BEHIND THE MASK

OUR HEALTHCARE STORY


FACE SHIELD
DO NOT DISTRACT
MENG JIE


Left Side
Right Side

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Vaccination Station
S5
Medical
Vaccination Station
S4
Vaccination Station
S3

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Saw Swee Hock School of Public Health,
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Singapore 117549

BEHIND THE MASK:
OUR HEALTHCARE STORY

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BEHIND THE MASK

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PHOTO: TAN TOCK SENG HOSPITAL

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MESSAGE BY DPM LAWRENCE WONG

STRONGER WHEN WE STAND TOGETHER

WE have spent three long years fighting COVID-19.

It was a journey with many twists and turns, and with repeated surprises and disruptions along the way. While our prior experience with SARS provided us a guide, COVID-19 turned out to be a far more formidable enemy. We had to be nimble and improvise our strategies, amidst a fast moving situation with incomplete information. In the end, our response to COVID-19 was by no means perfect. But we have much to be proud of. Our healthcare system, though strained, was never overwhelmed. We achieved one of the lowest COVID-19 death rates in the world, and a vaccination rate that is amongst the highest in the world.

One important factor for this was the dedication of our frontline workers, especially our nurses, doctors and other healthcare professionals. They worked tirelessly to see us through the crisis. Whether it was at our vaccination centres or foreign worker dormitories, whether it was in our clinics and hospitals or in quarantine facilities – they willingly assumed personal risks, over and over again, so the rest of us could be safe. They rose to the occasion when the going got tough, even in the darkest of times. We owe all of them a huge debt of gratitude.

What was also crucial was how our entire healthcare system rallied together to confront the crisis as one. When our public hospitals faced multiple surges in cases, the private and community hospitals stepped up to augment our capacity. Private laboratories and medical researchers also stepped up, working with our public institutions to roll out COVID testing on an unprecedented scale, and helping us make sense of the ever-changing situation.

This did not happen by chance. It reflects the tenacity, camaraderie, and strength of leadership amongst the healthcare fraternity in Singapore – captured here in this book through personal stories and reflections across our healthcare system. More broadly, it reflects the strong foundation of trust in our society – trust in Government and in each other. It was this trust that held us together during the crisis, enabling each of us to do our part for the greater good.

We have learnt much from this experience and will take steps to better prepare ourselves for the next pandemic, including fortifying our public health system, enhancing our forward planning capabilities, and strengthening our resilience as a nation. Even as we do so, we must not forget the most important lesson of COVID-19: that we are stronger when we stand and work together. That is why we must continue to strengthen our collective bonds and stay united. Whatever the challenges ahead, we can overcome them as one people and one Singapore.

MR LAWRENCE WONG
DEPUTY PRIME MINISTER,
MINISTER FOR FINANCE,
CO-CHAIR OF THE MULTI-MINISTRY TASKFORCE

PHOTO: MINISTRY OF TRADE AND INDUSTRY

MESSAGE BY MINISTER GAN KIM YONG

LESSONS FROM FIGHTING COVID-19

AS the crisis of a generation, COVID-19 brought unprecedented challenges for Singapore and the world. When the virus first emerged at the end of 2019, we expected it to eventually arrive in Singapore, but we did not expect the battle to last for three years. Looking back, our experience with COVID-19 has taught us three valuable lessons.

First, we must be nimble and flexible. No two pandemics are the same – we had initially thought that COVID-19 would be very similar to SARS, but this did not turn out to be the case. This meant that we had to quickly adjust our response, which was modelled based on SARS. With very little information on COVID-19 early on in the pandemic, we also had to "feel the stones as we crossed the river", and make decisions based on the data that we had at the time.

Second, the importance of transparency and trust. Our journey to living with COVID-19 would not have been possible without the high level of transparency and trust between the Government and the people. Even though we often had to make decisions on the fly and respond quickly to any change in situation, we made every effort to be frank and upfront, and explain the considerations behind our decisions. This transparency helped to build trust, mobilise everyone and ultimately, protect lives. Without this trust, many of the measures we had implemented during COVID-19 would not have been effective.

Finally, everyone in society has a part to play during a crisis. When the pandemic struck, our healthcare workers responded quickly despite not fully understanding how the virus spread or the risks it could pose to them as they cared for infected persons. Those in healthcare leadership positions went down to help out at the clinics and the hospital wards, standing shoulder to shoulder with those on the frontlines. When told to be prepared for a prolonged outbreak, the healthcare fraternity took it in their stride and worked out a plan to stay at DORSCON Orange for a long period of time. Other segments of society stepped forward to help as well, such as the private sector who helped to set up our community care facilities and Singaporeans who provided meals to those in need or sewed reusable masks for the community. These shows of solidarity were heartwarming and inspiring.

On this note, I would like to express my deepest appreciation to all frontline and healthcare workers for your tremendous dedication and sacrifice. Your hard work and perseverance has helped Singapore weather COVID-19 with one of the lowest fatality rates in the world, and it has been my privilege and honour to serve alongside you.

This will not be the last crisis we face. While we do not know when the next pandemic will happen, or what future crises may be like, we can be confident of and rely upon the Singapore Spirit – working with one another and looking out for each other, so that we can emerge stronger as a people and nation.

MR GAN KIM YONG
MINISTER FOR TRADE AND INDUSTRY,
CO-CHAIR OF THE MULTI-MINISTRY TASKFORCE,
FORMER MINISTER FOR HEALTH (2011–2021)

FOREWORD BY MINISTER ONG YE KUNG

BATTLING A PUBLIC HEALTH CRISIS

OUR journey in transiting to endemic COVID-19 is hard fought. After more than three years of battling COVID-19, Singapore emerged from the shadows of the pandemic in early February 2023. The daylight that came after a long dark night would not have been possible without everyone who has contributed to this fight.

Through this crisis, I have developed utmost respect for my healthcare colleagues, for their immense courage, dedication and resilience during this difficult time. Our doctors and nurses, particularly, have borne the load of patient care under tremendous pressure over a prolonged period, when the emergency departments were constantly overcrowded with patients seeking urgent treatment – and they have stuck it out. I shared their huge sense of relief each time an infection wave subsided, and their anxiety on when would the next one come.

I'm also thankful to all Singaporeans, and everyone who lived in Singapore during the pandemic, for doing your part. I know that the journey can be confusing and frustrating at times. But despite the twists and turns along the way, you have responded sensibly and responsibly to measures, and kindly to others in need.

Having the trust and support of fellow Singaporeans took much of the weight off the shoulders of the healthcare community in the thick of the battle. It was with everyone's cooperation and collective will that our healthcare system held up and healthcare capacity preserved.

This book is an effort to capture our healthcare story in battling a public health crisis. The experiences and insights from people in healthcare and our partners are invaluable in building a more robust and resilient ecosystem to tackle any future pandemics. From implementing the circuit breaker to containing the spread of COVID-19 in dormitories to rolling out a mass vaccination exercise and Home Recovery Programme, we accomplished what we never thought was possible during peace time.

As we remember what we have been through and our losses during the crisis, we also take stock of what we have gained and learnt. For instance, the pandemic has taught us how our resilience must not come just from adequate infrastructure, but also our collective understanding and action.

The crisis also pushed us to do or try new things, and catalysed transformations that would have taken us years to accomplish previously. One aspect is preventive care. We became more conscious of hygiene, safe distancing and infection control; learnt to self-test, self-isolate and get ourselves routinely inoculated against the virus to stay safe.

Our GPs stepped up to become the first line of care, which paved the way for Healthier SG to be established as a major shift towards preventive health with primary care at the forefront.

The crisis also precipitated many other changes to strengthen our healthcare system for future pandemics, such as the setting up of a Communicable Diseases Agency and maintaining a permanent crisis operations force. Singapore may be at ease now, but we remain vigilant and stand ready to deal with future challenges.

This book pays special tribute to workers in healthcare who continue to provide tireless care to keep Singaporeans well and healthy. We remember the sacrifices of many who braved the fight where the battle was the fiercest at the frontlines.

I like to extend my heartfelt thanks to our healthcare workers for your invaluable contributions. I hope you will draw lasting inspiration from this book.

MR ONG YE KUNG
MINISTER FOR HEALTH,
CO-CHAIR OF THE MULTI-MINISTRY TASKFORCE

THANK YOU

WE ARE STRONGER TOGETHER

PHOTOS: SHUTTERSTOCK.COM/NATNAN SRISUWAN; SHUTTERSTOCK.COM/BOYLOSO

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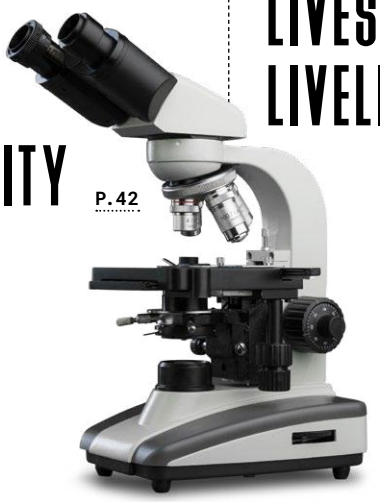


CONTAIN

COMBAT

CHANGE

COMMUNITY

To fight an enemy,
it was critical to understand it first.

CONF

THE EMERGENCE OF A NEW VIRUS SPARKED OFF WAVES OF PANIC AND FEAR IN SINGAPORE.
LONG QUEUES FORMED AT MUSTAFA CENTRE ON FEB 8, 2020, AS PEOPLE RUSHED TO STOCK UP ON PROTECTIVE MASKS.

PHOTO: GETTY IMAGES/SUHAIMI ABDULLAH

FRONT

But in the early days of January 2020,
not much was known about the mysterious virus –

which did not even have an official name then.

CHAPTER 1

A NEW THREAT

RENDERING: SARS-COV-2 & H1N1 VIRUS: FIRDAUS, A*STAR'S BIOINFORMATICS INSTITUTE

EMERGES

AS year-end festivities were in full swing in Singapore and around the world in December 2019, patients with a strange and severe pneumonia started showing up in hospitals in Wuhan, China.

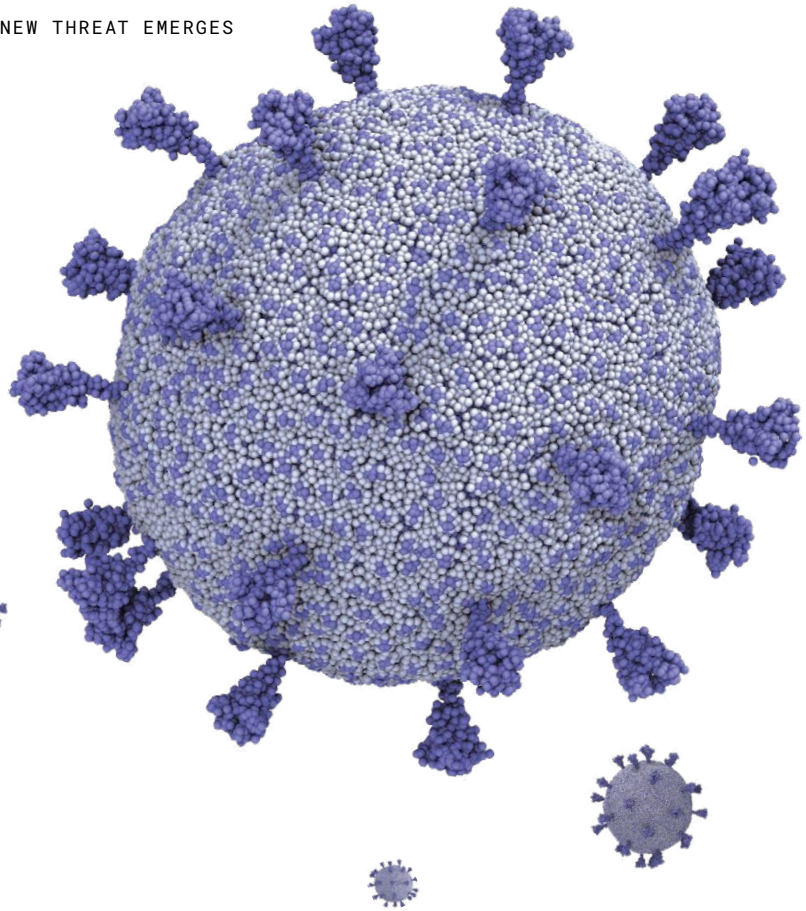
Doctors who first encountered such cases were stumped as to the cause of the atypical virus. After an alert was issued by local health authorities to all hospitals within Wuhan to be on the lookout for similar cases, news of the outbreak quickly spread overseas.

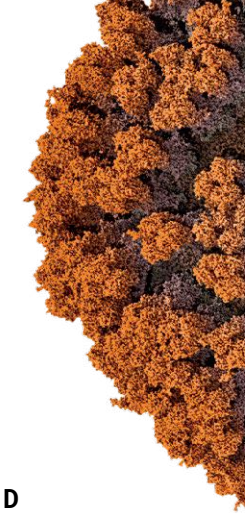
In Singapore, the Ministry of Health (MOH) was keenly following the developments. Little was known about the virus, other than all the patients had recent contact with the Chinese city's Huanan Seafood Wholesale Market.

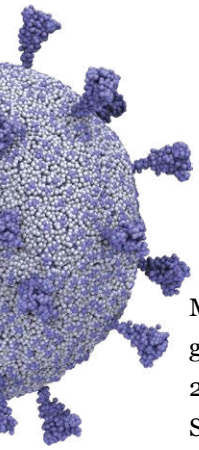
"We started to watch more carefully for further developments, and in countries and regions around China to see whether they were reading the tea leaves, or interpreting the information that was surfacing like what we were doing," said Professor Kenneth Mak, then-incoming Director of Medical Services at MOH*.

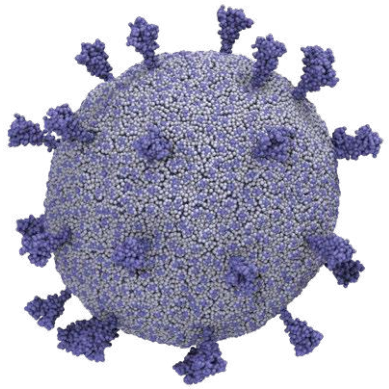
Soon, Hong Kong started border surveillance in late December. It was clear that this was no ordinary outbreak, and MOH sprang into action. When Wuhan authorities shut down the wet market on January 1, 2020, Singapore's Health Ministry had already prepared a report on the outbreak and disseminated it internally.

* WITH EFFECT FROM MAY 1, 2023, THE DIRECTOR OF MEDICAL SERVICES WAS RE-DESIGNATED AS THE DIRECTOR-GENERAL OF HEALTH.









BUT, AS MORE INFORMATION EMERGED FROM CHINA, THE SITUATION SEEMED WORSE THAN SARS.

It was hardly a happy new year for MOH officials who were reading the grim report. The next day, on January 2, a meeting was convened to discuss Singapore's strategy to combat the growing health crisis that would spark global panic and a pandemic that the world had never witnessed before.

PREPARING FOR A SHORT, SHARP WAR

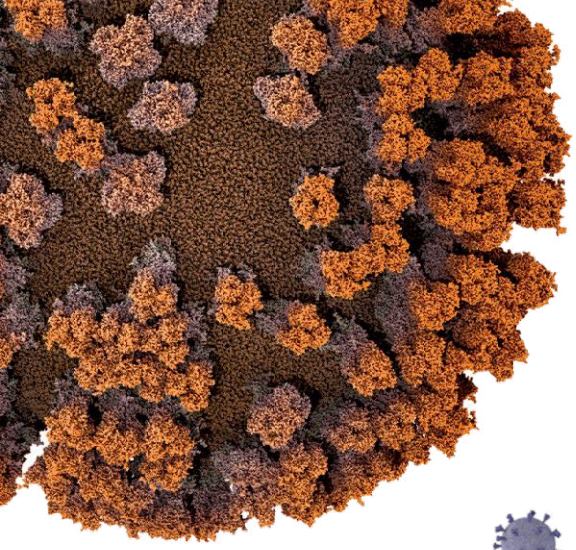
While the Ministry prepared for the worst in the early days, Permanent Secretary for Health Mr Chan Yeng Kit was still hoping for the best. "At that point in time, we were hoping that it would not be very severe, like another H1N1 or bird flu that became a non-event," he shared. "In the worst case, maybe another SARS."

The Severe Acute Respiratory Syndrome, or SARS, struck Singapore in 2003 – infecting 238 people and killing 33. Like SARS, this new virus was also a coronavirus, with a technical name of SARS-CoV-2, and viewed as the second-generation SARS virus.

But, as more information emerged from China, the situation seemed worse than SARS. "We started getting an inkling that this was actually going to be quite serious as the virus had the preconditions to cause a pandemic," noted Permanent Secretary for Health Development Mr Ng How Yue.

"It was quite infectious and in the initial days, the death rates were very high. It was 10 times more deadly than that of normal influenza."

Among the MOH leadership, the thinking was to prepare for a brutal but quick fight against the virus – similar to how SARS was swiftly eradicated from Singapore within three months. No one could have imagined that it would turn out to be a prolonged war over three years – and counting.



"IT WAS 10 TIMES MORE DEADLY THAN THAT OF NORMAL INFLUENZA."

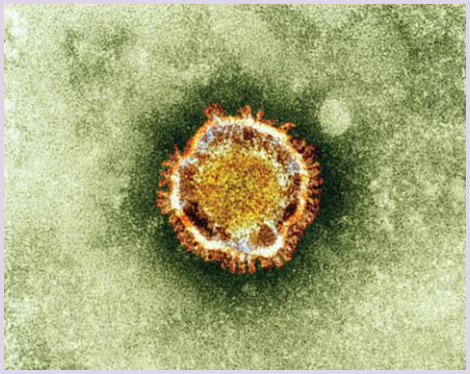
– MR NG HOW YUE, PERMANENT SECRETARY FOR HEALTH DEVELOPMENT

"We were ramping up for a short, sharp war and we were quietly confident that we had the processes and the people in place," explained Mr Chan.

He was referring to the processes of "test, trace and isolate" to stop the spread of the virus, strategies adopted during SARS. New facilities have also since been built to better cope with a health emergency. But a team to lead the charge had to be assembled quickly.

INFECTIOUS DISEASES IN THE LAST TWENTY YEARS

A look at the major infectious diseases that Singapore battled in the last two decades



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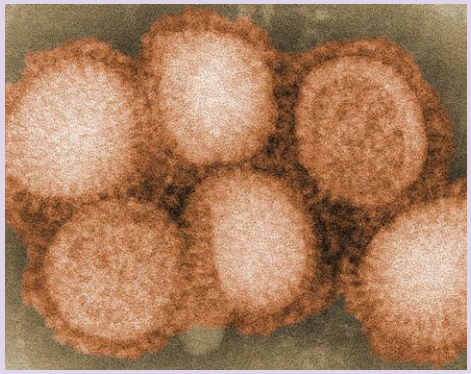


PHOTO: CYBERCOBRA AT ENGLISH WIKIPEDIA LICENSED UNDER CC-BY-SA-3.0

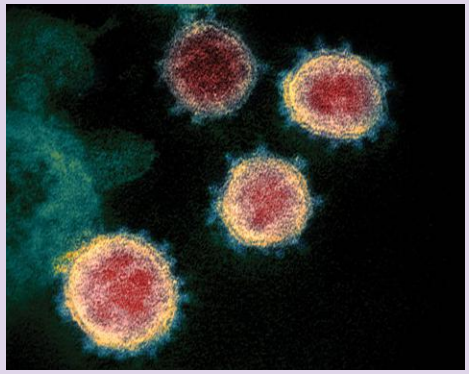


PHOTO: THE NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

SARS
SARS-CoV Virus

MAR 2003 › MAY 2003

238 INFECTED CASES

33 DEATHS REPORTED

SWINE FLU
A/H1N1pdm09 Virus

MAY 2009 › FEB 2010

415,000 INFECTED CASES

18 DEATHS REPORTED

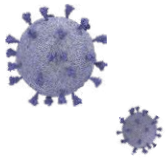
COVID-19
SARS-CoV-2 Virus

JAN 2020 › DEC 2022

2,204,214 INFECTED CASES

1,711 DEATHS REPORTED

Professor Kenneth Mak had planned to ease into his new role as Director of Medical Services. But when COVID-19 hit, he found himself thrust into the hot seat, having to advise the Government on Singapore's strategy to fight the pandemic. He quickly became a familiar face to Singaporeans, appearing alongside ministers at news conferences helmed by the Multi-Ministry Taskforce.



PUTTING TOGETHER A TOP FIGHT SQUAD

For Prof Mak, the speed of this escalating health threat dramatically altered his plan to gradually ease into his new position as Director of Medical Services in the new year. With his predecessor, Professor Benjamin Ong, on leave at the time, he was prematurely pushed into the hot seat of leading Singapore's medical response to the virus.

"Stepping up into a role that I had not been officially appointed to did give rise to some level of anxiety on my part. There's a little bit of beginner's nerves, so to speak," shared the liver and trauma surgeon who received the top national award in 2022 for his COVID-19 contributions.

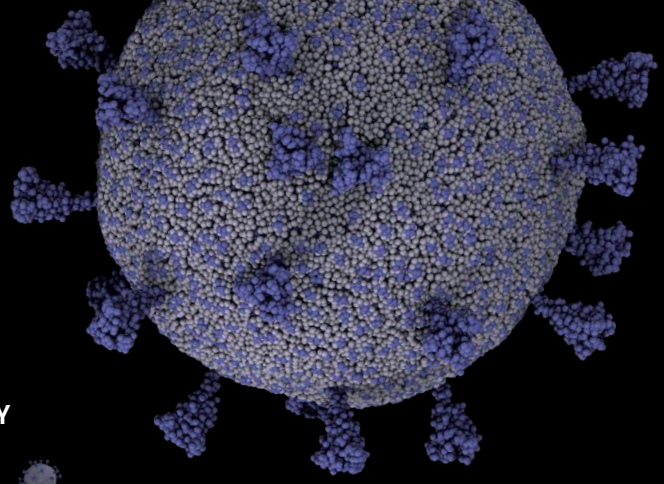
But he quickly steadied himself. Given how porous international borders had become, and the amount of travel between China and Singapore, he knew that it was only a matter of time before the virus reached the city-state.

Singapore was planning a few steps ahead. At that very first meeting on January 2, 2020, the Homefront Crisis Executive Group (HCEG) was activated – essentially triggering a whole-of-government response.

The HCEG comprised principal representatives from all ministries and agencies, and was led by Mr Pang Kin Keong, the Permanent Secretary for the Ministry of Home Affairs. Convening the HCEG signalled the seriousness of the issue, as the norm would have been to establish the Contingency Taskforce that would confine the effort within MOH.

But even the HCEG was not sufficient. Concurrently, the Multi-Ministry Taskforce (MTF) was also set up, bringing together ministers from key agencies to direct the national response to the outbreak and work with the international community to deal with the global health crisis.

Next was planning the counterstrategies.



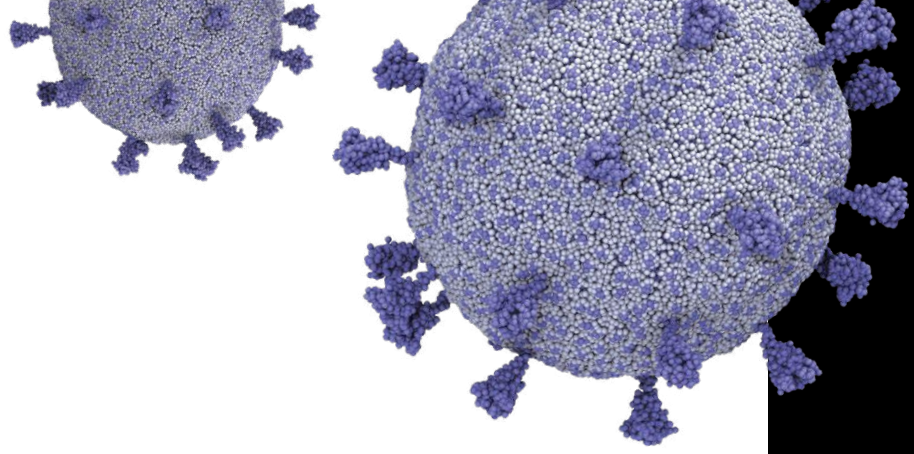
GIVEN HOW POROUS INTERNATIONAL BORDERS HAD BECOME,

PROF MAK KNEW THAT IT WAS ONLY A MATTER OF TIME BEFORE THE VIRUS REACHED THE CITY-STATE.

PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

A Multi-Ministry Taskforce, comprising ministers from diverse ministries, was set up on Jan 22, 2020, to coordinate Singapore's whole-of-government response to the COVID-19 outbreak. The Taskforce, co-chaired by then-Minister for Health **Mr Gan Kim Yong** (third from right) and then-Minister for National Development **Mr Lawrence Wong** (second from right), held its first press conference on Jan 27, 2020.

Among its members were **Mr S Iswaran**, then-Minister for Communications and Information (first from left); **Mr Chan Chun Sing**, then-Minister for Trade and Industry (second from left); and **Mr Ong Ye Kung**, then-Minister for Education (first from right).



KNOWING THE ENEMY

To fight an enemy, it was critical to understand it first. But in the early days of January 2020, not much was known about the mysterious virus – which did not even have an official name then.

At the forefront of unravelling the science of the virus was Professor Tan Chorh Chuan, Chief Health Scientist at MOH. After reading about the outbreak of unusual pneumonia in Wuhan, he quickly contacted his counterparts overseas. His top concern: has there been sustained human-to-human transmission?

The initial evidence had pointed only to animal-to-human transmission, which suggested it would die down quickly. But as the speed of spread in Wuhan became more rapid, he knew that it was wishful thinking. His worst fears of human-to-human transmission were confirmed by China on January 20, 2020.

"I thought what a terrible way to start a new year," said Prof Tan, who saw the urgent need to uncover the characteristics of the virus that would answer key questions such as the incubation period, how it is transmitted, how fast it spreads, and the infection mortality rate.

"Those were the things that you can only ascertain by studying the epidemiology of transmission from actual cases. And that required us to follow the literature very closely, and to also speak to our colleagues overseas who were starting to see more cases."

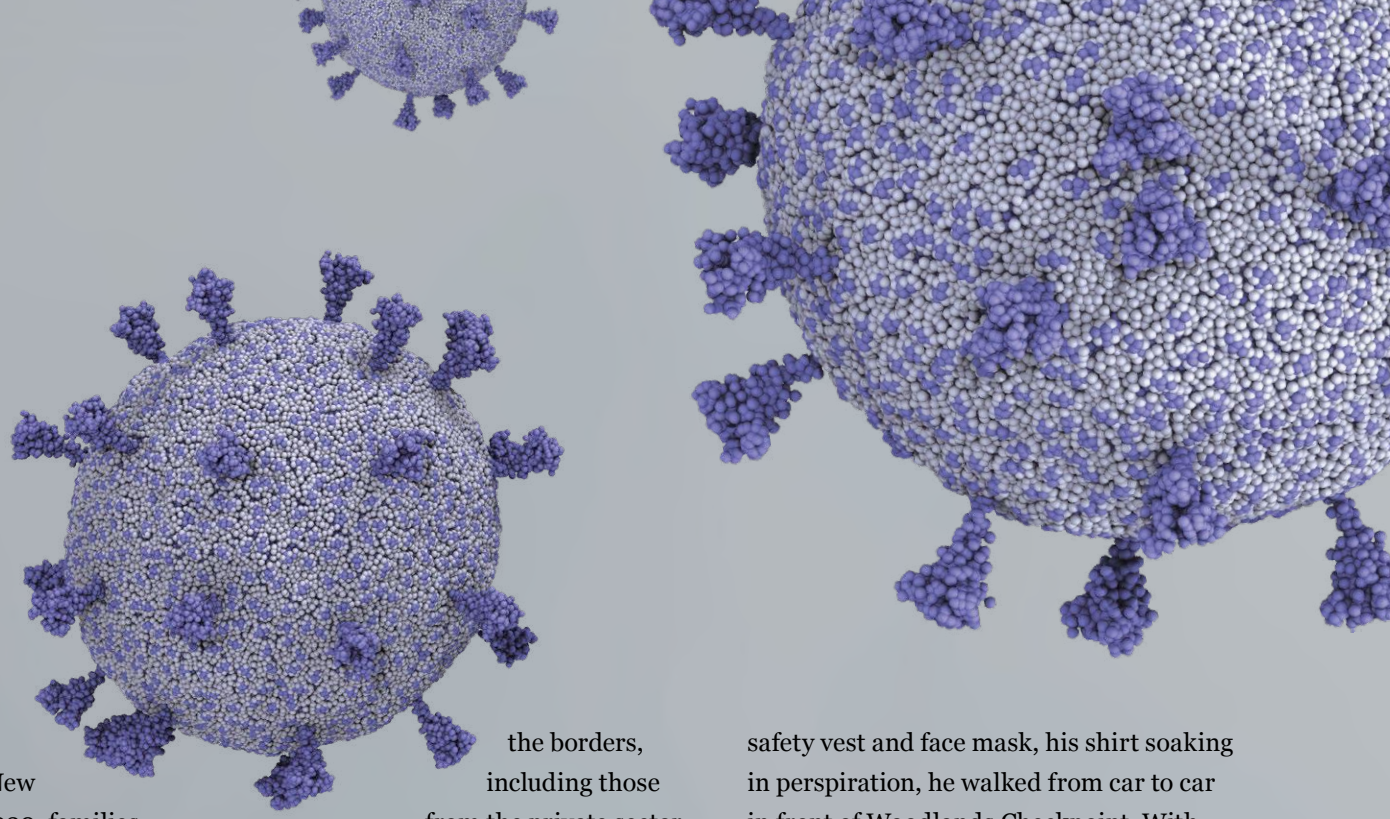
His other priority was to get good diagnostic tests ready, be it searching for options from overseas or supporting the rapid development of new tests locally.

Fortunately, the National Public Health Laboratory had already developed a test kit for the novel coronavirus before it infiltrated Singapore's borders, after Chinese scientists published the genome sequence of the virus on an open-access site in mid-January 2020.

When Singapore diagnosed its first case of the novel coronavirus virus on January 23, 2020 – the same day that the entire city of Wuhan was locked down – the nation was ready to deal with more cases.

PROF TAN'S WORST FEARS OF HUMAN-TO-HUMAN TRANSMISSION WERE CONFIRMED ON JANUARY 20, 2020.

The top question on **Professor Tan Chorh Chuan**'s mind when he heard about the strange pneumonia outbreak in China was whether there had been evidence of sustained human-to-human transmission. The Chief Health Scientist at MOH wasted no time connecting with his counterparts overseas to find out more about the virus and its epidemiology and transmission dynamics.



DEFENDING OUR BORDERS

The next day was Chinese New Year eve. On January 24, 2020, families were gathered for reunion lunches and dinners across Singapore, but there was no sign of festivities across the island's 20 land and sea checkpoints. Everyone was on high alert.

The virus had reached Singapore's shores. It was now time to put in place not just plans and protocols from recent meetings but also from years of preparation for a health emergency that dated back to SARS.

Learning from the battle against SARS, a crucial factor in fighting the virus was detection. This came in the form of temperature screening of travellers entering Singapore, as the assumption was that this novel coronavirus had similar traits to SARS – with infected persons having symptoms such as fever.

A large brigade of healthcare professionals and civil servants were deployed for temperature screening at the borders, including those from the private sector such as Dr Noel Yeo, then-Chief Operating Officer of IHH Healthcare Singapore. He had received a call from MOH just the day before to lead the screening operations at 10 of the checkpoints.

He had to find hundreds of people to man three shifts – a tall order made even more challenging as it was a long public holiday weekend. Most of his Malaysian staff had gone home for the Chinese New Year holidays.

In between dusting off temperature screening equipment and recalibrating thermometers, he and the other business and function heads had to recall staff from clinics closed for the holidays as well as non-clinical staff. "We said to them that everyone has to hunker down, let's get to the task. We have a mission to fulfil," recalled Dr Yeo.

Many answered the call, joining Dr Yeo on the ground. Donning a reflective safety vest and face mask, his shirt soaking in perspiration, he walked from car to car in front of Woodlands Checkpoint. With an infrared thermometer in one hand, he gestured for drivers to wind down their windows. "Do you have a fever?" he would ask, before scanning their foreheads.

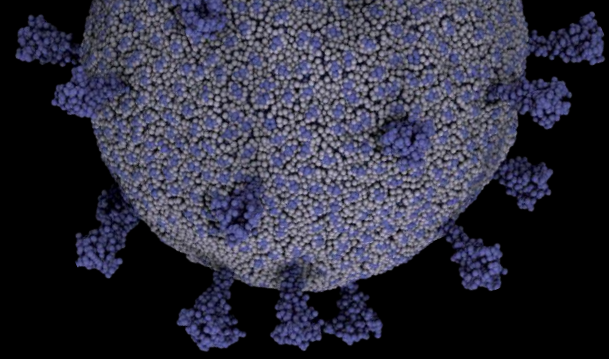
Each shift lasted 12 hours, during which he was mostly on his feet save for two short breaks. If the humid and hot Singapore weather was not energy-sapping enough, the lack of ventilation and the constant smell of vehicle exhaust fumes were sure to give a headache, even to the fittest of people. "If you asked me overall how it felt, I would say it was tougher than being in the outfield," he remarked.

At Singapore's Changi Airport, flights coming from China were being screened too, with "spotters" straining their eyes in search of any red that might appear on their thermal scanners, and "interceptors" keeping an eye out for passengers who might be wearing anything that could affect the scanner's accuracy.

PHOTO: YURI ARCURS PHOTOGRAPHY APS

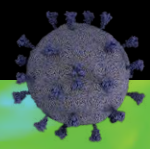
LEARNING FROM THE
BATTLE AGAINST SARS,

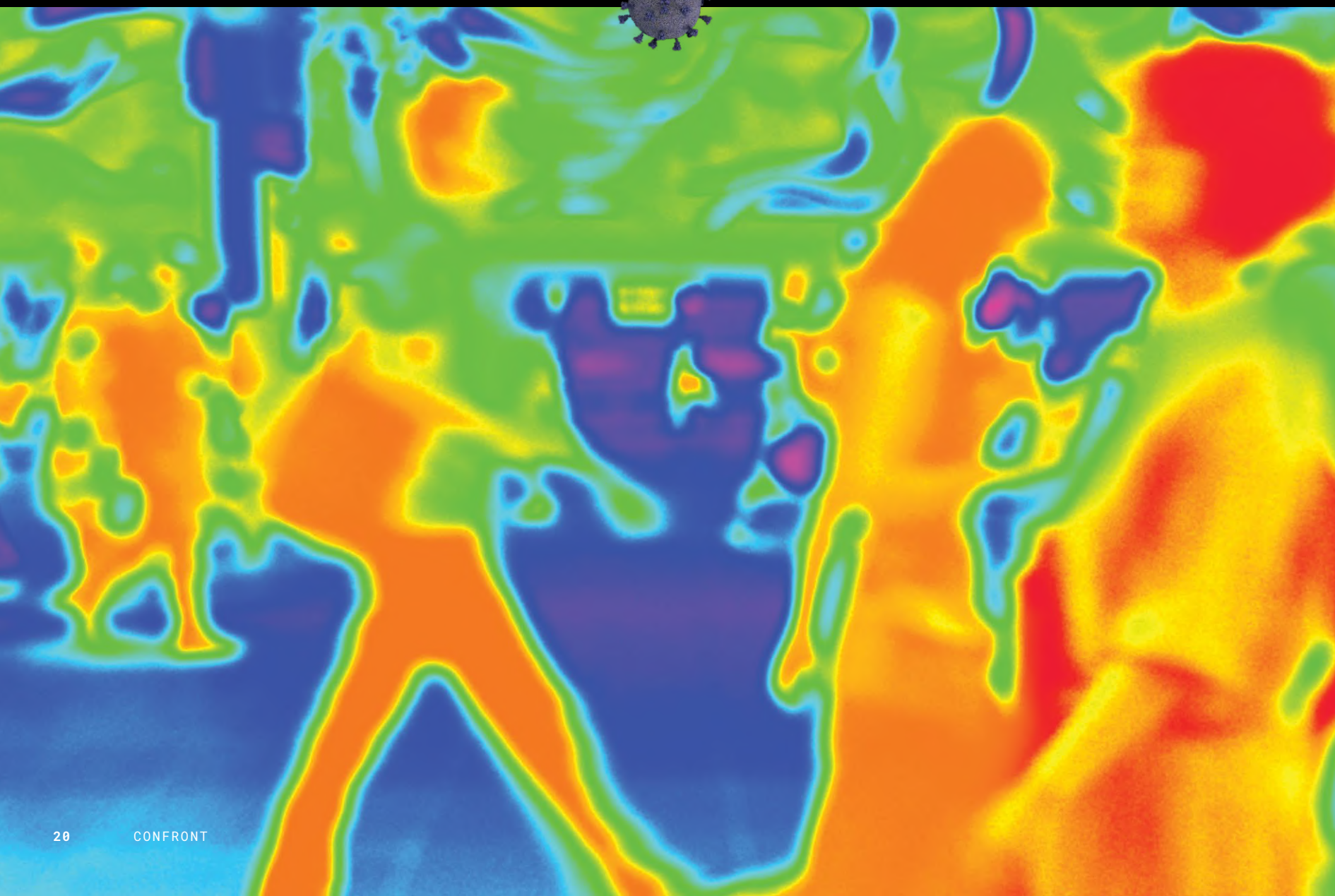
A CRUCIAL FACTOR
IN FIGHTING THE VIRUS
WAS DETECTION.



WHILE TEMPERATURE SCREENING WAS ONGOING, THE VIRUS WAS STILL NOT ON THE MINDS OF MOST –

AND EVEN SEEN AS A DISTANT PROBLEM FOR ANOTHER COUNTRY TO DEAL WITH.





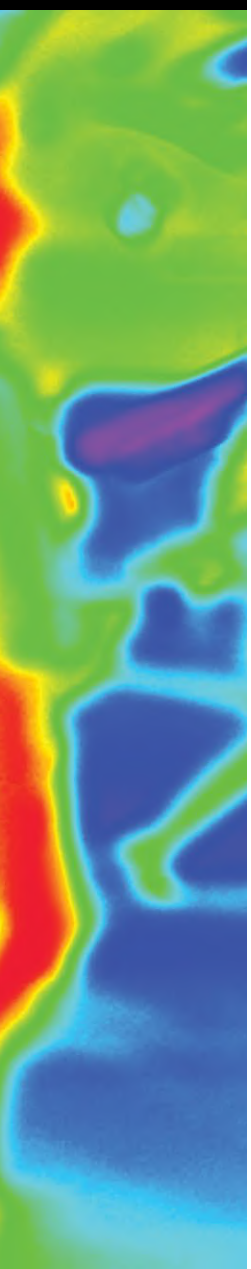


PHOTO: STOCK.ADOBE.COM/MODERNGOLF1984

GOING ON THE OFFENSIVE

While temperature screening was ongoing, the virus was still not on the minds of most – and even seen as a distant problem for another country to deal with. People were still travelling widely, and making plans for future trips.

But earlier health crises had taught the Ministry that it was always better to be overprepared, said Ms Ngiam Siew Ying, former Deputy Secretary for Policy at MOH.

"To overreact rather than to be caught off guard – the thinking on our minds was that it's better to get prepared earlier. And if the virus turned out to be something normal and easy to control, then we could just stand things down," said Ms Ngiam.

But even as the Ministry organised its resources, there were still many unknowns. It was unclear if the virus was airborne or mainly spread through droplets on surfaces. And there were also conflicting reports on the need for masks to prevent spread of the disease.

There was, however, no time to wait. Calculated assumptions, based on past experience with SARS, had to be made to defend Singapore.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Detection formed a key part of Singapore's pandemic response in the early days of COVID-19. In Jan 2020, healthcare workers and civil servants were deployed to Singapore's land, sea and air checkpoints to conduct temperature and health screenings, just as the first case of the novel coronavirus was detected in the city-state.

CARING FOR PATIENT NO. 1

DR BENJY SOH was just about to knock off from a hectic day at the emergency department when he was called over by a nurse. Two new patients had just walked in and the medical officer covering the next shift had not yet arrived.

Re-wearing his N95 mask, a new precaution since news broke of the virus spreading in China, he quickly walked over to meet the new patients.

"The virus was at the back of my mind. It wasn't here yet and we were still hoping it wouldn't hit," recalled Dr Soh, a Medical Officer at the Singapore General Hospital.

It was only when the first patient told him that he had a fever and was a tourist from China that alarm bells started to ring. Pressed further, the patient revealed an even more worrying detail – that he was specifically from the city of Wuhan.

"I thought *siao liao* (this is bad)," he added candidly.

The isolation protocols quickly kicked in. A blood test was taken and the patient was sent for an x-ray and a swab. The Ministry of Health was notified and the infectious disease department called up. Thankfully the second patient, also from China, had no travel history to Wuhan.

Once settled, Dr Soh headed home for a late dinner with his pregnant wife, who was also an emergency department doctor but at Changi General Hospital. Hearing about his day, she lamented that he was very "*suay*" (unlucky). But the drama was just starting.

The next day, January 23, 2020, he was awoken by a string of messages from his department head and colleagues. The patient from Wuhan, later identified as 66-year-old Mr Wang, had tested positive for the novel coronavirus. Dr Soh was asked a multitude of questions, including if he was running a fever or had any flu symptoms.

Over at Ward 68, an isolation ward with 51 beds and negative pressure rooms that prevent contaminated air from escaping, nurses had already been caring for Mr Wang, who had been admitted as a suspect case.

The ward's 80 to 90 nurses, now split into two teams after the hospital confirmed its first case, were all well trained in handling infectious disease patients. They were also kept updated on the international and local virus situation.

Senior Staff Nurse Nur Syaheda Binte Abdul Aziz, who was on duty that day, was not anxious despite the seriousness of the situation. Patient No. 1 was generally recovering well, though his family, especially his son, was extremely worried for his well-being, she recalled.

"We had to allay his fears by assuring him that his father was doing okay. We told him not to worry too much and that we would take good care of him," she said. Mr Wang's son was eventually infected too, becoming "Case 3".

For the senior Mr Wang, his symptoms remained mild. He ran a fever for the first three days and subsequently only had throat discomfort. He was isolated in hospital for 28 days as per the prevailing healthcare protocols.

