearing. Wearing masks in public was made mandatory in mid-April 2020. The WHO only officially changed its advice on mask-wearing in June 2020. The public viewed the change in mask-wearing policy as a U-turn contradicting the government's earlier position. This undoubtedly affected public trust and confidence in our handling of the crisis.

In hindsight, as the clinical evidence on COVID-19 was still evolving and before we learnt how easily the virus spread, we could have been less definitive in our position on mask-wearing. The government could have encouraged Singaporeans to devise their own face masks while we set up manufacturing lines to ramp up production of surgical masks — as was eventually done with projects such as Masks Sewn With Love, a ground-up effort where citizen volunteers helped to sew more than 400,000 masks for their neighbours, friends, children, and those in need.



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

04. Contact Tracing



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

Contact tracing was a key strategy to fight COVID-19. Before vaccines became available, it helped to significantly lower the effective reproduction rate and slow the spread of the virus. Singapore's healthcare system was not overwhelmed, and mortality rates were kept low. Contact tracing also enabled the government and medical experts to understand the virus better, including determining how it spread and the contacts who were at highest risk. This bought us time to learn more about the Delta and Omicron variants when these variants first hit in mid-2021 and early 2022 respectively.

The initial contact tracing efforts comprised a small team within MOH that manually identified and ringfenced suspect cases within local clusters. Our experience with SARS gave us the expertise and systems to do this well. The Singapore Police Force and Central Narcotics Bureau also contributed their investigative expertise to aid the effort. In February 2020, Harvard

University researchers described our contact tracing as “a gold standard of near-perfect detection”¹³. However, the process was very labour-intensive. It could take up to four days to identify and quarantine all of a patient’s close contacts, because other social contacts beyond the obvious family or workplace ones were difficult to track. The process also depended heavily on the recall of patients who were already ill. The scale and rapid spread of the virus forced us to ramp up contact tracing manpower quickly, and also required new technological solutions.

In response, GovTech, working together with the Smart Nation and Digital Government Office (SNDGO) and the rest of the public sector, launched the TraceTogether app and token, as well as SafeEntry, a national digital visitor registration system. These ultimately helped reduce the time needed to identify and quarantine close contacts from 4 days to less than 1.5 days.

While the app hit one million downloads within weeks,¹⁴ it took several more months before it made an impact on contact tracing efforts, as its effectiveness depended on widespread

adoption. The app also did not cover the digitally-excluded population, including seniors and young children who did not have smartphones. It did not work reliably on iOS devices initially, and there were concerns that it would drain the phone’s battery. These concerns were mitigated when TraceTogether tokens were offered as an option. Nationwide distribution of the tokens began in September 2020, starting with constituencies with higher concentrations of seniors. However, as it turned out, many residents beyond the target groups of seniors and children collected physical tokens, leading to token shortages.

Initially, people did not feel a strong need to use TraceTogether when out, whether by carrying the token with them or by keeping the app open in the background. To encourage active adoption, we developed a system for individuals to use TraceTogether for their SafeEntry check-ins. This came to be known as “TraceTogether-only SafeEntry” (“TT-only SE”).

In October 2020, SNDGO announced that TT-only SE would be introduced in public venues such as malls and hospitals by late 2020,

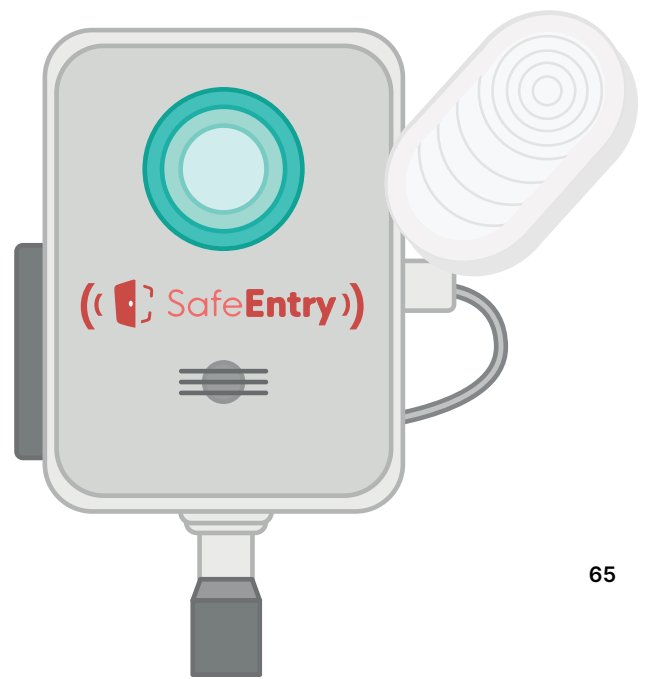
¹³ Center for Communicable Disease Dynamics, Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, USA, on “Estimating underdetection of internationally imported COVID-19 cases”, accessed 18 December 2022.

¹⁴ 1 month after its initial launch, 1.1 million users downloaded the TraceTogether app (Source: GovTech Update on TraceTogether, April 2020).

although it took several more months for 90% of the population to have either downloaded the app or collected the token, and for TT-only SE to be made mandatory. Ultimately, it was this integration of TraceTogether with SafeEntry that ensured faithful use of both tools — and paved the way for more effective tracing of close contacts, especially in social settings, and enforcement of SMMs. This shows that beyond developing the technology, we have to integrate the technology well with operational plans, and to tackle adoption challenges.