As for Dr Soh, he was isolated for 14 days in total at the hospital as a precaution and at home when his tests came back negative.

Meanwhile, healthcare workers started to take extra precautions to keep their families safe. Ms Syaheda made the decision to live apart from her young daughters, then aged three and four, for a month, in order to protect them from getting infected.

"THE VIRUS WAS AT THE BACK OF MY MIND. IT WASN'T HERE YET AND WE WERE STILL HOPING IT WOULDN'T HIT."

– DR BENJY SOH,
MEDICAL OFFICER AT THE
SINGAPORE GENERAL HOSPITAL

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Medical staff in full protective gear transferring a suspected COVID-19 patient from the Singapore General Hospital (SGH) to the National Heart Centre for an emergency scan.

The hospital treated the country's first confirmed COVID-19 patient on Jan 20, 2020. Since then, frontline staff have been hard at work treating patients with respiratory infections.

"I OFTEN WONDER WHETHER I'M A JINX"

Mr Chan Yeng Kit, Permanent Secretary for Health, joined the Ministry of Health on Dec 2, 2019 – just weeks before the first COVID-19 case was discovered in Singapore.

JUST BEFORE he was posted to the Ministry of Health (MOH), Permanent Secretary for Health Mr Chan Yeng Kit had a meeting with then-Minister for Health Mr Gan Kim Yong, which foreshadowed the battle that he would come to lead.

"He was telling me to expect that I would have to handle, from time to time, viruses, germs, diseases, etc. But never did I imagine that we would encounter what the Prime Minister called the crisis of our generation," said Mr Chan.

His first day at MOH, on December 2, 2019, was actually his birthday – but his present was far from pleasant. He would run right smack into the COVID-19 pandemic.

It was his 12th posting in the civil service and the veteran leader was familiar with having to learn the ropes again. He was starting to learn technical healthcare terms, acronyms of the different health policies and initiatives, and getting to know the different teams when news reports of a novel coronavirus in Wuhan, China, began to circulate at the end of the month.

"I often wonder whether I'm a jinx or I brought the jinx over here," said Mr Chan, with a weary laugh.

At his previous posting at MINDEF, he had to deal with multiple training deaths, the seizure of nine Terrex armoured vehicles by Hong Kong customs, and a territorial spat with Malaysia over the waters off Tuas. Some of his friends even asked him if he was unlucky.

"But I've told my colleagues and MOH staff at town halls that as a public officer, you would want to be where the crisis is, at least once in your lifetime, and play a part in it," he said. "So, in a way, I guess I have had the privilege of being in the centre of the storm."

This viral storm, however, seemed never-ending – causing many to lose confidence, especially those on the healthcare frontlines. Seeing this long COVID-19 journey as similar to route marches that National Service recruits do, Mr Chan said: "You really don't know where the end point is. You just keep walking and walking."

What kept many of the soldiers going was to scan the horizon for possible milestones to reach – a hill, an empty field or a building. "At least you know that you have moved forward, and are not moving backwards," he shared. "The most worrying thing is that people lose not just confidence and trust, but hope."

But it did not happen. "I'm very appreciative that we didn't have people quitting on us in droves. Our doctors and nurses did not abandon the hospitals, our healthcare leadership and those involved in planning and coordination also never gave up. We even had a lot of volunteers from other ministries who came to help," he said.

PHOTO: NATIONAL CENTRE FOR INFECTIOUS DISEASES

Following the Severe Acute Respiratory Syndrome (SARS) in Singapore, plans were made to set up a specialised infectious diseases facility to strengthen the country's ability to manage future pandemics.

The National Centre for Infectious Diseases officially opened on Sep 7, 2019, just months before COVID-19 engulfed the world.

A PANDEMIC PLAYBOOK – 17 YEARS IN THE MAKING

THE COVID-19 BATTLE may have begun in 2020, but Singapore started preparing for it 17 years ago when another coronavirus wreaked havoc here – the Severe Acute Respiratory Syndrome, better known as SARS.

In 2003, SARS brought three months of fear when it struck, shutting schools, closing one of Singapore's busiest hospitals, Tan Tock Seng Hospital (TTSH), costing the economy close to $1 billion, and killing 33 people here.

Even after the World Health Organization declared the country SARS-free, the Ministry of Health was acutely aware of the vulnerabilities in its system that the virus had exposed, and knew that it had to plug the gaps before the next pandemic occurred.

Plans were made to upgrade the Communicable Disease Centre at TTSH into the National Centre for Infectious Diseases (NCID) that officially opened on September 7, 2019.

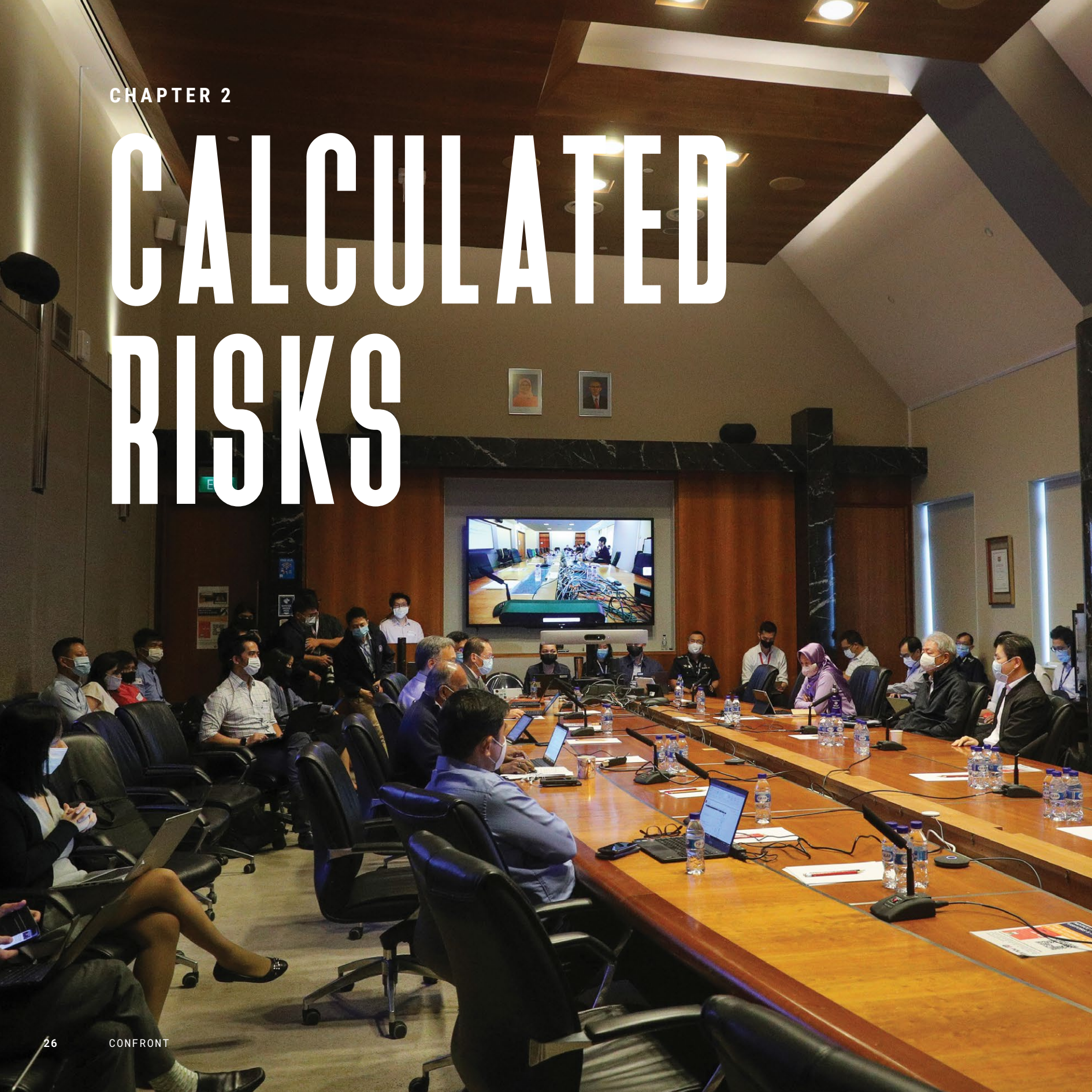
The 330-bed purpose-built facility would have new functional units including the National Public Health and Epidemiology Unit, the National Public Health Laboratory, the Infectious Disease Research and Training Office, the Antimicrobial Resistance Coordinating Office, and the National Public Health programmes for HIV and Tuberculosis.

Table-top exercises were regularly held following SARS, where healthcare organisations discussed their roles and responsibilities should a health crisis happen again. A response system was also developed, which when activated during a pandemic, would set off a chain of command.

When the COVID-19 pandemic struck, it was these years of training, knowledge building and preparation that allowed Singapore to spring into action early.

CHAPTER 2

CALCULATED RISKS



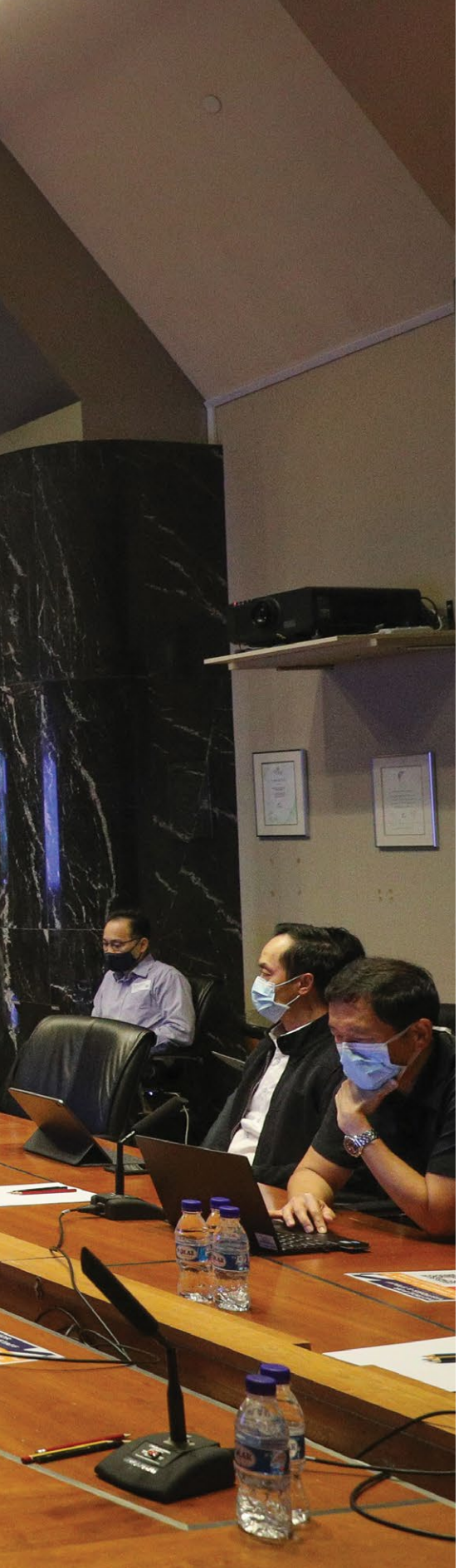


PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

The Multi-Ministry Taskforce meets to discuss Singapore's response to COVID-19 on Jan 7, 2021. Such meetings were held regularly throughout the pandemic, as Singapore learnt more about the virus and had to adapt its strategy accordingly.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Customers queue to buy face masks at Mustafa Centre on Jan 28, 2020. The pandemic set off a panic buying spree among Singaporeans. Each time a batch of masks were put up for sale at retail outlets, they would be snapped up in just a few hours.

SNAKING queues formed outside pharmacy chains in Singapore, and shelves were emptied of masks, hand sanitisers and thermometers. Soon, some retailers even tried to profit from the fear of short supplies by jacking up the prices of masks.

These scenes unfolded in the last days of January 2020, even as the Ministry of Health (MOH) assured the public that there were more than enough masks to go around should there be a surge in demand. Then-Senior Minister of State for Health Dr Lam Pin Min also posted on Facebook about his visit to a warehouse containing some of the country's stockpile, assuring the public that Singapore had sufficient supply of masks.

THE QUESTION ON MOST PEOPLE'S MINDS WAS WHETHER IT WAS TRULY NECESSARY TO WEAR A MASK.

PHOTO: STOCK.ADOBE.COM/TOA555

Amid the rush for masks and other supplies, there was also confusion. The question on most people's minds was whether it was truly necessary to wear a mask. But no one had a definite answer then.

"This was a novel infection at that point in time. We didn't understand what kind of virus it was at the beginning, how it was spread – by airborne transmission, or in some other way?" noted MOH's Director of Medical Services Professor Kenneth Mak.

"And therefore, you have to work out the rules as you go along. This was really starting from a blank page."

To fill in the blanks, the Ministry knew that it had to lean heavily on early assumptions about how the virus behaved while it waited for clinical data from treating the first cases here. Meanwhile, they turned to the Severe Acute Respiratory Syndrome (SARS) playbook for strategies to deal with the current outbreak.

LIKE CLOCKWORK, CONTACT TRACERS WOULD GET CRACKING THE MOMENT NEW CASES WERE CONFIRMED.

GOING FOR ZERO TRANSMISSIONS

If people infected with the novel coronavirus all exhibited symptoms, then there was a high chance the spread could be ring-fenced, just like SARS in 2003, thought policymakers and infectious disease experts.

This was exactly how SARS was wiped out from this island within three months in 2003, and why contact tracing kicked into gear immediately after the first imported case of the novel coronavirus was detected.

Like clockwork, contact tracers would get cracking the moment new cases were confirmed. They would call patients within an hour, asking them a series of questions to map out their movements in the days before they were tested positive.

Under incredible time pressure, contact tracers would collect as many details as they could about a patient's history and submit the information to MOH within about two hours of diagnosis.

It was a strategy that made sense. Due to Singapore's small and compact nature, cases could be identified quickly and close contacts effectively isolated.

"In most cases, for example with MERS or H1N1, by and large the strategy has been to eradicate. So we adopted the same strategy for COVID-19. We assumed that it was the right way to go, but on the basis of insufficient information. That was the playbook," shared Permanent Secretary for Health Mr Chan Yeng Kit.

Contact tracers would call patients within an hour to interview them, before mapping out their movements in the days before they tested positive for COVID-19. This strategy came from the SARS playbook, as it had successfully identified contagious individuals in the past.

WHILE A STOCKPILE OF MEDICAL SUPPLIES WAS CREATED FOR THE HEALTHCARE SECTOR FOLLOWING THE SARS PANDEMIC, STOCKPILING FOR AN ENTIRE NATION IS VERY DIFFERENT.

MASKS FOR FRONTLINERS FIRST

As more and more cases started sprouting outside of China, countries began to focus on protecting their own residents. On January 27, 2020, Taiwan became the first to limit its export of medical masks, announcing a one-month ban to prioritise the needs of its people.

It was an early sign that supply chains might soon be disrupted, potentially leading to a shortage of masks. While Singapore had a stockpile of masks, it later dawned on the Ministry that it could be insufficient as this was not going to be a short fight.

MOH could not risk a repeat of what happened during SARS. Recounting the situation among healthcare workers back then, Permanent Secretary for Health Development Mr Ng How Yue said: "They were putting their used N95 masks into clean zipper bags, and then reusing it."

While a stockpile of medical supplies, including masks, was created for the healthcare sector following the SARS pandemic, stockpiling for an entire nation is very different. Assuming that each resident uses just one mask a day, the country would need more than 170 million masks just to last a month.

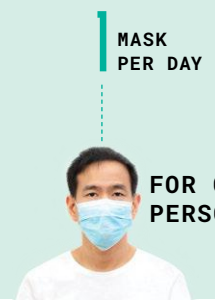
As mask orders started getting cancelled, and with evidence pointing to transmission through droplets and surfaces, the Ministry made a decision to prioritise the needs of healthcare workers as well as other frontline workers, including temperature screeners, who were at higher risks of exposure to the virus.

The protective equipment was critical in the care for patients and to keep up the fight against the virus. It was also important to ensure that healthcare workers did not become conduits of the virus.

"For this reason, we decided to reserve surgical masks and N95 masks for medical use. And when the global supply chains and manufacturing capabilities resumed, we were able to acquire more masks which allowed us to avail them to members of the public as well," said Mr Ng.

PRIORITISING THE PROTECTION OF FRONTLINE WORKERS

If Singapore were to stock up masks for the whole country, it would need more than 170 million masks each month, assuming that each person used one mask a day. The sheer figure made it unrealistic for the Ministry of Health to stockpile masks for residents. It decided to prioritise the needs of frontline and healthcare workers and reserve masks for them, as they were at higher risks of exposure to COVID-19 due to the nature of their jobs.

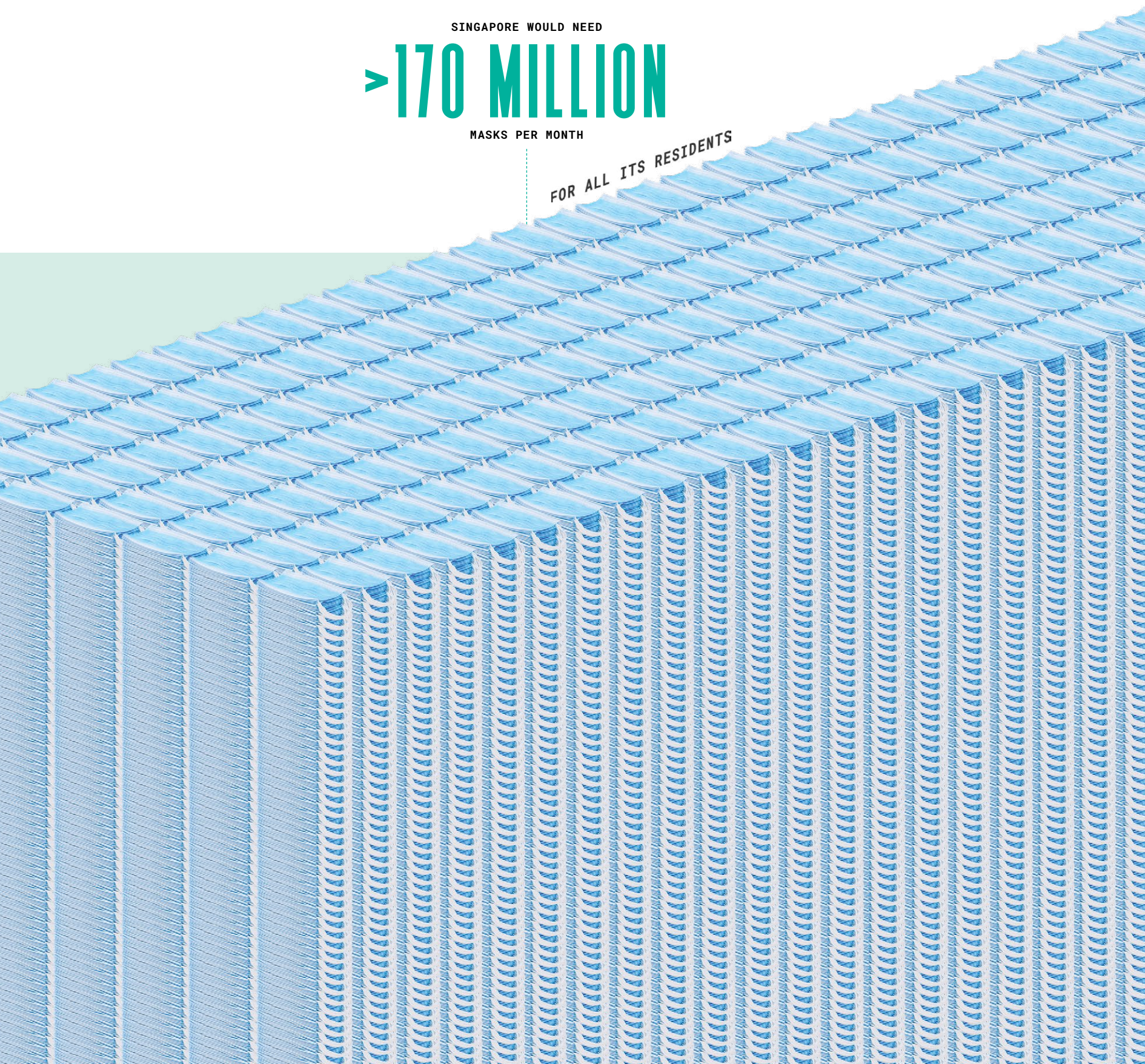


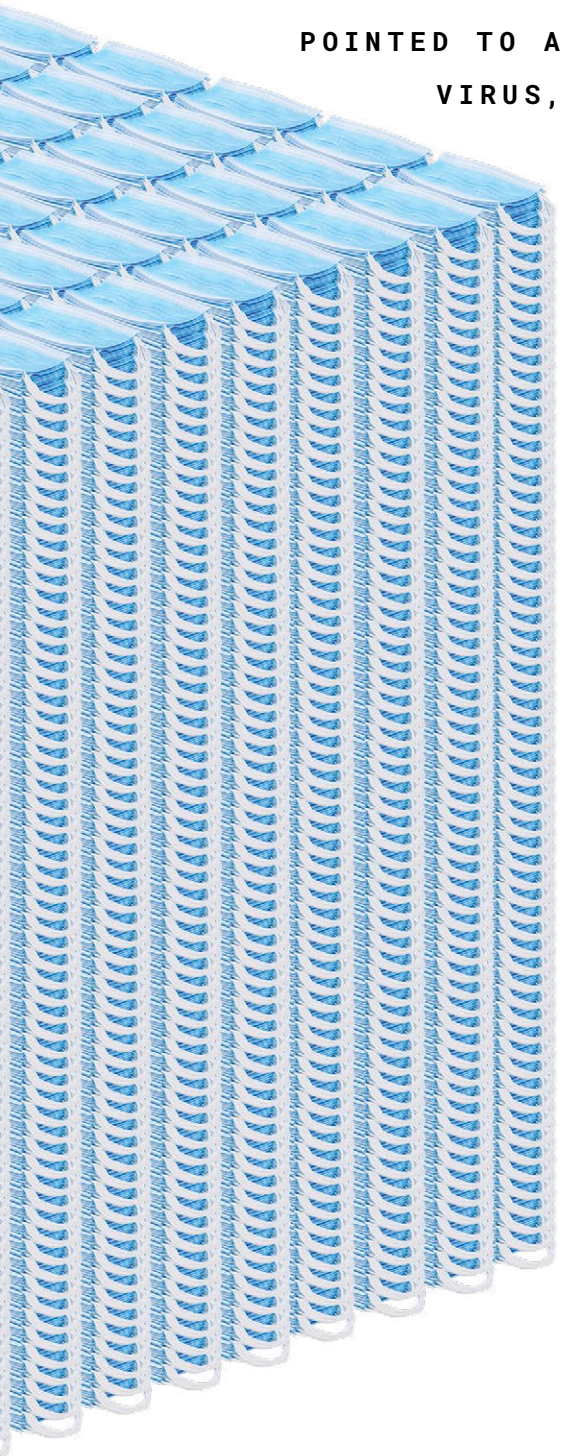
SINGAPORE WOULD NEED

>170 MILLION

MASKS PER MONTH

FOR ALL ITS RESIDENTS





> A warehouse where masks and personal protective equipment are stocked in Singapore.

AS SCIENTIFIC EVIDENCE INCREASINGLY POINTED TO ASYMPTOMATIC CARRIERS OF THE VIRUS, THE GUIDELINES TURNED FROM "WEAR A MASK ONLY WHEN YOU ARE UNWELL" TO "EVERYONE SHOULD WEAR A MASK" IN APRIL 2020.

A mask mandate eventually came into force on April 14, 2020, a week after Singapore imposed a circuit breaker to curb the spread of the virus. Till today, however, the Ministry's guidance on mask usage is often pinpointed by the public as an area where it made a "U-turn".

Explaining the decision not to mandate mask-wearing in the early days, Mr Chan shared that the general consensus from global counterparts then was that the virus likely spread through droplets. It meant that maintaining good personal hygiene such as frequent washing of hands would be sufficient to keep the virus at bay.

In March 2020, the World Health Organization (WHO) had recommended mask-wearing only for people who are sick, or those who are caring for them.

This was further reinforced by the SARS experience, where temperature screening and contact tracing successfully identified contagious people. "If you could pick out people who had symptoms, then they should be the ones wearing the masks, and everyone else did not need to wear a mask," added Professor Mak.

But as scientific evidence increasingly pointed to asymptomatic carriers of the virus, the guidelines turned from "wear a mask only when you are unwell" to "everyone should wear a mask" in April 2020. The WHO also updated its position at about the same time, and began advising people to wear a mask when they were out.

Prime Minister Mr Lee Hsien Loong explained in a national address on April 3, 2020: "We now think there are some cases out there in the community going undetected, though probably still not that many. We also now have evidence that an infected person can show no symptoms, and yet still pass on the virus to others... Therefore we will no longer discourage people from wearing masks."

It was yet another sign that Singapore's understanding of the virus was still growing, and strategies should evolve accordingly.


V40
V41
V42
QC CHECKING STATION

PHOTO: BENJAMIN ONG

As early as February 2020, scientists in Singapore were already tracking the different vaccines in the works. One of them was **Professor Benjamin Ong**, then the outgoing Director of Medical Services at the Ministry of Health. He would go on to chain an expert committee to advise the Government on the country's vaccination strategy, assess vaccine candidates and recommend appropriate vaccines for use here.

PLACING BETS ON VACCINES

Some 10 months before the first batch of Pfizer-BioNTech vaccines landed in Singapore, scientists here were already tracking the vaccines that were receiving funding from scientific bodies.

This was in February 2020, the same month that the disease caused by the novel coronavirus finally got its name – dubbed COVID-19 by the WHO.

Looking back at SARS, it took 20 months for a SARS vaccine to be ready for human trials, and by then the outbreak was long over. A COVID-19 vaccine within the year sounded near impossible. Yet scientists here had their eyes on several vaccine platforms.

First, those using inactivated virus. Second, vaccines that stimulate an immune response to a protein of the virus. Third, the ones developed using the pathogen's genetic code – also known as mRNA vaccines.

"These are all the technologies that could potentially create a COVID-19 vaccine. And we placed bets on all platforms," said the Ministry's outgoing Director of Medical Services Professor Benjamin Ong at the time.

How did they know which vaccines to focus on? The simple answer by Prof Ong was that data does not lie.

"You can see the data, you can interrogate the data, you can criticise the data, then you anchor on fewer and fewer vaccine options from a large number. So the better the data that emerges, the more confident you are that it has been safely evaluated and comprehensively tested," he said.

This was another area where the Ministry took a calculated risk –

by choosing vaccination as a key strategy to exit the pandemic. Committees were set up to procure and evaluate vaccines, and manpower devoted to the tasks.

Eventually, the Government would sign advance purchase agreements with Pfizer-BioNTech, Moderna and Sinovac to guarantee the country's access to these top vaccine candidates ahead of time.

"We were prepared to pay a deposit for the vaccines. And the deposit is non-refundable. If the vaccines turn out to be unviable and you don't buy them eventually, too bad, you will lose the deposit and this money is substantial. But the bet paid off: we were among the first in the world to get very effective vaccines by December 2020," said Mr Chan.

As policymakers and scientists continued to put their heads together to strengthen the country's defences against COVID-19, flights were taking off at Changi Airport to evacuate Singaporeans stuck beyond our shores, some of whom were still in the epicentre of the pandemic.

TYPES OF VACCINE TECHNOLOGIES

1

INACTIVATED VIRUS

These vaccines are treated with heat, chemicals or radiation to inactivate the virus and prevent it from replicating, but still allow an immune response to be triggered. Examples include vaccines for influenza and the Sinovac COVID-19 vaccine.

2

PROTEIN SUBUNIT VACCINES

These vaccines contain pieces of viral proteins rather than the entire germ, to show the immune system what coronavirus proteins look like and teach it to create antibodies. Examples include vaccines for shingles and the Novavax COVID-19 vaccine.

3

MRNA VACCINES

These vaccines based on mRNA, or messenger ribonucleic acid, carry snippets of the viral genetic code and teach cells to make spike proteins that provoke an immune response without actual exposure to the virus. Examples include the Pfizer-BioNTech and Moderna COVID-19 vaccines.

174 SINGAPOREANS FINALLY HAD THEIR FEET ON HOME SOIL AFTER WHAT HAD BEEN A HARROWING FEW WEEKS.

PHOTO: STOCK.ADOBE.COM/JCM

PHOTO: POH YU KHING

Staff members from Conrad Centennial Singapore, one of the hotels involved in the Government's quarantine plans, masked up and decked out in full personal protective equipment (PPE) as they volunteered to serve returning Singaporeans directly.

BRINGING SINGAPOREANS BACK HOME

Standing in line to get their temperature taken and screened for respiratory symptoms, some still in winter coats – 174 Singaporeans finally had their feet on home soil after what had been a harrowing few weeks.

They were arriving from Wuhan, the city that had been locked down by the Chinese government just over two weeks ago to curb the spread of the virus.

The passengers were on the second evacuation flight out of Wuhan, which landed at Changi Airport on February 9, 2020 – a joint operation between the Ministry of Foreign Affairs, Ministry of Transport and Scoot. The first evacuation flight, carrying 92 Singaporeans, landed on January 30, 2020.

Escorting them back was qualified paramedic, Ms Emiliah Bte Hamzah, who had volunteered for the mission. The manager from Raffles Medical, together with fellow colleague Dr Pang Ah San, had flown over from Singapore earlier in the day.

They brought along medical supplies including IV drips and resuscitation equipment, ready to intervene should there be a medical emergency. Thankfully, no one required aid apart from a family that had gotten into a car accident en route to the airport, and was treated for minor abrasions.

Having worked as a paramedic during the SARS pandemic, Ms Emiliah stepped up to the task despite the fear and uncertainty surrounding the virus at the time. She felt it was the right thing to do. "I just felt happy, because I was bringing families back home," she said.

The move to evacuate Singaporeans from Wuhan was described as "one of the high points" for the Singapore government. "We showed that we don't leave people behind," said Mr Chan.

While some countries were barring their citizens from returning, doing the same to Singaporeans was never an option, even though it meant potentially flying the virus here.

"As a Government, we went into this knowing that there will be leakage of the virus to the community, but it is important

Ms Ngiam Siew Ying, who was then the Deputy Secretary for Policy at the Ministry of Health, was tasked to draw out quarantine plans for the Singaporeans who had been flown back from China on the two evacuation flights.

PHOTO: NGIAM SIEW YING

that our people can come back and we look after them," added Mr Chan.

But bringing citizens home safely was not yet mission accomplished. What happens when they get back?

A whole-of-government effort was stood up to organise the quarantine plans. Agencies liaised with hotels to prepare rooms for the returning Singaporeans to stay in, organise transport there as well as arrange for subsequent swab tests.

AGENCIES LIAISED WITH HOTELS TO PREPARE ROOMS FOR THE RETURNING SINGAPOREANS TO STAY IN, ORGANISE TRANSPORT THERE AS WELL AS ARRANGE FOR SUBSEQUENT SWAB TESTS.

"There were so many permutations and combinations for how long the quarantine should be; when do we test them; what tests do we use and so on. We really had to figure that out on the fly and try to use the data that we had to organise it," MOH's former Deputy Secretary for Policy Ms Ngiam Siew Ying shared.

Taking guidance from public health experts, the team decided on a 14-day quarantine for the returning Singaporeans since that was the typical incubation period for flu viruses.

For Ms Ngiam, her main consideration was to balance personal comfort, such as how long they had to stay isolated from others, and public health. "So you don't want to hold them for longer, or impose more restrictions than you need on them," she said.

The experience also highlighted to her how the Singapore government made its decisions and what its priorities were. The Government is often criticised for prioritising economic growth over society, she said, adding that civil servants were constantly reminded that keeping Singapore open as a business hub was key to economic development.

"But the border controls and evacuation efforts were clear evidence that the key decision makers really prioritise Singapore and Singaporeans. Not the economy, not having a shiny city. But really, if Singaporeans needed something to be done, though it would impact economic growth, they were willing to do so," she said.

"So I salute the people who were willing to make that difficult call, and it really shows the heart of the decision makers at the end of the day."

"WE COULD SEE IT ON THEIR FACES – RELIEF"

AS THE RETURNING SINGAPOREANS touched down on home soil, the fear and anxiety dissipated.

"Our reward is seeing the relief on the faces of Singaporeans and their families, the assurance that no matter what happens, Singapore is always there for our people," said Mr Ng Hock Sing, Director of Emergency Preparedness & Response Division (EPRD) at MOH.

He and his emergency response and operations team at MOH were given just 48 hours or less to prepare for the safe return of Singaporeans trapped in Wuhan. Health declaration forms had to be printed out, screening stations set up, quarantine accommodations booked, and transportation arranged.

The team was no novice – they had been activated to deal with other unexpected health situations before, such as a tourist case of mpox here in 2019. They had also conducted "worksite sweeps" of places where suspected COVID-19 cases were detected.

But even then, they could not handle the evacuation on their own – the first flight would carry 92 Singaporeans and 174 on the second flight, all highly anxious about their health and situation. Thankfully, they could count on their close partners for support, such as the Health Promotion Board and Certis Cisco. In total, the operation involved over a hundred people.

"We had gotten into a rhythm then of quick planning and execution in which the various agencies and bodies roughly knew their roles. They would say 'okay, you need us to be deployed, when? In 24 hours' time, sure, where? How large of a force do you need us to be?' That sort of cooperation was very useful," said Mr Ng.

Planning was vital. Leading the team was Mr Colin Chiok, Deputy Director of Operations Readiness & Control at MOH's EPRD, whose responsibilities went right down to deciding how to manage the luggage. If an individual were found to be positive, his or her luggage would have to be disinfected before being transported.

The most sought-after piece of information during that time was a name list of all the passengers. "I told the Ministry of Foreign Affairs, regardless of how many hours in advance you give me, even two hours, it would be good. It would allow me to organise better," he said. And this was how the team managed to pre-fill personal details into the Quarantine Order as well as pre-allocate rooms at the quarantine facilities.

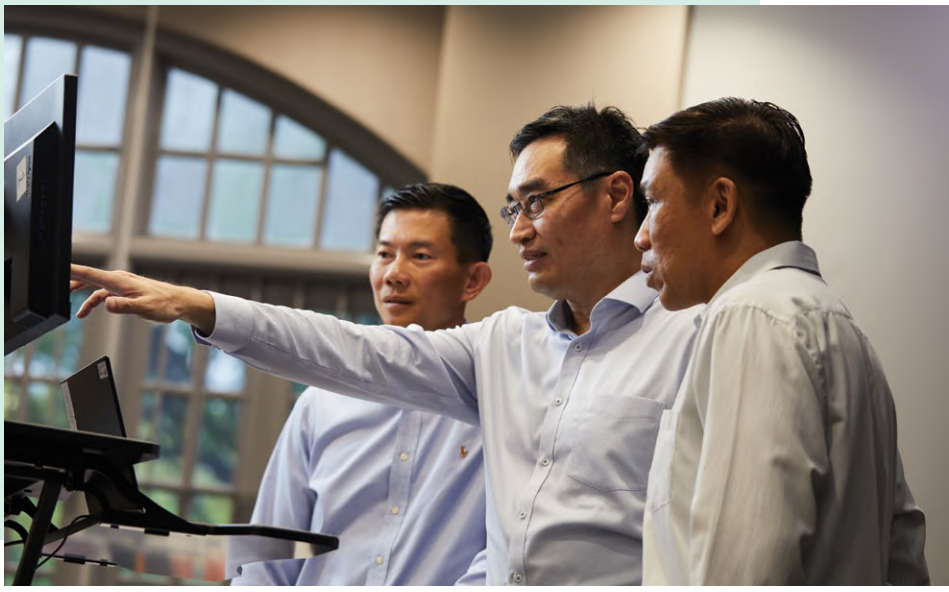
Passengers with fever were sent to a hospital to take a COVID-19 Polymerase Chain Reaction (PCR) test, while those without symptoms were quarantined for 14 days during which they had to check their temperature twice a day.

But as with all emergency operations, some things were beyond the team's control. The second evacuation flight out of Wuhan, for instance, was delayed by eight hours, shared Mr Mark Tan from MOH's Crisis Strategy and Operations Group. There were also times when the team had to adapt on the spot.

He recalled how one of the passengers was a father who was travelling with three young kids in tow, one still a baby. "There were instances where people like us, seeing to the ground operations, had to help them carry their children," said Mr Tan.

There was no clear demarcation of roles. Everyone double-hatted or even triple-hatted, doing what they could for the comfort and well-being of Singaporeans, which the team found both meaningful and rewarding.

From left: **Mr Colin Chiok, Mr Ng Hock Sing** of the Emergency Preparedness & Response Division at the Ministry of Health; and **Mr Mark Tan** from the Ministry's Crisis Strategy and Operations Group. The trio were tasked to organise the evacuation efforts of the Singaporeans trapped in Wuhan and ensure their safe return, all in 48 hours.




DEPARTU
TIME TO FLIGHT CHECK - IN ROWS REMARKS BOARDING
16 20 BALI - DENPAS SQ942 GA9071 03
VA5614 UK8942 MI5832 SK8015 03
13 25 TIRUCHIRAPPAL IX681 08 CANCELLED / ASX AIRLINE
13 40 KUALA LUMPUR MH606 EY2785 05 CANCELLED / ASX AIRLINE
SQ5606 FY7324 MI5706 05
18 40 KUALA LUMPUR SQ118 ET1338 02 - 03
UK8118 NZ3434 MH5844 MI5818 02 - 03
18 40 JAKARTA SQ966 GA8966 02 - 03
VA5632 LH9794 UK8966 02 - 03
19 25 ABU DHABI EY473 AZ5741 CANCELLED / ASX AIRLINE
VN3275 UX2718 JU7524 S74586
19 40 CHENGDU 3U8094 CZ4088 05 CANCELLED / ASX AIRLINE
22 20 TOKYO-HND NH844 AC6227 08
SQ5906 08
00 10 CHENNAI IX687 CANCELLED / ASX AIRLINE
00 20 WARSAW LO8564 05
TIME TO FLIGHT CHEC RO
04 40 WARSAW LO8550
28 MAR 2020
DATE
14 07
LOCAL TIME
3
DEPARTURE

The once bustling Changi Airport sees uncharacteristically empty check-in counters on Mar 28, 2020, as countries around the world start to close their borders.

In the weeks after, more and more flights were chartered to evacuate Singaporeans from other countries, including the United States, Britain and parts of Europe. At the same time, Singapore also started to close its borders to countries that had an escalating number of infections.

"We were reducing flights, we were stopping flights from several countries, and we were requiring people to serve Stay-Home Notice when they came back," said Mr Ng on the unprecedented border controls that Singapore, along with other countries, were putting in place to protect citizens.

Despite Singapore's best efforts at border controls and contact tracing, the virus broke through the barriers. Soon, Singapore encountered its first wave of COVID-19 infections in the community.

PHOTO: ISTOCK.COM/REDONION1515

CHAPTER 3

THE VIRUS INFILTRATES THE COMMUNITY

ON FEBRUARY 7, 2020, MOH RAISED SINGAPORE'S DORSCON LEVEL FROM YELLOW TO ORANGE, SIGNALLING THAT THE VIRUS WAS SEVERE AND COULD SPREAD EASILY.

HEALTHCARE workers dressed in full personal protective equipment (PPE) were deployed to the National Centre for Infectious Diseases' (NCID) screening centre, filled with tables and chairs that were arranged in examination hall-like neatness – spaced at least 1m apart.

In the seats were people waiting anxiously for their turn to get swabbed and checked. Since the Ministry of Health (MOH) confirmed the first cases of local transmission on February 4, 2020 – where four women with no travel history to Wuhan tested positive for the virus – more and more people had been turning up at the centre.

The virus had spread across the globe, and as more Singaporeans returned from overseas, it was inevitable that COVID-19 would creep into the community. On February 7, 2020, MOH raised Singapore's Disease Outbreak Response System Condition (DORSCON) level from yellow to orange, signalling that the virus was severe and could spread easily.

Inter-school and external activities were suspended until after the March school holidays, while event organisers were urged to cancel or defer non-essential large-scale events.

"New information is emerging daily; we expect that this is likely to take time to resolve...Life cannot come to a standstill but we should take all the necessary precautions and carry on with life," said then-Minister for Health Mr Gan Kim Yong at a media briefing. But life was not the same anymore.

DORSCON ALERT LEVELS

GREEN	YELLOW	ORANGE	RED
Disease is mild or severe but does not spread easily	Disease is severe and is spreading easily outside Singapore, or spreading in Singapore but typically mild (except in vulnerable groups)	Disease is severe and spreads easily but is being contained	Disease is severe and spreading widely

ENTERING A NEW STATE OF UNCERTAINTY

RAISING the Disease Outbreak Response System Condition (DORSCON) from yellow to orange in February 2020 was not an easy decision, revealed then-Minister for Health Mr Gan Kim Yong.

"It is something we need to do so that we are able to mobilise the whole country to respond, but it is going to have a severe impact on the economy, on the way we live, study, play," shared Mr Gan, currently the Minister for Trade and Industry.

He made the announcement on February 7, 2020 during a press conference, which inadvertently sent Singapore residents into a state of panic buying at supermarkets.

Asked how he felt when he made that announcement, he said: "The sense is that we are entering into a new state, filled with uncertainties and unknowns. At that time, we knew very little about the virus. But we knew we had to mobilise the nation."

Shoppers at the Fairprice Finest outlet in Bukit Timah Plaza reaching out for toilet paper even before it got stocked on the shelves, after the Disease Outbreak Response System Condition (DORSCON) was raised from yellow to orange on Feb 7, 2020. Politicians and supermarket chain representatives urged shoppers to remain calm as shelves started emptying at unprecedented rates.

A CAPACITY ISSUE TO BE ADDRESSED

With no way to test for the virus at polyclinics and general practitioner clinics yet, anyone with signs of respiratory tract infections was being sent to hospitals – with NCID shouldering the bulk of cases as the first response site. But the team faced three challenges.

First, the massive number of people with runny nose and other respiratory tract infection symptoms, which made testing all of them unfeasible. "Did we have this kind of testing capabilities right from the beginning, during the first wave? We did not," shared Professor Leo Yee Sin, Executive Director of NCID*.