The TraceTogether programme suffered a setback when it was disclosed in Parliament that TraceTogether data could be used in Police investigations as it was not exempt from Section 20 of the Criminal Procedure Code (CPC). This contradicted earlier reassurances that TraceTogether data would be used only for contact tracing. This error naturally caused unhappiness and affected public trust. Three weeks later in February 2021, the government introduced the COVID-19 (Temporary Measures) (Amendment) Bill in Parliament to reassure citizens that once the pandemic was over it would cease the use of the TraceTogether and SafeEntry systems, and all personal contact

tracing data collected, except those which had been or were being used investigating serious offences, would be deleted. The government should have been clearer about the use of TraceTogether data from the onset.



05. COVID-19 Rules and SMMs



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

The responsibility for implementing SMMs was shared by many different government agencies. Implementation moved into high gear as infection rates climbed and especially during the Circuit Breaker. Staff from the ministries and agencies, as well as temporary staff and volunteers recruited for this specific purpose, had to learn and improvise on the job. The sprawling effort covered shopping malls, restaurants, hawker centres, entertainment outlets, and so on, and was not without its challenges.

There was some unevenness in treatment as the government sought to define specific rules for different categories of businesses during and immediately after the Circuit Breaker. For

instance, fine distinctions were made in the list of essential services that were permitted to operate. These were not always consistent, and some businesses and workers were unhappy at not being defined as “essential”. The public highlighted the discrepancy of not allowing home-based businesses and bubble tea shops to operate during the Circuit Breaker, even though these settings did not pose significantly greater public health risks than other takeaway-only F&B outlets. In the distribution of face masks to healthcare workers, groups such as Traditional Chinese Medicine (TCM) workers were not included as they were not deemed to be part of the healthcare sector.

During the various phases of re-opening, some SMMs were also overly calibrated, which meant that they had to be changed frequently in response to the evolving situation. Instructions had to change — and quite often — was unavoidable given the unpredictable course of the outbreak. However, some of the measures were overly elaborate, difficult to operationalise and explain, and therefore confused the public. At one point, different rules for physical activity applied, depending on the level of exertion and whether the activity was conducted indoors or outdoors. While the intention was to carve out exceptions for important life events such

as wedding ceremonies and funeral wakes, the requirements tended to emphasise precision over simplicity and were often too complicated to precisely adhere to. For instance, wedding meals were subject to a host of rules around pre-event testing, zoning of guests, and restrictions on mingling. Re-opening the economy in phases while limiting the spread of community infections turned out to be a more complicated, and emotionally affecting, journey than expected. All this highlights the need for us to exercise greater flexibility in a crisis, go for broader brush but more implementable measures, and to guard against the instinct to aim for unrealistic standards of perfection.

06. Transition Difficulties to Endemic COVID-19



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

The Delta variant hit Singapore just as the country was starting to transition towards living with COVID-19. MTF first mooted the possibility of COVID-19 becoming endemic in May 2021 as it had thought that with high vaccination rates, we could keep hospitalisation and ICU cases low. However, it soon became apparent that even if only a small proportion of infected cases were hospitalised, that small proportion of a very large base of infected cases could overwhelm our hospital system.

To check the spread of the Delta variant, the MTF had to tighten and ease measures repeatedly over the second half of 2021. Singaporeans were understandably frustrated by the constantly changing measures as the country moved in and out of a series of “phases”, even as we adjusted our strategy from “Zero-COVID” to “Living with COVID”.

We attempted to make a more decisive shift in August 2021 when about 80% of the population had been vaccinated. However, when cases again rose rapidly in September 2021, we had to backtrack with a Stabilisation Phase to slow the growth in numbers and ease the load on healthcare workers. The public was understandably dismayed by this decision. While some felt we should have gone into a full lockdown, others questioned our resolve to live with COVID-19 as endemic. Some also felt that the government was constantly shifting goal posts for re-opening by citing different measures — first, through vaccination rates targets, then with other statistics like weekly infection growth rates, ICU utilisation rates, and hospital bed occupancy rates. In reality, it was trying its best to respond to the changing nature of the virus, while trying to avoid overwhelming the healthcare system.

The situation was aggravated by teething issues when we launched the HRP. MOH had expected 2 to 2.5% of infected individuals to be identified as severely infected and admitted for acute care in the hospitals. This is about the present rate¹⁵, with the Omicron variant and based largely on clinical severity. But when the HRP was first introduced, our more cautious

risk profiling method led to 30% of patients being admitted to hospitals.

The HRP was supposed to be launched first as a pilot. But it soon became the default mode of recovery in order to manage the fast-growing number of cases sent to the hospitals. The change happened too quickly. The sudden re-characterisation of COVID-19 as a disease mild enough for one to recuperate at home was too unsettling for many to accept. It caused uncertainty and anxiety among patients and their families. Many families were unsure whether their home environment was conducive for taking care of sick family members or whether they could cope with the task, resulting in a surge of people calling in with questions. The FAQs on the government's digital channels could not replace the psychological need to speak to someone during a crisis. Hotlines were overwhelmed, and our limited resources were stretched.

While we had set out a roadmap to endemicity, we had no way to ensure that the virus would follow it. We had to roll with the punches and adapt to its twists and turns.

¹⁵ As of January 2023.

A stylized, hand-drawn illustration of a virus particle with a circular body and several protruding spikes, rendered in a dark red color. It is positioned in the upper center of the page, partially overlapping the red horizontal band.

**LEARNING
FROM COVID-19:
PREPARING FOR THE
NEXT PANDEMIC**

A stylized, hand-drawn illustration of a thermometer, tilted diagonally. It has a white body with a red bulb at the bottom and a red liquid column. The temperature reading '38.1°C' is displayed on the scale. The thermometer is rendered in a dark red outline and is positioned in the lower half of the page.

38.1°C

LEARNING FROM COVID-19: PREPARING FOR THE NEXT PANDEMIC

The COVID-19 pandemic shocked the world. Some would like to believe that such outbreaks are once-in-a-century events. Unfortunately, this is most unlikely. The risk of outbreaks is rising steadily for several reasons. Population growth in both animals and humans, greater consumption of meat, and closer proximity to wildlife in urbanised landscapes, all raise the risk of animal viruses spilling over to humans. With global travel, a novel pathogen can cross borders with ease, spreading across many countries within a short time, potentially causing a global pandemic. However, modern advances have equipped us with new tools to prevent and contain outbreaks before they turn into global pandemics. Our focus, at least on the public health front, must therefore be to work pre-emptively with the global community to use these tools to prevent future outbreaks from spreading worldwide.

Over the last three years, the COVID-19 pandemic has tested the government's basic approaches to and doctrines for crisis management, the adequacy of our contingency planning and the limits of our crisis infrastructure. The long-term investments we have made in growing a strong life sciences eco-system, and in maintaining

good international and business relationships, also helped Singapore withstand the worst of the pandemic and supported our recovery in significant ways.

Our governing principles, such as fiscal prudence, certainly proved their worth. We spent \$72.3 billion for economic and social support and public health management measures from FY2020 to FY2021. This includes the \$36.9 billion drawn from our Past Reserves, which would have been impossible but for the healthy financial reserves Singapore had accumulated over decades. The government engaged the President on multiple occasions to brief her on the evolving situation and the need for extraordinary measures. Having considered the exceptional circumstances and dire necessity and consulted the Council of Presidential Advisors, the President gave her support for the draw on Past Reserves. This allowed the government to mount a strong response to save lives and livelihoods¹⁶.



¹⁶ See message by President Halimah Yacob to Parliament on the Government's Proposal to Fund Extraordinary Budgetary Measures from Past Reserves, 26 March 2020.

This section of the report distils what we have learnt from COVID-19 into seven lessons. It sets out concrete actions Singapore should take to be better prepared for future pandemics, which will also gear us up to deal with other national crises too.

LESSON #1

In dealing with a complex crisis, we should establish upfront which dimension to prioritise. We need to adapt more quickly to changing situations, and not allow the perfect to become the enemy of the good.

LESSON #2

We need to strengthen further Singapore's resilience as an economy, society, and nation, to be better prepared for disruptions and to bounce back from shocks.

LESSON #7

We have to continue delivering transparent and clear public communications to build trust and ensure effective response in a crisis.

LESSON #6

We need to strengthen our structures and capabilities for forward planning, to respond to the next pandemic in a more agile and fluid manner.



LESSON #3

We can do more to harness the strengths of the people and private sectors. To do so, the government must develop an eco-system to support and nurture these relationships in peacetime.

LESSON #4

We need to systematically build up strong public health expertise and organisational capacity to tackle future pandemics.

LESSON #5

We need to institutionalise the use of science and technology in pandemic crisis management. In digital technology, this means investing in interoperable data systems and engineering capabilities, as well as ensuring the cybersecurity of our information infrastructure.

Lesson #1

In dealing with a complex crisis, we should establish upfront which dimension to prioritise. We need to adapt more quickly to changing situations, and not allow the perfect to become the enemy of the good.

COVID-19 was a complex crisis. We must expect the next pandemic to pose equally if not more complex challenges. In such situations, we will need to establish upfront the objectives or dimensions we want to prioritise to address the immediate challenge at hand.

This includes being clearer on when to prioritise public health over economic considerations, or vice-versa. For example, over the last three years, we assessed that some cross-border travel was critical to ensuring business continuity and so ensured that vital channels remained open. We prioritised the opening of cross-border movement of goods and supplies with Malaysia, and enabled this by vaccinating and testing the truck drivers, limiting their contact with the local community, and using technology to track their locations in real-time. This made sense and allowed Singapore to remain open to important cross-border flows without compromising the safety of residents. Conversely, at the start of the pandemic and subsequently in response to the Delta wave outbreak across the Indian sub-continent, we could have established upfront that public

health was our overriding priority, and tightened our borders more quickly and decisively.

The same considerations would apply to the decisions we have to make on which groups to open our borders to. The government never wavered from its position to stay open to Singaporeans and PRs, even though this sometimes presented challenges to our quarantine and healthcare capacity. Where LTP Holders are concerned, we will have to carefully weigh the numbers and public health risks. In future pandemics, we should take a more differentiated approach, based on a fuller range of considerations. These include the outbreak situation in the countries these LTP holders are arriving from, and the reliability of their pre-departure test results, to the social or economic dimensions to prioritise, including the desire to keep families together and to meet manpower needs in critical sectors. Specific to migrant workers, we need to lay the groundwork to quickly facilitate employers' programmes to bring the workers in safely through testing and isolation processes in their home countries.