Second, the issue of isolating individuals exhibiting symptoms while they waited for the results of their test, which at the time were solely Polymerase Chain Reaction (PCR) tests. These tests took around three hours to process and up to 48 hours for corresponding reports to be generated.

Third, the possibility of false negative and false positive PCR test results. For every false negative case, it could potentially infect five to six others, and set off a chain effect that could remain undetected. "It meant that for every person that we miss, someone may die down the road," said Permanent Secretary for Health

* PROFESSOR LEO YEE SIN STEPPED DOWN AS EXECUTIVE DIRECTOR OF NCID ON JULY 1, 2023, AND WAS APPOINTED SENIOR CONSULTANT AT MOH AND SENIOR ADVISOR AT THE NATIONAL HEALTHCARE GROUP.

PHOTOS: TAN TOCK SENG HOSPITAL

Mr Chan Yeng Kit. The fatality rate at the time was 2 to 5 per cent.

On the flipside, false positives would further exacerbate the shortage of isolation wards. Even though other public hospitals, besides Tan Tock Seng Hospital, were also opening their isolation facilities to suspected cases, the sheer numbers were overwhelming.

MOH held nightly meetings with international and local public health and infectious disease experts, deliberating on how to scale up hospital capacity to meet demand. Eventually, they concluded that the current approach was simply not practical.

They had to find creative ways to keep people out of the hospital without compromising their well-being and the safety of others. This would also buy time for the country to ramp up its testing capabilities.

Tan Tock Seng Hospital constructed tents outside the Screening Centre at the National Centre for Infectious Diseases in Apr 2020, to increase screening capacity to meet the rising demand of COVID-19 cases (far left and centre).

It also set up an extended facility at the Emergency Department to create more screening spaces, as part of ramped-up efforts in Sep 2021 (far right).

RAPID EXPANSION OF TESTING CAPABILITIES

AT THE NATIONAL CENTRE FOR INFECTIOUS DISEASES' NATIONAL PUBLIC HEALTH LABORATORY, the team went from monitoring influenza and food-borne outbreaks to screening suspected COVID-19 cases.

Changes had to be made overnight, from setting up a separate space within the lab with a higher biosafety level, to adding personal protection equipment and double gloves to their daily uniform.

To boost the lab's testing capacity, the team extended their working hours and took on shifts. Automation, such as automated extractors, was also introduced to speed up the process, said Ms Nataline Tang, a Senior Medical Technologist at the laboratory.

Together, these measures allowed them to maximise the number of Polymerase Chain Reaction (PCR) tests conducted per hour.

But the most challenging part for Ms Tang was the time pressure to complete everything quickly. Contact tracers and medical staff were waiting on the results that would decide their next step.

The efforts of such laboratories would help to increase Singapore's daily testing capacity from mere hundreds to 70,000 by May 2021 – just in time as the Delta variant started its rampage.

PHOTO: DIGITALVISION VIA GETTYIMAGES/TANG MING TUNG

> "THE TRICKY THING WITH COVID-19 PATIENTS WAS THAT THEY DID NOT ALWAYS APPEAR SEVERELY ILL IN THE INITIAL STAGES EVEN WHEN THEIR CONDITION WAS DETERIORATING."
>
> – DR SAPNA SADARANGANI, INFECTIOUS DISEASES CONSULTANT AT THE NATIONAL CENTRE FOR INFECTIOUS DISEASES

LIGHTENING THE LOAD ON HOSPITALS

Bringing every person with a runny nose to NCID was not efficient and would take resources and attention away from patients who required closer monitoring and critical care. Thus, it became a common practice to place patients with mild symptoms and unconfirmed diagnoses on five days of sick leave to allow self-monitoring at home.

Only patients who did not recover after five days, or were linked to COVID cases, were referred to NCID for further medical assessments and tests.

Most patients who showed respiratory symptoms (fever, cough, sore throat, runny nose) tested negative for COVID-19, noted MOH. But the Ministry also recognised that extra precautions were necessary, and Singaporeans had to be socially responsible.

The Ministry stressed in its press release: "Patients must recognise the importance of staying home when unwell. Mixing in large crowds, or continuing to go to work or school when ill, even with mild symptoms, will put others at risk."

At the same time, MOH also reactivated its network of more than 900 general practitioner clinics to provide subsidised treatment, investigations and medications for patients with respiratory symptoms.

Later, in April 2020, swab isolation facilities comprising over 4,000 beds would be set up to house patients awaiting the results of their swab test overnight, further easing the strain on medical facilities.

The various solutions lightened the burden on hospitals, allowing doctors and nurses to focus on confirmed cases, especially those who had severe symptoms – which were prevalent in the pre-vaccine days.

Recalling the prognosis of the first 30 patients, Professor Benjamin Ong, then the outgoing Director of Medical Services at MOH, said they had terrible outcomes. "Anytime you see patients over 60, we were very worried because the rate of mortality was so high," he said.

The tricky thing with COVID-19 patients was that they did not always appear severely ill in the initial stages even when their condition was deteriorating, shared Dr Sapna Sadarangani, an infectious diseases consultant at NCID. Moderate to severe COVID-19 causes a mismatch in how the lungs exchange air and how the blood vessels extract oxygen. This is known as ventilation-perfusion mismatch, and is different from how bacterial pneumonia may cause low oxygen when air sacs and airways are filled with mucous and pus.

"The patients didn't always look

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

Within hospitals, medical staff had to gown up in full personal protective equipment (PPE) at all times, even having to change their PPE in between tending to different patients to ensure the highest safety levels. Hospitals were also well-equipped with medical equipment like ventilators, and still had sufficient isolation wards, intensive care units and beds at the time, especially after private hospitals started taking in COVID-19 patients.

that bad initially. They weren't gasping and didn't appear too breathless, but when you checked their oxygen, it was so low. If you didn't address it, they would have gotten even worse. We had to be vigilant," she added.

WORKING AS ONE TEAM IN THE HOSPITALS

"Clean" and "dirty" zones had to be clearly demarcated at the NCID patient care areas to prevent cross contamination, as every patient suspected to have COVID-19 was treated as potentially infectious until a negative result was received and the patient was deemed safe to be de-isolated by the assessing physician. Housekeeping staff would also clean the premises several times a day.

There were moments when the screening centre would get so busy that infectious diseases doctors like Dr Sadarangani would also head down to offer her emergency department colleagues extra support. "Obviously if they are busy down there, the busyness is going to come to us anyway. We were in this together and we all had to work together," she said with a smile.

By March 2020, the public hospitals found their beds filling up faster than they could discharge patients. Private hospitals had to be roped in, with Mount Elizabeth Hospital becoming the first to take in COVID-19 patients.

Almost overnight, the hospital's 29-bedded Ward 5E was transformed into a COVID-19 ward. Assistant Nurse Clinician Ms Lee Ann Aquino Carino and her fellow ward colleagues were quickly trained to perform PCR swab tests, suited up in full PPE, and split into two teams to ensure care continuity should one team get infected.

The nurses would work in pairs. Once the swab was completed, the swab stick would be passed to the next nurse who would triple pack it in plastic zipper bags, disinfect the bag, and then send it off for testing. It also became a requirement to change their PPE between patients, which meant having to gown up multiple times a day.

Donning the PPE was one of the biggest tests of Ms Carino's resilience as it often left her feeling dehydrated because of the heat. "I would drink water if I had the


EXIT

choice. But the worry was that I would then need to use the toilet, which would mean removing the gown. Putting it back on was not easy as it had to be done carefully, and I also had to get somebody to recheck that it was done properly," she said.

While hospitals were well-equipped with medical equipment such as ventilators, and still had enough isolation wards, ICU facilities and beds, the wild card was manpower. "You can never quite estimate when workers will get exhausted and won't be able to function properly," noted Permanent Secretary for Health Development Mr Ng How Yue.

On the research end, scientists like Professor Lisa Ng, Executive Director at the A*STAR Infectious Diseases Labs, tried to understand how the virus behaves, the cells it infects, and whether it causes mild or severe disease. Samples were also taken from patients to study their immune response and how factors like age affect the progression of COVID-19.

"We had weekly workgroup meetings with the Ministry and various healthcare institutions like NCID to update each other on the latest findings," she said.

Still close to a year away from a vaccine, the approach then was to keep the number of cases from exploding and overwhelming the healthcare system. This was done by tracking down potential cases, and preventing others from getting infected.

Gowning up and down became a regular affair for healthcare workers at hospitals. Here, a healthcare worker helps a colleague with the gown at the Intensive Care Unit of the Ng Teng Fong General Hospital.

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

"GOLD STANDARD"

Tucked away in a lecture room at MOH was the first contact tracing centre, where 40 to 50 people sat in front of computers with telephones in hand, asking patients on the other end of the line to retrace their steps in the days before they tested positive.

The contact tracers would then draw up comprehensive activity maps – essentially large electronic spreadsheets – to visualise the various potential points of spread.

The pioneer team consisted mainly of staff from the MOH's Communicable Diseases Division (CDD) and "reservist" staff with concurrent appointments in other parts of MOH, who were called in to beef up the team.

Describing contact tracing as both a science and an art, CDD's Senior Director Professor Vernon Lee* said it was not only important to understand how the virus spreads, but also know how to ask the right questions in the right manner.

"If I go to you demanding that you tell me all that you've done in the past fourteen days, you will get really flustered as it's difficult to recall, right?" he said with a laugh.

* IN ADDITION TO HIS CURRENT ROLE AS SENIOR DIRECTOR OF MOH'S COMMUNICABLE DISEASES DIVISION, PROFESSOR VERNON LEE WAS APPOINTED EXECUTIVE DIRECTOR OF NCID ON JULY 1, 2023.

Professor Vernon Lee, Senior Director of the Communicable Diseases Division at the Ministry of Health, describes contact tracing as both an art and a science. Understanding how the virus spreads was important. But it was equally crucial to ask the right questions of people to gather information about their activities, to determine how far the virus had reached, to control transmission.

"IT WAS NOT ONLY IMPORTANT TO UNDERSTAND HOW THE VIRUS SPREADS, BUT ALSO KNOW HOW TO ASK THE RIGHT QUESTIONS IN THE RIGHT MANNER."

– PROF VERNON LEE,
SENIOR DIRECTOR OF THE
COMMUNICABLE DISEASES DIVISION (CDD)
AT THE MINISTRY OF HEALTH

The team had a way of getting people to recall their past activities and to open up. They started by asking about daily routines, whether they have kids, and if they send them to school. And in the process, they would latch on to any changes in patterns, say a special birthday celebration.

"Of course, some individuals, unfortunately, were a bit shifty. And they didn't want to tell us things. That's why we have the Infectious Diseases Act, which is the legal instrument and the law by which we work," shared Prof Lee. "We have the legal powers to get information from individuals and if they do not comply, they can be charged."

One such individual in fact sparked off the SAFRA Jurong cluster. Fearful that people might misinterpret her actions, Case 94 did not tell contact tracers various important details, and was eventually charged in court for the offence. The cluster grew to 47 cases before it was officially closed in April 2020.

"By the time we actually figured out who spread to whom, it was already such a big cluster, which took us a long time to rein it in," said Prof Lee. But he pointed out that such irresponsible individuals make up less than 1 per cent of all people contacted.

Then there was the mystery of the Grace Assembly of God Church cluster, which had contact tracers scratching their heads over who seeded the infection there. Eventually, it took a serology test developed by researchers at Duke-NUS Medical School and much sleuthing by MOH's epidemiology team to crack the case.

The contact tracing team's success in the first few months of the pandemic was well-known, with Harvard University researchers describing Singapore's contact tracing as "gold standard".

But contact tracing alone was insufficient. It had to be combined with sound quarantine measures. For instance, high-risk individuals would be placed in dedicated quarantine facilities, the low-risk ones on phone surveillance, and the very low-risk are asked to self-monitor their health.

Over the course of the pandemic, the contact tracing team grew to over 1,000 during the peak of the infection wave, before stabilising at about 200. Staff from the Singapore Police Force and Singapore Armed Forces also joined the team at critical times to bolster its capabilities.

But even with Singapore's rigorous contact tracing efforts in early 2020, the rate of infection increased exponentially. The seven-day moving average spiked from one to 53 cases in March 2020. Singapore also recorded its first two deaths on March 21, 2020 – both were patients at the NCID.

More trouble was also brewing – Singapore was starting to see infected cases in migrant worker dormitories by April 1, 2020, and was discovering the presence of asymptomatic carriers. This was a "game-changing moment", said Professor Kenneth Mak, Director of Medical Services at MOH.

"In the past, when we could identify people who were infectious, or people who were potentially infectious because of close contacts, our policy then was to isolate them," he noted. But this process would miss out the asymptomatic carriers, who would go on to infect many more. Something drastic had to be done, urgently.

EVEN WITH SINGAPORE'S RIGOROUS CONTACT TRACING EFFORTS IN EARLY 2020, THE RATE OF INFECTION INCREASED EXPONENTIALLY.

In the first few months of the pandemic, Singapore's contract tracing success was well-known worldwide, with Harvard University researchers lauding it as "gold standard".

SAF'S HAND IN FIGHTING THE COVID-19 WAR

PHOTO: MINISTRY OF DEFENCE

As cases burgeoned, contact tracing capacity had to be scaled up urgently. The Singapore Armed Forces (SAF) roped in personnel from across its ranks to do so, including full-time National Servicemen, the SAF Volunteer Corps, and service personnel from the Singapore Army, the Republic of Singapore Navy and the Republic of Singapore Air Force.

TRY AS IT MIGHT, MOH could not fight the COVID-19 war on its own.

"In mid-March 2020, there were about 25 cases a day. By then, the need to scale up was already clear. That was when they asked the Singapore Armed Forces (SAF) for help with contact tracing in addition to health surveillance efforts," Brigadier-General (BG) Lee Yi-Jin recalled.

In hindsight, the Ministry might have roped in the SAF at just the right time. After receiving training from the professionals at MOH, SAF then set up its first contact tracing centre (CTC) within Mandai Hill camp by the end of March.

However, with the accelerating spread of the virus around the nation, what started as a target to double or triple contact tracing capacity ended up with the SAF running a total of seven CTCs in just two weeks. And with each centre being larger than the original one at MOH, it increased the capacity tenfold.

"To scale up that fast meant that you were running people very thin. The first batches were working pretty much without breaks," BG Lee said.

Eventually, the SAF was able to scale up with personnel from across its ranks. They included full-time National Servicemen, the SAF Volunteer Corps, service personnel from the Army, the Republic of Singapore Navy and the Republic of Singapore Air Force (RSAF).

Another source of manpower came from the then-dormant travel industry. The strong customer service skills of air crew made them perfect hires as callers at the CTCs.

Tapping technology made the entire process more efficient. The Army, RSAF, Defence Science and Technology Agency and even volunteer coders from the National University of Singapore came together to create SwiftCobra, a digital activity mapping tool to assist contact tracers.

But even with the increased manpower and the help of technology, the stress and anxiety levels of contact tracers and activity mappers were still high. With the long hours, fatigue was a big challenge too. Fortunately, many food vendors showed their support in tangible ways for those working hard in Singapore's fight against COVID-19.

BG Lee recalled how "when bubble tea stores shut down, it was like a national disaster" as many consumers were deprived of their daily fix. But those working in the CTCs got to enjoy the sweet beverage as a treat from the SAF.

"We made sure that there was some kind of morale booster every day. These simple pleasures – usually food – kept the soldiers going."

It might not have been a battle the SAF were trained for, but the troops rose to the occasion and cut down the average contact tracing time for a case by half. This was a feat that greatly helped to slow the spread of the virus.

WORLD'S FIRST COVID-19 ANTIBODY TESTS THAT LINKED TWO CLUSTERS

CONTACT TRACERS WERE STUMPED. A new cluster had emerged at the Grace Assembly of God Church, but none of the first two cases had links to Wuhan or any other existing clusters. And in just two days, it had grown to more than six times its size to 13 cases.

The usual means of contact tracing was not sufficient. Out of options, the team turned to what was then an experimental method – a novel COVID-19 serology test developed by Duke-NUS Medical School scientists. This proved to be the key that would unlock the mystery.

On February 25, 2020, 13 days after the first cases were detected, a link was finally established between the Grace Assembly of God cluster with the Life Church and Missions Singapore cluster, which was seeded by tourists from Wuhan in January 2020.

The serology tests – which look for COVID-19 antibodies in blood samples – managed to belatedly detect two cases of COVID-19. The couple (Case 83 and 91) did not fit the definitions of suspected cases as they had exhibited symptoms earlier and hence were not tested.

But after tracing their earlier whereabouts, contact tracers found that the couple had been at the Life Church and Missions on the same day as two Wuhan tourists (Cases 8 and 9), and had attended the same Chinese New Year gathering as a Grace Assembly of God staff (Case 66), who then seeded the Grace Assembly cluster at a staff meeting.

Such a test is particularly effective in handling a disease like COVID-19, which can be spread by asymptomatic patients, said Professor Wang Linfa of the Programme in Emerging Infectious Diseases at Duke-NUS Medical School, who led the development of the test.

"You might have been infected two weeks ago, had a little bit of a sore throat but did not think it was COVID-19. Two weeks later, Polymerase Chain Reaction (PCR) or rapid antigen tests will not be able to diagnose the infection anymore because your body has cleared the virus," he explained.

"During that process, your body induced what we call the antibody molecule. So we devised this test to detect a specific antibody in your serum, also known as blood."

Known commercially as cPass, the test also cuts down the traditional antibody detecting process from three to five days, to just 60 minutes.

"What we did is use protein engineering, using a biochemical simulation of that process. And now it's purely just protein-based, and we can do it in a normal lab," said Prof Wang.

Previously, the process – mixing a blood sample with the virus and placing it on cells – could only be conducted in a highly contained biosafety level three lab by highly skilled scientists.

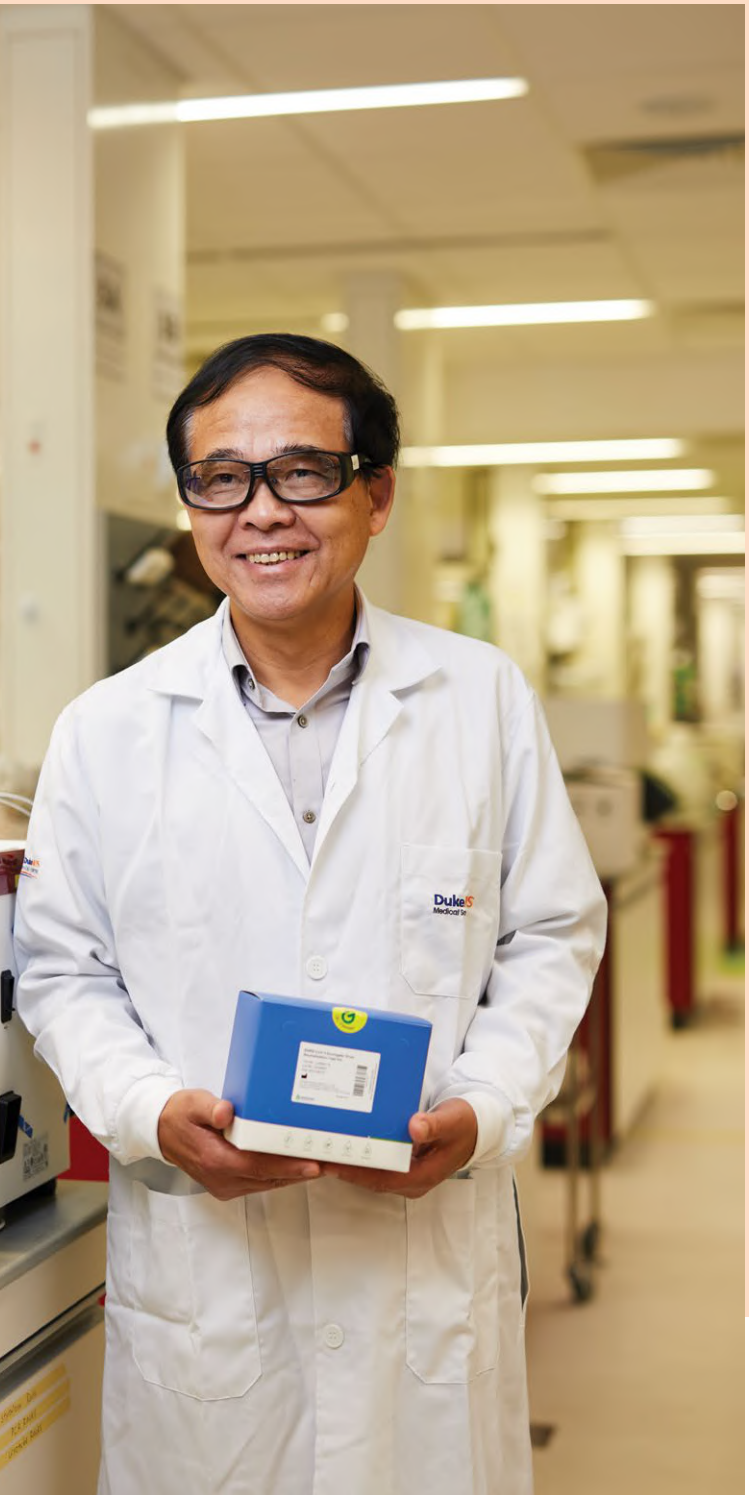
cPass is the first such test to be approved by the United States Food and Drug Administration, and it is now used across 80 to 90 countries for various research studies.

But the test has to be constantly updated to keep pace with the mutation of the virus. So far, the team has developed 22 different cPass-like tests to detect different variants. With just five millilitres of serum (blood) from a fingertip prick, scientists are able to use the test to check for immunity to any of the 22 variants through what is called a multiplex test.

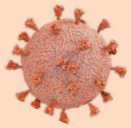
The team is currently creating tests for variants of the virus that have not yet jumped to humans.

"We are already working towards the potential SARS three and SARS four, because these viruses are already circulating in bats, pangolins and civets. We have developed tests for these future viruses, as there is a high risk of them jumping to humans," said Prof Wang.

Professor Wang Linfa, one of the world's leading zoonotic disease experts, worked with his team to develop cPass, a serology test that can assess within an hour if a person had been previously infected with COVID-19.



HOW CONTACT TRACING WORKS



POSITIVE CASE CONFIRMED

ACTIVITY MAPPING

Patient is interviewed to determine who he/she has been in contact with

CONTACTS ARE CALLED UP

Information obtained through interviews with the case are corroborated against other sources of information (e.g. travel records, SafeEntry records, etc.)

AT-RISK INDIVIDUALS EXPOSED TO THE CASE ARE IDENTIFIED AND PLACED ON APPROPRIATE PUBLIC HEALTH FOLLOW-UP ACTIONS

Close contacts are quarantined for up to 14 days. If they have symptoms suggestive of infection, they are medically assessed and tested

Contacts who are of lower risk are monitored via phone surveillance for up to 14 days

CON

For 55 days,

the nation hunkered down and remained home

THE RUSH HOUR COMMUTE ON SINGAPORE'S TRAINS WAS REDUCED TO JUST A HANDFUL OF COMMUTERS AFTER THE CIRCUIT BREAKER CAME INTO FORCE ON 7 APR, 2020.

to stem the spread of COVID-19.

PHOTO: SHUTTERSTOCK.COM/KANDL STOCK

THE discussion lasted well into the night. Huddled in a meeting room in the Istana, health experts provided data and science on a possible lockdown, while key politicians and policymakers debated the merits and drawbacks of such a move.

"It's something we were always prepared to do, but actually activating it was a tough decision," revealed Mr Ng How Yue, Permanent Secretary for Health Development at the Ministry of Health (MOH).

The disruption to lives and livelihoods, as well as the social cost of isolation were the trade-offs to consider. On the other hand, "the greater evil was if hospitals were overwhelmed", he added, a growing concern as the number of cases climbed.

Given the severity of this decision, it required the approval of the country's top leaders. "We had never put in place such a set of community measures before – ever. Even during SARS, we didn't do this.

CHAPTER 4

TURNING OFF THE SWITCH

PHOTO: DREAMSTIME.COM/RICHIE CHAN

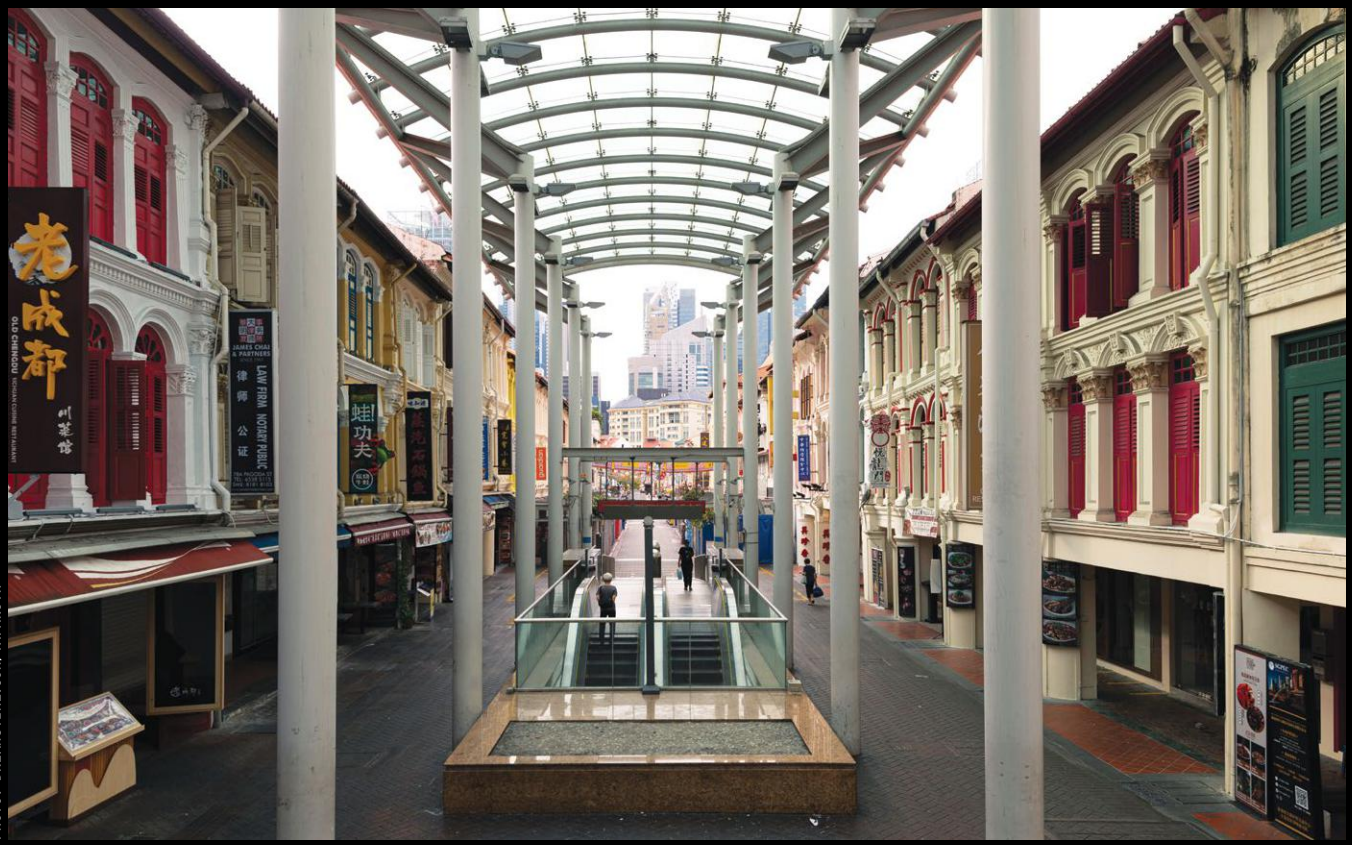


PHOTO: DREAMSTIME.COM/TAPANUTH

Before (above): Before the pandemic, Pagoda Street at Chinatown was often packed with tourists and locals.

After (below): Pagoda Street without its usual crowd after circuit breaker measures kicked in on Apr 7, 2020.

PHOTO: REUTERS/EDGAR SU

Therefore, this was an issue that was brought all the way up to Cabinet," explained Professor Kenneth Mak, Director of Medical Services at MOH.

"Prime Minister Lee Hsien Loong told the team to 'take one day to sleep on it', before deciding whether to proceed," recalled Mr Gan Kim Yong, who was then the Minister for Health and co-chair of the Multi-Ministry Taskforce (MTF).

"At the time, we did not have vaccines, we did not have any tools against infection. So the only thing that we could do was isolation," shared Mr Gan. "But we also need to time that isolation very carefully. If you do it too early, it's not going to have any effect and the isolation period will be very prolonged, because as soon as you open, the infection will come back."

The green light was eventually given. "The decision was made to not just impose a lockdown but impose it right up front, rather than have a phased implementation," recalled Prof Mak, adding that the discussion then went into how to manage the ensuing public engagement.

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On Apr 3, 2020, Prime Minister Lee Hsien Loong made a televised appearance to give an update on the COVID-19 situation. There was now evidence that asymptomatic cases were spreading the virus unknowingly, with new clusters discovered in foreign worker dormitories and one nursing home. There was a need to impose "significantly stricter measures...like a circuit breaker", he said.

"I AM WORRIED THAT UNLESS WE TAKE FURTHER STEPS, THINGS WILL GRADUALLY GET WORSE, OR ANOTHER BIG CLUSTER MAY PUSH THINGS OVER THE EDGE."

– PRIME MINISTER LEE HSIEN LOONG

"We had never done it before, what signals were we giving to the public? Would there be a big drop in morale? Would this be a signal that we might be losing the plot?" he observed. "But we felt that open communication was important. And we needed to do this very decisively, because if we didn't do this, we were at risk of losing control of the situation."

This sobering news was delivered by the country's top leader. On April 3, 2020, PM Lee appeared on national TV, and made an announcement that turned Singapore from bustling metropolis to ghost town.

"I am worried that unless we take further steps, things will gradually get worse, or another big cluster may push things over the edge," he explained. "We should make a decisive move now to pre-empt escalating infections. We will therefore impose significantly stricter measures."

A "circuit breaker" would start in four days, and tentatively last four weeks. Most workplaces were to be closed. Students had to learn from home. People of different households could not gather – not even families. But Singapore's lockdown was unique.

While most countries had imposed stringent measures to control the movement of people that had no end in sight, the city-state's novel circuit breaker, as its name suggests, was an assurance that it would not last indefinitely. It was a pause, a reset.

WHEN A CUP DIVERTED ATTENTION

IT HAS BEEN MADE into merchandise, featured on countless memes, and even become a Singapore icon.

But hardly anyone paid attention to the blue porcelain cup when it was first glimpsed on screen on April 3, 2020, next to Prime Minister Lee Hsien Loong who was addressing the nation. Until he took a sip from it and began speaking in fluent Malay. Another sip, and effortless Mandarin followed.

The online space exploded. "I'd like to have whatever he's drinking", "what magic cup is this?", "the legendary language-changing cup". For a brief moment, a ceramic cup had made Singapore forget about COVID-19.

The light-hearted comments were completely incongruent with the hard-hitting news that PM Lee had just delivered – Singapore was about to take an unprecedented step in its battle against the virus, with a circuit breaker.

As PM Lee sipped from his cup, the message seeped in: Singapore was entering uncharted territory. It was essentially shutting down – for a time.

PM Lee's cup inspired countless memes, and a store in Singapore even created a similar looking cup with a tongue-in-cheek product name: Magic, The Legendary Language-Changing Cup.

PHOTO: SUPERMAMA STORE

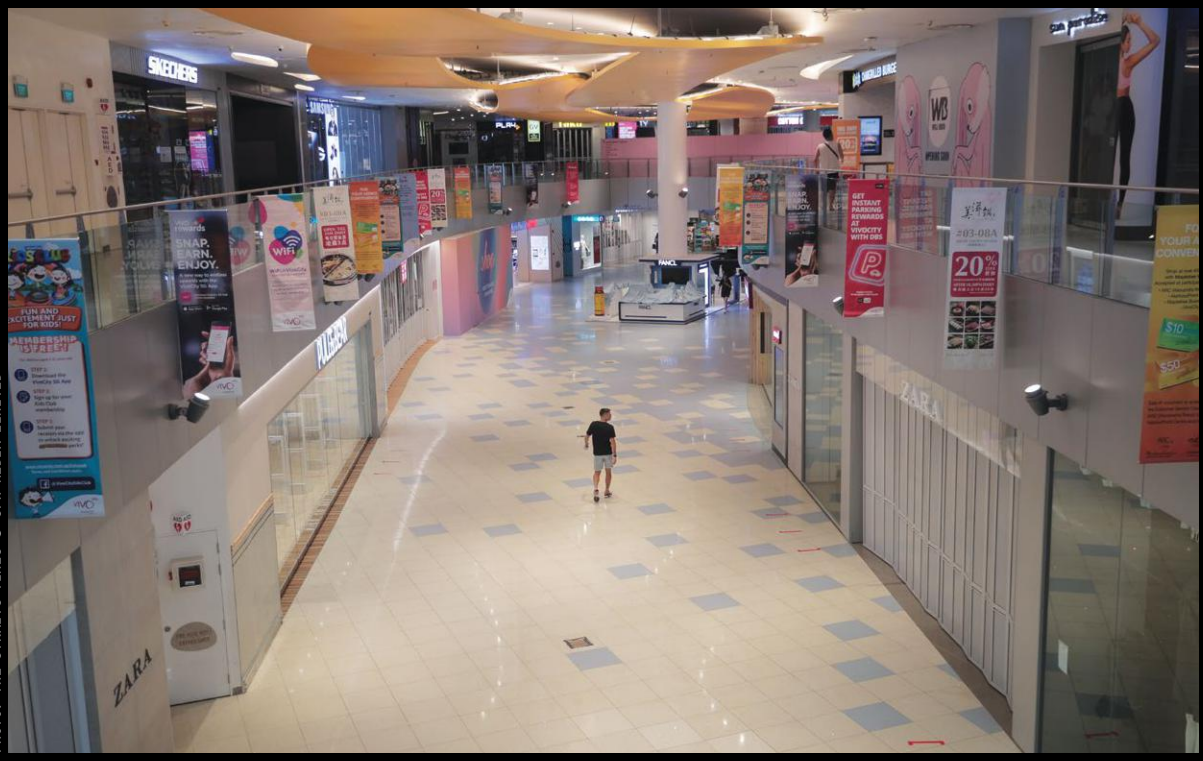


PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

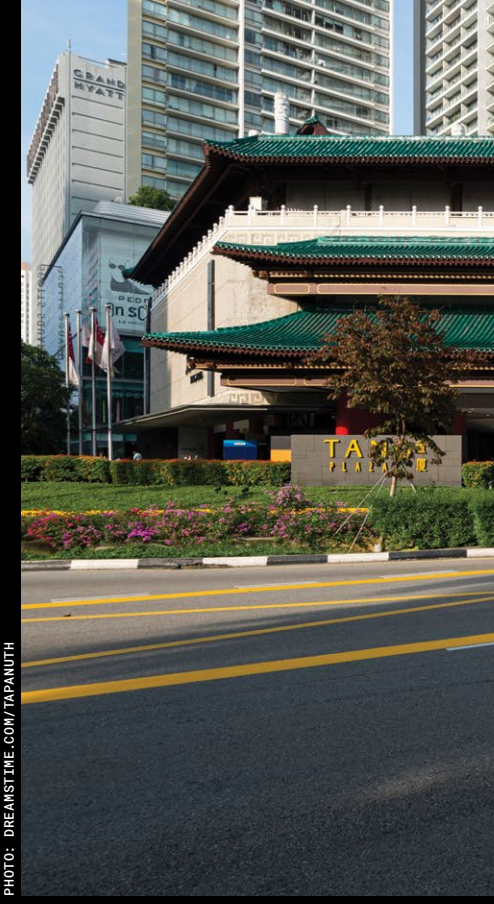


PHOTO: DREAMSTIME.COM/TAPANUTH

ON APRIL 7, 2020, CIRCUIT BREAKER MEASURES KICKED IN,

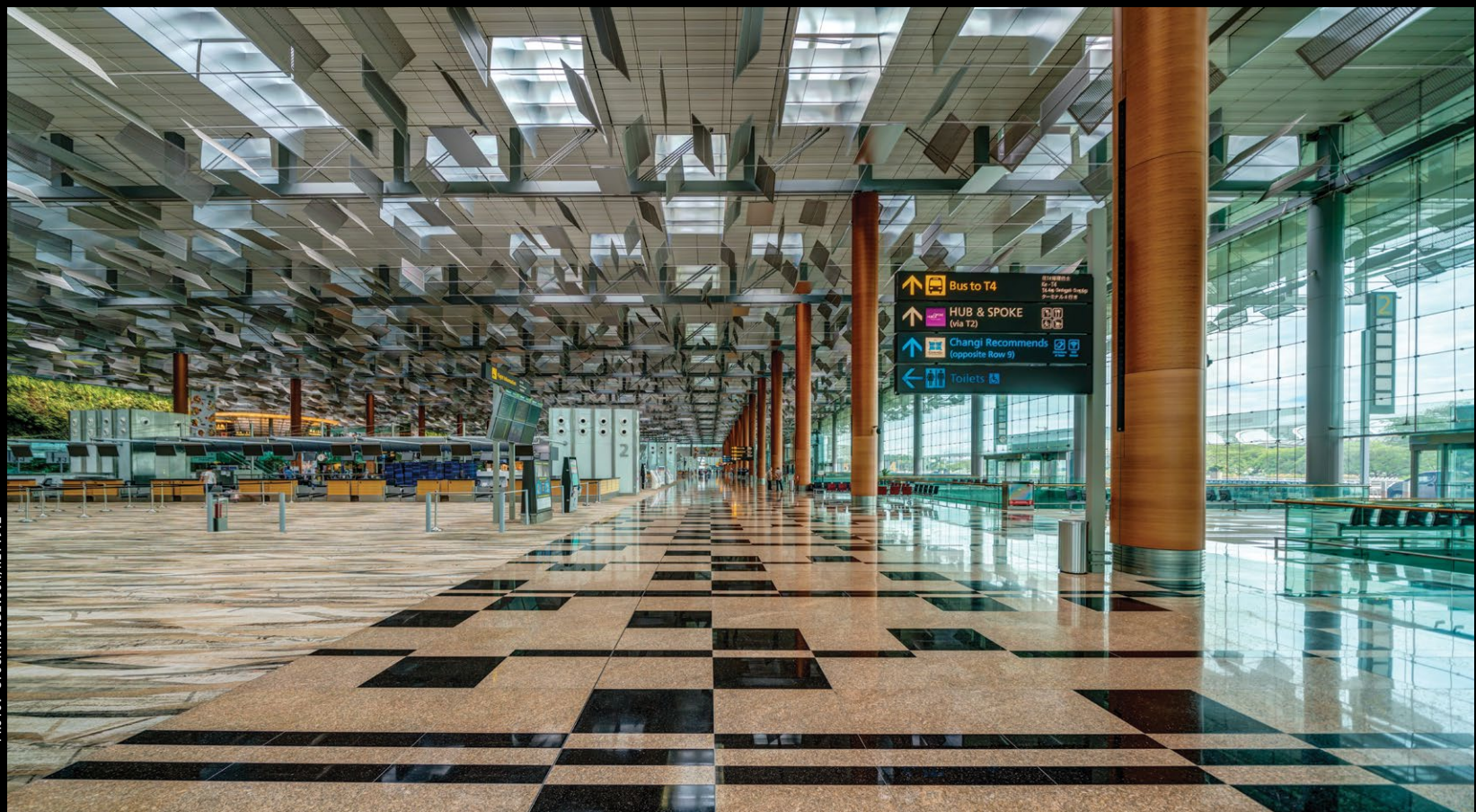


PHOTO: STOCK.ADOBE.COM/HIT1912

PHOTO: REUTERS/EDGAR SU

TURNING SINGAPORE FROM...

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

(Clockwise) VivoCity, Orchard Road, Woodlands Causeway, Jewel, Changi Airport.

From border checkpoints to shopping malls and streets, popular tourist attractions and the world-class Changi Airport, it was hard to find any signs of human activity in once-busy areas across the country when the circuit breaker officially kicked in.