With future pandemics, we will also need to exercise more flexibility. During COVID-19, at times we allowed the perfect to be the enemy of the good, for example the over-calibration of some SMMs and treatment protocols. In striking the right balance between achieving precision and ease of implementation in our public health protocols, we should guard against leaning too much in the direction of the former.



Lesson #2

We need to strengthen further Singapore’s resilience as an economy, society, and nation, to be better prepared for disruptions and to bounce back from shocks.

We cannot avoid being hit by crises, nor can we ever be fully prepared for the myriad twists and turns of a crisis as complex and long-drawn as COVID-19. But we can do more to strengthen our resilience. This means being better prepared to cope with disruptions, to recover quickly from shocks and stresses, and to adapt and grow from the experience.

**Maintain access to key resources;
build buffers**

A resilient system needs the buffer to deal with and absorb unexpected shocks and volatility. Singapore’s most significant source of national resilience is its healthy financial reserves, accumulated over generations of prudent government. The Constitution institutes a two-key system to safeguard our Past Reserves accumulated before the current term of Government. As the custodian of our Past Reserves, the President holds the second key to unlock and use them in an emergency.

This buffer enabled the government to draw \$36.9 billion from the Past Reserves in FY2020 and FY2021, with the President’s concurrence, to fund economic and social support as well as public health measures¹⁶. This enabled us to

substantially cushion the fall in employment and economic output during the pandemic, without having to borrow to fund our crisis support, unlike many other countries. Our best safeguard in any crisis remains having access to significant financial reserves and to critical supplies.

While we did well to keep supplies flowing, COVID-19 nevertheless highlighted how we could strengthen our supply chain resilience, as situations may arise where we cannot secure sought-after supplies even if we are willing to pay a premium for them. We will review our stockpiling strategies and improve diversification of critical supplies by working upstream to identify a more comprehensive list of critical items, expand the potential sources, and establish new supply chains and stockpiles. We will also have to consider if and how to diversify the sources of our migrant workforce. In both cases, we will have to carefully consider the costs of buying such “insurance” and ensure that this premium is worth paying in return for greater resilience. While Singapore can never be entirely self-sufficient, we will, in selective areas that we judge essential and feasible, invest in more local production to guard against future disruptions. The government has

¹⁷ In total, we spent \$72.3 billion in our fight against COVID-19 from FY2020 to FY2021.

already set a stretch target building Singapore’s capability and capacity to produce 30% of our nutritional needs locally by 2030, an initiative launched before the COVID-19 pandemic to improve Singapore’s food security. We are also taking steps to build our vaccine development capability by anchoring companies like BioNTech and Moderna in Singapore and establishing “fill and finish” manufacturing capability here.

Invest in systems and capabilities

Beyond securing the resources required, we will build systems, capabilities, and the necessary levers to be able to mobilise, adapt and marshal these resources well. For instance, to enhance access to accurate information on workers living in dormitories, MOM has reviewed the Foreign Employee Dormitories Act to ensure a consistent framework for dormitory infrastructure and management standards across all dormitories (other than very small ones). It has invested in new dormitory surveillance and operational capabilities to deal with large-scale issues in the dormitories. It has also introduced a new geography-based primary healthcare network across the island to improve migrant workers’ access to primary healthcare, and a capitation fee model along with existing medical insurance for the migrant workers to make them less dependent on their employers when they need care.



SOURCE: MINISTRY OF TRADE AND INDUSTRY

Other important structures and capabilities have also emerged or become more significant during COVID-19. We will cement these gains and make peacetime investments to enhance them. For example, the wastewater surveillance capacity that Singapore had developed for other purposes some years back was deployed at the dormitories during the outbreak and proved to be a very useful early warning system for the presence of COVID-19 cases. The government then acquired more wastewater collection machines to monitor the spread of COVID-19 in the community, and enable us to trigger response plans early. We will do more research to understand the potential of sewage surveillance for future disease outbreaks. Other initiatives include the enhanced SupportGoWhere portal that has since been repurposed to provide consolidated information on all social support schemes; and the ComLink programme that was accelerated

during COVID-19 and will continue to be enhanced to provide more integrated support to families living in rental housing.

Enhance the adaptability of our infrastructure and workforce

Resilience is also about being more adaptable so that we can pivot quickly in a crisis. While some plans can be made ahead of time, we must always expect to be surprised by unexpected developments. When this happens, we need to be nimble and move fast so as to overcome critical choke points and solve unanticipated problems. For example, when we first managed to bring protein and meat supplies into Singapore, there was an issue of where to store these goods. We solved it by bringing in refrigerated containers, or reefers, to provide sufficient cold storage capacity, and ramped up the power capacity required to support their operations.

Where possible, the government will design its facilities to be multi-use so they can be repurposed or redeployed into accommodation, medical and other critical facilities during a crisis. Specific to the context of a pandemic, we will develop the ability to convert, at short notice, existing spaces into additional healthcare facilities to substantially augment hospital bed capacity. For instance, Singapore

Expo halls and the Changi Exhibition Centre were initially converted in April 2020 to Covid-19 isolation facilities to house recovering and early COVID-19 patients with mild symptoms. Additional Singapore Expo halls were subsequently repurposed as a COVID-19 community care facility for children and seniors. Looking ahead, Changi Airport Terminal 5 will be made pandemic-ready with better segmentation of spaces to segregate and manage passenger flow.