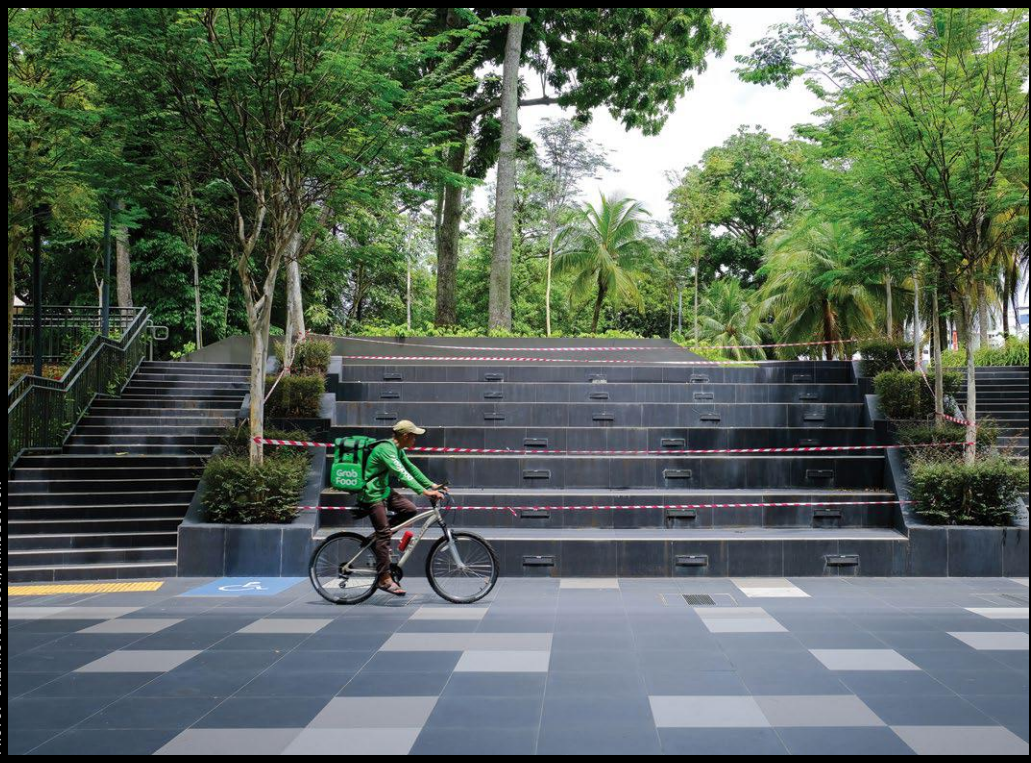


PHOTO: DREAMSTIME.COM/KANDLSTOCK

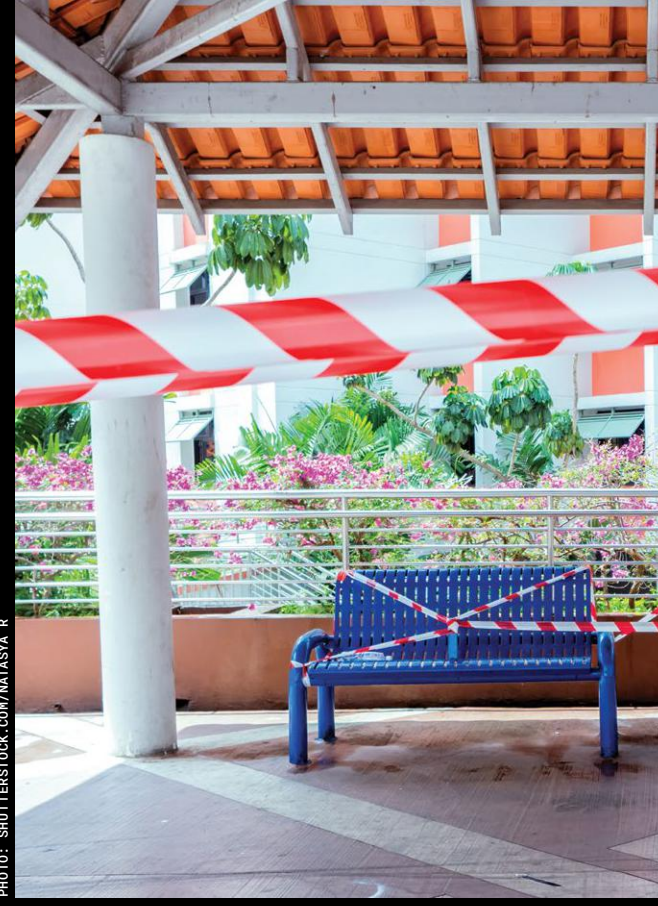


PHOTO: SHUTTERSTOCK.COM/NATASYA R

...A BUSTLING METROPOLIS

PHOTO: STOCK.ADOBE.COM/HAIKOON

PHOTO: DREAMSTIME.COM/KEITH BRENDA SU

TO A GHOST TOWN OVERNIGHT.

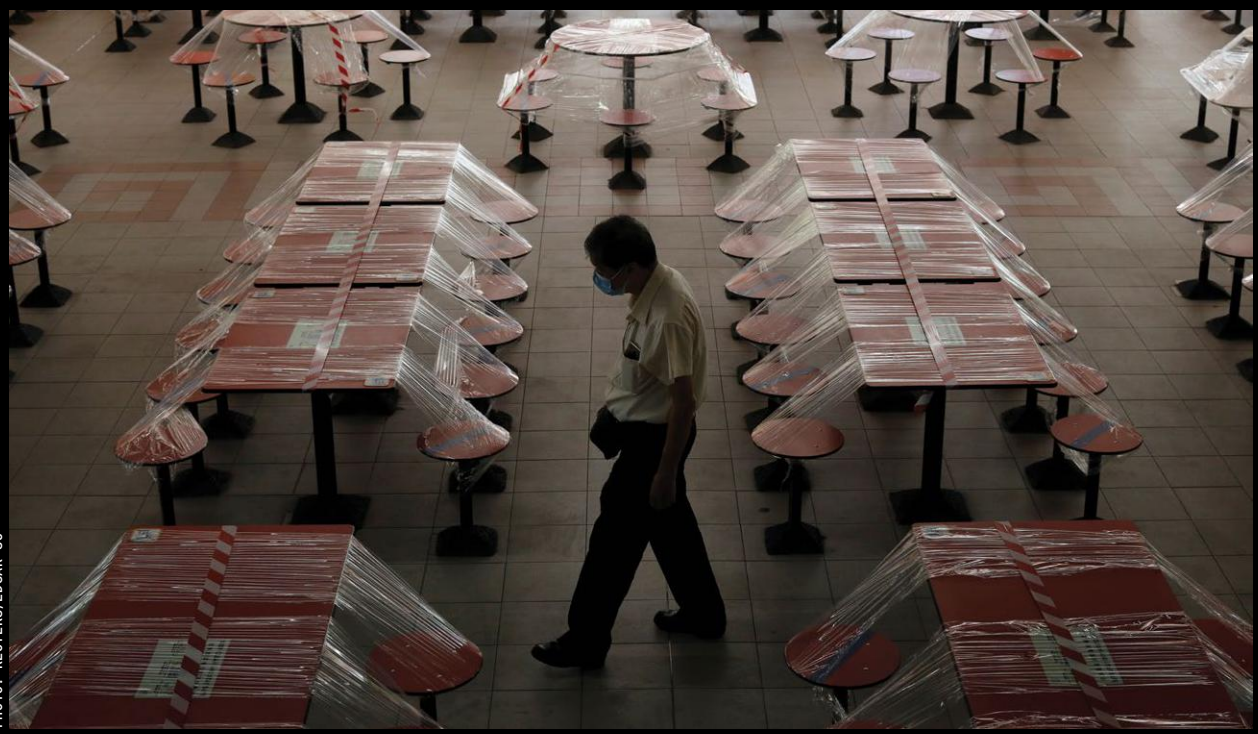
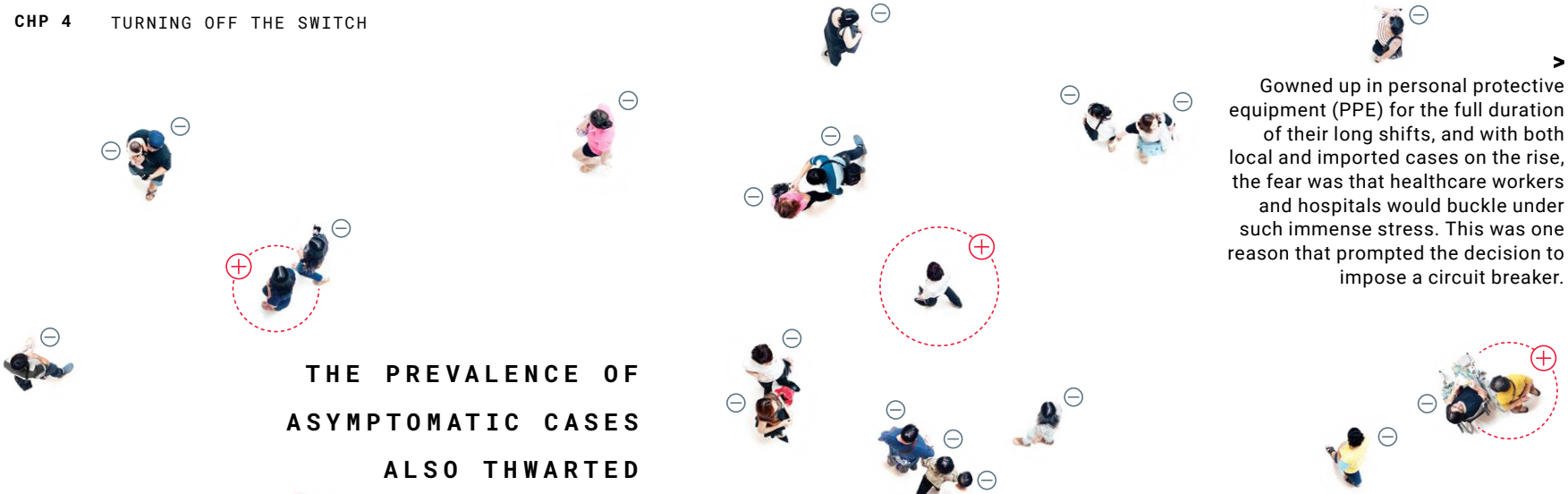


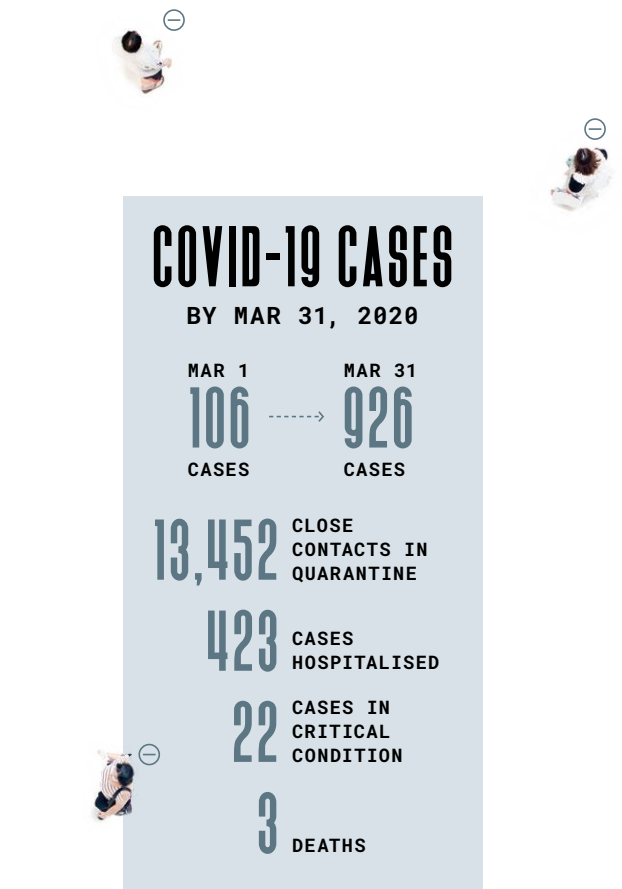
PHOTO: REUTERS/EDGAR SU

The same went for residential areas and other community spaces which became uncharacteristically empty, save for the occasional jogger or delivery rider.



Gowned up in personal protective equipment (PPE) for the full duration of their long shifts, and with both local and imported cases on the rise, the fear was that healthcare workers and hospitals would buckle under such immense stress. This was one reason that prompted the decision to impose a circuit breaker.

THE PREVALENCE OF ASYMPTOMATIC CASES ALSO THWARTED ATTEMPTS TO TRACE AND FLUSH OUT POSITIVE CASES FROM THE COMMUNITY.



COVID-19 CASES

BY MAR 31, 2020

MAR 1		MAR 31
106	⇢	926
CASES		CASES

13,452 CLOSE CONTACTS IN QUARANTINE

423 CASES HOSPITALISED

22 CASES IN CRITICAL CONDITION

3 DEATHS

THE HAMMER BEFORE THE DANCE

What tipped the scales in favour of a lockdown was a confluence of six factors. One, the steadily rising number of daily cases, from single digits at the start of March to dozens by the month's end.

Several reasons contributed to this rise. Among them was the surge in imported cases which crossed into the community. "We started having a lot of people coming in, not just from China or our part of the world, but from Europe and the US," noted Prof Mak. "And a number of them had been exposed to infection – so the numbers in our community started to rise."

Two, the prevalence of asymptomatic cases also thwarted attempts to trace and flush out positive cases from the community. "In other words, the patient can be infectious even before he or she realised that they have developed symptoms," said Professor Leo Yee Sin, Executive Director of the National Centre for Infectious Diseases (NCID).

Three, alarm bells began ringing in the medical community that the virus was more transmissible than previously thought. So far, aggressive measures such as border closures and suspension of mass events appeared insufficient in preventing the virus from spreading.

"We turned off the tap from the borders, but there were local leaks causing this pool of water that we had to mop up," said Professor Vernon Lee, Senior Director of Communicable Diseases Division at MOH. "We couldn't mop up fast enough using contract tracing."

Four, the virus had reached vulnerable seniors at nursing homes and migrant worker dormitories where thousands lived together in communal settings.

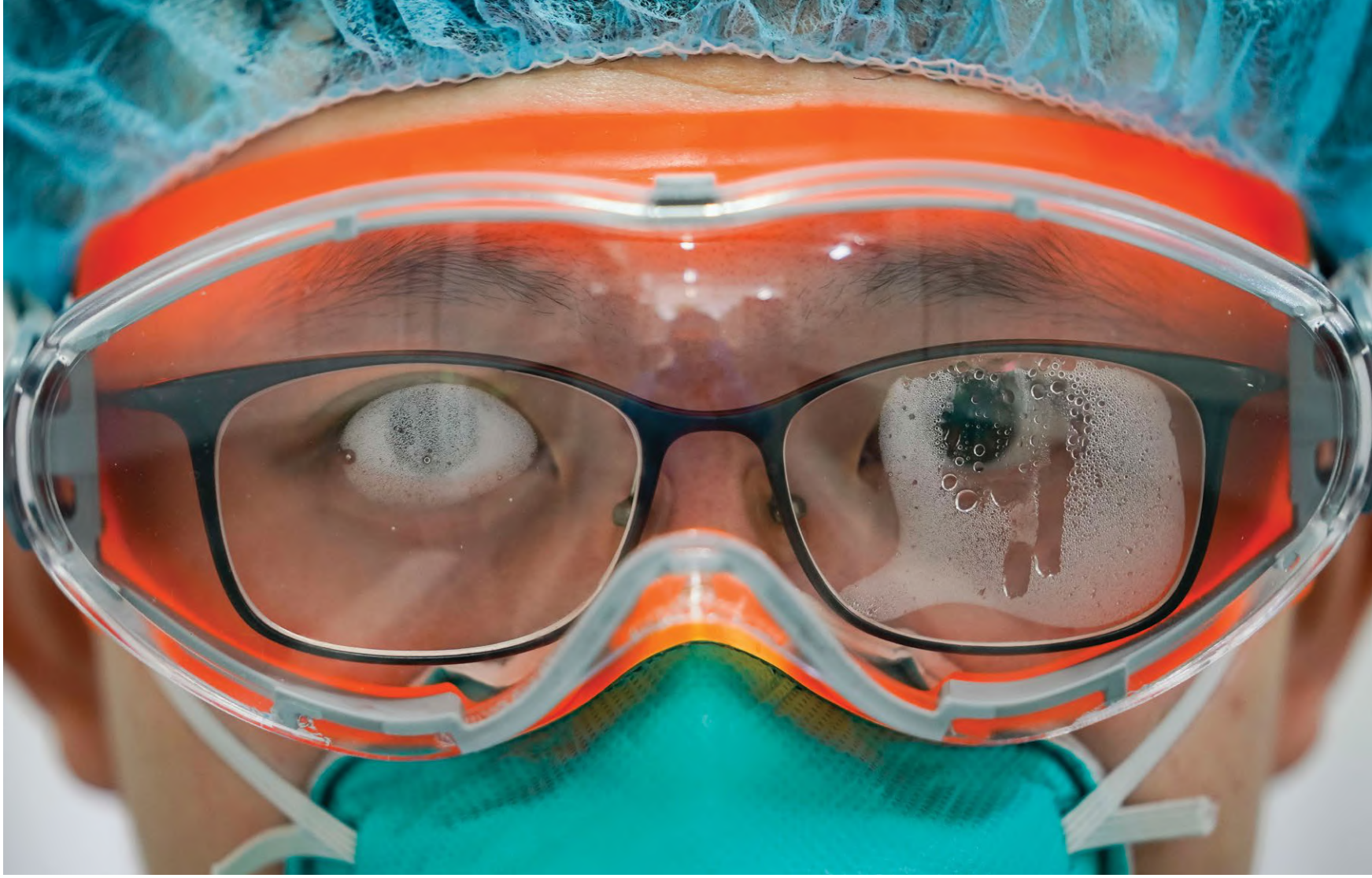


PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

Five, there was little that could be done medically. Vaccines had not been developed yet. Existing medication or therapeutic agents were not good enough.

Six, the defining issue that cemented the decision was the fear that hospitals would buckle under the weight of an exponentially rising number of cases. "That's how some countries suffered high deaths," noted Mr Ng.

Everyone agreed that more drastic measures were needed. It would also buy time, as contact tracers could identify remaining undetected cases, hospitals could expand their capacities and labs could increase their testing capabilities.

The lockdown was a forceful measure, akin to French-Spanish engineer Tomas Pueyo's hammer strategy which represented quick and aggressive action to suppress the virus. "When you hammer something, you have to make sure the nail goes all the way in," said Prof Lee. "We had to be decisive, swift. Do it once, do it well."

In fact, Singapore was prepared to take even more extreme measures, revealed Mr Chan Yeng Kit, Permanent Secretary for Health. "If COVID was as lethal as SARS and as transmissible as Omicron, we probably would have needed a curfew," he said. "We had planned for that. Thankfully, we never had to put it in place."

For now, Singapore would enter a partial lockdown without curfews or total restriction of movement, unlike the more draconian measures taken by some other countries. But it would not be called a lockdown.

PREDICTING THE PANDEMIC'S NEXT MOVE

IT WAS 7.45AM and Associate Professor Alex Cook had been called into an urgent meeting with then-Health Minister Mr Gan Kim Yong. Singapore had a problem: despite its rigorous contact tracing system, an unlinked case of COVID-19 had surfaced.

"It was in the very early phase and we thought that we were capturing all the infections, but then there was this case that wasn't connected to any known cases or contacts," said the Vice Dean (Research) of the Saw Swee Hock School of Public Health, National University of Singapore.

The question posed by Mr Gan was: could the total number of unlinked cases be estimated?

He had asked the right person. Assoc Prof Cook is an expert in the field of biostatistics and modelling, where he uses mathematical models and statistical assumptions to predict the trajectory of infectious disease outbreaks. And in 45 minutes, he had an answer.

While he was not expected to respond that quickly all the time, speed was nonetheless crucial for Assoc Prof Cook and his team of around 20 research staff as MOH tried to get ahead of the virus. Judging when to tighten, or loosen, the local economy and social restrictions had become the world's most consequential guessing game.

By using data on the residential population, such as their age and travel distances, and data on the disease, including its transmissibility, the COVID-19 models could also predict the possible outcome of policy decisions before they are implemented. For instance, whether the closure of schools or workplaces would flatten the growth of cases, and by how much.

While Assoc Prof Cook said he could not take credit for any of the successes of MOH's responses, since multiple factors were taken into consideration before a decision was made, he noted that their forecast for the Omicron outbreak in 2022 was spot on. "What I understand is that it was one of the reasons why we didn't relax measures until the end of the wave," he said. In fact, Singapore's COVID-19 model was the first in the world.

Throughout the pandemic, the Saw Swee Hock School of Public Health was one of the key engines powering MOH's science-based and data-driven approach to fighting the virus' spread. COVID-19 modelling aside, the School, which is part of the National University of Singapore, also pored through tons of research papers to come up with comprehensive reports on subjects such as the characteristics of the virus, vaccines and containment strategies.

Week after week, Associate Professor Jason Yap, Vice Dean (Practice) at the School, and his small team of public health interns and undergraduates would receive requests from MOH for reports on new subjects, or for updates on previous ones. "It was a crazy time where it was just report, report and report. And we made sure we changed the colour of the highlights in the reports, which indicated new information," he said. Over six months, from February to July 2020, the team produced 114 versions of 10 reports.

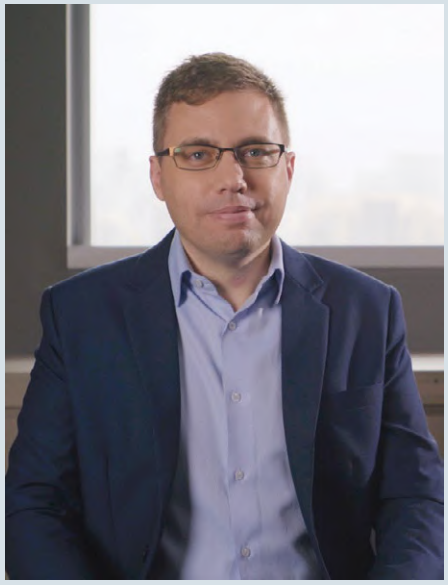
What he found most memorable was the camaraderie he witnessed among his team members. "One member would say 'I can't finish the report, I need to fetch my daughter somewhere' and another would immediately reply 'pass it to me, I'll continue'," he shared.

Though the reports were developed for local use, they were eventually downloaded by scientists and policymakers around the world, even by the United States administration.

While the reports and models will only be useful in another respiratory disease outbreak, the framework developed by the teams will be timeless. The next time a health pandemic comes along, Singapore will be more equipped to predict its next move and hopefully block its path.

>
Associate Professors Alex Cook (right) and **Jason Yap** (far right) from the Saw Swee Hock School of Public Health were involved in powering the Ministry of Health's science- and data-based approach to fighting the spread of COVID-19, through statistical modelling and timely reports.

Established in Oct 2011, the Saw Swee Hock School of Public Health, under the National University of Singapore, specialises in the research, training and practice of epidemiology and public health.



PHOTOS: SAW SWEE HOCK SCHOOL OF PUBLIC HEALTH, NATIONAL UNIVERSITY OF SINGAPORE

TRIPPING THE POWER

How Singapore's version of a lockdown took on the name of an electrical safety device is uncertain.

Many have been credited for coming up with the term: PM Lee, Mr Gan and the entire MTF. No one really knows who thought of it first, but the MOH leadership said it was not them. "None of us, I think, would have been imaginative enough to come up with this," quipped Prof Mak.

The thinking behind the term was simple. "The concept of the circuit breaker is that if you have a surge in power, you have a circuit breaker that breaks it," said Mr Chan. "Take a pause so that you can get things in order, then you go back to normal."

PHOTO: NATIONAL LIBRARY BOARD, SINGAPORE, COVID-19 COLLECTION/LIM SHAO BIN

This relatable term would also facilitate clearer communications on the ground. “It’s such an apt way of describing what we wanted to do,” said Prof Mak. “Immediately stopping transmission of electricity was the parallel that made it easy for us in the public discourse, conversations and engagements to help people understand why we were doing this.”

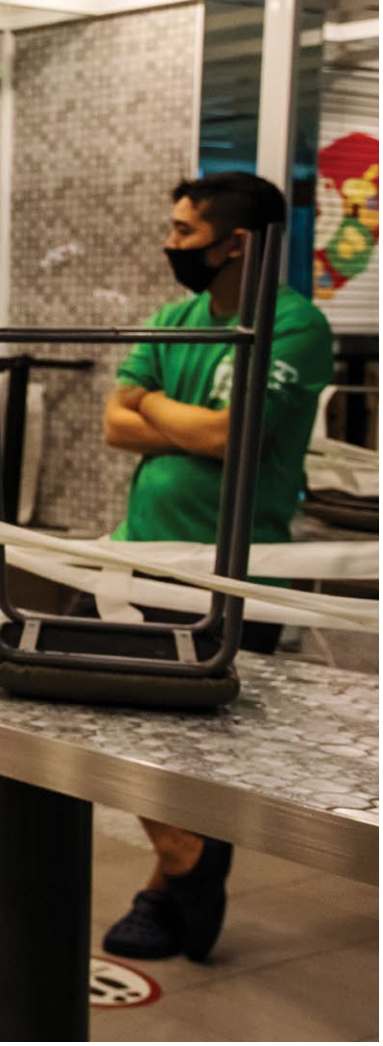
And compared to a “lockdown”, it certainly did not sound as severe. “You can reset the circuit, you can flip a switch and then electricity flows again,” added Prof Mak. “And therefore came the promise that these lockdowns would not be draconian, permanent fixtures – there was the prospect of hope at the end of the tunnel.”

But for now, hope had to wait. Almost overnight, Singapore switched off as the measures kicked in on April 7, 2020. The countdown to May 4 – the initial date of the circuit breaker’s end – began. But two weeks later, PM Lee made an earlier-than-expected appearance onscreen again, as the number of unlinked cases had not reduced.

“This suggests there is a larger, hidden reservoir of COVID-19 cases in the community, that is the source of these unlinked cases, which we have not detected,” he announced. “We want to bring down the community numbers decisively.

Then came the bombshell: the circuit breaker would be extended by another four weeks to June 1.

There would be closures of more workplaces, with the list of open essential services trimmed even further. Hairdressing and barber shops, confectioneries, and beverage outlets would be closed. Even grass-cutting would be less frequent in public areas.



A food delivery rider at Toast Box, Northpoint City Shopping Mall on May 25, 2020. Services necessary for daily living like food stalls were allowed to continue operating during circuit breaker, even though dining in was not permitted.

NO SNIPS AND SWEET TREATS FOR A TIME

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

The announcement that bubble tea shops had to close during circuit breaker led to long queues forming outside bubble tea kiosks around the country, with Singaporeans desperate to get their last dose of the sweet drink.

UNHAPPINESS BUBBLED OVER once the announcement was made public.

Ms Marilyn Song recalled the mini uproar that ensued when bubble tea shops had to close their shutters in April 2020, as part of tightening measures which further reduced the number of essential services.

Snaking queues were seen on the last day that they were allowed to operate, as bubble tea lovers made special efforts to get one last cup of their favourite drink. "People had a really big reaction to the bubble tea stores closing," said Ms Song from the Multi-Ministry Taskforce (MTF) secretariat team who was involved in working out the services that could operate during the circuit breaker.

But with the extension of the circuit breaker, the team had to whittle down the list of essential services to stem further spread of the virus. The priority was safety, not sugary drinks or treats.

"What do we allow to remain open? What do we consider as essential services?" said Permanent Secretary for Health Mr Chan Yeng Kit.

The rule of thumb was that services necessary for daily living, such as supermarkets and food stalls, should be allowed to continue operating.

Even then, it was still not totally clear what services were essential. "Cosmetic surgeons for those who need Botox – are they essential?" said Mr Chan, who revealed that such services were the subject of intense debates. "Is TCM (Traditional Chinese Medicine) essential or non-essential?"

"Some areas were quite grey," noted Ms Song.

Hairdressing services was another area where discussions arose on whether personal grooming was essential. "Some would argue that you could go three months without a haircut, compared to other types of services," explained Ms Song.

Beyond undetected cases, this extension had also stemmed from new medical knowledge collated from countries that had also enacted lockdowns, noted Professor Tan Chorh Chuan, Chief Health Scientist at MOH.

"The lockdowns need to be about two months – or about eight weeks. Because it takes about that amount of time to suppress the numbers to the levels needed," he said.

Another four long weeks lay ahead of them. While the majority would be able to handle the enforced measures, some could not. They would need help.

PROTECTING THE VULNERABLE

At a time when most of the nation stayed at home, Ms Uma Mageswari and her colleagues were out across the island, delivering dry food rations to seniors living alone.

While nurses and doctors were at the frontlines providing medical support to patients, Ms Mageswari was part of an army of social workers and volunteers who kept a close watch on this vulnerable segment of the population. She is a Senior Division Lead at the Silver Generation Office, the outreach arm of the Agency for Integrated Care (AIC).

"Our role is to visit the seniors, check in on their well-being and connect them with the programmes available," she explained. "We're a bridge for the seniors in terms of the schemes and support available."

But with the circuit breaker in effect, such daily visits had to be suspended. To adapt, most social services tapped on technology and pivoted to tele-engagements. Through weekly phone calls lasting 15 to 20 minutes, Ms Mageswari and her team would check in on their seniors.

"Are they okay? Do they need assistance with anything? We wanted to ensure that they were safe and doing okay," she said.

Ms Uma Mageswari, a Senior Division Lead at the Agency for Integrated Care's Silver Generation Office, kept in touch with vulnerable elderly folks during the circuit breaker, ensuring that they received the social services and assistance they needed.

For the vulnerable and the elderly, the circuit breaker and safe distancing measures can be hard to deal with. During the pandemic, staff and volunteers with the Agency for Integrated Care's Silver Generation Office fanned out across the island to check in on them, providing them with care and support. This included sending them groceries, providing them with haircutting services, and in some cases, even celebrating their birthdays with a simple cake.

PHOTOS: AGENCY FOR INTEGRATED CARE

"THEY WERE VERY CONFUSED. THEY WERE ASKING, 'I DON'T USUALLY TALK TO THE TV SO WHY MUST I TALK TO IT NOW?' SO THEY WEREN'T RESPONDING TO VOLUNTEERS ON ZOOM."

– MDM LOW MUI LANG, EXECUTIVE DIRECTOR AT THE PEACEHAVEN NURSING HOME

Seniors and technology, however, sometimes made an unsuitable pairing. During the circuit breaker, Mdm Low Mui Lang, Executive Director at the Peacehaven Nursing Home, witnessed the frustrations that some faced while communicating with their family members and volunteers via Zoom on laptop and TV screens.

"They were very confused. They were asking, 'I don't usually talk to the TV so why must I talk to it now?' So they weren't responding to volunteers on Zoom," she recalled. "Many were also unhappy because there were no physical family visits."

Strict restrictions were placed on visits to nursing homes, which were deemed to be one of the most high-risk settings that health authorities were keeping a close watch on.

PROTECTING NURSING HOME RESIDENTS

It was a COVID nightmare come true. When Lee Ah Mooi Old Age Home became the first to be hit by the virus on March 31, 2020, MOH moved swiftly to protect all nursing home residents islandwide.

Visitors were immediately banned. As the circuit breaker kicked in, bigger nursing homes also had to implement strict, segregated zones that prevented seniors from mingling. "They couldn't even go to the garden for daily exercise," said Mdm Low. "Everyone had to stay in their own living space."

The rapidly changing rules also caused confusion in the early days. "There were many MOH circulars going around daily – fast and furious. It was very tough to keep up and disseminate the information,"

PHOTO: E+ VIA GETTY IMAGES/KIATTISAKCH

Many seniors had to pick up digital skills during the pandemic. The role of technology was further underscored during the pandemic, and continues to be part of Singapore's shift towards preventive care, where Singaporeans can actively manage their health through the use of mobile applications.

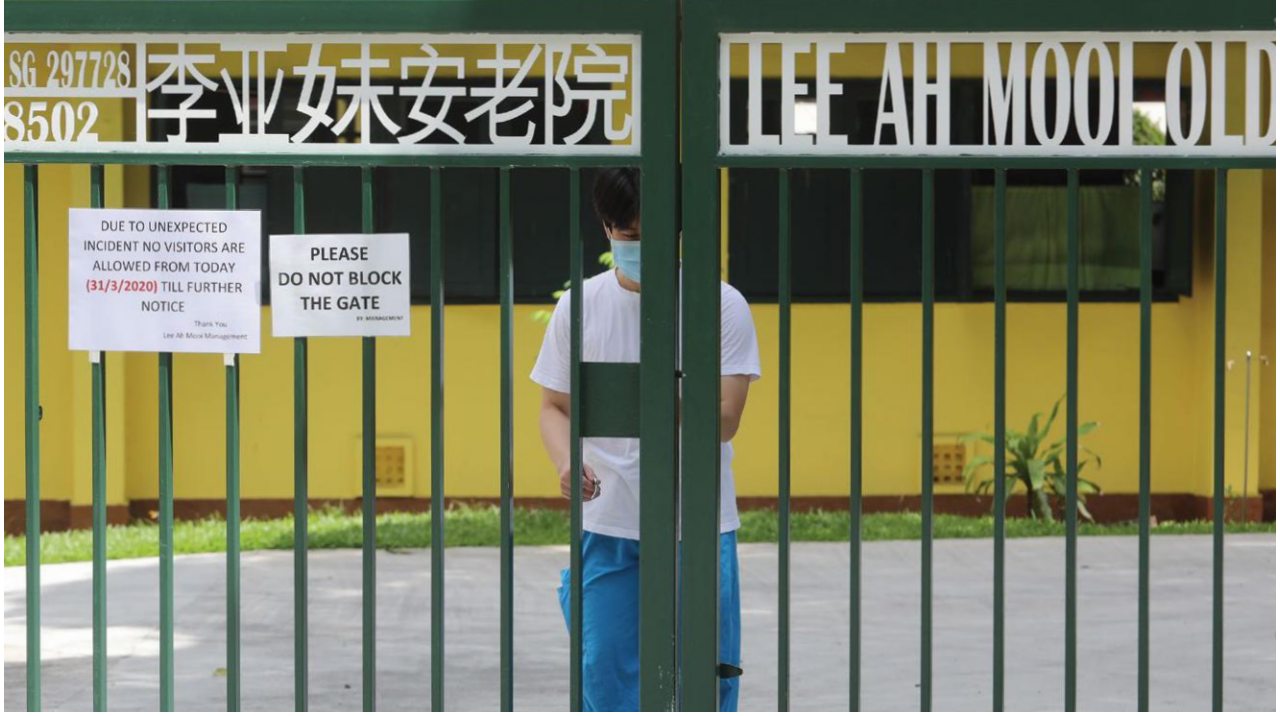


PHOTO: CHINESE MEDIA GROUP © SPH MEDIA LIMITED

Lee Ah Mooi Old Age Home was the first nursing home to be hit by the virus. Its response strategies served as a blueprint to help other nursing homes manage their outbreaks.

recalled Mr Then Kim Yuan, administrator of Lee Ah Mooi Old Age Home.

Eventually, the home came up with visual guides that helped residents understand the new measures better.

To cushion the blow of stringent restrictions and maintain morale, staff at another nursing home, Peacehaven, also tried to sweeten the mood – literally – through drinks and dessert. "We had to give them something they were looking forward to, and divert their attention from what is happening," said Mdm Low.

While the initial changes took some effort and getting used to, it allowed the homes to learn and adapt to the virus. Procedures and protocols were tweaked and tested, with staff now ready to respond to any outbreaks. "We all know what to do now," said Mr Then.

Having clear communications was also another lesson learnt. "The fear of the unknown can be suffocating for many," he added. "So I was brutally honest about what was happening on the ground."

When COVID-19 first hit Lee Ah Mooi Old Age Home, he posted daily updates on the Home's Facebook page, assuaging the worries of residents' family members. "It's very important for us to be the steady agent," he added.

By May 2020, MOH had also stepped up its defence. A total of 25,000 staff and residents across all 80 nursing homes would be tested in an effort to weed out the virus.

Accommodation would also be provided for as many resident-facing staff as possible, either at hotels or on-site facilities. This would reduce the risk of them spreading the virus to the community, if they had caught it.

The stringent approach quashed any fears that the nursing homes would see significant fatalities. By October 2020, there had been four COVID-related deaths among nursing home residents – making up 14 per cent of the deaths in Singapore.

In comparison, data from the United States showed that by June 2021, nearly one third of deaths in the country had been linked to nursing homes. The World Health Organization in Europe had also reported that half of COVID-related deaths in the region had been in long-term care facilities.

"The entire notion of separating people, preventing certain interactions, putting additional measures in place…it was all because we recognised that these were particularly vulnerable people at risk of having severe infection and death that we needed to protect," said Prof Mak.

But these residents were not the only group that MOH had to keep an eye on. There was another battle raging across the island involving tens of thousands of patients that would stretch the Ministry's resources to the limit.

FROM CHAOS TO CALM: HOW COVID-19 WAS MANAGED AT NURSING HOMES

AFTER AN 86-YEAR-OLD woman became Singapore's first nursing home resident to contract the virus, it almost left the rest of the seniors at Lee Ah Mooi Old Age Home devoid of any care staff in April 2020.

"It was a unique situation," said Mr Then Kim Yuan, administrator of the Home. "We had never planned for a total stand-down of the workforce."

Yet, that was exactly what happened, due to the Home's communal living and caring arrangement. "There were no split zones prior to the pandemic – everyone mingled," explained Ms Tay Shu Ying, a member of the Agency for Integrated Care's (AIC) COVID-19 Incident Response Team (CIRT) that was set up to support partners such as Lee Ah Mooi Old Age Home in managing COVID-19 patients.

It led to the entire workforce being "wiped out" when all of the care staff were being served quarantine orders, as Ms Tay described it.

The rapid response force was on standby 24/7 in the event of an outbreak. Together with three other AIC colleagues on the ground who were supporting off-site management, the team quickly assembled a separate temporary care team for the Home – made up of staff from other nursing homes.

"The temporary care team went the extra mile to support the Home, even though they weren't familiar with the care needs of the residents and were thrown into a new and unfamiliar environment," she said. Public health experts from MOH, National Public Health Laboratory and Tan Tock Seng Hospital also provided support and guidance on what to do, such as recommending swabbing schedules, conducting medical reviews of residents and giving advice on infection prevention and control measures.

For two weeks, the AIC team was stationed at Lee Ah Mooi Old Age Home daily for more than 12 hours, and performed multiple roles, from administrators, to welfare providers, to contact tracers. "We wanted to do everything that we could to support the Home through this difficult period," Ms Tay said.

A key task was to mitigate further spread of COVID-19 among residents in the Home. "We tried to space out the residents in the ward, but there wasn't enough space to ensure safe distancing for all," shared Mr Daniel Wong, who was part of the larger AIC team supporting the Home.

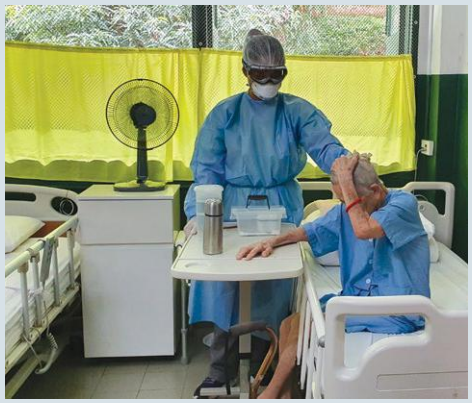
"As such, we worked with MOH to source for another possible nursing home to decant some residents to free up some space."

With MOH's help and the ready support from another nursing home operator, around 11 residents were safely decanted for the remainder of the enhanced surveillance period.

While containing the outbreak was not easy, the episode provided a blueprint for AIC to manage subsequent outbreaks in other nursing homes.

"We learnt a lot through this experience, which helped shape the processes and protocols that were put in place to help nursing homes safely manage COVID-19 cases," said Mr Wong.

WHILE CONTAINING THE OUTBREAK WAS NOT EASY, THE EPISODE PROVIDED A BLUEPRINT FOR THE AGENCY FOR INTEGRATED CARE TO MANAGE SUBSEQUENT OUTBREAKS IN OTHER NURSING HOMES.



PHOTOS: LEE AH MOOI OLD AGE HOME

When an elderly resident in the Lee Ah Mooi Old Age Home was found to have COVID-19, staff members who had been in contact with her had to be quarantined, leaving the Home bereft of manpower. The COVID-19 Incidence Response Team from the Agency for Integrated Care (AIC) quickly sprung into action to assemble a care team made up of staff members from other nursing homes, hospitals and agency nurses, coordinated by Ms Tay Shu Ying and her team at AIC.

CHAPTER 5

CLEARING THE DORMITORIES OF COVID-19

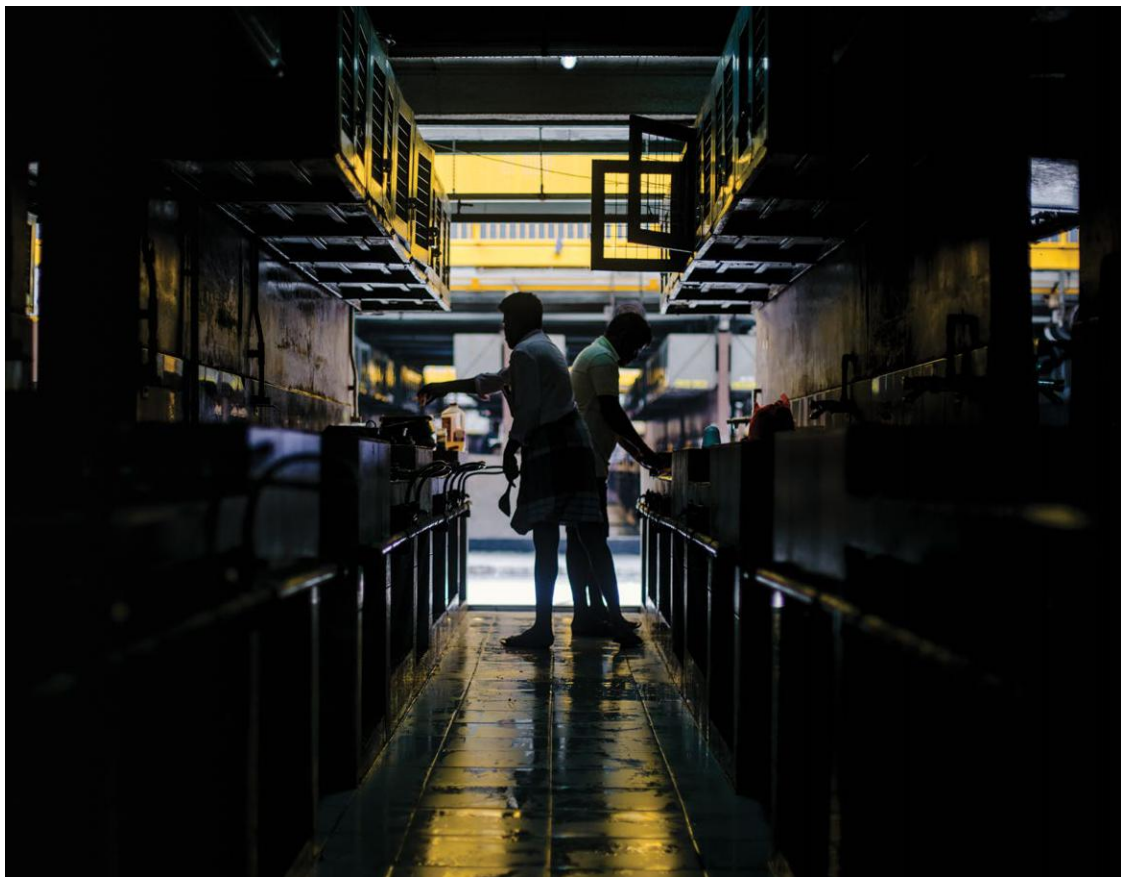
IN THE MIDST OF A RAGING PANDEMIC, SUCH CLOSE-QUARTER LIVING DESIGNS MEANT THAT THESE PURPOSE BUILT-DORMITORIES WERE TINDERBOXES WAITING TO BE IGNITED.

AS Singapore prepared for the circuit breaker in April 2020, a new COVID battlefront had opened that required precision targeting: its 43 purpose-built dormitories (PBDs) across the island.

Home to around 323,000 migrant workers, PBDs are large complexes that function as mini towns. They have minimarts and barber shops, offer services like laundry and remittances, and contain facilities such as gyms and outdoor recreation areas.

Each room holds up to 12 workers, sleeping in double-decker beds compactly arranged together. In normal times, such close-quarter living facilitated interaction and fostered cohesiveness among the workers, most of whom came from countries where communal living was the norm.

But in the midst of a raging pandemic, such designs meant that these PBDs were tinderboxes waiting to be ignited – the perfect setting for a contagious virus to spread like wildfire.



S11@Punggol, a sprawling purpose-built dormitory for migrant workers, was named as a COVID-19 cluster on Mar 30, 2020, when four confirmed cases were discovered. Over the next few weeks, the number of confirmed cases in the dormitory would continue to rise.

PHOTO: GETTY IMAGES/ORE HUIYING

Cochrane Lodge II, a purpose-built dormitory for migrant workers, was one of several to be gazetted as isolation areas by the Ministry of Health in Apr 2020. The move was aimed at curbing the spread of COVID-19, and residents were not allowed to leave the premises for 14 days.

"We started seeing, in rapid succession, outbreaks occurring in many dormitories...which was worrying because it suggested that the spread was occurring in several different settings", said Director of Medical Services Professor Kenneth Mak.

Cases began to surge among the migrant worker population, and cases in the community were rapidly increasing.

As Permanent Secretary for Health Mr Chan Yeng Kit put it: "We were on the verge of losing control; it was spreading." Drastic action was necessary.

A LOCKDOWN AMID A LOCKDOWN

Associate Professor Dan Yock Young recalled the snaking queues of migrant workers outside the Emergency Departments (EDs) of hospitals in the first week of April 2020.

"There were so many waiting to see a doctor, they were spilling out onto the roads...the hospitals just couldn't clear them fast enough," shared Assoc Prof Dan, the Ministry of Health's (MOH) Deputy Director of Medical Services (Health Services Group)*.

"We realised that we had a huge challenge. Because if the hospitals were paralysed, we would be overwhelmed."

There was little choice – the dormitories had to be sealed off. On April 6, 2020, three days before the country went into a national lockdown, the Government quickly set up the Joint Task Force (Assurance), also known as the JTF(A). Later that month, on April 26, 2020, the Medical Operations Task Force (MOTF) was set up.

The MOTF, led by MOH and supported by the Singapore Armed Forces (SAF), oversaw and coordinated on-the-ground healthcare efforts for the community and migrant workers.

The JTF(A) – comprising officers from MOH, the Ministry of Manpower (MOM), the National Environment Agency, the SAF, the Singapore Police Force and the Migrant Workers' Centre – would support the migrant worker population and dormitory operations alongside the MOTF.

On April 5, 2020, just a day before the JTF(A) was set up, the Government also gazetted two of the hardest hit PBDs as isolation areas: S11 Dormitory @ Punggol and Westlite Toh Guan. The move placed around 20,000 workers in a 14-day quarantine.

* WITH EFFECT FROM MAY 1, 2023, THE DEPUTY DIRECTOR OF MEDICAL SERVICES (HEALTH SERVICES GROUP) WAS RE-DESIGNATED AS THE DEPUTY DIRECTOR-GENERAL OF HEALTH (HEALTH SERVICES GROUP).

The Westlite Toh Guan dormitory in Jurong East was one of the first purpose-built dormitories to be gazetted as an isolation area due to a spike in COVID-19 cases within its community.

Five days later, on April 10, all dormitories island-wide had been sealed off in an attempt to detect and isolate every case. It was a community-specific measure during the circuit breaker – one that separated migrant workers from the rest of Singapore. In effect, it was two circuit breakers running in parallel.

"The idea was to ring-fence this spread so that we were not fighting a big fire, but multiple small fires we could at least contain," explained Prof Mak. "It would have been a nightmare scenario if there was free movement and free transmission and infection that occurred back and forth between the dormitories and community."

A critical aim was to cut off the virus' advance. "If we could contain the outbreak within the dormitories and not allow it to spread, maybe we would have a fighting chance," added Mr Chan.

To support the workers, the JTF(A) deployed teams to provide care. While its Forward Assurance and Support Teams (FAST) attended to daily needs such as food, welfare and ensured safe distancing measures, the MOTF would take charge of healthcare.

ACCELERATED PLANNING AND OPERATIONS

The MOH teams had only 48 hours to devise their medical support plans for the dormitories.

"Time was of the essence – we could not wait for a perfect plan. We had to execute the plan first, then refine and tweak it as it went along," explained Adjunct Associate Professor Raymond Chua, MOH's Deputy Director of Medical Services (Health Regulation Group) and Deputy Commander of the MOTF*.

"If we had waited for the perfect plan, the spread would have gone beyond control. We needed a timely rollout coupled with agility in our plans."

To optimise resources for all 43 PBDs,

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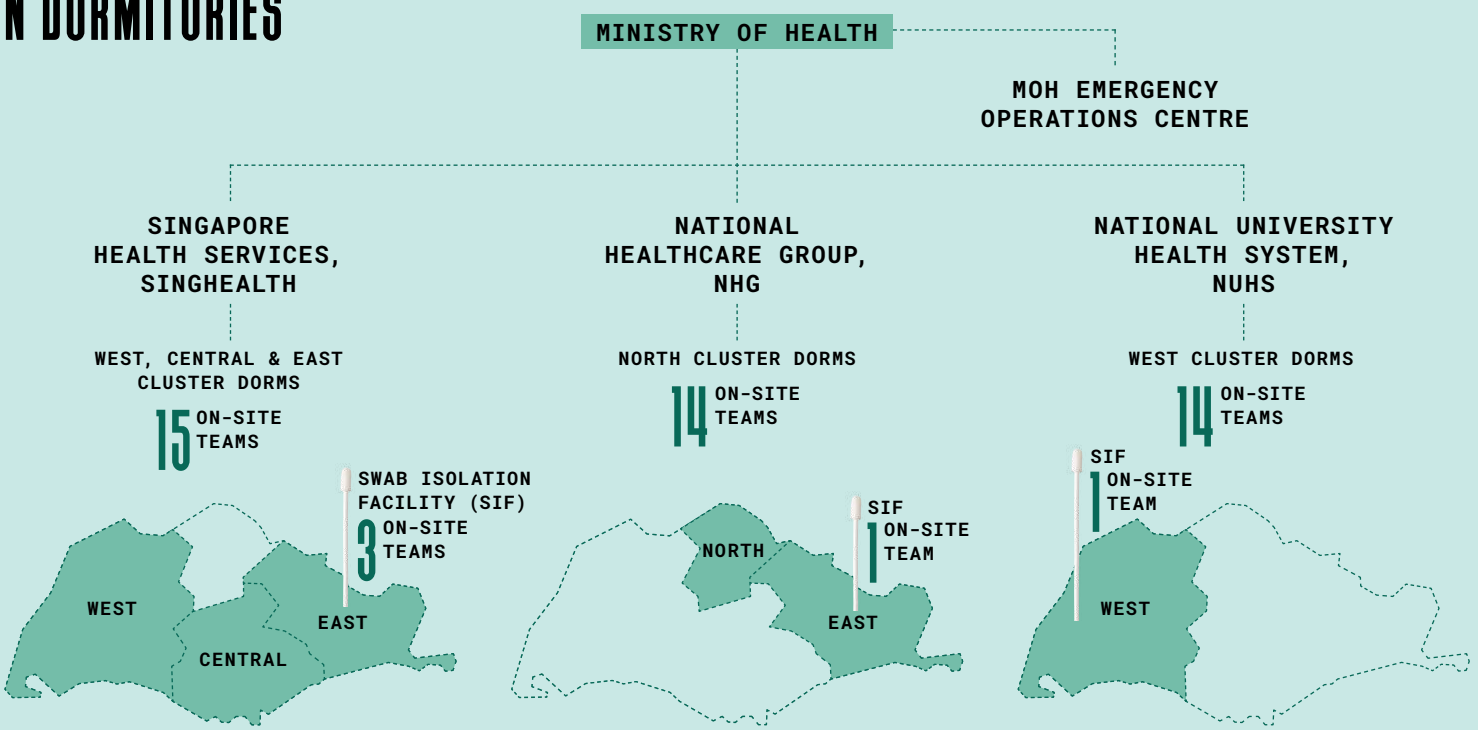
MOH tapped on its three public healthcare clusters: Singapore Health Services (SingHealth), the National Healthcare Group (NHG) and the National University Health System (NUHS) to augment the SAF Medical Corps, who were first to be deployed on the ground. Private medical groups were tasked to look after non-purpose-built dorms.

Each cluster would be responsible for 14 to 15 PBDs which were split regionally. NHG would take charge of the dorms in the north, NUHS would handle the west, while SingHealth would be responsible for the east, west and central areas.

Each cluster would also have a medical lead, who formulated the deployment strategies and implemented clinical control protocols for the respective dorms at breakneck speed.

PROVIDING MEDICAL CARE FOR MIGRANT WORKERS IN DORMITORIES

The Singapore Armed Forces Medical Corps was the first to enter the dormitories to help clear them of the virus. But as the number of positive cases among migrant workers kept rising and the COVID-19 clusters in the dormitories ballooned, the Ministry of Health deployed its three public healthcare clusters to provide ground support.



THE MISSION WAS CLEAR:

TO CONTAIN THE OUTBREAKS IN THE DORMITORIES

IN THE SHORTEST TIME POSSIBLE.

The medical operations consisted of three key areas. First, to provide round-the-clock medical care for common ailments such as the flu as well as chronic diseases. Second, to render enhanced medical monitoring and support to workers who had contracted COVID-19. Lastly, to identify and transfer the potentially vulnerable and ill workers to other care facilities and hospitals.

"The key mission was to control and stop the outbreak," explained Assoc Prof Dan from MOH, who, together with Dr Andrew Aw, was one of the two Deputy Commanders (Medical) of the Joint Task Force.

This required two key courses of action: surveillance and segregation. For instance, there were daily routines where dormitories would screen their workers, and those feeling unwell would report to their dormitory operators. They would then be taken to temporary medical posts set up in each dormitory.

Besides isolating unwell workers, the general population had to be systematically segregated as well, depending on whether they had come into contact with positive cases. Older workers and those with pre-existing chronic health conditions who were more vulnerable to the virus were separated. Safe management measures were also instituted to disrupt transmission within the dormitories.

Nothing was left to chance, from designing routes that different groups of workers should take as they moved within the dorms, to designating toilets.

Medical teams comprising doctors, nurses and technicians were sent to dormitories around Singapore to test the migrant workers and treat those infected with COVID-19.

Ng Teng Fong General Hospital's healthcare workers fanned out to dormitories in the western part of Singapore to provide medical and mobile swabbing operations for migrant workers.

PHOTOS: NATIONAL UNIVERSITY HEALTH SYSTEM

The mission was clear: to contain the outbreaks in the dormitories in the shortest time possible. Within a week, medical posts had been set up in all PBDs, each fully staffed with teams of doctors, nurses and technicians. Tents had been erected, barriers installed and tables set up.

"There was a duty and quiet determination to make sure that we provided the best care possible for our migrant workers because they had helped to build our country," said Assoc Prof Dan. "At the same time, we knew that if we were able to clear the dorms of COVID-19, we would be able to protect the rest of Singapore."

The pressure was on. But things would only get worse before they got better.

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

Fully functional medical stations were set up within the dormitories, to enable healthcare workers to swab, screen and treat the migrant workers.

SWAB FORCE: TESTING 1,500 ESSENTIAL WORKERS IN 8 HOURS

FIRST CAME THE PAIN, then the tears. Eyes scrunched up in agony, a migrant worker jolted involuntarily as the straw-like swab stick plunged deep into his nose.

Behind him, hundreds more waited their turn to be tested by the 20 swab teams deployed to the sprawling, unused school campus at Bukit Merah on April 12, 2020.

It was a mass swabbing operation on a Sunday, conducted for essential workers who were plucked from their dormitories that were plagued by the COVID-19 outbreak and temporarily housed in the school.

This exercise was critical to sieve out essential workers who were well and able to keep the country's critical services operating, in the midst of the circuit breaker.

The medical crew, decked out in personal protective equipment, were racing against time. There were more than 1,500 people to test. Everyone had to be cleared by the day's end.

If the task sounded challenging, it was made even more daunting with a one-day advance notice to launch this operation. A "bombshell" was how Dr Edwin Low described the shock he received on a Saturday morning (April 11).

"That was a totally big surprise," he said, especially since he had only been in his new role as SingHealth's Lead of the Medical Operations Task Force (MOTF) for barely an hour before being given this assignment.

He recalled being told "mobilise whatever you think is necessary to do this" and accordingly sprang into action.

Within hours, the swab force was assembled, consisting of teams from Singapore General Hospital and National Dental Centre. Boxes of biohazard waste bags, swab sticks and other medical equipment were quickly packed.

The teams achieved the near impossible. By 6pm on Sunday, every migrant worker had been tested in just over eight hours.

The swabbing operation foreshadowed the need for more mass testing exercises in subsequent months to manage the COVID-19 spread.

Dr Edwin Low, SingHealth's Lead of the Medical Operations Task Force, was tasked to identify essential workers who were well, and could continue to work during the circuit breaker.

Securing an unused school campus in Bukit Merah, he organised a mass swabbing exercise for migrant workers who had been pulled out from their dormitories.

Associate Professor Dan Yock Young, Deputy Director of Medical Services (Health Services Group) at the Ministry of Health (right), worked closely with the Ministry of Manpower to coordinate the medical response at the dormitories.

On the ground, the different healthcare clusters were tasked to oversee dormitories in different parts of Singapore. **Associate Professor Thomas Loh**, medical lead at the National University Health System (left), was in charge of the medical operations at 14 dormitories in the west.

INTO THE FRAY

For most of the healthcare professionals, this was a step into unfamiliar territory. "The majority of our healthcare staff were trained to provide and organise care in hospitals or polyclinics – not out in the field," noted Assoc Prof Dan.

Medical leads in the three clusters recalled the uncertainty that gripped their teams prior to entering the dorms.

"There were quite a lot of unknowns. Besides entering areas that none of us were familiar with, we were also dealing with a virus we knew very little about at that point in time – how it spread, what was needed," said Professor Benjamin Seet, National Healthcare Group's medical lead and Deputy Group Chief Executive Officer (Education & Research), who oversaw their operations across 14 dormitories in the north.

Suddenly, the likes of neurologists, paediatricians and orthopaedic surgeons were all tasked to handle infectious diseases.

"We didn't know what to expect, because this was not within the normal realm of activities," noted Associate Professor Thomas Loh, NUHS' medical lead who was tasked to look after 14 dormitories in the west.

But they bravely entered the

Professor Benjamin Seet (right) Deputy Group Chief Executive Officer (Education & Research) and medical lead at the National Healthcare Group, was tasked to oversee the medical operations across 14 dormitories in the north of Singapore.

PHOTO: NATIONAL HEALTHCARE GROUP

dormitories and encountered a virus that seemed unstoppable.

Massive clusters were popping up, with the S11 Dormitory @ Punggol rapidly becoming Singapore's biggest with over 2,000 cases. The medical team there struggled to halt the rampaging virus.

To focus testing efforts and resources, MOH decided that every migrant worker who showed acute respiratory symptoms would be treated as a COVID patient – no tests were necessary. The same applied to other severely affected dormitories.

The medical teams operated in formidable conditions. Logistics, security and communications all posed daily

HOTELS AND EXPO HALLS USED AS ISOLATION AND CARE FACILITIES

EVERY ROOM WAS FULL. So full that some migrant workers had to be put up in makeshift tents outdoors to recover.

As migrant workers contracted the virus in the hundreds, medical teams found themselves in a bind: where to isolate them and those awaiting their swab test results?

"The isolation facilities in a dormitory are very limited," said Dr Edwin Low, SingHealth's medical lead. "We kept running out of space."

This was where Swab Isolation Facilities (SIFs) and Community Care Facilities (CCFs) came into use.

Hotels were converted into SIFs to temporarily accommodate workers waiting for their swab results. COVID-positive patients with mild symptoms were transferred to chalets and convention halls that had been transformed into CCFs.

The majority of them were housed at the Singapore EXPO. The massive CCF complex, managed by SingHealth, could take in more than 3,000 recovering patients.

"The CCF made things a lot better," said Dr Low. "Because we're able to give them a safe isolation area, and care for them in a much more effective manner."

PHOTO: INTEGRATED HEALTH INFORMATION SYSTEMS PTE LTD

Community Care Facilities, such as the one at Singapore Expo and Max Atria (above), took in recovering COVID-19 patients who are mostly well, with mild symptoms and lower risk factors. These spaces were crucial in shifting the patient load away from hospitals.

"THE FACILITIES OFFERED TO US WERE LESS THAN IDEAL IN MANY SITUATIONS – CAR PARKS, BASKETBALL COURTS... IT WAS NOT SIMPLE...DEALING WITH ISSUES LIKE POWER SUPPLY, WATER, INFECTION CONTROL AND WASTE DISPOSAL."

– PROFESSOR BENJAMIN SEET, NATIONAL HEALTHCARE GROUP'S MEDICAL LEAD AND DEPUTY GROUP CHIEF EXECUTIVE OFFICER (EDUCATION & RESEARCH)

PHOTO: NATIONAL HEALTHCARE GROUP

In each dormitory, medical teams had to assess where the medical stations could be set up, and adapt their operations as they went along. This meant that the teams were working out of areas like basketball courts, car parks and canteens.

challenges that they had to solve by any possible means.

"The facilities offered to us were less than ideal in many situations – car parks, basketball courts," noted Prof Seet. "It was not simple – setting up in a car park and dealing with issues like power supply, water, infection control and waste disposal."

"It's all done on the fly," added Assoc Prof Loh. "In a war zone, you go in and see what your situation is, and then make a call. We did just that."

But what truly made it unbearable was the intense heat. In such open spaces, temperatures could reach up to a searing 37°C. Exposed to the elements in their stifling personal protective equipment (PPE), some healthcare employees could not endure the heat.

"They couldn't tolerate it. We had to let them rest," recounted Associate Professor Steven Thng, Senior Consultant at the National Skin Centre, who was Prof Seet's deputy on the ground. "We were desperately trying to see how to cool the deployed teams."

While air conditioners and air coolers

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

The medical work in the dormitories was made even more challenging due to the intense heat. At times, healthcare workers were working at spaces where the temperatures reached 37°C.

To cool the premises down, air conditioners and air coolers were brought in, but these had to be strategically placed to not circulate the virus around the space.

were brought in, such equipment had to be deployed carefully. "Air coolers might circulate the virus," added Assoc Prof Thng. "So we even had to consult the infection control specialists on which was the best direction to blow the air towards."

The physical security of healthcare employees was also a concern. With small teams of people operating in massive dorms that housed thousands of migrant workers who had suddenly been restricted from moving freely within the premises, tensions were simmering.

In the initial stages of uncertainty and apprehension, there were also security concerns in dormitories that were locked down. The fear of rioting from a crowd under confinement was real, especially if the lockdown was prolonged.

"The mental health of the migrant workers was a big challenge. They were locked down, had limited access to information and often, we couldn't even communicate effectively what was happening or what our plans were to stop the outbreak," noted Assoc Prof Dan.

"So one can imagine how they were confused – being swabbed multiple times, moved around and yet still unable to go out."

There was also the issue of battle fatigue among the healthcare workers. "The lowest point was when the outbreak was raging. Despite our efforts, we seemed unable to stop the virus in the dorms," added Assoc Prof Dan. "We would self-doubt and wonder: were we ever going to win, or despite our efforts, witness the inevitable?"

>
As the days stretched on, the migrant workers began showing signs of distress at being cooped up in their rooms, with no sure sign of when they could be released. To assure them, the medical teams put up posters sharing information about the virus in different languages such as Mandarin, Tamil and Bengali. Counselling services were also offered to them.

FIGHTING AT THE FRONTLINES

"WE WERE RUNNING A 'MINI-COVID HOSPITAL' WITHIN THE DORM."

– DR LOH LIK ENG, SENIOR CONSULTANT AT KK WOMEN'S AND CHILDREN'S HOSPITAL, INTENSIVE CARE UNIT FOR CHILDREN

FOR PAEDIATRICIAN Dr Loh Lik Eng, it had been more than two decades since she last treated an adult patient – until COVID-19 hit.

Her medical world turned 180 degrees at the Shaw Lodge Dormitory, where she led a team of seven medical personnel to care for almost a thousand migrant workers.

From diagnosis to medication dosage, everything was different, shared the Senior Consultant at KK Women's and Children's Hospital who works at the Intensive Care Unit for children.

For instance, while medication prescribed for children had to be measured in micrograms, she and her team had to recalibrate this practice for adults. "We had to look up information, making sure we were doing things right," she recalled. "We were looking up chronic conditions that we don't deal with in kids."

For almost four months, the days were demanding, the pace intense. Daily operations ran like clockwork, with the team's morning rounds starting at 9.30am and ending at 4.30pm – amid the oppressive heat.

"We had to be gowned up, gloved up, and masked up," she said, describing the PPEs as "impermeable". "We were sweating like crazy."

As COVID-19 cases surged, healthcare institutions could not cope with the sheer number of patients. Many had to be treated at the dorm itself. "We were running a 'mini-COVID hospital' within the dorm," she added.

For some patients, frustration boiled over. "Some were so stressed by the situation that they would call you 10 times a night," recalled Dr Loh, who had an on-call phone to be contactable round the clock in case of emergencies.

It was not only the migrant workers who felt the fatigue – her team members felt it too. What they thought was a two-month stint suddenly seemed to have no finish line when the situation worsened.

"Every time we had a new outbreak, we just went 'oh no, it's not ending'," she shared. "How long was this going to last?"

MEETING OTHER CRITICAL NEEDS

With migrant workers confined to their lodgings for weeks, dorm operations went beyond providing medical and daily care, to boosting their morale as well.

"The stress was very high on the migrant workers," shared Assoc Prof Thng. "They had very little information, did not know what was happening, did not know when the end was in sight and they were kept in their bunks."

"Put yourself in their situation," added Dr Low. "You come here to work, now you can't work. You don't know if your company is going to fold. You don't know how your own family is back home. You can imagine a lot of things weighing on their minds and then being cooped up."

To assuage their concerns and enhance communications, the medical teams put up posters sharing information about the virus, which were translated into Mandarin, Tamil and Bengali. Holistic Outreach Teams provided counselling

services for those who needed them.

Migrant workers themselves even created Facebook groups that translated and shared news from the media, MOM and MOH websites. The grassroots initiative was well appreciated.

For the medical staff toiling tirelessly on the ground, the leadership teams also ensured that they were well taken care of. Ice cream rounds, or "morale rounds" as described by Assoc Prof Thng, were daily affairs.

Working with sports complexes, some facilities were secured for staff to shower and change their clothes before heading home each day. As the virus raged on, it only spurred the battle-hardened teams to persevere. Everyone was dedicated to doing their duty.

The numbers, however, continued to rise. By May 2020, there were over 15,000 cases in the dormitories. But the Government would soon take a major step to turn things around.

"YOU CAN IMAGINE A LOT OF THINGS WEIGHING ON THE MIGRANT WORKERS' MINDS AND THEN BEING COOPED UP."

– ASSOC PROF STEVEN THNG, SENIOR CONSULTANT AT THE NATIONAL SKIN CENTRE

RESOLUTE PUSH TO GET CLEARED

In June 2020, the Singapore government stepped up efforts in proactive testing and screening of workers in the dormitories – whether they were symptomatic or not. The focus shifted from containing the outbreak to clearing it out from the dorms completely.

Two reasons underpinned the major move: to allow workers to resume work safely as Singapore emerged from the circuit breaker, and to identify asymptomatic cases that could be spreading the virus undetected.

"This testing was to make sure we did not miss any cases," explained Adj Assoc Prof Raymond Chua. "One of the things we wanted to do was to break the chain of transmission, which was complicated by the fact that people were asymptomatic. To be able to do so, we had to make sure that we tested everyone."

The testing strategy involved a three-pronged identification process: to distinguish those who had never been infected from those who had since recovered and those currently infected. This would help MOH better segregate the workers who had not been infected, and avoid isolating recovered workers for prolonged periods.

Serology tests would be the instrument of choice in dormitories with higher levels of infection. While Polymerase Chain Reaction (PCR) tests could only diagnose new or current infections, a serology test could identify whether a person had a previous history of infection by detecting COVID-19 antibodies in blood samples. This required personnel skilled in the medical art of phlebotomy – or drawing blood.

"That was quite challenging, having to get nurses and phlebotomists together and complete testing for about 60,000 workers in two to three weeks," said Assoc Prof Thng.

Over the next two months, more than 3,000 migrant workers were tested daily in operations lasting over eight hours. "After that first week, I became very good at

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

In Jun 2020, the Government stepped up efforts in testing and screening workers, in a bid to clear it out from the dormitories completely. By Aug 11, 2020, testing for all 323,000 migrant workers was completed.

THE FOCUS SHIFTED FROM CONTAINING THE OUTBREAK TO CLEARING IT OUT FROM THE DORMS COMPLETELY.

blood-taking," quipped Assoc Prof Thng, a dermatologist by training.

But that tedious process marked the turning point of the dormitory battles, noted Dr Low. "It's basically systematically going dorm by dorm, and clearing all the people room by room...that started the route to normalcy," he said.

In one month, by July 2020, more than 70 per cent of workers had either recovered or tested negative. The early surge in cases – once the scourge of the medical teams – was also beginning to work in Singapore's favour.

"As more and more people were infected, the chances of getting immunity became higher," explained Adj Assoc Prof Chua.

By August 2020, testing for all workers was complete. Their confinement was finally over on August 11. For now, they were free to resume their jobs.

For the healthcare professionals, it was equally exhilarating to witness the migrant workers going back to work. "It was testament to the work we had done – from providing medical care, to phlebotomy, to seeing them finally released into the community," said Assoc Prof Thng.

The numbers that the medical staff pulled off were staggering. In just over four months, the teams from SingHealth alone had completed over 51,000 swab tests and nearly 45,000 serology tests across 15 dormitories. Nearly 49,000 patients were seen and treated.

"I'm glad we were able to assemble a really sterling team that performed extraordinarily," said Dr Low. "They went day in, day out in very austere conditions, to do that kind of work – and they did it with a lot of compassion as well."

The efforts of the dormitory teams paid off for Singapore, as they paved the way for an integral part of the country's labour force to return to work. Just in time too, as the country had just recently reopened after a lockdown.

CHAPTER 6

LIVES VS

FOR 55 days, the nation had hunkered down and remained home to stem the spread of COVID-19. As case numbers dropped, it was time to lift the restrictions. June 2, 2020 was the date that marked the end of Singapore's circuit breaker.

"After two months, we found that the circuit breaker was going according to plan," said Mr Ng How Yue, the Ministry of Health's (MOH) Permanent Secretary for Health Development. "The fall in case numbers was what we predicted – we thought we could open up."

This meant that students could return to school, healthcare services like dental procedures and cancer screening could resume, and factories could restart operations.

Singapore's decision to reopen also revolved around a critical issue: lives versus livelihoods. It was a delicate balancing act.

"We knew that the tighter the restrictions, the more livelihoods we affected," said Mr Chan Yeng Kit, MOH's Permanent Secretary for Health. "But the looser we are, the more lives might potentially be lost."

To the decision makers, resuming activities presented a far more formidable challenge than simply shutting everything down.

"When you lock down, everything closes – very straightforward," noted Mr Chan. "But the biggest challenge is, how do you reopen from the circuit breaker in a safe way?"

>
Empty tables at a food centre in Singapore. When Singapore tightened its COVID-19 restrictions from May 16 to Jun 13 due to the rise of COVID-19 cases in the community, only groups of two people outside were allowed and dining-in at eateries was prohibited.

LIVELIHOODS

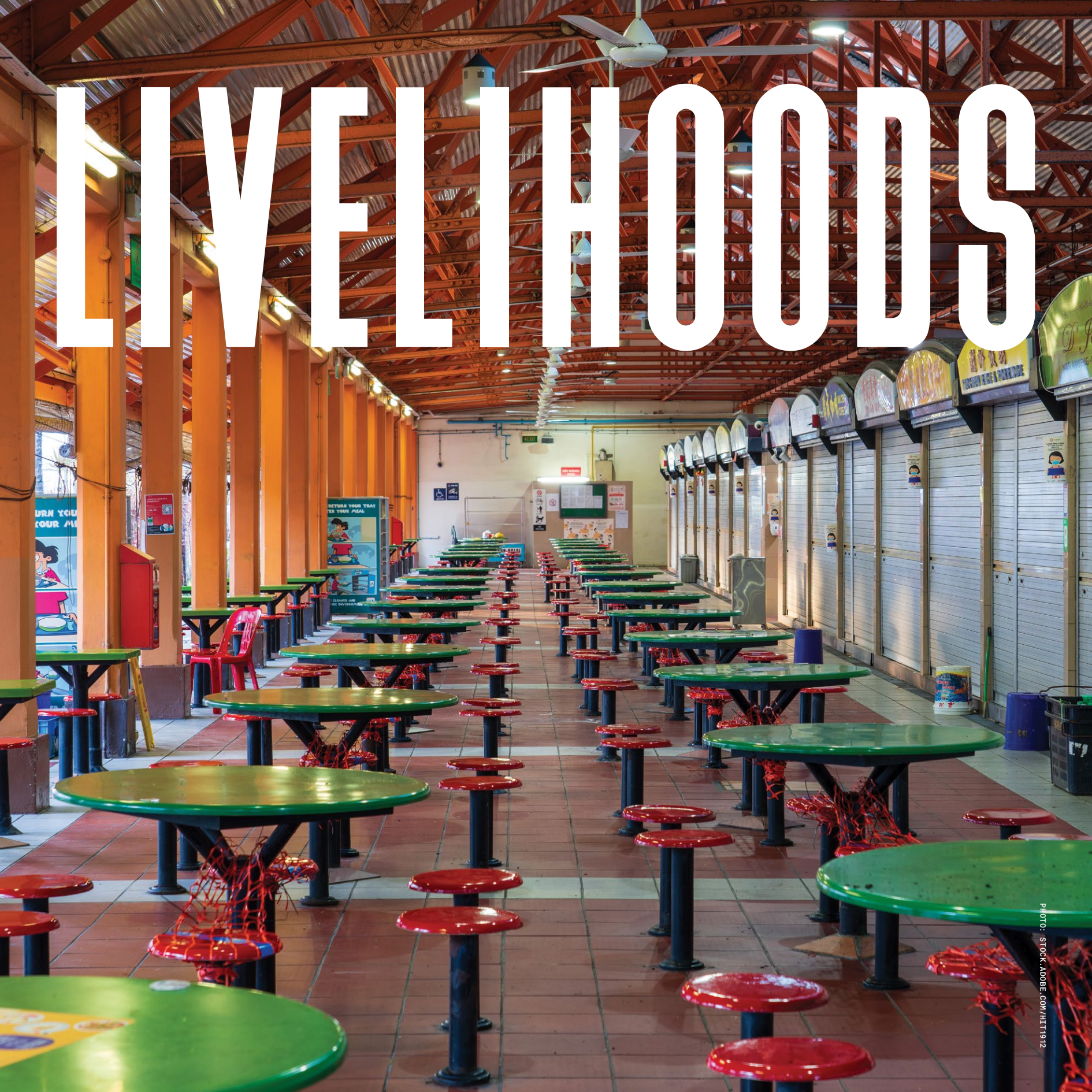


PHOTO: STOCK.ADOBE.COM/HITT1912

PHOTO: REUTERS/EDGAR SU

Children from St James' Church Kindergarten wearing protective face masks sanitise their hands before they attend classes. Schools were allowed to reopen in Singapore on Jun 2, 2020.

HAMMER AND DANCE

The consensus among the leaders was: reopen in phases.

This was also part of the "hammer and dance" approach conceptualised by French-Spanish engineer Tomas Pueyo. Published in March 2020, his essay garnered 15 million views within just three months.

While the "hammer" referred to the stringent steps taken to stop COVID-19 from spreading, primarily through lockdowns, the "dance" would see the relaxation of certain measures that allowed some economic activities and general life to resume.

"You cannot lock down forever," said Professor Vernon Lee, MOH's Senior Director of the Communicable Diseases Division. "During the dance, we will see cases rise. But you introduce a few more safe management measures, see the cases come down, and then you can relax a bit again."

The "hammer and dance" approach was seen by governments and epidemiologists as a good way to combat the virus while balancing economic and social impacts.

"It was very appropriate," noted Professor Leo Yee Sin, Executive Director of the National Centre for Infectious Diseases. "Suppression is not enough – we have to quickly find other ways which give us the ability to manage and cope."

So it was not immediately back to normal for Singapore at the end of the circuit breaker. Restaurants and hawker centres still had their seats cordoned off; eating in was not yet allowed. Department stores stayed empty, and no one could gather yet.

Singapore had entered Phase 1, which was aptly themed "safe reopening". This calibrated approach was adapted from watching what other countries were doing.

IT WAS NOT IMMEDIATELY BACK TO NORMAL FOR SINGAPORE AT THE END OF THE CIRCUIT BREAKER.

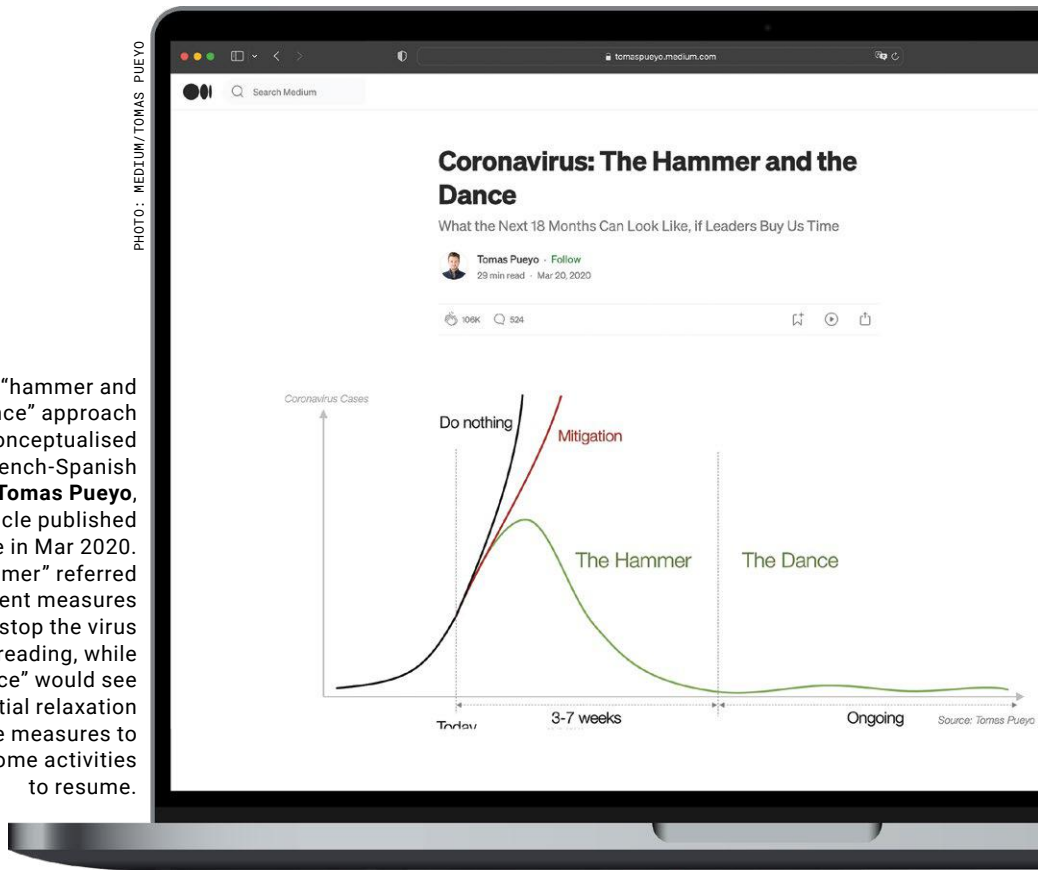
In the West, countries like the United States were beginning to reopen fully. Restaurants and shopping malls were back in business. People could gather in large numbers again. Capacity limits were lifted for all events. In some states, mask-wearing was no longer mandated.

"We felt that some of them relaxed too early," said MOH's Director of Medical Services Professor Kenneth Mak. "Each time they relaxed, they relaxed with a big bang, by removing many of the measures at one time. And then a week or two later, with mega participation events, they started to see big surges of infection occurring."

This was simply not tenable. "If we were going to relax those rules, it had to be paced, it had to be a gradual stepping up of the normal activities we were accustomed to doing," he added.

It meant careful calibration. "Take a step at a time," said Mr Chan. "Don't do a big jump. Because if you do, rolling the measures back is going to be difficult."

PHOTO: MEDIUM/TOMAS PUEYO



The "hammer and dance" approach was conceptualised by French-Spanish engineer **Tomas Pueyo**, in an article published online in Mar 2020. The "hammer" referred to stringent measures taken to stop the virus from spreading, while the "dance" would see the partial relaxation of these measures to allow some activities to resume.

"THE FIRST SET OF DISCUSSIONS WERE REALLY ABOUT WHAT TO RESUME AND WHAT THE PARAMETERS WOULD BE."

– MS ELIZABETH QUAH,
FORMER GROUP DIRECTOR OF THE PLANNING DIVISION AT THE MINISTRY OF HEALTH

Three weeks into the circuit breaker, **Ms Elizabeth Quah** and her team began planning how Singapore could reopen safely. The team developed a risk-based approach to determine which activities could resume first, while weighing the economic impact against risks of infection.

FRAMEWORK TO FREEDOM

Figuring out the steps to reopening was done by the Post-Circuit Breaker Task Group, who started planning the country's exit from the lockdown as early as three weeks into the circuit breaker.

"The first set of discussions were really about what to resume and what the parameters would be," explained Ms Elizabeth Quah, then-Group Director of MOH's Planning Division, who was in the Post-Circuit Breaker Task Group. She is currently SingHealth's Group Director of its Regional Hospital Network.

From these parameters, the group conceptualised a framework that began with the establishment of safe management measures. This included restricted group sizes for gatherings, safe distancing requirements, capacity limits for premises and zones for large events, and mandatory mask-wearing. These measures were meant to mitigate potential risk drivers – factors that would escalate the virus' spread.

STRIKING REMINDERS

VISUALS: LAND TRANSPORT AUTHORITY

THEY WERE EVERYWHERE. Stuck onto the seats at bus stops and train stations, pasted onto the floors of hospitals and schools, the safe-distancing stickers came in all hues of bright colours – from neon green to electric yellow.

'Keep 1 metre apart', 'Keep social distance', 'Protect yourself and others!' were some of the messages emblazoned on them in big bold letters. These were the signs of a country ready to reopen.

But as people cautiously emerged from domestic hibernation, the round, colourful stickers peppering public spaces were a reminder that a virus was still raging across the island. Vigilance was key – wearing masks was the norm and hand sanitisers were a public commodity found everywhere. The weary nation still had to remain wary.

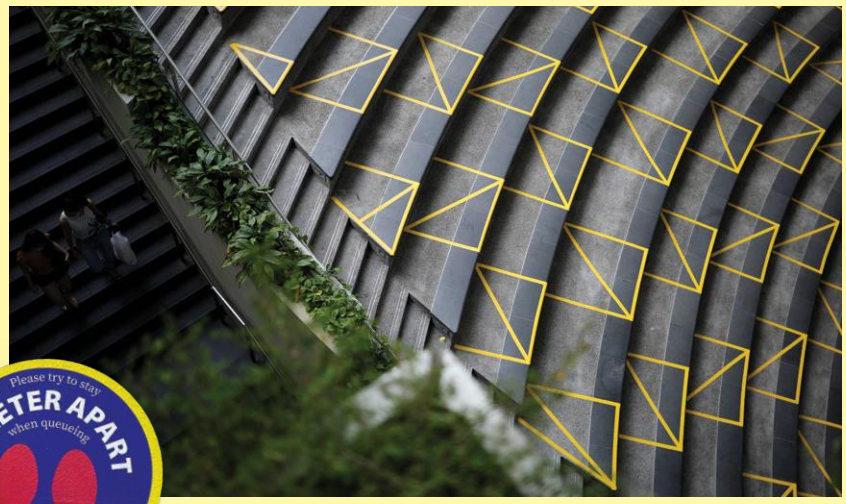


PHOTO: REUTERS/EDGAR SU

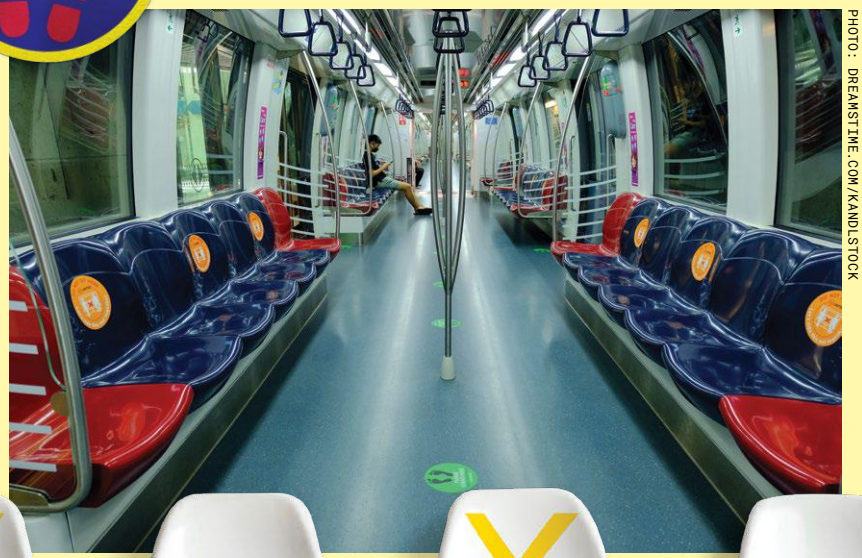


PHOTO: DREAMSTIME.COM/KANDLSTOCK

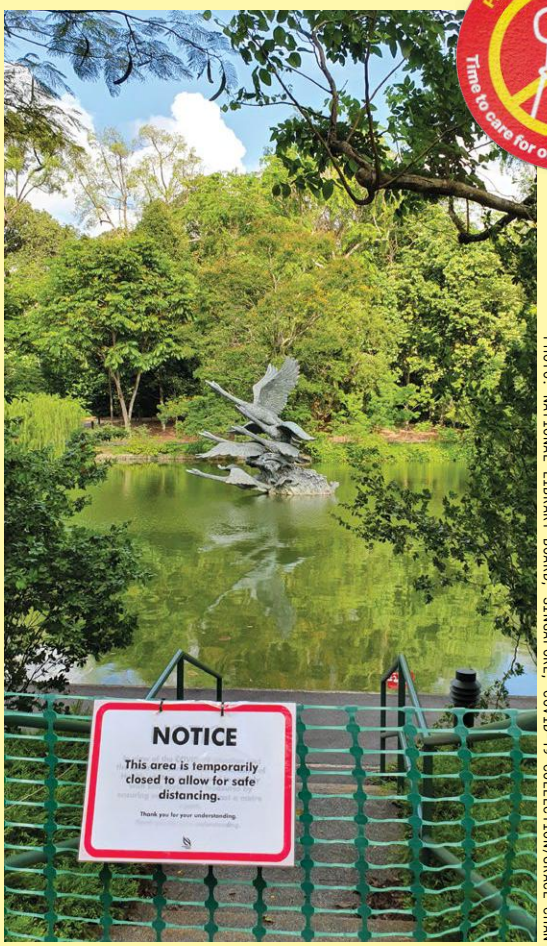


PHOTO: NATIONAL LIBRARY BOARD, SINGAPORE, COVID-19 COLLECTION/GRACE CHAN

Even as restrictions slowly eased after the circuit breaker was lifted, safe-distancing stickers continued to pepper public spaces, from MRT seats to parks and to the floors of malls, a reminder that vigilance was still very much necessary.