For capabilities that have a steep learning curve and are difficult to develop at scale in a crisis (e.g., healthcare operations, contact tracing and other response operations) or functions that will face surge demand (e.g. call centres, ground enforcement) that exceeds what any single agency can cater for and keep idle in peacetime, the government will put in place a more centralised system of tagging crisis-time roles to suitable individuals and training them ahead of time so they can be redeployed quickly when mobilised, as well as plan for a sustainable buffer. This will allow us to stand up, at short notice and at scale, important functions.

Lesson #3

We can do more to harness the strengths of the people and private sectors. To do so, the government must develop an eco-system to support and nurture these relationships in peacetime.

COVID-19 has demonstrated the importance of cultivating networks, and developing and sustaining structures that support partnerships with various stakeholders during peacetime. This is critical to mobilising whole-of-nation support in a crisis. To nurture these efforts long after the pandemic and strengthen social capital on an ongoing basis, the government will continue to deepen engagements and develop partnerships with these stakeholders, and actively encourage ground-up initiatives. We will also continue to cultivate and develop our networks of volunteers, enhance volunteer coordination and management capabilities across agencies, and set up one-stop platforms for the public to offer and seek support in times of need.

Private sector partners like Temasek were indispensable sources of support during COVID-19. Learning from the experience of COVID-19, the government will more proactively partner the private sector to identify gaps in our resilience plans and develop responses to address these gaps, by tapping on their capabilities and global supply chain connections.

We also need structures to more effectively activate and mobilise private resources. The pandemic demanded the full capacity of our medical facilities. Private hospital groups had



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

to be roped in, first to receive transferred non-COVID-19 patients, and subsequently to run supporting facilities such as vaccination centres, recovery facilities, and PCR testing operations. Similarly, we had to pull together accommodation facilities including hotels and student hostels at short notice to house those returning from overseas. A similar effort was undertaken to utilise sports halls, cruise ships,

unused HDB blocks, SAF camps, and other similar facilities as temporary housing for migrant workers who were transferred from their dormitories, as well as Malaysian workers who could no longer commute daily across the Causeway.

While the COVID-19 (Temporary Measures) Bill gave the government the option of mobilising civilian resources using the Requisition of Resources Act (RORA) for the purposes of containing COVID-19 and caring for those at risk, our sense was still to use RORA only as a last resort and not for non-military emergencies. The government will leverage alternative structures — for example, through strategic partnerships or cooperation agreements — to effectively harness civilian resources in non-military crises. In the meantime, agencies like MOH will further develop the role of SG Healthcare Corps and put in place processes for currency training and mobilisation, so that the Corps can function as an additional standby reserve for healthcare manpower in future pandemics.

Private sector data, especially data of national importance, is another key resource for which we must build systems to tap. For instance, as public and private hospitals used different operating systems, clinical data from NCID was not linked to data coming out from public and private hospitals and the community care facilities. This hampered monitoring of the ground situation. MOH has since set up the TRUST platform to enable healthcare professionals and institutions, both private and public, to contribute and use data for research. Going forward, a more concerted effort will be undertaken to identify private sector healthcare data of significance and to develop an effective data-sharing strategy system.

Lesson #4

We need to systematically build up strong public health expertise and organisational capacity to tackle future pandemics.

COVID-19 will not be the last global pandemic. Just as we learnt from SARS in our response to COVID-19, we need to be even more prepared when the next pandemic hits us. MOH will therefore be instituting several improvements to strengthen its pandemic response capability.



SOURCE: A*STAR

One key aspect of this is to expand our healthcare capacity. At the primary care level, family doctors can advise the population to take the appropriate personal measures, such as getting vaccinated and observing health protocols. This is our first line of defence. We are strengthening this with the national Healthier SG strategy. In particular, we

will build up the capacity to vaccinate our population swiftly, leveraging primary care clinics if need be. Our planning parameter is to be able to administer the vaccine to everyone aged 50 and above within three to four weeks. For acute care, we will do more to place patients in the appropriate level of healthcare facilities, moving them from ICU and hospital wards to other facilities providing step-down care, transitional care, and long-term rehabilitation support. In particular, Transitional Care Facilities have proven very useful during a pandemic crisis for relieving the burden on acute hospitals, and we will explore expanding them further. An effective healthcare system will require well-trained and sufficient manpower, and we will continue to grow our talent pipeline, from all training pathways, and including both local and foreign sources.

More importantly, we need to further consolidate and strengthen our public health expertise, especially in the area of communicable disease control and management. As the ministry overseeing hospitals, MOH is traditionally strong in individual medical assessment and clinical care. But during a pandemic, this has to be balanced against competing public health

considerations at the system level. For instance, even after Antigen Rapid Tests (ART) became widely available, we continued for some time to require PCR tests for most situations. For purposes of making clinical decisions, PCR tests are preferred as they are more sensitive and can better ascertain if a patient has COVID-19. However, from the perspective of managing the spread of the pandemic in the community, ARTs have a short turnaround time and can be self-administered, and hence, are much more scalable and effective for the purpose even though they are less sensitive than PCR tests. With better public health capabilities, we could have weighed the options more effectively and optimised the use of both tests for the appropriate settings. We could have leveraged ARTs and transitioned earlier to population-wide testing as a way of life, while using PCR tests for specific situations that required them.