PHOTO: AFP VIA GETTY IMAGES/ROSLAN RAHMAN

WHILE THERE WAS AN EAGERNESS FOR SINGAPORE TO RESUME BUSINESS AS USUAL, REOPENING HAD TO BE APPROACHED WITH CAUTION.

This framework formed the foundation of Singapore's reopening strategy, providing a step-by-step approach on how activities should resume across many different sectors – safely.

While there was an eagerness for Singapore to resume business as usual, reopening had to be approached with caution so as not to cause a rapid escalation of cases.

"It's very straightforward. We were very clear that unless we could curb the number of cases, we would risk re-entering another circuit breaker," said Ms Quah.

"Everyone, all the economic and social agencies, as much as they wanted their activities to resume, was clear they wanted to do so safely."

Similarly, Deputy Prime Minister Mr Lawrence Wong, co-chair of the Multi-Ministry Taskforce (MTF), said at a press conference in May 2020: "We have to do this in a very careful and calibrated manner, because we do not want to risk a flaring up of the virus again...We do not want to sacrifice the efforts that all of us have put in over the past few weeks in controlling the outbreak."

But the Post-Circuit Breaker Task Group had a selection headache: which activities were safe enough to resume first? This was where complex formulae would come in.

PHOTO: DREAMSTIME.COM/KANDLSTOCK

People observe safe distancing rules at a hawker centre in Singapore on Jun 19, 2020 (left), as Phase 2 begins and restrictions to prevent the spread of the COVID-19 novel coronavirus are eased. A long line of people queue to enter Northpoint City shopping mall on Jun 28, 2020, waiting to pass through safe entry stations, where they will have their temperature scanned (bottom).

TAKING CALCULATED RISKS

In Phase 1, the priority was to start with activities with the lowest risk first, so most business-to-business activities, like factory operations, could resume.

"Those were deemed to be of lower risk because you've got relatively fewer interactions with people," explained Ms Quah. Customer-oriented services, such as retail and social activities, on the other hand, would have to wait.

Her team conceptualised a risk-based approach and "budget", which enabled them to gauge the trade-offs between risks of infection and increasing overall activity levels.

This risk modelling prioritised which activities could resume, with a balance between the economic and social as both were needed to boost the resilience of the country and its citizens.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

"It helped us reopen in a way that was more controlled, and allowed us to calibrate and prioritise sectors," said Mr Chan, who gave some examples of the trade-offs.

For instance, the Singapore Tourism Board (STB) would push for the cruise sector to sail again. But the Ministry of Trade and Industry, which oversees the STB and other agencies, had to decide if other sectors should take precedence before tourism.

"Is the construction industry more important, or shipbuilding, or electronics? Because if you can't open everything at the same time, what will we open first?"

Without the risk scorecard and budget, "everyone will say their sector is important, everyone will want to reopen", Mr Chan added.

Inevitably, there were big risks that the MOH team had to take, especially when inaction would have far more serious consequences. For instance,

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The Post-Circuit Breaker Task Group allowed construction work to resume, despite the fact that it would involve hundreds of workers in close proximity. Construction was considered a key sector to Singapore's economy and important construction projects like the building of new MRT lines and Build-to-Order (BTO) flats could not be delayed without long-term implications.

the construction sector had to resume, despite the fact that it would involve hundreds of workers being in close proximity.

Besides being a key driver of Singapore's economy, construction projects could not sit idle for too long because of safety concerns. Some projects, like the building of new MRT lines, were also critical.

"Construction was a key sector – there were long-term implications of that short-term decision in allowing workers to return to construction sites despite the risks. We took the risk by taking precautions such as imposing mandatory routine testing for the workers," said Ms Marilyn Song, who was part of the MTF secretariat team that also helped to chart Singapore's reopening plan.

For example, the delays of Build-to-Order public housing projects not only affected thousands of families, but also created a backlog of unconstructed flats that left construction companies scrambling to keep up.

But barely three weeks after Phase 1 began, the country decided to take an even bigger risk. The trickle of activity soon turned into a stream.

THE MAGIC FORMULA THAT CAME IN USEFUL

MATHEMATICS WAS EMPLOYED in deciding which activities should reopen first, with a formula designed to calculate risk levels of various activities.

The formula looked to ensure one thing: that the effective reproduction rate – or Rt – of the virus could not exceed one. If it did, this meant that cases were increasing.

To ensure this did not happen, Ms Elizabeth Quah and her Post-Circuit Breaker Task Group conceptualised an index with a scoring system. Used to tabulate the total number of activities that could resume at any one time, this score could not exceed 100.

"We worked through the various activities, which would make up this '100'," explained Ms Quah, the former Group Director of MOH's Planning Division. This would also allow for the budgeting of certain activities, or the extent to which certain parameters, such as group sizes, should be adjusted.

Using this index, the group conducted various simulations for certain activities, helping them determine which were safe to reopen, which could reopen with additional precautions in place, and which to keep closed for longer. This kept the potential number of cases per week within acceptable limits.

When it came to implementing the formula, various public agencies compiled a list of roughly 50 activities that ranged from organising weddings to holding MICE (meetings, incentives, conferences and exhibitions) events.

A risk score was then generated for each activity, going by certain metrics such as the type of environment, the number of people and likely number of interactions between them, and whether masks should be worn during the activity.

With the numerical results from this formula, Ms Quah and her group could then rank the activities according to their risk levels. The safest ones could reopen first whilst others could reopen with additional safety measures. This novel scorecard did not just make a local impact – it also garnered academic attention after being published in Oxford Academic's Journal of Travel Medicine in 2021.

"Once we get the baseline risk… then we can see how much of the risk budget is left for the other activities," explained Ms Quah.

"And once you know how to mitigate the risk, then you know how many other activities you can allow to take place."

At the start of Phase 2, weddings and funerals could host only 20 people at any one time (right), while congregational services at all places of worship were allowed to resume only in groups of up to 50 people (bottom left). Later on, the Kong Meng San Phor Kark See Monastery became one of 12 religious organisations allowed to accommodate up to 100 people at a time for congregational and other worship services from Aug 7, 2020 onwards (bottom right).

HIGHLY-ANTICIPATED MOVE INTO PHASE 2

On June 19, 2020, Singapore stepped into Phase 2 of its reopening. People could meet again in up to groups of five. Retail stores and malls could raise their shutters. Food could be served at dine-in eateries once more.

But signs that the pandemic was far from over were everywhere – posters requesting people to mask up and safe-distancing stickers were found in even more areas. Prime Minister Lee Hsien Loong also offered a friendly reminder on his Instagram page: "Please don't go overboard celebrating."

Allowing the resumption of social activities was also intended to serve as a morale booster for a nation worn down by weeks of the circuit breaker. For instance, the Government allowed places of worship to resume congregational services for up to 50 people – despite significant risks of COVID-19 spreading.

It was a decision that was made after intense debates within the Homefront Crisis Executive Group and among the Permanent Secretaries of the various ministries, revealed Ms Song. While some were wary that a repeat of the earlier church clusters would emerge again, others thought that it would serve to lift spirits.

Lifting public morale was as important as Singapore's desire to sustain economic growth. "Allowing people to return provided a psychological boost. We had to take the risk, with the necessary precautions such as adopting more effective contact tracing tools like TraceTogether," she added.

This was also why barber shops were allowed to reopen even before Phase 1 had kicked in. Mr Chan himself had pushed hard for them to resume business.

"I argued that it was an essential service from the point of view of psychosocial resilience," he recalled. "If you're untidy, unkempt, your personal confidence will actually be affected."

PHOTOS: THE STRAITS TIMES © SPH MEDIA LIMITED

WHY WERE WEDDINGS AND WAKES ALLOWED?

THEY HAD THE POTENTIAL to be super spreader events. They could have upended Singapore's calibrated COVID-19 strategy. But weddings and funerals were still allowed to continue throughout the pandemic.

When Phase 2 started, up to 20 people were allowed to attend these activities – a time when social gatherings only permitted a maximum of five people.

Having these mass gatherings, although incongruent with Singapore's 'safety-first' approach, was all about citizen well-being. Social interaction was the antidote to isolation.

"The psychosocial resilience of people is important," explained Mr Chan Yeng Kit, Permanent Secretary for Health. "If the people give up, we'll have lost the battle."

But allowing these social occasions was a huge gamble, with other countries witnessing spikes in COVID-19 cases following such events.

"These are two occasions where it's very hard to impose safe management measures," shared Mr Chan. "If it's a funeral, people will be grieving. They will hug each other – you can't stop that."

This was where the risk budget helped to mitigate the threat. Allowing weddings and wakes to proceed, albeit with certain restrictions like no mixing between tables, meant that certain other activities could not. To keep to the budget, there had to be compromises.

"For these activities, we worked out how we could best mitigate the risk so that we could allow more activities overall to take place."

TEST, TEST AND TEST

To deal with the inevitability of rising cases as Singapore further opened up, surveillance and early detection capabilities were ramped up. This would hinge on one key tool: testing.

In June 2020, the massive Float @ Marina Bay, usually associated with National Day Parades, was transformed into a place of testing. It was among the first Regional Screening Centres set up across the island to support daily testing, with more than 30 centres planned by the year's end.

These centres were part of a national testing strategy that had been announced on June 8, 2020 to conduct active surveillance testing on targeted groups, help detect cases early and reduce the risk of large COVID-19 clusters from developing. Now, as the country progressively began to exit the circuit breaker, the strategy would serve a new purpose: to allow for a safer reopening.

One of the first Regional Screening Centres was set up at The Float @ Marina Bay to support ambitious daily testing goals. These centres were part of a national testing strategy to conduct active surveillance testing on targeted groups to detect cases early and reduce the risk of large COVID-19 clusters.

PHOTO: HEALTH PROMOTION BOARD

HOW PRE-SCHOOL TESTING GAVE SINGAPORE CONFIDENCE TO REOPEN

PHOTO: AFP VIA GETTY IMAGES/ROSLAN RAHMAN

Children wearing face masks gather around a table inside their classroom as schools reopened in Singapore on Jun 2, 2020, as the city-state eased its partial lockdown.

WHEN THE DECISION was made to lock down Singapore's migrant worker dormitories in April 2020, no one knew exactly how effective it would be in preventing the spread of COVID-19 outside of the dormitories.

Success was confirmed from an unlikely source: pre-schools.

In May 2020, it was decided that all teaching and non-teaching staff at pre-schools would be tested for COVID-19 to ensure the safe reopening of schools.

"We were tasked very quickly to ramp up testing of pre-school teachers and to sieve out whoever was COVID-positive," shared Mr Zee Yoong Kang, who led the Testing Operations Task Group.

Within a single week, over 30,000 teachers, principals, cleaners and cooks, among others, were swabbed and tested.

The results were a pleasant surprise. "Hardly any one of them was COVID-positive…this was the first time we actually had a good sample size of Singapore residents outside the dorms," said Mr Zee.

"We realised that however bad the situations were in the dorms, we had managed to successfully seal off the dorm outbreak. The rest of society had a very different set of numbers."

"Pre-school testing became one of the most important data points that indicated COVID was actually under control in the rest of Singapore," he noted.

Workers in critical economic sectors, from the marine and process industries to even slaughterhouses, were routinely screened at these centres, up to twice weekly.

"Testing was a key enabler for the reopening – we didn't have vaccines yet," noted MTF's Ms Song. "After the circuit breaker, the numbers did go up. We expected that. But we mandated routine testing to catch these cases before they became clusters – especially at the work sites."

Spearheading Singapore's testing efforts was the Health Promotion Board (HPB), which had set up the Testing Operations Task Group (TOTG) to implement the national testing strategy and coordinate testing efforts between different sectors. TOTG would also be responsible to ramp up testing capabilities and pilot new methods.

"When TOTG first started, it was to support the reopening of the economy as Singapore was coming out of the circuit breaker," said HPB's Chief Operating Officer Mr Koh Peng Keng, who was also TOTG's Group Director.

With experience in handling large-scale programmes like the National Steps Challenge, HPB was well suited to handle mass testing efforts.

"We just shifted that knowledge from handling mass events to handling big numbers for COVID," added former HPB Chief Executive Officer Mr Zee Yoong Kang, who led the TOTG alongside Mr Koh.

But even with all of HPB's know-how, it was still a formidable task. In April 2020, Singapore was equipped to conduct 2,000 tests a day. HPB's job was to increase this number to 60,000, revealed Mr Zee.

"There were manpower challenges, facilities challenges, testing capacity challenges and logistics challenges," he said. "Each of these aspects were major feats that we had to pull off."

For instance, efforts to ramp up manpower saw the recruitment of 5,000 swabbers. A large part of the initial recruits came from the Singapore Healthcare Corps – a group of volunteers recruited from healthcare workers. But very quickly other recruits had to be roped in from suspended sectors like aviation and hospitality. The likes of air crew and hotel staff swapped their suits and dresses for personal protective equipment (PPE).

"Over the longer run, we shouldn't use doctors and nurses to do swabbing," explained Mr Zee, noting that they were needed to do other tasks in pandemic control. "They can supervise swabbing and ensure clinical standards, but lay swabbers quickly became very skilled at their work due to the huge volume of swabs they had to do."

These swabbing novices, freshly parachuted into the medical world, would undergo comprehensive training. "We don't leave anything to chance – every month you're put through a technical evaluation," said Mr Koh.

At the same time, HPB was also working with labs to make sure that samples were quickly turned around – some within eight hours, as compared to the typical 12 to 24 hours needed for a Polymerase Chain Reaction (PCR) test.

Singapore was soon testing at a rate that was among one of the highest in the world. By September 2020, the country was conducting about 27,000 tests a day.

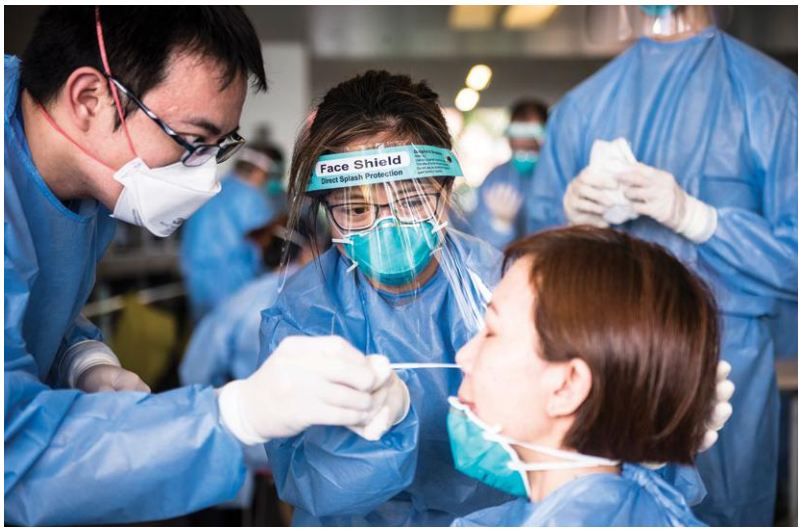

PHOTO: EDWIN KOO

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

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Crowds passing through the underpass connecting Wisma Atria and Takashimaya on Dec 19, 2020. Malls across the island were teeming with shoppers after Prime Minister Lee Hsien Loong announced that the highly anticipated Phase 3 would begin on Dec 28, 2020.

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The Singapore Healthcare Corps supported the healthcare workforce in the fight against COVID-19 (far left). These volunteers received training in wearing personal protective equipment (PPE) and masks properly, and how to perform nasopharyngeal swabs, before being deployed to support healthcare operations or roles in community care. Cabin crew from then-grounded airlines like Singapore Airlines, SilkAir and FlyScoot being trained as Care Ambassadors for hospitals (left).

READY FOR PHASE 3

Singapore's cautious and calibrated approach was paying off. After reopening, cases were dipping – from the hundreds to double digits, before whittling down to single digits.

On October 13, 2020, the country reached a major milestone: zero local cases of infection for the first time since March 2020. By the end of November, all COVID-19 clusters had been closed.

The highly anticipated Phase 3 was an early Christmas present, delivered by PM Lee on December 14, 2020 – nearly a year since Singapore saw its first COVID-19 case.

"With everyone's full support, our enhanced safeguards worked and we could gradually ease our restrictions, and we can be proud of how far we have come," announced PM Lee. "Because of your efforts, we are now ready to progress to the next phase."

Phase 3 was to begin in two weeks. Groups of five could now become eight, malls and worship services could increase their capacity limits, and live performances could resume – music to the ears of many.

As the country looked forward to a new year, MOH was pinning its hopes on a new strategy: vaccination.

The arrival of vaccines was viewed as a gamechanger,

an antidote to neutralise the threat of the virus.

COMBAT

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

HEALTHCARE WORKERS ON THE COVID-19 FRONTLINES SPENT LONG HOURS IN FULL PERSONAL PROTECTIVE GEAR, WHICH INCLUDED GLOVES, GOWNS, GOGGLES, HEAD COVERS AND SURGICAL MASKS.

CHAPTER 7

BEHIND THE JAB

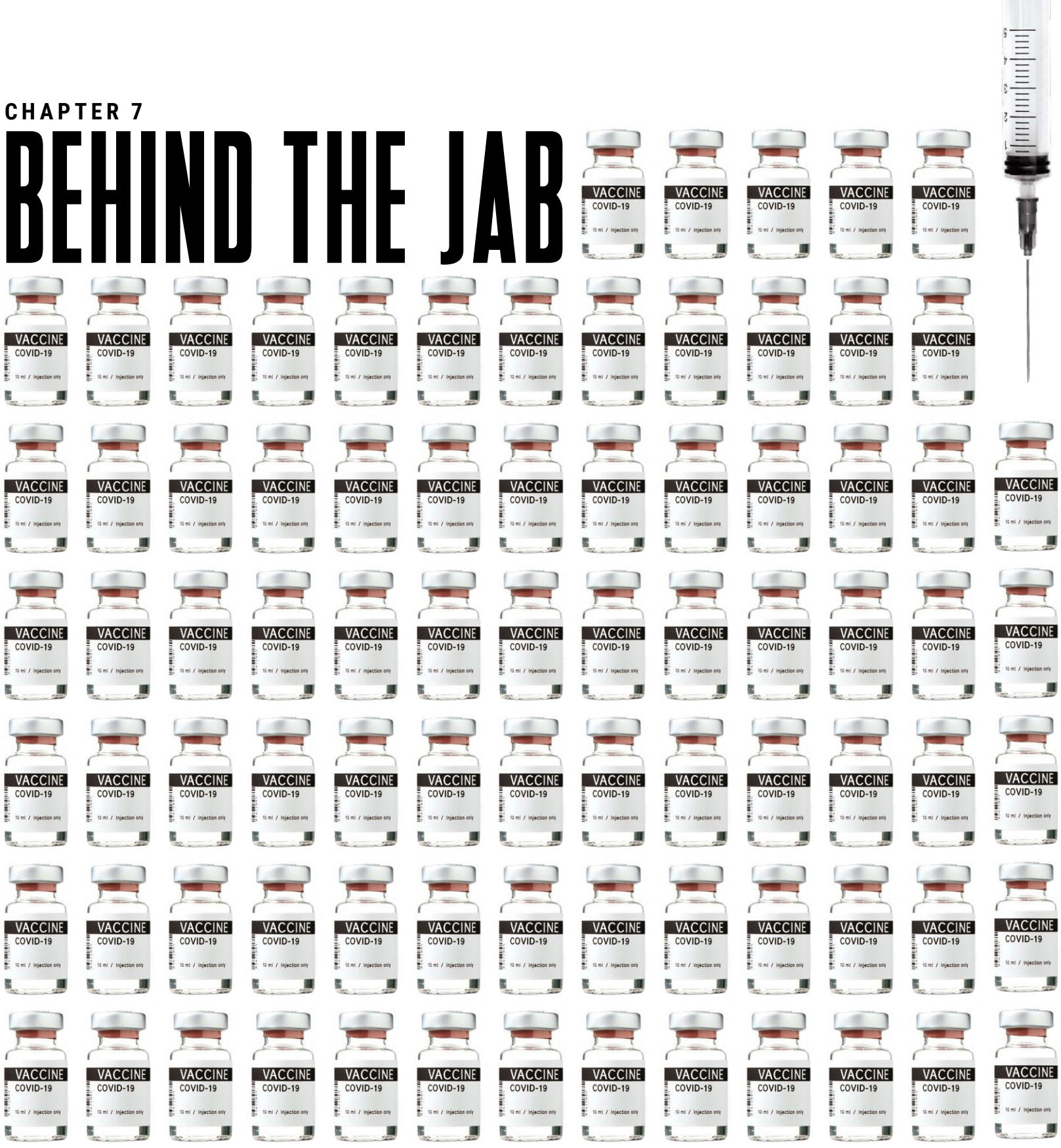


PHOTO: MINISTRY OF TRANSPORT

PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

Then-Minister for Transport **Mr Ong Ye Kung** (second from left) is among the on-the-ground crew at Changi Airport receiving Singapore's first batch of Pfizer-BioNTech vaccines on Dec 21, 2020.

THEN- Minister for Transport Mr Ong Ye Kung and Captain Sam Llewellyn shared a COVID-appropriate fist bump, flanked by First Officer Wilson Lee and Singapore Airlines CEO Goh Choon Phong, who were each giving a thumbs-up.

The reason for their joy was the boxes behind them, tightly bound by yellow packaging tape. In those boxes were precious cargo: the first batch of Pfizer-BioNTech COVID-19 vaccines. They were flown in by the national carrier from Brussels, Belgium, landing at Changi Airport on December 21, 2020 – making Singapore the first country in Asia to receive this vaccine.

Mr Ong later posted on Facebook that their safe and smooth arrival was a "historic cold chain moment". For one thing, the vaccines had to be packed and transported at very low temperatures throughout the delivery. But, more interestingly, the night they arrived in Singapore coincided with the Winter Solstice Festival, an occasion when the Chinese community gathers to eat *tang yuan* (glutinous rice balls) on what is believed to be the coldest day of winter.

While the tradition continues in tropical Singapore, the larger gatherings had to wait just a little longer. A week later, on December 28, Singapore officially started Phase 3 of its carefully calibrated

PHOTO: URBAN REDEVELOPMENT AUTHORITY

The façades of Fullerton Hotel Singapore and the Merlion at Marina Bay were lit up with artworks depicting the collective efforts of organisations and individuals who helped others in need during the pandemic on Dec 25, 2020 – a fitting precursor to Phase 3 of Singapore's reopening three days later.

reopening plan, six months after the nation exited from the circuit breaker in June 2020.

Many were looking forward to celebrating the new year with loved ones. Eight people were allowed to gather, an increase from five in Phase 2; live performances were slowly making a comeback; and the capacity for marriage solemnisations was increased.

The government's confidence to loosen restrictions was premised on one key reason: the arrival of the vaccines.

It was viewed as a game-changer, an antidote to neutralise the threat of the virus. But even as most people looked forward to gaining herd immunity with inoculation, not many realised the remarkable feat of securing the vaccines early.

A behind-the-scenes look at this journey reveals how medical experts and scientists from the Ministry of Health (MOH) and other agencies, together with officials from the Economic Development Board (EDB), joined hands to form a formidable force to secure the vaccines.

TEAM VACCINES

Several committees were set up to take three vital steps to get early access to the vaccines in 2020: identify potential vaccines in the market, negotiate for

advance procurement, and assess their efficacy and safety.

None of these steps were simple or straightforward, and some steps happened concurrently in a bid to get the vaccines faster.

Mr Chan Yeng Kit, Permanent Secretary for Health at MOH, revealed that these tasks required more than just the Ministry's involvement. Much needed help came from the Head of Civil Service, Mr Leo Yip, who offered to chair a planning group to get the vaccines early – arguably one of the toughest tasks.

"I think he took pity on all of us because we had so many things to handle," said Mr Chan. As Mr Yip was the former Chairman of EDB, he had a vast network of connections, including the contacts of large pharmaceutical and biotechnology companies that have invested in Singapore.

"We have good relations with the companies, and we tried to get into the vaccine queue. So rather than waiting in line to secure supplies, we used the relationship route," he shared, adding that Singapore was prepared to take the risk and enter into advance procurement contracts.

STEERING SINGAPORE'S VACCINATION PROGRAMME

THERAPEUTICS AND VACCINES EXPERT PANEL, TxVax FORMED IN APR 2020	Comprised 18 members, including clinicians, scientists, public health experts and immunologists from both the public and private sectors	Their main task was to source for – and assess – promising vaccines to procure for use in Singapore.	
PLANNING GROUP TO SECURE ADVANCE ACCESS TO VACCINES FORMED IN LATE APR 2020	Chaired by Head of Civil Service Mr Leo Yip Its members included officers from the Economic Development Board (EDB) and MOH	They were tasked to make 'strategic bets' on promising vaccine candidates recommended by TxVax and sign non-disclosure agreements that would give Singapore early access to	confidential data on vaccine progress. These tasks were facilitated by leveraging EDB's strong relationships with pharmaceutical and biotechnology companies, like Pfizer, Moderna and BioNTech.
EXPERT COMMITTEE ON COVID-19 VACCINATION, EC19V FORMED ON OCT 5, 2020	Comprised 14 experts in infectious diseases, immunology and other relevant fields	Its main role was to advise the Singapore government on how to best deploy the vaccines safely across all age groups in Singapore after they arrive. EC19V	also worked closely with TxVax on various aspects of Singapore's vaccine strategy, including procurement and recommendations for vaccine selection and deployment.

"THE HISTORICAL BETTING AVERAGE OF GETTING THE RIGHT VACCINE WAS ONE IN 10... IN FACT, THERE WERE AS MANY AS 290 KNOWN COVID-19 VACCINE PROJECTS BY MID-2021."

– PROFESSOR BENJAMIN SEET, DEPUTY GROUP CHIEF EXECUTIVE OFFICER (EDUCATION & RESEARCH) AND MEDICAL LEAD AT THE NATIONAL HEALTHCARE GROUP

IDENTIFY:
GETTING A HEAD START ON VACCINES

The search for vaccines began almost 11 months before they arrived in December 2020. "The first conversation I had about vaccines was as early as February 2020," recalled Professor Tan Chorh Chuan, Chief Health Scientist at MOH.

He and other colleagues in the scientific community had been closely following the Coalition for Epidemic Preparedness Innovations (CEPI) – a foundation that funds early vaccine development – and tracking which vaccines they were putting their funds into.

When it became increasingly clear that a vaccine would be needed as part of Singapore's pandemic response, a committee to head the search for vaccines was set up in April 2020.

The Therapeutics and Vaccines Expert Panel, or TxVax, was chaired by Professor Benjamin Seet, Deputy Group Chief Executive Officer (Education & Research) of the National Healthcare Group. The committee comprised 18 clinicians, scientists, public health and industry experts.

Its job was not easy. "The historical betting average of getting the right vaccine was one in 10, and there were so many vaccine projects in development. In fact, there were as many as 290 known COVID-19 vaccine projects by mid-2021. We were in touch with more than 50 companies and academic groups around the world," Prof Seet recalled.

TxVax adopted a "portfolio approach", taking into account the efficacy and safety of candidates across different vaccine technology categories, while also making sure to diversify the sources of manufacturing and production in case of supply chain disruptions.

The list was eventually narrowed down to about 15 promising vaccine candidates. After conducting an extensive study, they submitted their recommendations to the planning group headed by Mr Yip. By June 2020, the first advance procurement agreement was signed with Moderna, and by September 2020, the second with Pfizer-BioNTech.

"SOME DECISIONS HAD TO BE TAKEN DURING THE EARLY PHASES OF CLINICAL TRIALS OF THE VACCINES, WHERE THERE WAS NO CERTAINTY OF THE FINAL OUTCOMES."

– MR LEO YIP, HEAD OF CIVIL SERVICE AND FORMER CHAIRMAN OF ECONOMIC DEVELOPMENT BOARD

NEGOTIATE: MAKING ADVANCE PURCHASES

The multi-agency planning group, made up of largely EDB and MOH officers, had an equally tough task of deciding which vaccines should be purchased.

From the shortlist of vaccine candidates by TxVax, the planning group signed about 40 non-disclosure agreements, which gave them early access to unpublished data about the progress of the vaccines.

The consensus then was to diversify options. Given the variety of vaccine types, there needed to be a "balance between established options and fastest to the market", noted Ms Lisa Ooi, EDB's Vice President of Healthcare and Wellness Strategy, at a media Q&A on COVID-19 vaccines on December 21, 2020.

In the next few months, the planning group, together with TxVax, scrutinised the different data before deciding which vaccines to purchase. "We had to cut through the fog of war, because some decisions had to be taken during the early phases of clinical trials of the vaccines, where there was no certainty of the final outcomes," shared Mr Yip, at the same media interview.

Eventually, three strong contenders emerged: Moderna, Pfizer-BioNTech and Sinovac. The first two utilised a novel messenger ribonucleic acid (mRNA) technology, while Sinovac was an inactivated virus vaccine.

To ensure that Singapore would not be bypassed in the global vaccine market, the planning team also linked up with other countries to do group orders.

Professor Benjamin Ong, Chair of the Expert Committee on COVID-19 Vaccination (EC19V), explained the rationale for doing so: "We don't have the clout of bigger countries. We cannot expect a company to sell us four or five million doses at once."

Apart from scaling orders, Singapore also went one step further to ensure vaccine priority. As early as June 2020, the Government had signed advance purchase agreements with Moderna. By August, similar agreements were signed with Pfizer-BioNTech and Sinovac, in a bid to guarantee the country's access to these vaccines ahead of time without waiting for their clinical trials to be completed.

Over S$1 billion was set aside for vaccines, with down payments made even before TxVax found out that the two mRNA vaccines – Pfizer-BioNTech and Moderna – had an efficacy rate of over 90 per cent.

Naturally, this was a big, albeit calculated, risk: Singapore was making advance investments in vaccines that could very well fail. But the risk of not getting the vaccines was far deadlier.

As MOH negotiated the purchase, the Health Sciences Authority (HSA) was reviewing the scientific data when it became available as part of the regulatory process.

PHOTO: DIGITALVISION VIA GETTY IMAGES/TANG MING TUNG

EVALUATE:

SAFETY OF VACCINES

The speed at which policymakers moved to secure vaccines was far quicker than behind-the-scenes processes of evaluating the vaccines.

"That is the fundamental challenge of using science to inform policy," said Prof Tan. "In a pandemic, policymakers want to make decisions fast, but the process of science – evidence gathering and analysis – takes time."

To expedite the process of assessing vaccine candidates, HSA – the regulatory body in charge of approving vaccines for use in Singapore – began establishing the Pandemic Special Access Route (PSAR) as early as June 2020.

PSAR became a formalised mechanism for vaccine companies to submit "rolling submissions" to HSA, where data from product development and clinical trials could be sent over faster, as and when they became available, instead of waiting for one complete set of data.

Not every potential vaccine candidate passed HSA's stringent standards. Certain vaccines that were initially thought to be strong contenders did not get approved due to the risk of serious adverse reactions, such as severe bleeding and blood clots.

With everyone putting in their best effort to speed up the process of evaluating the vaccines, the top vaccines were finally approved in good time, and not without careful consideration. The next course of action: well-planned logistics to ensure the smooth and safe delivery of vaccines to Singapore.

READING "800 HARRY POTTER NOVELS" IN SIX MONTHS

EVEN AFTER TxVax had managed to successfully narrow down their list of 290 known COVID-19 vaccines to 15 promising vaccine candidates, the copious amount of documents to plough through was still formidable.

Associate Professor Chan Cheng Leng, Group Director of the Health Sciences Authority's (HSA) Health Products Regulation Group (HPRG), recalled that her team had received about 400 to 500 softcopy files for every brand of vaccine.

To illustrate the reams of reports to be scrutinised, she drew this analogy: imagine a Harry Potter book, which has about 500 pages. Her team of 24 regulators had to read a total of 400,000 pages – the equivalent of 800 Harry Potter novels – in less than six months. And reading these academic papers was nowhere as enjoyable as fantasy novels.

"My colleagues were working overtime and very long hours over the weekend to ensure that we were able to approve the first vaccine by December 14," she revealed. "Many of us lost sleep knowing the huge responsibility that we carried to safeguard our population."

Essentially, her team of dedicated professionals were looking for three main criteria in a vaccine: quality, safety and efficacy.

Evaluating the quality of a vaccine involves a step-by-step assessment of how manufacturers develop vaccines as well as their purity and potency. Most importantly, whether a company produces 10 or 1,000 batches, each has to be of consistently high quality.

As for the efficacy and safety of vaccines, companies must be able to provide ongoing data on both their non-clinical (animal) and clinical (human) trials.

For instance, studies conducted on mice give a good indication of the toxicity and potential immune response elicited by the vaccine. Clinical trials, on the other hand, demonstrate how the vaccine behaves in humans and whether it offers a good enough immune response.

HPRG also consulted experts from HSA's Medicines Advisory Committee, which consisted of senior doctors and pharmacists, before locking in the final decision.

To approve the first vaccine by Dec 2020, regulators from the Health Sciences Authority's Health Products Regulation Group raced against the clock to read through academic papers to determine the quality, safety and efficacy of each vaccine candidate, said Group Director **Associate Professor Chan Cheng Leng**.

LOGISTICS: COLD CHAIN MOMENT

The "historic cold chain moment" that Mr Ong alluded to might have seemed like just a singular point in time, but it was evident that the events leading up to the first delivery of vaccines took the collective time, effort and discretion of many.

Now that the vaccines had finally been procured and received, the next hurdle to cross before they could make their way out into the population was the issue of storage. The delivery of vaccines is a complex task, and requires a carefully coordinated chain of events to transport and store in temperature-controlled environments.

Pfizer-BioNTech vaccines, for example, had to be stored at -70°C, while Moderna vaccines must be stored at -20°C. Both had a limited shelf life when stored at regular refrigerator temperatures.

MOH Permanent Secretary for Health Development, Mr Ng How Yue, explained how getting the logistics right was critical.

"None of our current vaccines needed to be stored at that temperature, so we had to work with private sector providers to bring in special fridges, and check with the Energy Market Authority to make sure that the place where we keep the fridges have triple redundancy of electricity. Otherwise, the vaccines would not have made it," he shared.

Other organisations also chipped in to help. For instance, local ground-handling company Singapore Airport Terminal Services (SATS) offered their cool dollies – wheelable refrigerated warehouses – to transport the vaccines from Changi Airport to their official storage location.

The vaccines continued to arrive steadily in batches, strengthening confidence that there would be "enough vaccines for everyone" by September 2021, Prime Minister Lee Hsien Loong assured Singaporeans in a nationwide televised address on December 14, 2020.

Now, it was time to convince Singaporeans to take their shots.

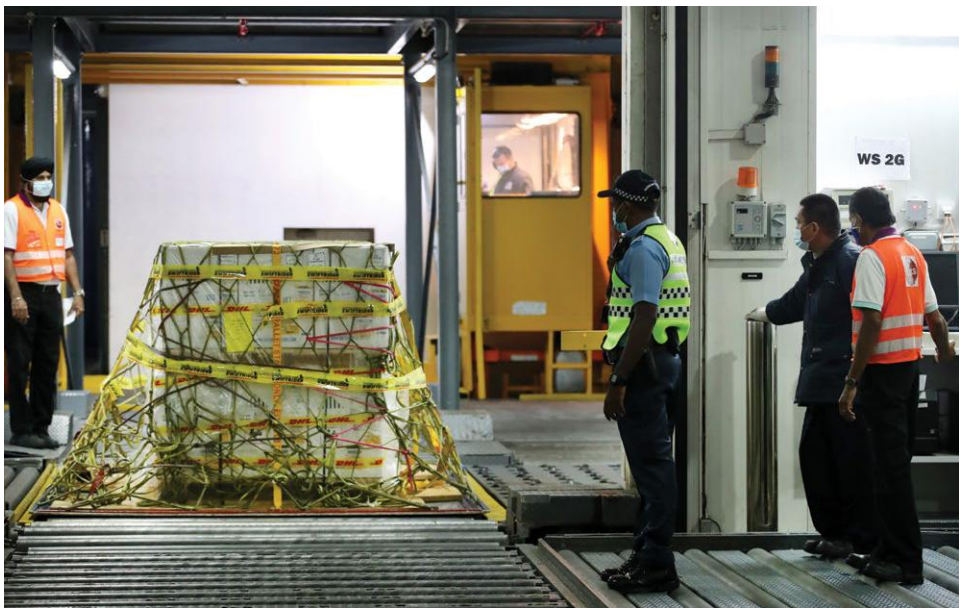
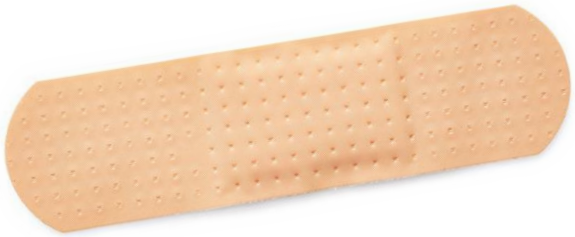


PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

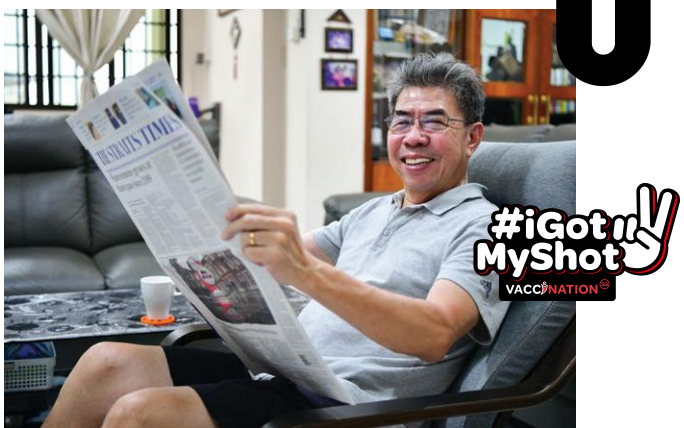
After the arrival of the vaccines, transporting and storing them was the next crucial task. Singapore Airport Terminal Services (SATS) helped transport the vaccines in wheelable refrigerated warehouses to be stored in special, temperature-controlled fridges.

CHAPTER 8

TAKING THE SHOT



PHOTOS: INSTANT REPLAY PRODUCTIONS



AFTER the tough quest of clinching the best vaccines early, another arduous mission awaited: getting the shots to everyone, quickly yet systematically.

This required many agencies working in double quick time to ensure the mass vaccination programme would succeed, on a scale that Singapore had never attempted before.

"This country had not seen a nationwide mass vaccination exercise since 1958," noted Mr Dinesh Vasu Dash, who was tasked to lead the Ministry of Health's (MOH) massive vaccination operations. He was referring to the polio inoculations over 65 years ago, when the country had 1.4 million residents. In 2020, there was a total of about 5.7 million people living in Singapore – an astounding four-fold growth in population.

The initial goal was to have half the population fully vaccinated within eight months, by National Day on August 9, 2021. Later, the bar was raised to cover two-thirds of the population.

From administering around 40,000 vaccine doses a day in May, this rose to 47,000 in June and jumped to 80,000 in the weeks leading up to National Day. The hard work and cooperation of Singaporeans paid off. Not only did Singapore hit its vaccination target, it did so ahead of schedule by three days.

< #IGotMyShotSG was a campaign launched by the Singapore government to encourage Singaporeans to get their COVID-19 shot whenever it was made available to them.

COVID-19 VACCINE DOSES THAT SINGAPORE HAD GIVEN OUT

FROM DEC 2020 TO MAR 2023

16,999,547

Six critical capacities contributed to the success of Singapore's mass vaccination campaign:

1

INFRASTRUCTURE

Accessible locations with ample space to hold large crowds, basic facilities like washrooms and good ventilation

2

MANPOWER

Medical professionals to prepare and administer vaccines, staff to support the registration process and monitor members of the public during the observation period

3

STRATEGY

A comprehensive plan for the vaccination rollout, including prioritising seniors above 60 and vaccinating home-bound individuals

PHOTO: REUTERS/EDGAR SU

After receiving their vaccinations, members of the public had to wait in an observation area for 30 minutes in case of any adverse side effects. This was later cut down to 15 minutes for booster shots.

4

MESSAGING

Transparent, clear and timely communications with the public

5

TECHNOLOGY

Easy booking of appointments and updating of vaccination records via an online portal

6

LOGISTICS

Transport and storage of vaccines and other supplies

This was how Singapore pulled off its biggest national vaccination campaign to date.

A nurse prepares a dose of the COVID-19 vaccine at a vaccination centre (right), while those who have received their vaccines wait at a holding area (above).