Another example that illustrates this balance was the interval between vaccine doses. While we were building up an adequate stock of vaccines, we decided after some deliberation to widen the interval between the first and second doses. This was so that more people could benefit from at least a first dose, even

though this deviated from the recommended vaccination schedule. During the Delta variant outbreak, with cases increasing rapidly and ample vaccine supplies, there was a proposal to shorten the interval between the second dose and the booster jab to give more people better protection against severe illness. We eventually decided not to do so, because of limited data. In contrast, Israel, in a similar urgent situation, had shortened the interval before the booster jab, with good results. They too did not have definite data available, but in an emergency they were prepared to exercise scientific judgment, make educated guesses, and act upon them. This is an important attitude of mind and capability which we need to cultivate in our medical and scientific experts, in our healthcare institutions, and in the government.

To better balance the objectives of good individual clinical care and population health, and strengthen our overall capabilities to tackle future pandemics, we should establish a dedicated set-up where expertise in surveillance, disease prevention, preparedness and response, epidemiological analytics and modelling can be enhanced and sustained. We need to build institutions and organisations focused on public

health, to develop competence in public health, implement public health programmes, and champion public health considerations in our pandemic responses. This will involve a consolidation of expertise that currently resides in different parts of the healthcare ecosystem, such as NCID, NPHL, and operational outfits within MOH headquarters. This is also the approach many countries have undertaken, in setting up Centres for Disease Control.

We should also review our legislative levers to support more flexible public health responses in a pandemic. The existing Infectious Diseases Act (IDA) caters only to two binary scenarios – peacetime or emergency. This was too constraining and did not give the government the legal levers to calibrate public health and safe management measures as the situation evolved. Many other countries, such as Japan and Malaysia, encountered similar challenges. To overcome this and to complement the IDA, we enacted Part 7 of the COVID-19 (Temporary Measures) Act. Learning from this experience, we should review the IDA, so as to institute the legal provisions for more flexible and effective responses to the changing circumstances of a pandemic.

As pandemics are global in nature, we should leverage the international networks that have

flourished and grown as a result of COVID-19. We will plug ourselves into international technical and surveillance networks, such as the WHO and GISAID, systematically and effectively. This will enable us to detect and understand novel pathogens faster. We also need to complement this with data from a variety of sources, including exchanging information with partner countries, monitoring traditional and social media, and gathering local data through digital surveillance systems and wastewater testing. Early intelligence on the emerging global spread and disease characteristics of new and evolving variants will buy us time to decide on our next course of action. For instance, in deciding on the nature and extent of our border measures, we will benefit from better external surveillance and closer cooperation with the international network of scientists and health authorities, along with the capability to test incoming travellers at scale. These will give us an early sense of whether and how the disease may have taken hold in the countries these travellers come from, so that we can calibrate our border measures and manage our risk based on the best information available.

Lesson #5

We need to institutionalise the use of science and technology in pandemic crisis management. In digital technology, this means investing in interoperable data systems and engineering capabilities, as well as ensuring the cybersecurity of our information infrastructure.

Over the years, we have invested heavily in infrastructure and talent to build a large science and technology ecosystem in Singapore. Different entities in this eco-system supported the COVID-19 fight in their own ways. We must build on these earlier investments, and tap more into the science and technology ecosystem for support during a pandemic. MOH is linking up the NCID with other research laboratories and experts on infectious disease – for instance, those in our universities – to facilitate the continued exchange of clinical data and synergise research. A Programme for Research in Epidemic Preparedness and Response (PREPARE) will systematically pursue research efforts to better prepare for future pandemics: for instance, by strengthening our capabilities in infectious disease-related modelling; accelerating the development of diagnostics, therapeutics and vaccines; enhancing our vaccine production capacity; as well as developing a strong regional infectious disease collaboration network.

Beyond the life sciences, we should make better use of digital technology solutions in the next pandemic. While investment in in-house digital capabilities within government enabled us to develop TraceTogether and SafeEntry for contact tracing during COVID-19, we could not realise the full potential of these tools until adoption was high and we could integrate them with ground operations. Central structures that were set up to coordinate our data and technology needs, such as the Smart Nation Digital Government Office (SNDGO) and GovTech, should have been activated earlier to integrate digital solutions with ground operations, to speed up the rate of adoption of these solutions during the crisis.

Additionally, data across institutions were not organised for easy merging and sharing, limiting our ability to exploit data more effectively to support our needs. For instance, much time and effort were spent cleaning and merging datasets to monitor the ground situation at migrant worker dormitories. DSTA also had to develop a quick-fix solution to

facilitate data-sharing across hospitals and community care facilities. Moving forward, we will invest in data engineering capabilities and interoperable systems across government, so that agencies can fuse data from multiple sources to quickly obtain a common picture of the ground situation during a pandemic.

As we rely more on digital tools in our crisis preparedness and response, we need to be mindful of the potential cybersecurity risks these tools may inadvertently create, and invest in systems to enhance cybersecurity and prevent data breaches. We will also need to manage the cybersecurity risks of

critical systems that support crisis operations, especially where there are operational dependencies. To effectively do so while addressing competing operational demands for quick and effective implementation, we need agile structures that can assess trade-offs and make fast decisions on project implementation issues. Such structures should include not just technology teams, but also security, operations, communications, and policy experts whose perspectives should be incorporated as early as possible in the design stages.



Lesson #6

We need to strengthen our structures and capabilities for forward planning, to respond to the next pandemic in a more agile and fluid manner.