PHOTOS: AFP VIA GETTY IMAGES/ROSLAN RAHMAN

1 INFRASTRUCTURE: FACILITIES FOR MASS VACCINATION

The vaccination campaign began on December 30, 2020 – about a week after the vaccines arrived. But there was much more to be done, especially for the team that Mr Dinesh, Group Director of MOH's Crisis Strategy and Operations Group (CSOG), led.

The first thing he and his team had to consider was ways to ensure vaccination could be done in large numbers and smoothly. The airport, which was underutilised as planes were grounded, was just the right space.

With this, the largest vaccination centre was ready to run in just seven days. On January 13, 2021, Changi Airport's refashioned Terminal 4 opened its doors for vaccination.

Next was the Raffles City Convention Centre, followed by two more centres at

PHOTO: BLOOMBERG VIA GETTY IMAGES/WEI LENG TAY

Vaccination centres administered an average of between 2,000 to 4,000 vaccinations a day. The atmosphere was made to feel as relaxing as possible, with soothing music played in the background and staff situated on-site to attend to members of the public at all times.

"WE STARED AT A MAP OF SINGAPORE JUST TO MAKE SURE THAT THERE WAS AN ADEQUATE NUMBER OF VACCINATION CENTRES IN EACH OF THE AREAS... ESPECIALLY IN AREAS WITH MORE SENIORS."

– PROF KENNETH MAK,
DIRECTOR OF MEDICAL SERVICES AT THE MINISTRY OF HEALTH

the end of January 2021, located at the former Hong Kah Secondary School and Woodlands Galaxy Community Centre.

The rationale was to set up community vaccination centres at locations that had high human traffic, such as public housing estates or areas along major public transport routes.

Professor Kenneth Mak, Director of Medical Services at MOH, explained that the accessibility of these centres was important.

"We stared at a map of Singapore just to make sure that there was an adequate number of vaccination centres in each of the areas where we expected people to be, especially in areas with more seniors," he shared.

On the speed of setting up the vaccination centres, Dr Noel Yeo, then-Chief Operating Officer of IHH Healthcare Singapore, explained that it depends on the location. "For an unused school space, it is very difficult. There's definitely some renovation that needs to be done. You need to make sure the electrical supply is there, that the sewage and the toilets are all working," he said.

The situation is far easier if the vaccination centres are in community clubs with existing facilities and support from the People's Association to set up registration zones.

As Singapore increased its vaccination target, the number of centres logically followed suit. By March 16, 2021, a total of 24 vaccination centres were in operation. By April, this number further rose to 40. The average vaccination centre could administer about 2,000 injections a day, while larger vaccination centres like the one at Changi Airport Terminal 4 could complete up to 4,000.

But simply setting up vaccination centres was not enough – providing good service delivery was a big part of the vaccination centre experience as well. Just like the COVID-19 injection, the entire process of getting vaccinated was made as pain-free as possible.

For instance, the COVID-19 injection hurt less than an average shot due to the use of special, finer needles. And to ease people's anxieties, especially during their half-hour observation period after inoculation, soothing music was played and staff were situated on-site to answer any questions the public may have.

"I don't know of anywhere else in the world where you go for vaccination and you get a box of masks, hand sanitisers, all these goodies," quipped Professor Vernon Lee, Senior Director of the Communicable Diseases Division at MOH, in his signature good-natured manner.

"I had friends overseas who had to queue for hours in bad weather just to get their vaccine, but in Singapore, you only need to wait for about 15 minutes."

"DO YOU WANT TERMINAL 2 AS WELL?"

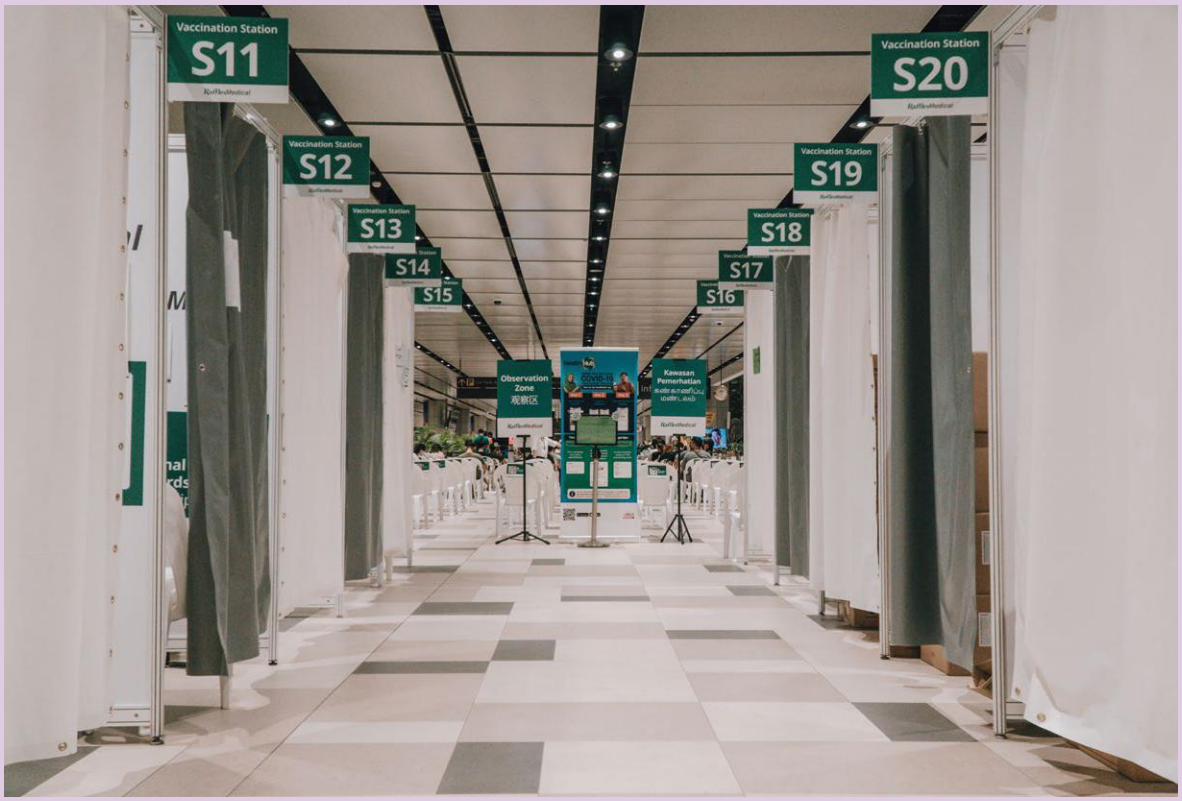


PHOTO: CHANGI AIRPORT GROUP

Singapore's largest vaccination centre was set up at Changi Airport Terminal 4 on Jan 13, 2021, opening its doors to airport workers and air crew to be vaccinated.

WHEN IT CAME TO choosing potential locations for vaccination centres, there was a general rule of thumb: the bigger, the better.

This was why Changi Airport Terminal 4 – the size of about 27 football fields – was an obvious choice.

Mr Dinesh Vasu Dash, Group Director of MOH's Crisis Strategy and Operations Group, recalled that Changi Airport Group was swift to give their permission, and the terminal was quickly being retrofitted.

There was just one small problem – this decision had not been cleared with the higher-ups in the civil service yet.

He quickly dashed out a brief email to the Permanent Secretary (PS) of the Ministry of Transport. "I think it was a two or three-line email. He replied within two hours and said, 'Please go ahead and use it'," he recalled.

It then hit him that he had not yet gotten approval from his own bosses, the two PSes in MOH. Stressed, he quickly sent them an email to explain the situation. And thankfully, they were understanding.

The next day, he met then-Minister for Transport Mr Ong Ye Kung, at a Multi-Ministry Taskforce conference and thanked him for allowing the use of Terminal 4. Mr Dinesh held his breath, bracing for a possible reprimand for the late notice, but Mr Ong's response was instead: "Do you want Terminal 2 as well?"

Such was the speed of planning and seamless coordination behind Singapore's vaccination campaign. Shorn of any bureaucratic requirements, it was clear from the responses that everyone was pulling in the same direction and ready to play their part.

2 MANPOWER: PUBLIC-PRIVATE PARTNERSHIPS

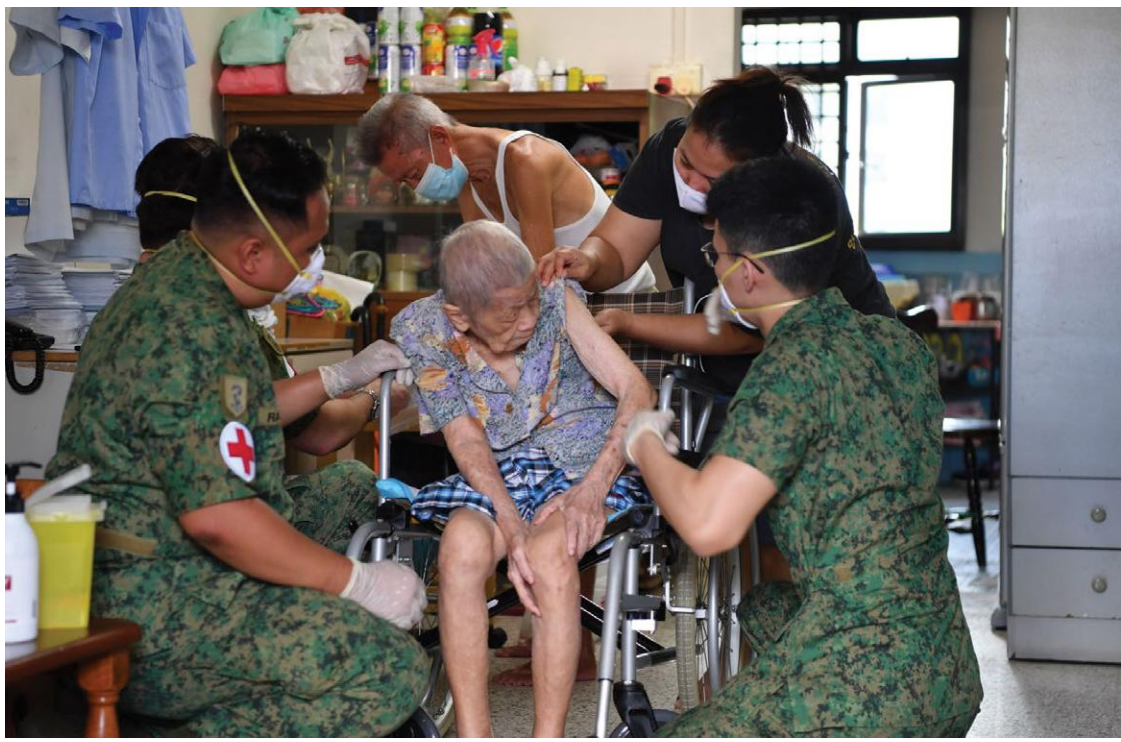
Vaccination centres were not complete without the people to run them. Ms Lavinia Low, Director of Manpower Planning and Strategy at MOH, shared that manpower requirements for vaccination operations were inherently different from those of swabbing operations.

"We could not simply recruit non-healthcare-trained candidates to do vaccinations; we needed personnel with prior relevant training," she shared. "Moreover, our nursing colleagues highlighted that COVID vaccinations were done by intramuscular injection, not like insulin injections that are just below the skin. It is a technique that needed specific training and supervision."

This was why ex-paramedics from the Singapore Civil Defence Force or those who had been in medic vocations during National Service were roped in to help as vaccinators.

Manpower allocations also had to match the different configurations of each vaccination centre.

"We had to understand how many lanes we needed, from queuing to



PHOTOS: MINISTRY OF DEFENCE

93-year-old Mdm Lai receives her COVID-19 shot from one of the Singapore Armed Forces' (SAF) home vaccination teams. COVID vaccinations required specific training and technique, which was why those who served in medic vocations during National Service were recruited as vaccinators.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Land transport workers waiting to register for their COVID-19 shots at the vaccination centre housed in the former Hong Kah Secondary School on Jan 25, 2021.

vaccination booths to waiting areas, and what kind of manpower was needed for each lane, like how many administrative staff, nurses, non-nurses and doctors should be on standby," Ms Low added.

The entire vaccination exercise would not have been possible without an army of private sector doctors, nurses and healthcare staff too. In December 2020, MOH reached out to IHH Healthcare Singapore to set up a number of community vaccination centres.

They agreed, and things moved quickly. Within three weeks, the first centre was set up in January 2021 at the former Hong Kah Secondary School, one of the designated centres for essential land transport workers, such as bus and taxi drivers.

IHH Healthcare Singapore was eventually tasked to run two more public vaccination centres. Hundreds of healthcare workers from its network were deployed – doctors, nurses and even pharmacists volunteered to be vaccinators.

Similarly, Thomson Medical ran three vaccination centres from February 2021, which were community clubs in mature estates with a high percentage of elderly residents. They recruited doctors and nurses on a contract basis since their permanent staff had to continue serving in their hospital for business continuity. The site supervisors, however, were full-time staff from Thomson Medical.

The workload was heavy, so morale had to be maintained by celebrating milestones. "The first time we hit 2,000 vaccines in a day, we bought bubble tea for the team," shared Ms Chan Wei Ling, former Chief Executive Officer (Specialist Centres) of Thomson Medical.

VACCINATING CARGO DRIVERS

ON TOP OF running three public vaccination centres, IHH Healthcare Singapore began a "special vaccination project", revealed Dr Noel Yeo, then-Chief Operating Officer of IHH Healthcare Singapore.

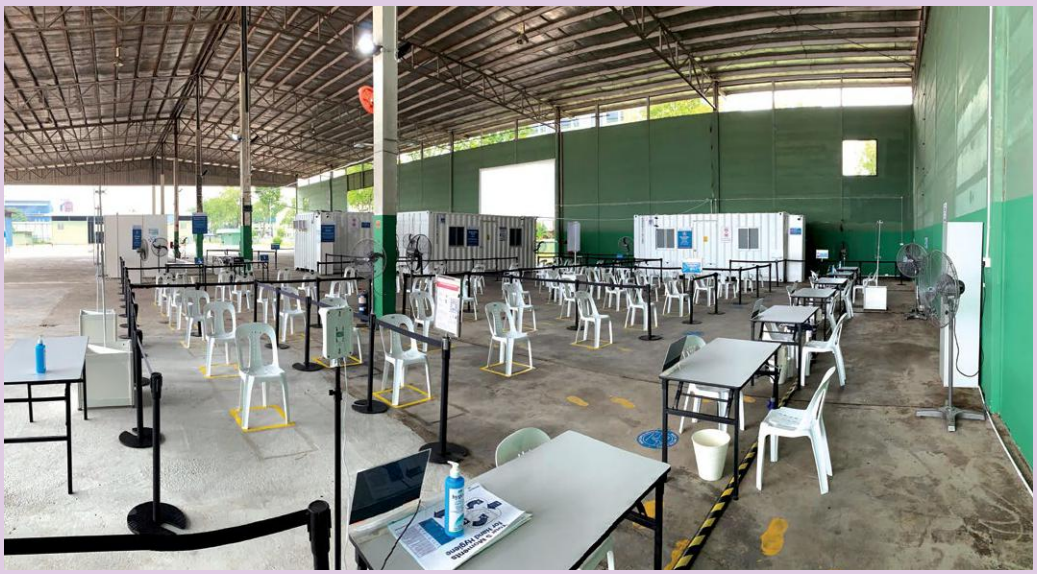
From March to June 2021, two locations in Singapore – Benoi Sector in the West and Sungei Kadut in the North – were identified as holding areas that were large enough to house up to 20 to 30 cargo trucks coming in from Malaysia at any one time.

The goal: to ensure Malaysian cargo drivers were vaccinated so that they could continue to safely deliver goods to Singapore.

"This group of drivers who transport supplies from across the border are very important to our supply chain and our survival. They are considered essential workers to us," explained Dr Yeo. "Otherwise, who is going to help bring in our vegetables, our chickens, our ducks and most importantly… our durians."

Thus, it was decided that Malaysian cargo drivers could receive their vaccinations here as needed. It was an effort that was well-received, with many Malaysian cargo drivers even hoping to be selected for the scheme to continue their routine journeys into Singapore.

From end-June 2021 to March 2022, the vaccination project continued with the need for booster shots, and was consolidated at the Sungei Kadut site.

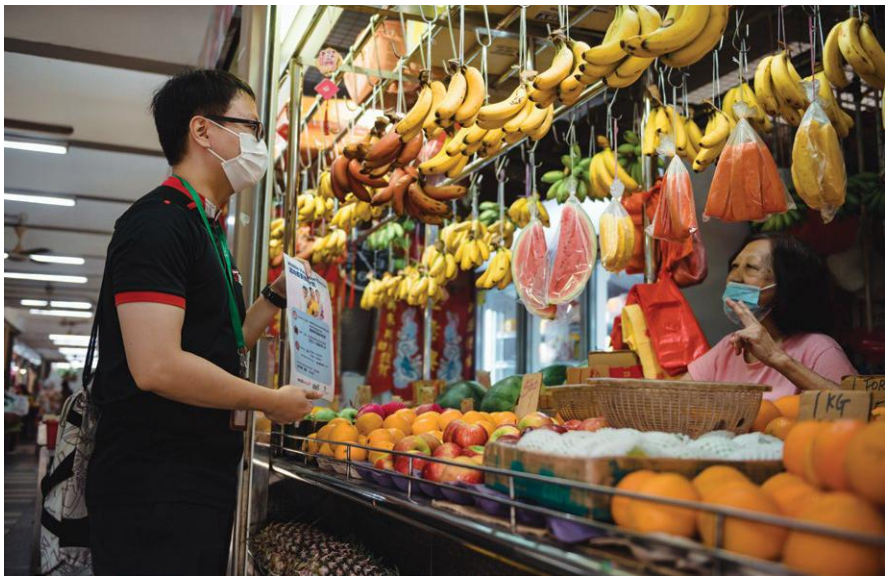


PHOTOS: IHH HEALTHCARE SINGAPORE

"THIS GROUP OF DRIVERS WHO TRANSPORT SUPPLIES FROM ACROSS THE BORDER ARE VERY IMPORTANT TO OUR SUPPLY CHAIN AND OUR SURVIVAL."

– DR NOEL YEO,
FORMER CHIEF OPERATING OFFICER
OF IHH HEALTHCARE SINGAPORE

Malaysian cargo drivers would receive their shots at vaccination sites (above) at either Benoi Sector or Sungei Kadut after parking their vehicles in a holding area (right), so that they could continue to safely deliver essential goods to Singapore.



Officers from the Vaccination Operations Task Group engaged in outreach efforts to explain vaccination policies to seniors in particular, who were one of the groups prioritised in the vaccination rollout.

3 STRATEGY: PRIORITISING CRITICAL GROUPS

The task fell on the Expert Committee on COVID-19 Vaccination (EC19V) to figure out how best to deploy the vaccines, as they were arriving in batches.

But not everyone could be vaccinated all at once, due to logistical and supply constraints. After studying the data from Singapore and other countries, EC19V's advice was to vaccinate vulnerable age groups first. Professor Benjamin Ong, Chair of EC19V, explained that this was because without vaccines, the age at which more severe health risks start is actually 40.

Essential frontline workers – including nursing home staff, those working in the aviation and maritime industries – and people with vascular medical comorbidities were also prioritised.

MOH's Permanent Secretary for Health Mr Chan Yeng Kit called this staggering of vaccination rollouts a "zero-sum game", where one group's gain was another group's loss.

"If we allocate a hundred doses of vaccines to the SQ (Singapore Airlines) crew, it means that we are devoting a hundred doses that could have gone to someone else," he noted.

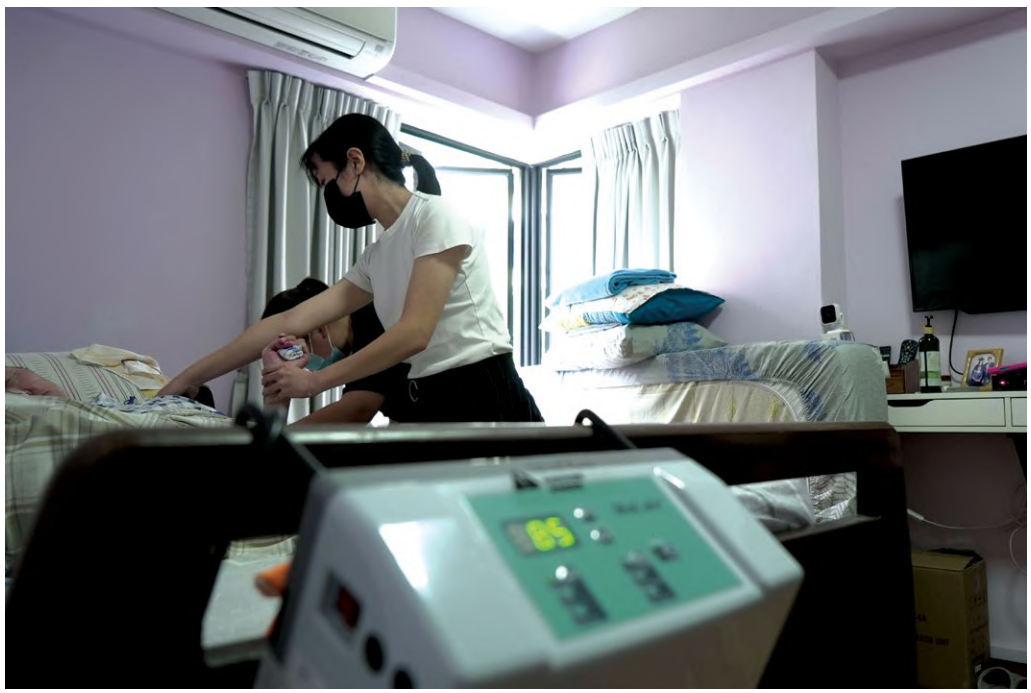
However, the vaccination rate began to plateau around July 2021, with about 30 per cent of seniors still unvaccinated. Naturally, this was a cause for concern as they were one of the most vulnerable groups.

Thus, to encourage more seniors to get vaccinated, mobile vaccination teams were formed to reach out to those in the heartlands on July 7, 2021. This scheme was an extension of the initiative started by the Health Promotion Board (HPB) earlier in the year.

There was also a need to reach those who were unable to travel to vaccination centres due to mobility restrictions. Under the home vaccination programme, a nurse-doctor pair would make their way to the homes of these individuals, administer the jab upon their consent and stay by their side for the designated observation period.

With the support of the Agency for Integrated Care (AIC), who coordinated requests from the public for home vaccinations, homebound individuals could receive their vaccines easily. To date, more than 100,000 individuals have benefitted from this initiative.

But not everyone was keen on getting vaccinated, with rumours and misinformation circulating about the efficacy of vaccines. A well-considered communications plan was needed.



Homebound individuals, including those with mobility restrictions, could opt for home vaccinations, where a nurse-doctor pair would travel to their homes to administer the shot.

MEMORABLE MOMENTS SHARED BY VACCINATION OPERATIONS TASK GROUP OFFICERS

SAYING THANK YOU WITH FLOWERS

One patient who stood out to me was this old gentleman with a walking stick who came to get his vaccination. He started asking us a lot of questions, and even after we had assured him that the vaccine was safe, he asked the doctor a second round of questions. Eventually, he got his shot. But what surprised us the most was that he returned half an hour later, not to ask questions, but with a bouquet of flowers for the doctor. He was genuinely thankful that we took the time to explain things to him so patiently.

– MICHELLE CHEN

SPECIAL CARE

As I was conducting one of my routine spot checks of our home vaccination teams one day, I chanced upon a girl with special needs. She was violently rejecting the nurse and throwing such severe fits that her father had to physically pin her down to the chair. A fear of needles can be common in people with disabilities, especially when we consider their challenges in trying to understand the procedure and communicate their concerns. Home vaccinations, conducted in familiar and quiet spaces, can thus be regarded as a more conducive alternative for them. With my experience in working with special needs kids, I tried to make conversation and practise breathing techniques with her to calm her down. When she was distracted by my voice, I quickly signalled to the nurse to give her the injection. Her father could not thank us enough after that.

– SITI AQILAH

HEAVY LIFTING

I had similar experiences where many seniors would show their gratitude by bringing our team snacks and drinks. But one encounter in Ubi stood out to me. This senior and her family were living on the twelfth floor, but the lift was stuck at the tenth floor and she was a wheelchair user. Her son and I personally carried her down two floors – in her wheelchair – so that she could take the lift downstairs to get her shot. She held my hand and cried after that. I told her that I would do this for my grandma, and that there was no reason why I would not do the same for her.

– CITARRA RHEA

4 MESSAGING: PERSUADING THE MASSES

Ms Lim Siok Peng, Director of Corporate Communications at MOH, was caught in a dilemma – should she or shouldn't she take the vaccine?

"I suffer from allergies and anaphylaxis, and take antihistamines on a daily basis," she revealed. "So when vaccinations were first introduced, if you ask me, I'd rather have COVID than potentially have an anaphylactic reaction."

The irony was not lost on her. How could the person who had to drive the public health communications plan to persuade people to take the vaccine not take the jab herself? In the end, she was convinced by her own communications strategy.

She consulted Prof Ong, Chair of EC19V, and Professor Leo Yee Sin, Executive Director of the National Centre for Infectious Diseases (NCID), who explained the science behind the vaccines and their necessity.

Prof Leo's argument moved her: vaccination during a pandemic is not only for personal protection – it is also protection for the entire community. "During a pandemic, you can't just think for yourself," she recalled Prof Leo saying.

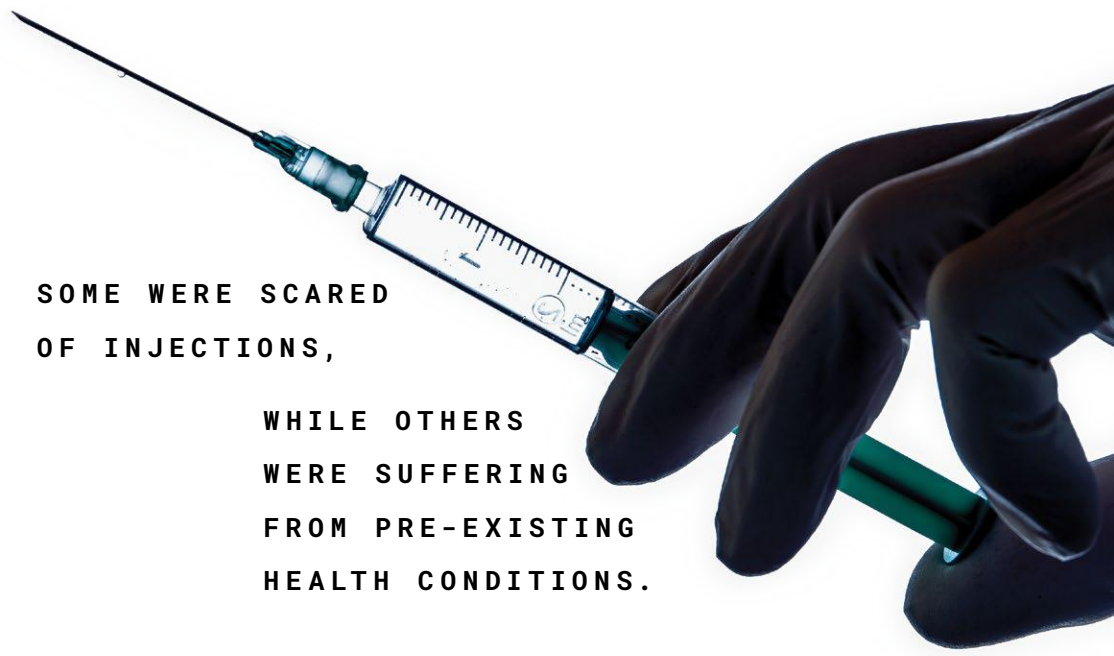
In some ways, it was also her own experience that made her the best person for the communications role. She could empathise with many of the vaccine-related queries and appeals from the public that were flooding in. Some were scared of injections, while others were suffering from pre-existing health conditions.

"We needed to reach a stage where we could convince people like me to take the vaccination. The value of communications is significant," said Ms Lim.

Publicity played a key part in this strategy, one that was open, transparent and based on science. MOH invited the media to visit vaccination centres and feature various profiles there, be it the first people to get vaccinated or vaccinators themselves.

But what made a deeper impression was that doctors and nurses from NCID were part of the first group of people to get inoculated. "They are at the forefront and they know best what's happening. These showed people that the vaccines are safe enough for them and they trust it," Ms Lim shared.

The Silver Generation Office (SGO), the outreach arm of AIC, similarly helped to spread the message in their daily door-to-door efforts to engage seniors. Where such visits were not possible, SGO reached out to people via phone calls to check in on how seniors – especially those who were living alone – were coping.



SOME WERE SCARED OF INJECTIONS, WHILE OTHERS WERE SUFFERING FROM PRE-EXISTING HEALTH CONDITIONS.

PHOTO: AGENCY FOR INTEGRATED CARE

To get as many vulnerable seniors to receive their vaccinations as possible, volunteers from the Silver Generation Office went door-to-door to explain vaccination policies, book appointments for them and even accompany them to vaccination centres.

Not only did they patiently unpack certain vaccination policies, which may have been confusing to the elderly, they also went the extra mile to assist less digitally-savvy seniors in booking their appointments online or even accompanying them to vaccination centres.

Ms Uma Mageswari, a Senior Division Lead of the SGO's Bishan-Toa Payoh Satellite Office, said many seniors were willing to talk to volunteers and learn about the vaccine, despite their concerns regarding its side effects.

While the Government was encouraging people to get vaccinated, the anti-vax movement was stirring worldwide. Thankfully, the anti-vaxxers in Singapore were a minority, and did not derail the vaccination programme.

THE FIRST JAB

"RELAX," said the healthcare staff about to inject Ms Sarah Lim. Behind the blue surgical mask, Ms Lim was composed, seemingly unfazed by the prospect that she would soon become the first person in Singapore to receive the COVID-19 vaccine.

The 46-year-old Assistant Nurse Clinician was among a group of 40 healthcare workers to take the jab before the rest of the nation. She was on the frontlines at the National Centre for Infectious Diseases (NCID)'s Clinic J, screening for suspected cases daily.

"I have to be responsible as a nurse and get vaccinated first so that I can protect others and deliver my patient care," she said in a media interview afterwards.

Her vaccination signalled a new chapter in the battle against COVID-19. It came just two days after December 28, 2020, which marked the beginning of Phase 3 of Singapore's gradual reopening.

Soon after, Prime Minister Lee Hsien Loong became the first member of Singapore's Cabinet to take the first dose of the Pfizer-BioNTech vaccine on January 8, 2021, along with MOH's Director of Medical Services Professor Kenneth Mak.

"My Cabinet colleagues and I, including the older ones, will be getting ourselves vaccinated early. This is to show you, especially seniors like me, that we believe the vaccines are safe," said PM Lee.

By August 2021, over four million had joined them in receiving at least one dose of the vaccine.

Assistant Nurse Clinician **Ms Sarah Lim** (below) and **Prime Minister Lee Hsien Loong** (bottom) are among the first Singaporeans to take their COVID-19 shots in late Dec 2020 to early Jan 2021. Eight months later, more than two-thirds of the population had done the same.

PHOTO: NATIONAL CENTRE FOR INFECTIOUS DISEASES

PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

5 TECHNOLOGY: A USER-FRIENDLY APPOINTMENT BOOKING SYSTEM

As part of the effort to rally people to be vaccinated, technology was deployed to ensure convenience in scheduling vaccine appointments as well as maintain crowd control.

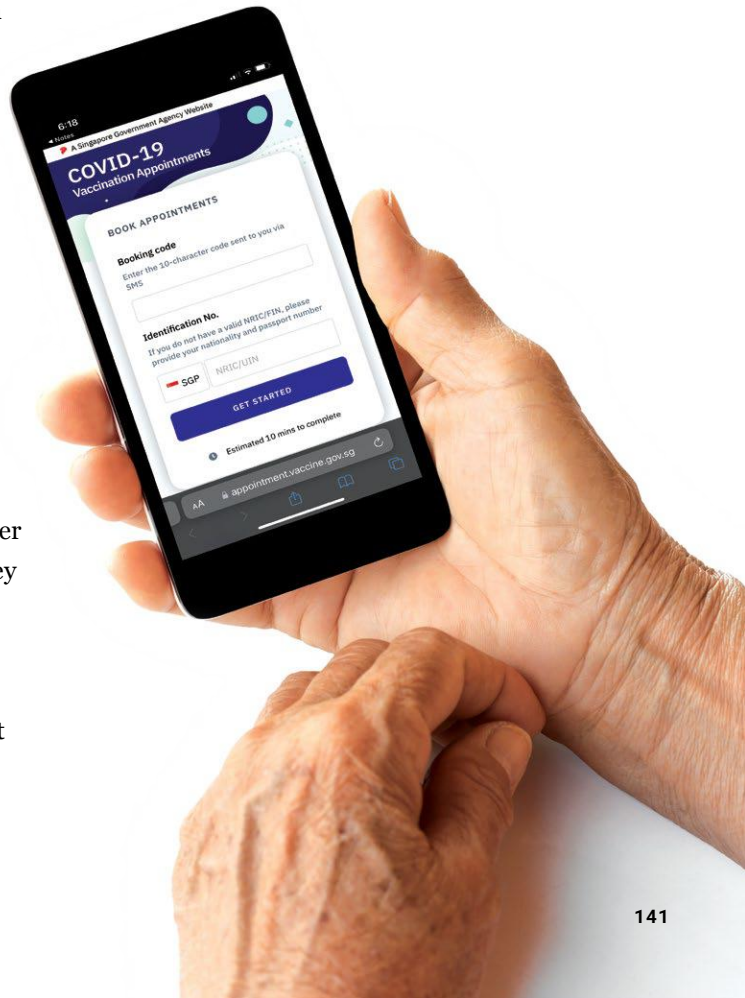
The National Appointment System (NAS) was set up to allow people to book and schedule appointments for both doses of the vaccine. Just like vaccination centres, this system was also developed from scratch and completed within three weeks.

Built by GovTech, the end result was an online platform that enabled a seamless user experience, allowing people to not only book their vaccination appointments but also be reminded to go for them.

It was designed to be user-friendly even to age groups who were less tech-savvy. Mr Dinesh shared that he felt reassured when both his 72-year-old father and 80-year-old uncle confirmed that they could easily navigate the system.

This was also a move that assured the public that operations were running smoothly, according to MOH's Permanent Secretary for Health Development Mr Ng How Yue.

"Imagine if you're already jittery, and then you find that the system doesn't allow you to book an appointment easily. That would discourage people from taking their shots. So creating a smooth system was good for public confidence," he said.



6 LOGISTICS: SUSTAINING A STEADY STREAM OF SUPPLIES

The speed at which Singapore secured vaccines was quite a feat, but the logistics of the ensuing vaccine rollout were complex. At the back-end, the team had to ensure a steady supply of vaccines, and the country once came close to pausing its nationwide campaign when it almost ran out of supplies.

This predicament was wholly unexpected. Usually, Singapore would maintain one to two weeks' buffer for their vaccine stock. But with one week's worth of vaccines left in the inventory, CSOG received the unfortunate news that their new shipment of one million fresh doses would be delayed by four whole days.

And it came at an unfortunate time too, when Singapore was intensifying its vaccination campaign in June 2021 in the midst of the Delta wave.

"We had a transition strategy, but the supply was not cooperating," admitted Minister for Health Mr Ong Ye Kung. "Luckily, someone in the private sector was able to locate an unwanted batch of Pfizer vaccines – one million doses that were not required by whoever bought it."

Needless to say, anxiety was running high. "We were literally tracking the vaccinations from their storage house in their host country all the way through their route movement into the aircraft to make sure that it lands on time," recalled Mr Dinesh.

Of course, they also had to contend with the likely possibility that there would be further delay. If that happens, "we had hundreds of contingency plans", he shared, including getting people to cancel their appointments.

But, as luck would have it, these contingency plans did not have to be activated as the new batch of vaccines arrived just in time, three days before the country would officially run out of them.

"The eagle has landed," Mr Dinesh quickly texted the senior leadership at MOH. He was greeted by a string of thumbs-up and smiling emojis in response, with cries of joy reverberating across the room when the crisis was resolved.

There was also a plan to get more doses of vaccine from one vial – six, instead of five – so as to maximise the vaccine supply.

Today, Singapore has one of the world's highest vaccination rates, with 92 per cent of the population having completed their primary vaccination regimen as at March 29, 2022 – far surpassing the global average of 57.7 per cent.

While vaccines seemed to be the light at the end of the tunnel that everyone was hoping for on the road to normalcy, this light was dimmed when the Delta wave hit Singapore.

PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

The first batch of Pfizer-BioNTech vaccines arrives safely at Singapore Airport Terminal Services' (SATS) Coolport, a temperature-controlled cold chain facility in Dec 2020.

SINGAPORE ONCE CAME CLOSE TO PAUSING ITS NATIONWIDE CAMPAIGN WHEN IT ALMOST RAN OUT OF SUPPLIES.

HOW TO SQUEEZE 6 DOSES OUT OF 5-DOSE VACCINE VIALS

THE AVERAGE VACCINE comes in a single-dose vial. Simply put: one patient, one vial, one injection.

But as COVID-19 vaccines had to be manufactured so quickly in such a short period of time, they came in multi-dose vials that were easier to distribute and took up less storage capacity. Each vial contained five doses.

In a bid to maximise precious vaccine supplies, MOH decided to draw six doses out of five-dose vials.

"We really wanted to get the six doses in," shared Permanent Secretary for Health Development Mr Ng How Yue.

As long as each dose contained the full 0.3 millilitres of vaccine, this sixth dose worked just as well. If the remaining amount of vaccine in the vial does not amount to 0.3 millilitres, it will automatically be discarded, regardless of any excess volume.

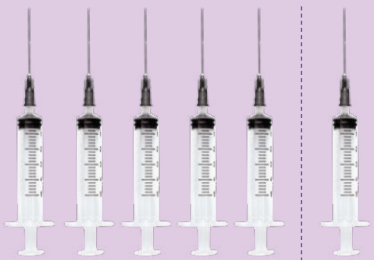
The National Centre for Infectious Diseases (NCID) was the first to accomplish this feat "by pure skill", shared Mr Ng.

Subsequently, one of the Health Promotion Board (HPB)'s mobile vaccination teams followed suit, led by seasoned nurses whose routine job scope already involved vaccinating children in schools as part of the National Vaccination Programme.

"If you're very careful, you might even be able to draw seven doses," Chief Operating Officer of HPB Mr Koh Peng Keng said, dropping his voice to a conspiratorial whisper.

Eventually, special low dead-volume syringes for COVID-19 vaccines were secured, allowing all vaccine administrators to achieve this standard. They were thinner than average and had less space between the needle and plunger when it is fully pushed in, giving them a built-in precision to draw the exact amount needed and waste less vaccines.

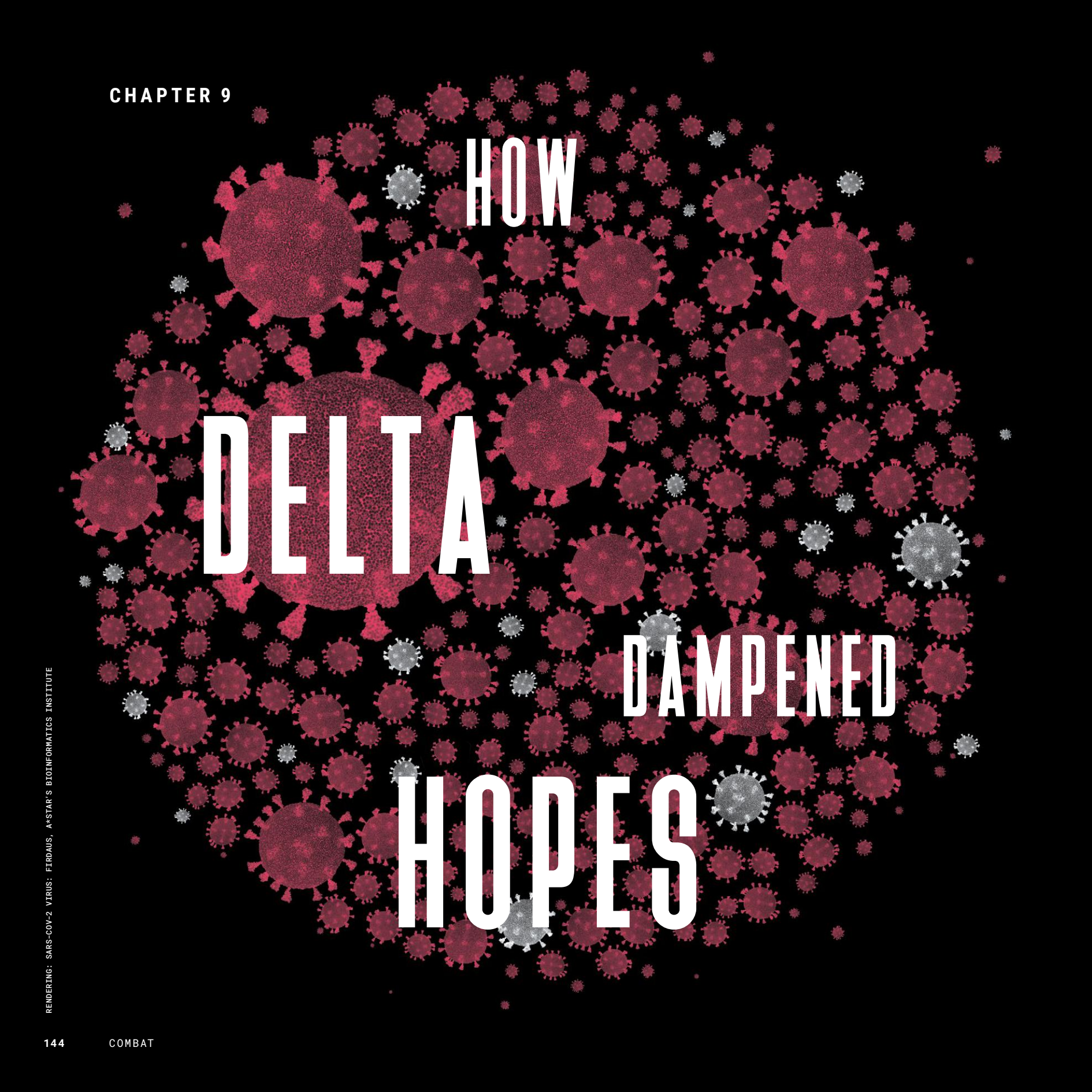
The limited supply of vaccines meant that they had to be treated like liquid gold. As Mr Ng put it: "Every droplet counted."