This pandemic emphasised the criticality of strengthening the government's structures and capabilities for crisis planning and management. The government must keep our crisis planning and management muscles warm, and strengthen our anticipatory capabilities. While we cannot anticipate all curveballs, we can grow our ability to adapt and respond effectively to all kinds of changes. The government should continue to hold its regular tabletop exercises covering various crisis scenarios to sensitise key decision-makers to potential shocks, and to hone its instinct to deal flexibly with unanticipated events.

While it made sense that our planning parameters took reference from the last pandemic, we needed to guard against letting the tendency to “fight the last war” limit or slow down our response to new and constantly evolving situations. It was soon clear that in building pandemic preparedness on a SARS model, we had not adequately challenged certain assumptions. As SARS was a short, regional outbreak, largely confined to hospital settings, our pandemic preparedness system was largely focused on managing outbreaks

within the hospital eco-system and not in the wider community. Stockpiling of important medical equipment was thus largely confined to the hospitals. But COVID-19 turned out to be more transmissible though less severe than SARS, and the pandemic lasted for several years instead of a few months. The extent of disruption to global supply chains was also unexpected, as was the impact of the crisis on the economy and jobs.

We learnt from SARS that dealing with a pathogen with high severity but low risk of transmission would require us to hunker down for several months until it passes. We have also learnt that for highly transmissible but low-severity viruses like influenza and H1N1, the best response is to carry on with life as normally as possible, while maintaining good hygiene, wearing masks when sick, and getting vaccinated. In this pandemic, we had to deal with the Delta variant, which was highly transmissible, and presented a moderate threat to health and lives, especially for unvaccinated seniors. However, the Delta variant is far from the most dangerous pathogen that could afflict us. The world could be hit with a novel

pathogen that carries both high contagion risk and high mortality. This is where the trade-off between lives and livelihoods will be the starkest.

There is no clear “worst case” that we can define and plan for. Post COVID-19, we will have to broaden the range of baseline scenarios for our pandemic planning, and review the resources needed to maintain appropriate buffers in our hospital bed capacity, stockpiles, and other pandemic-related requirements. This must be done judiciously, to ensure cost-effective use of limited resources. We will also build up our ability to quickly establish the parameters of any new disease – its transmissibility and severity, mode of transmission, incubation period – so we can identify the right policy measures to adopt, including the extent of our SMMs, how much to ramp up healthcare capacity, and what testing and vaccination strategies to consider. This means we have to grow Singapore’s pandemic-related research capabilities.

With a novel pathogen, we will always be dealing with unknowns. As the pandemic unfolds, our response will have to be a combination of preparedness and improvisation. Some scrambling is inherent, as we discover more information, and consider the need to

update, revise or even reverse decisions taken in the fog of war. Hence, besides updating our baseline pandemic scenarios, we must equip our crisis management structure with better forward-planning capabilities to anticipate and imagine what might happen next, and to keep buying insurance throughout the campaign.

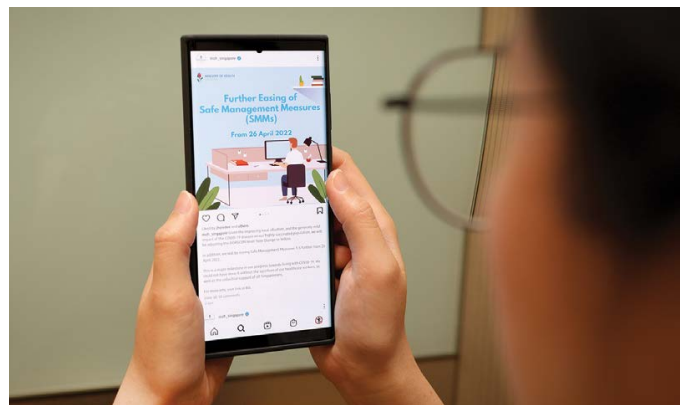
In a complex and fast-moving crisis such as COVID-19, operational departments and their headquarters will not have bandwidth to do forward thinking, future operations, and policy all at the same time. For future pandemics, the government will create a separate dedicated forward planning team with the bandwidth and expertise to better anticipate the next few bounds, ask the “what if” questions, and prepare ahead for situations which have not yet arisen and perhaps may not arise at all. This dedicated set-up can adopt a data-driven approach to sensemaking and risk-identification, consider different scenarios of how the crisis could evolve, and have that inform its longer-term plans. While we will not get every call right, we would certainly be better placed to make more educated guesses, and be more assured in charting out the next steps.

Lesson #7

We have to continue delivering transparent and clear public communications to build trust and ensure effective response in a crisis.

Overall, public communications during the crisis were well-handled and helped greatly in building and maintaining trust between the government and the population. Clear and transparent public communications kept citizens informed and reassured, and therefore psychologically prepared for what lay ahead. The government also did well to put out regular communications via daily case updates and frequent press conferences. These provided an important measure of consistency and predictability. In uncertain times, it is critical that the government communicates regularly and openly, to share its considerations in decision-making as well as to address public concerns.

What we have done well we will build upon for future pandemics. Nevertheless, in some instances, public communications considerations could have been better factored into policy design and implementation. For instance, many safe distancing ambassadors as well as the public found it challenging to keep up with the frequent changes to our SMMs, particularly when vaccination-differentiated SMMs were first introduced. A lot of effort



SOURCE: MINISTRY OF COMMUNICATIONS AND INFORMATION

went into explaining the changes to individuals and businesses. We will therefore need to weigh the impact of constantly changing instructions against the policy intent, and consider whether implementation challenges could be mitigated with simpler policy design at the start.

Public communications, when well leveraged, can effectively shape the national psyche and manage public sentiments, in support of important shifts during a crisis. For example, in the initial phase of the crisis, a deliberate decision was made to announce the DORSCON level publicly, even though the DORSCON framework had been developed as a tool for ministries and agencies to coordinate and

execute the government's response to outbreaks of infectious diseases. While the purpose of being transparent was to bolster vigilance, the news sparked public panic and led to a run on essential items. We will review how we design and communicate indicators of crisis severity and related public health measures as part of our larger emergency preparation and public communications framework, so as to avoid causing undue public anxiety. Similarly, when it was decided that we would shift to endemicity, more effective public communications could have helped in supporting the psychological transition that the population needed to make. COVID-19 was still feared as a disease severe enough to warrant quarantine; yet, the population was

expected to immediately pivot to recovering at home, with other family members in the same household. We could have provided more information ahead of the launch of the HRP to explain how the prevailing rates of mortality and severe disease from COVID-19 infections were no different from the flu, for vaccinated individuals. At the same time, we should have directed more resources towards managing frontline crisis communications, especially at the case management level, to ensure tight information flow between agencies and vendors hired to manage calls and operations on the ground — as was eventually done when the SAF was roped in to coordinate the HRP.



Conclusion

CONCLUSION

COVID-19 has afflicted Singapore for more than three years, as it has the entire world. Countries that had experienced SARS in 2003, like Singapore, were more prepared for COVID-19 than those that had not. Singaporeans, with a strong communitarian spirit and generally high trust in government and scientific advice, were socially and psychologically more prepared to accept and comply with strict measures for the greater good of all, when compared with other communities. Measures such as safe distancing and vaccination proved to be vital in our fight against COVID-19.

There were a few close calls, the most dangerous being the outbreak in the migrant worker dormitories that put more than half a million migrant workers at risk with the threat of the infection spilling over into the wider local community. Had that happened, Singapore could have experienced a devastating surge of infections that would have overwhelmed its healthcare system. Mortality rates would have been catastrophic. The economy would have suffered even more with a significant proportion of the workforce out of action. While the dormitory situation was eventually brought under control with assistance from the SAF, Home Team and other non-government

entities, the episode exposed gaps in our crisis management system, and highlighted Singapore's unique vulnerability. Other countries and cities which experienced major localised outbreaks worse than our dormitory outbreak could overcome them and pull through by drawing resources from a larger hinterland. Singapore does not have the luxury of such a safety net.

This vulnerability also showed up in the way Singapore's supply chains were disrupted. We had always assumed that if Singapore faced a crisis, other parts of the world would still be open for business, so that our critical needs could be met by buying off the global markets. COVID-19 turned out to be a global pandemic that put every country into crisis mode. Many countries resorted to protectionist measures to safeguard their own critical supplies, even when they had more than sufficient for their own domestic needs. This affected not just medical supplies, but even basic necessities such as food. This therefore raises the broader question of resilience and the premium Singapore should now be willing to pay for greater protection.

In addition to our investments over the years in infrastructure and talent to build a large science and technology eco-system in Singapore, we

need to continue investing in systems that incorporate digital technology more effectively and securely into crisis operations. Specifically, our government data architecture must be enhanced to improve the interoperability of our systems.

We were able to make decisions and get them implemented, even in conditions of great uncertainty and fear, because of the trust people had, not just in the government, but also in the public health system and other public institutions, as well as in each other. However, there were also occasions when the public was confused by frequently changing and sometimes inconsistent instructions. We will learn from these episodes, especially in the way we design our policies and how they are communicated. One challenge we will increasingly have to grapple with is social media. The prevalence of social media has meant that information, misinformation or even disinformation can reach a very wide audience overnight, undermining the position of government communications as the authoritative voice. Our approach to crisis communications must find an answer to this.

Finally, when considering our response to the COVID-19 crisis, we should consider

the overall quality of governance and not just the performance of the government itself. High quality governance in a crisis is about organising our systems, structures and resources, such that the public, private and people sectors can band together and work in effective and complementary ways to deliver the best outcomes for our people and country. This is the Whole-of-Nation paradigm.

While we have identified some areas where we could have done better, the quality of governance throughout the crisis has been generally high. Through a strong Whole-of-Nation response to the pandemic, we have effectively preserved lives and livelihoods. The public service banded together and served with a strong sense of mission and commitment. Healthcare and other essential and frontline workers gave their all during this trying period. We succeeded in keeping schools open and protecting our students from the learning disruptions faced by students in many other countries. The most vulnerable in society received additional protection from the worst effects of the pandemic. The private sector stood up to support a whole range of activities, from face mask distribution and construction of laboratories, community care and treatment facilities, to maintaining critical supply chains.

Finally, the people of Singapore never gave up and displayed considerable fortitude in responding to the tough measures imposed at different phases of the pandemic.

This crisis of a generation showed us, and the world, what Singaporeans are capable of when faced with a severe existential test. It marks a certain maturity of Singapore as an economy, as a people, and as a nation. We can be proud of how far we have come. And we will learn from the experiences of the last three years to be better prepared for the next pandemic.