THE 6TH DOSE – FULL **0.3** MILLILITRES OF VACCINE

CHAPTER 9

HOW DELTA DAMPENED HOPES



RENDERING: SARS-COV-2 VIRUS: FIRDAUS, A*STAR'S BIOINFORMATICS INSTITUTE

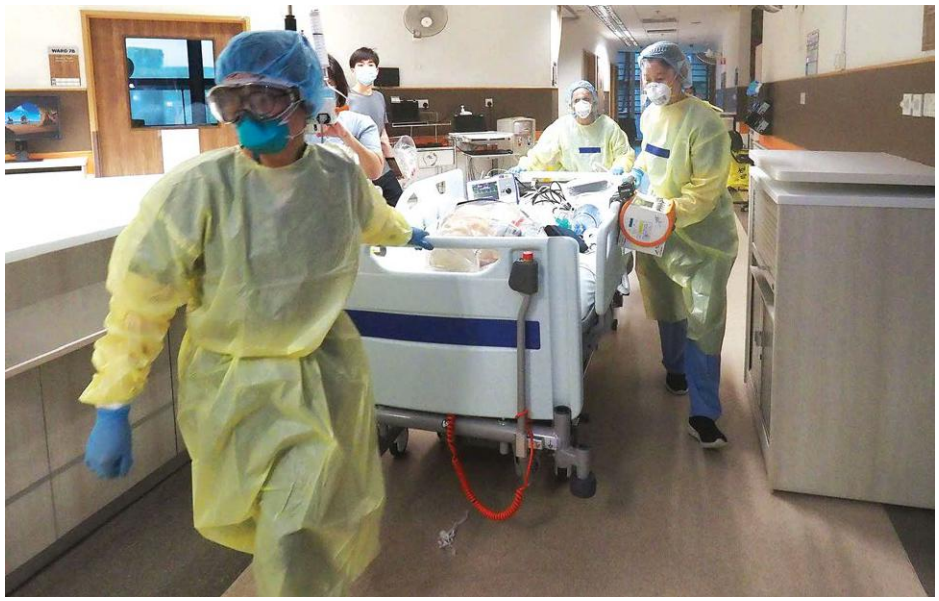


PHOTO: TAN TOCK SENG HOSPITAL

Singapore's first hospital cluster was at Tan Tock Seng Hospital, leading to the first and only hospital lockdown during the pandemic.

FROM the lockdown of a hospital to potentially uncontainable clusters breaking out in the community, Delta left a trail of destruction in its wake. This marked a major setback for the nation.

Prior to this, besides a few errant cases, people were used to seeing locally transmitted cases in the single digits for months – at times even zero cases. But the new Delta wave led to a surge in cases, as this variant was more infectious than the original strain.

The gravity of the situation was obvious: it was also the first and only time a hospital here was locked down during the pandemic, with the only other time that Tan Tock Seng Hospital (TTSH) closed its doors to the public being the 2003 SARS outbreak.

No one had expected a healthcare worker from a hospital that was one of Singapore's key battlefields in the fight against COVID-19 to catch the virus, much less a person who had already been vaccinated. Anxiety was brewing.

A TIMELINE OF COVID-19 CLUSTERS

2021

APR

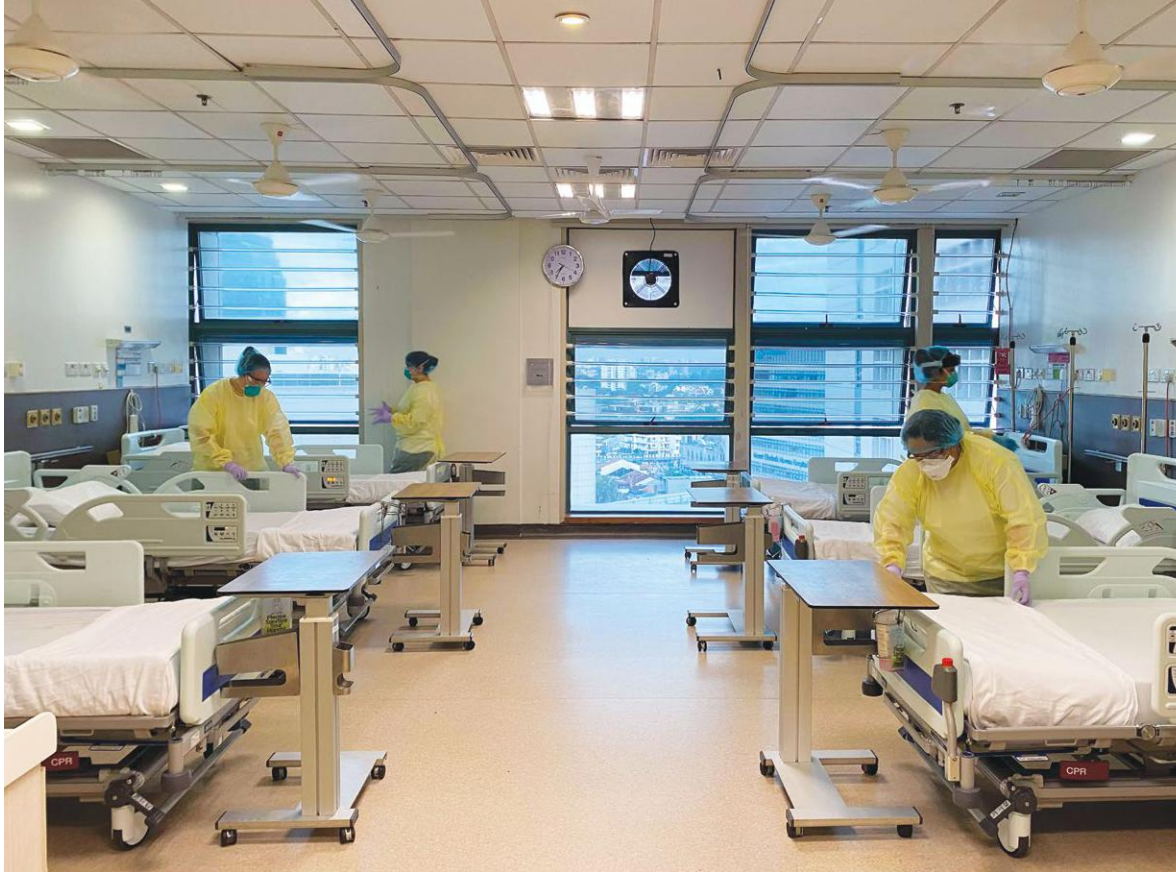
28 APR 21
Senior staff nurse at Tan Tock Seng Hospital (TTSH) tests positive for COVID-19. Ward is locked down.

29 APR 21
Visitors to TTSH are disallowed.

30 APR 21
Two other wards are locked down.

MAY

4 MAY 21
The TTSH cluster becomes the largest active COVID-19 cluster, with a total of 40 cases linked to it.



PHOTOS: TAN TOCK SENG HOSPITAL

INSIDE THE WARZONE

Chairman of TTSH's Medical Board Professor Chin Jing Jih, who handles all clinical issues at the hospital, recalls the fear when the TTSH cluster broke.

"The first reaction we had was that we needed to get a handle on this because otherwise, it's going to spread like wildfire in the hospital to weak and vulnerable patients," he said.

As TTSH went into lockdown, as part of sectoral ring-fencing strategies, the aim was to limit the spread of COVID-19 transmissions within a targeted location or area without having to impose a whole-country lockdown.

While ring-fencing was also used in the SARS outbreak, such strategies had to be scaled up and expanded during the COVID-19 crisis, given its high rate of transmission.

"The biggest challenge is how to ring-fence the community. When we looked at TTSH, I remember there was

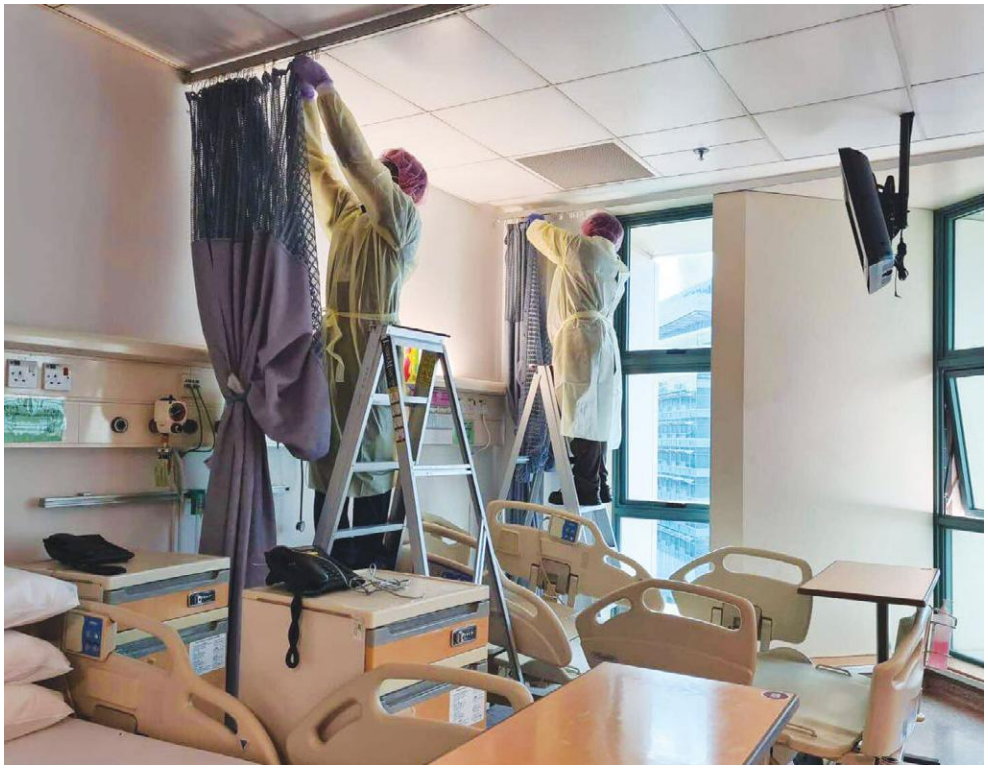
> "TO US, MORE PEOPLE IN QUARANTINE MEANS A GREATER IMPACT ON OUR STAFF STRENGTH."
>
> – PROF CHIN JING JIH, CHAIRMAN OF TAN TOCK SENG HOSPITAL'S MEDICAL BOARD

MAY

5 MAY 21
A cleaner at Changi Airport Terminal 3 tests positive for COVID-19.

12 MAY 21
The Changi Airport cluster grows to 26 cases, and Jewel, Terminal 1 and 3 are closed to the public.

The housekeeping team at Tan Tock Seng Hospital carried out extensive terminal cleaning and decontamination cycles at the wards using hydrogen peroxide vaporisers and ultraviolet decontamination devices.



one discussion with the Multi-Ministry Taskforce on whether we can isolate the Novena Square area," revealed Permanent Secretary for Health Mr Chan Yeng Kit.

"In the end, we recommended against it. Even if we lock down the buildings, people have come out already. So we didn't do, and have never done, geographical lockdowns."

But while TTSH's internal ring-fencing measures were timely, they had to face other repercussions too. At one point, over a thousand staff were under quarantine and on leave of absence – basically out of action. This, too, was a tough decision to make.

Prof Chin compared his thought process to surgery. "You cut bigger margins to make sure that the cancer cells are all taken off, but that also means a bigger chunk of tissues being taken away. To us, more people in quarantine means a greater impact on our staff strength," he said.

20 MAY 21
The Changi Airport cluster becomes the largest active COVID-19 cluster, with a total of 100 cases linked to it.

Ms Lim Mei Ling, Senior Nurse Manager at TTSH, further shared that uncertainty and anxiety were dominant sentiments on the ground at that time. "In affected wards, quarantine orders could be extended for up to 21 days," she said.

As a result, staff from other departments and healthcare institutions had to be brought in to supplement the hospital's dwindling manpower. This was not always ideal as these reinforcements were working in an unfamiliar environment, and had to adjust to new team dynamics within a short span of time.

Those who were unaffected by quarantine and isolation measures had to step up to cover additional areas of care in the hospital, leading to longer working hours which could extend up to 12 hours per shift. This took a toll on not just their mental health as they were unable to get sufficient rest, but their family time too.

"I was worried about spreading the virus to my family, so I sent my kids to my in-laws' place," said Ms Lim. "I did not see them for more than three weeks."

AN OUTBREAK FROM WITHIN TAN TOCK SENG HOSPITAL

AT FIRST, she thought it was just fatigue. After all, nurses had to follow a strict hygiene code, decked out in protective equipment – PPE gowns, gloves, face masks and even face shields – at all times. It seemed unlikely that the virus would penetrate these defences.

But over the next few hours, Tan Tock Seng Hospital (TTSH)'s Senior Staff Nurse Ms Jennilyn Flores Angeles developed respiratory symptoms one after another, including a high fever, cough, runny nose and body aches.

She immediately went for a swab test and, as the clock struck midnight, she was confirmed COVID-positive on April 28, 2021.

The next day, six new cases linked to the TTSH cluster were reported, including a 94-year-old patient in Ward 9D. The hospital sprang into action and locked down the ward immediately.

By April 30, 2021, TTSH had disallowed all visitors and locked down two other wards. As part of a mass screening exercise, all 1,100 patients and 4,500 staff in the hospital were swabbed, while potential close contacts were quarantined. Emergency cases were redirected to other hospitals.

But the numbers continued to climb. In a matter of days, it became the largest active cluster in Singapore, with 40 cases linked to it as of May 4.

Professor Chin Jing Jih, Chairman of the Medical Board at TTSH, admitted that the hospital was caught by surprise: "We never expected the enemy to come from within."

JUN

6 JUN 21
The TTSH cluster is officially closed, with no new cases linked to it after 28 days.

9 JUN 21
The first case of the Bukit Merah View Market and Food Centre cluster is reported.

13 JUN 21
The Bukit Merah View Market and Food Centre is closed for three days for deep cleaning.

CLUSTERS OF CONCERN

But if the TTSH cluster took the country by surprise, nothing could have prepared Singapore for what came after. Cluster after cluster appeared within the community across the next few months, driving home the point that Delta was a force to be reckoned with.

Just after the TTSH cluster reached its peak, a new one emerged at Changi Airport. On May 5, 2021, an 88-year-old cleaner at Terminal 3 tested positive for the virus. A week later, the cluster had grown to 26 cases. By May 20, it had taken over TTSH as Singapore's largest active cluster with 100 cases.

More worrying were the clusters that had broken out at Housing and Development Board (HDB) estates, particularly those with a high proportion of elderly residents.

In June 2021, four clusters were reported in the Bukit Merah View and nearby Redhill estates, with seniors making up almost half of these cases.

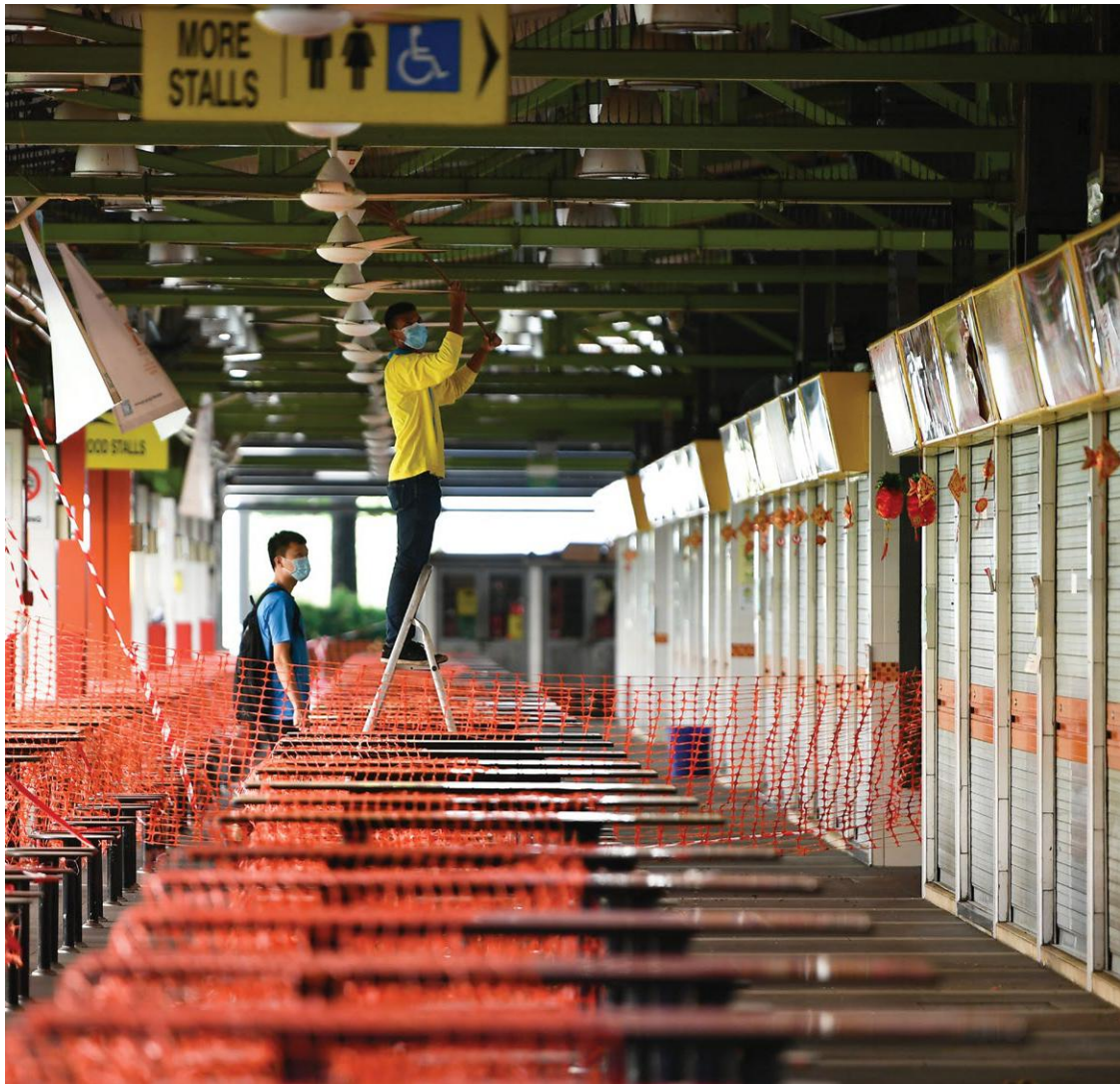


PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Bukit Merah View Market and Food Centre on Jun 23, 2021.

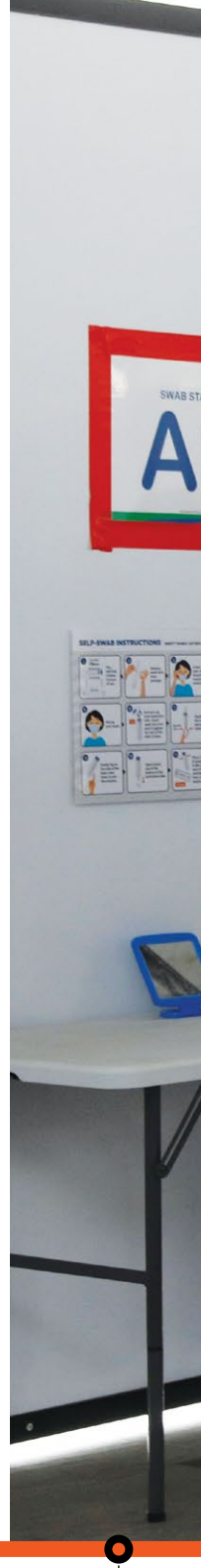
14 JUN 21
Jewel Changi Airport reopens after a month-long closure.

About 40 per cent of these seniors were not fully vaccinated. Subsequently, more community cases were springing up in other residential areas in Punggol, Hougang, Tampines, Yishun and more.

This was when mass testing operations for affected public housing estates were introduced, complemented by wastewater testing efforts of the National Environment Agency (NEA). Wastewater testing served as a surveillance strategy to identify COVID-19 viral fragments in wastewater, allowing MOH to efficiently deploy its testing resources and swab operations to the right sites.

From May to August, slightly more than 30 of such mandatory mass testing operations were conducted, with about half of them surfacing positive cases. HDB, as well as the People's Association (PA), were key partners in this effort, managing residents through ground engagement and giving them prior notice through mailers and advisories.

PHOTOS: REUTERS/EDGAR SU



Residents queue to take their mandatory COVID-19 swab tests after cases were detected in their estate (above).

Quick test centres were set up near residential estates and at popular malls to make COVID-19 testing more convenient (right).

Mr Ng Hock Sing, Director of MOH's Emergency Preparedness and Response Division, said his key priority was assuring residents that testing operations were done out of precaution and for residents' protection, and that most people were unlikely to be infected.

"The PA would already have engaged the residents before we released the news to the public," he said. "Then, in the next one to two days, we will carry out the testing. We didn't want the residents to read about positive cases for the first time in the news."

JUL

12 JUL 21
The KTV cluster is announced by MOH, with three cases linked to it.

16 JUL 21
Linked to the KTV cluster, the Jurong Fishery Port (JFP) cluster is first announced after cases were found there. All nightlife establishments have to close for two weeks.

17 JUL 21
The KTV cluster has grown to 148 cases.

20 JUL 21
142 new cases in the JFP cluster are reported.

22 JUL 21
Return to Phase 2 (Heightened Alert) due to the growing JFP cluster

PHOTOS: MINISTRY OF SUSTAINABILITY AND THE ENVIRONMENT

Linked to the KTV cluster, the Jurong Fishery Port cluster was announced on Jul 16, 2021 after seven cases were detected there.

But two clusters in particular captured people's attention: the KTV and Jurong Fishery Port (JFP) clusters.

The first three cases linked to KTVs were announced on July 12, 2021. It was discovered that, since May 2021, numerous nightlife operators and establishments had been breaching safe management measures, failing to prevent the intermingling of large groups and allowing live entertainment and games.

Within five days, the cluster had swelled to 148 cases. More than 400 nightlife establishments were suspended for two weeks, with all employees required to undergo mandatory testing for COVID-19.

It did not stop there. On July 16, 2021, cases were detected among visitors to Hong Lim Market and Food Centre as well as JFP. The next day, both locations were closed to the public. At its peak, it saw a total of 1,155 cases.

It was later reported that the JFP cluster was linked to the KTV cluster, as the virus detected in both clusters were different from the Delta variant seen in other local clusters.

This was a sign that the virus was mutating at a pace far beyond what was anticipated. Another grave realisation was that vaccines could not prevent transmission within the larger community.

"3 STEPS FORWARD, 2 STEPS BACK"

Singapore was left with little choice but to revert to tightened restrictions, called Phase 2 (Heightened Alert). Dining in and social gatherings were once again disallowed, people could only leave the house in groups of two, and work-from-home and home-based learning became the default once more.

In fact, the entire period from May to August 2021 resembled a whack-a-mole situation where Singapore had to aggressively tackle a spate of emerging clusters, and a period of tightening and easing community measures ensued. In the span of just three months, Singapore had cycled between Phase 2 (Heightened Alert)

SEP

1 SEP 21
Changi Airport Terminal 1 and 3 reopen.

7 SEP 21
JFP cluster is officially closed.

and Phase 3 (Heightened Alert), where people were allowed to gather in groups of two, then five, then back to two.

These decisions were not made lightly. Minister for Health Mr Ong Ye Kung, who took over the reins just as Delta hit Singapore, explained, "The main consideration was to buy time for vaccinations because we were not at the stage we are at now, where we have very strong hybrid resilience – three shots, some four, plus infection."

His predecessor, Mr Gan Kim Yong, acknowledged the sentiment on the ground that it seemed that Singapore was "taking three steps forward, and two steps back".

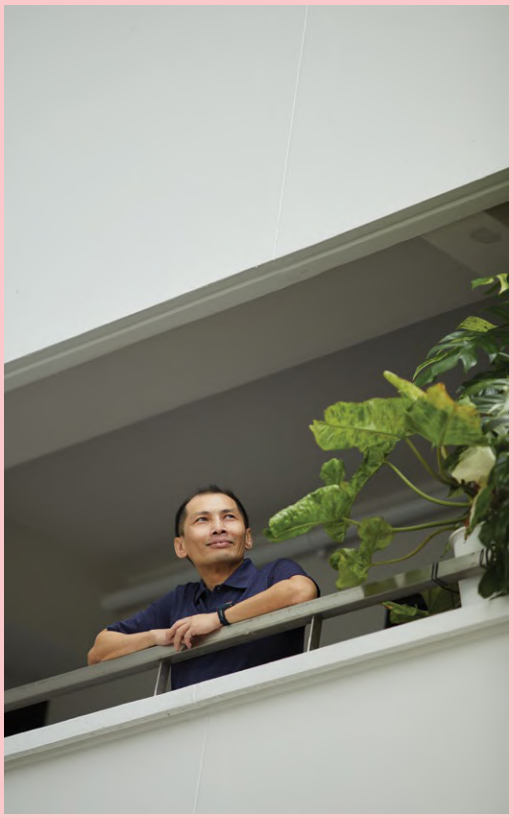
But there was a need for recalibration to "prevent a massive outbreak and collapse of the healthcare system", said Mr Gan, who remained in the MTF while he moved on to helm the Ministry of Trade and Industry in May 2021. "We must be nimble and prepared to change."

The Jurong Fishery Port cluster was especially hard to contain as the virus had made its way into a large community, from fishmongers to stall assistants and delivery drivers.

SWABBING STORIES

THE MOST CHALLENGING PART OF BEING A SWABBER IS HAVING TO DEAL WITH PEOPLE'S EXPECTATIONS FOR SWABBERS TO DO THEIR JOBS PAINLESSLY.

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM



MANY FEAR THE PAIN of being swabbed for a Polymerase Chain Reaction (PCR) test, but not many know the woes of being a swabber.

Like all frontline workers, Mr Liang You Rui, a swabber on contract with MOH, had to don full PPE gear and an N95 mask for hours every time he was called for a testing operation.

"At the end of the day, the mask would have cut lines into the side of your face, your fingers would be wrinkly, and your underwear would be soaked," he said. "All you want to do when you get home is lie down on the floor and fall asleep."

He was part of the Quick Response Force (QRF), an elite team of swabbers who were activated by the management of MOH whenever there was a more significant – and worrying – surge in COVID-19 cases. The QRF was also deployed to the mass testing operations at public housing estates during the Delta wave, such as those in Hougang and Chinatown.

But the most challenging part of being a swabber is having to deal with people – more specifically, their expectations for swabbers to do their jobs painlessly.

"This is a job where you know they won't see you and smile," quipped Mr Liang.

It didn't help that every resident had to be swabbed twice – once for an Antigen Rapid Test (ART) test, and once for a PCR test. The rationale was that diagnostic tests could sieve out positive cases as quickly as possible within 15 minutes, while PCR tests served as a confirmation of whether someone indeed had COVID-19 or not.

Typically, it takes only three minutes to swab one patient. For the elderly, however, especially those who had an irrational fear of being swabbed, this could take up to 15 minutes.

Mr Liang remembers the difficult cases well. "Some people will pull out the swab stick when it's halfway up their nose and slam it on the table," he recalled.

Another instance was when swabs were introduced for children under the age of 12. "The father wanted the child to be swabbed, but the mother didn't want to. The parents quarrelled in front of me, and we ended up taking over an hour just to swab this one kid," he recalled.

Mr Liang You Rui was part of an elite team of swabbers on contract with the Ministry of Health called the Quick Response Force (QRF), which was activated whenever there was a surge in COVID-19 cases.

The KTV and Jurong Fishery Port clusters posed challenges to contact tracers due to the immense number of unlinked cases.

LOSING TRACK OF CONTACT TRACING

As more cases sprouted, contact tracing efforts, which had previously been lauded as "gold standard", were struggling to keep up.

"The Delta wave was really challenging because of the sheer numbers," said Professor Vernon Lee, who headed the contact tracing work as the Senior Director of the Communicable Diseases Division at MOH.

Some clusters were harder to deal with than others. For instance, the infamous KTV cluster was hard to contain because of the illicit nature of activities. Both establishments and customers had been breaching safe management measures and were reluctant to share accurate information.

As Mr Chan, Permanent Secretary for Health, quipped: "Some were more worried about being killed by their wife than the virus."

The result was a great number of unlinked cases. "If we are unable to link someone to a known network of cases, that means there's some transmission going on that we don't know about – it could be a small transmission or it could be a big cluster that we have not detected," explained Prof Lee.

Still, the KTV cluster was not as bad as the JFP cluster, said Mr Ong, Minister for Health. The former was a closed community of KTV-goers, but the latter was a larger community consisting of fishmongers, stall assistants, delivery drivers and others who visited the port before working at various markets in Singapore.

"By the time we thought we had suppressed it, it was too late. Actually, it already went out to the community – hawker centres, markets and through the bus interchanges," he said, acknowledging that quicker action could have prevented the spread.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

PHOTO: SMART NATION AND DIGITAL GOVERNMENT OFFICE

While SafeEntry and TraceTogether were useful tools to assist contact tracing efforts and establish links between cases, contact tracers were sometimes overwhelmed by the sheer amount of digital data that they had to sift through.

Digital tools like SafeEntry and TraceTogether were introduced to complement manual contact tracing efforts, and helped shorten the average time required for contact tracing from four days to less than one-and-a-half days. However, this resulted in a lot more data for contact tracers to sift through and verify. Even with about 450 contact tracers, they felt overwhelmed.

"TraceTogether helped us identify people who did not know each other but were close enough to be potentially exposed to infection. We had that data, but we also needed to figure out whether it was accurate," explained Mr Faris Abdul Wahab, a contact tracer with MOH.

He went on to outline a hypothetical situation: "Imagine a case travels daily via MRT from Jurong to Pasir Ris every day. I end up with 300 to 400 people being picked up as potential close contacts via TraceTogether just for one case. If you have three cases, you could end up with 900 people."

His colleague, Mr Paul Lee, added that this often led to a "compounding effect". As the number of cases increased to 1,000 a day, their work steadily piled up.

Contact tracing efforts were subsequently "repurposed" during the Delta wave, according to Prof Lee. It was becoming increasingly impossible to contact-trace every single case in detail, so efforts were focused on vulnerable settings like schools and eldercare facilities instead. Ultimately, contact tracers had to make the final call on whether or not to issue a quarantine order to close contacts depending on their risk assessment.

But even on the quarantine front, the coordination between MOH and its private partners was compromised by the sheer volume of cases. Quarantine orders were sometimes confusing and inconsistent, resulting in numerous complaints from members of the public. These included quarantine orders that were rescinded or extended at the last minute.

Not surprisingly, public confidence was at an all-time low as cases piled up. On April 1, 2021, Singapore had witnessed about 2,300 community cases, 54,500 dormitory cases and 30 deaths. By

December 1, these numbers had burgeoned to about 180,400 community cases, 79,800 dormitory cases and 726 deaths.

"Delta was a period of great chaos," said Mr Ong. "I got a lot of flak – deservedly so – but we were caught off guard at that time. We were planning for it, but it came very fast, and too soon."

At a press conference in September 2021, he had also cautioned that Singapore's daily COVID-19 cases could hit 1,000 soon, as numbers had been doubling every week. This was seen as a necessary "rite of passage" for any country to go through before they could even hope to live with the disease.

Sure enough, on September 18, 1,009 new cases were reported. The healthcare system was under stress, and people were panicking. There was a pressing need for a change in strategy.

IT WAS BECOMING INCREASINGLY IMPOSSIBLE TO CONTACT-TRACE EVERY SINGLE CASE,

SO EFFORTS WERE FOCUSED ON VULNERABLE SETTINGS LIKE SCHOOLS AND ELDERCARE FACILITIES INSTEAD.

(From left to right) Contact tracers **Mr Paul Lee**, **Ms Eileen Chen** and **Mr Faris Abdul Wahab** were part of a team that found themselves handling about 1,000 cases a day at the height of the Delta wave, and had to make important calls on whether or not to issue quarantine orders to close contacts.

LETTING THEM GO WITH DIGNITY

WITH THE CHRISTIAN HYMN Amazing Grace playing in the background, Dr Ho Lai Peng and two nurses delicately dressed the deceased patient in new clothes and tidied his hair. Once it was done, she took a photograph of the patient that would be sent to his family members.

It was the last photograph of the patient, a Christian, who had died of COVID-19.

As a medical social worker for over three decades, Dr Ho was used to seeing suffering and death up close. But COVID-19 posed a different challenge altogether. Safe distancing rules meant that patients on their deathbeds could not be with their loved ones. And death sometimes came suddenly and quickly.

At the National Centre for Infectious Diseases, the responsibility of accompanying patients through their last days fell on Dr Ho and her team. They also became the middlemen helping family members fulfil their last wishes for the patients, and comforted them when patients passed on.

"The last photograph is very important. It makes the family feel at ease to know that their loved ones did not suffer in their last moments," she said.

The sheer number of cases that Dr Ho's team had to handle during COVID-19 – especially during the height of the Delta wave when the case fatality rate peaked – was overwhelming. To cope with the increase in caseload, three more members from her team were subsequently deployed to support the team at the COVID wards.

The work of a medical social worker extends to providing end-of-life care to patients and allaying the fears and anxieties that they and their loved ones have. The job is emotionally taxing, even for the most seasoned practitioners. At times, family members would vent their frustrations on Dr Ho's team when their requests to deliver food to patients or visit dying patients were rejected.

"Some would scold us and shout at us. We see their point of view and we try to empathise. But it is a lonely and tiring journey. There were days I didn't eat, didn't drink and didn't use the toilet for hours because there was so much to do. Sometimes, at the end of the work day, my colleagues would break down. You're just handling deaths the whole day," she said.

In trying times, Dr Ho clings on to the purpose of her work. "We are here to maintain the dignity of the deceased, and assure their next-of-kin that someone was there with the patient when they passed," she reasoned.

"This is social work – you enter difficult situations that people are facing. If you don't want to go into the fire, then you should not be a firefighter."

Ultimately, Dr Ho sees herself as playing a privileged role to protect the dignity of the dying. "I know my patient's family members would willingly trade positions with me to be in the ward, but they can't. So I see what I'm doing as a privilege – it is an honour to be able to play music for the deceased, to dress their body and comb their hair," she said.

Dr Ho Lai Peng, medical social worker at the National Centre for Infectious Diseases (NCID), and her team accompanied patients in their last days and saw them off with dignity.

AN INTERDEPENDENT ECOSYSTEM

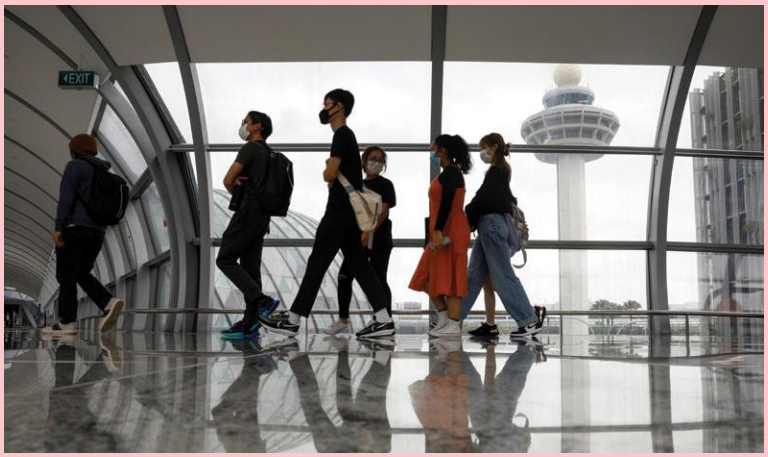


PHOTO: REUTERS/EDGAR SU

As Singapore slowly got Delta under control and started to transition to living with COVID-19, the country sought to resume travel, establishing vaccinated travel lanes with other countries starting from Sep 2021.

"FOR EVERY COVID-POSITIVE PATIENT, 15 close contacts will be generated," explained Mr Tan Leong Boon, who was recalled to the Enhanced Quarantine Order Task Group (EQO TG) in May 2021 when the Delta wave hit.

Previously, he was involved in quarantine operations when there was an outbreak in foreign worker dormitories in Singapore a year before.

To him, the scale of the work that the EQO TG had to handle was magnified by 15 times. Their responsibilities went beyond just issuing QOs to close contacts – they also had to transport them to hotels or government quarantine facilities (GQFs), test them at the start and end of their QOs, as well as ensure their physical and mental well-being for 14 days.

There was also the issue of dealing with difficult individuals. Some were unhappy upon being informed that they were close contacts of COVID-positive cases, sometimes even getting verbally aggressive with Certis officers and demanding to know where they could have caught the virus from.

Some were at the other end of the spectrum, in a category that Mr Tan calls "Worried Well". These were individuals, usually family members of a confirmed case, who were concerned about whether they had caught the virus or not, but had not heard from anyone on what their next course of action should be.

Their work was "laborious and draining". In theory, the quarantine process seemed fairly straightforward, even simple. In practice, however, all sorts of complications arose. The entire quarantine "ecosystem" was precarious at times.

"Many parties are involved and they need to play their part in the ecosystem. If there's a delay at the call centre, then there's a delay by Certis, a delay at the regional swab centres, and a delay at check-in – the whole thing snowballs because everything is interdependent," said Mr Tan.

PHOTO: ALAMY STOCK PHOTO/POSITIVESOUNDVISION

CHA

SENIORS PLAY A GAME OF CHINESE CHESS AT CHINATOWN ON FEB 3, 2021. SINGAPORE ENTERED 2021 WITH THE LOOSENING OF CIRCUIT BREAKER MEASURES, ALLOWING SOCIAL GATHERINGS OF UP TO EIGHT.

NGE

A fundamental
shift in strategy –

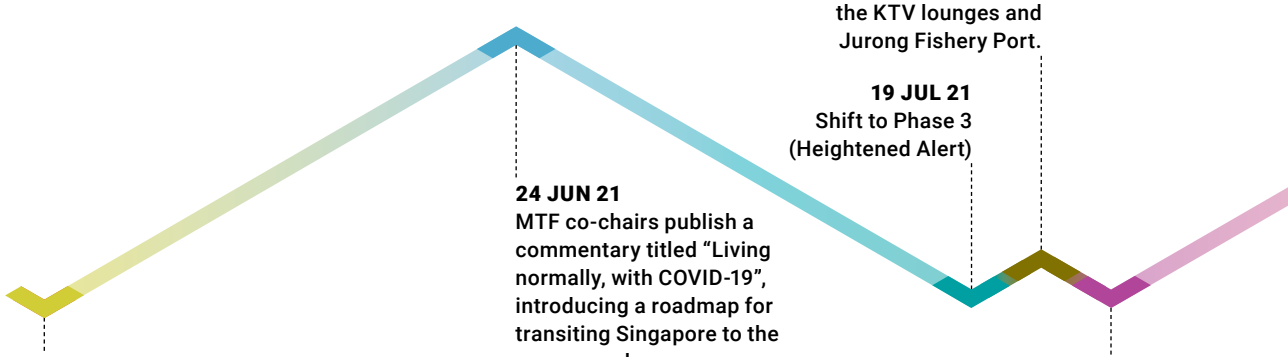
from zero-COVID
to endemicity –

was now necessary.

CHAPTER 10

PANDEMIC PIVOTS

2021: THE MOVE TOWARDS ENDEMICITY



28 MAY 21
Multi-Ministry Taskforce (MTF) co-chair Minister Lawrence Wong announces at a press conference that Singapore is planning for the possibility that COVID-19 might become endemic.

24 JUN 21
MTF co-chairs publish a commentary titled "Living normally, with COVID-19", introducing a roadmap for transiting Singapore to the new normal.

19 JUL 21
Shift to Phase 3 (Heightened Alert)

20 JUL 21
More COVID-19 cases emerge, including at the KTV lounges and Jurong Fishery Port.

22 JUL 21
Singapore reverts to Phase 2 (Heightened Alert) measures; dining-in is ceased and the cap on social gatherings is reduced from five to two people.

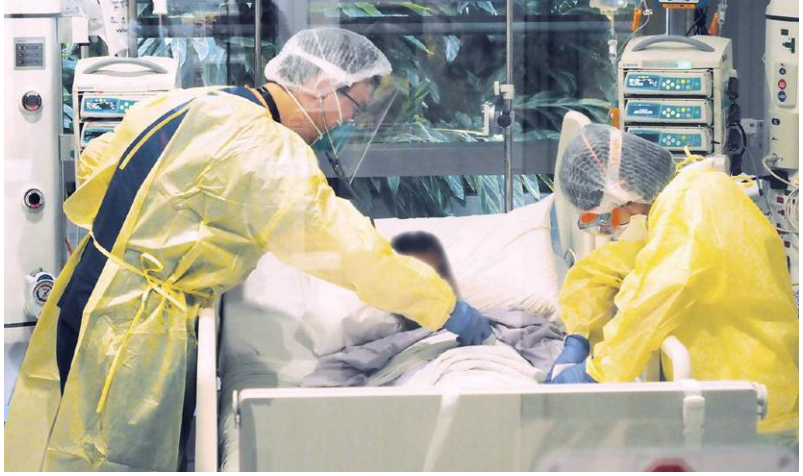


PHOTO: TAN TOCK SENG HOSPITAL

At the National Centre for Infectious Diseases, healthcare workers in full personal protective equipment care for a patient in an isolation ward.

AS Singapore lived through the dark days of Delta, hope came from crucial changes that drastically altered how the nation coped with the mutating COVID-19 virus and prolonged pandemic.

Not all measures were easy to implement, or readily accepted by the population. But the entire healthcare family soldiered on, knowing that change was necessary to win the fight.

To Mr Chan Yeng Kit, Permanent Secretary for Health at the Ministry of Health (MOH), the emergence of the infectious Delta variant signalled that a switch was on the cards. "The darkest period for MOH was the Delta outbreak, where our earlier 'test, trace, isolate' method became obviously impossible. We would have been overwhelmed."

At ground zero – the intensive care units (ICUs) and emergency departments of hospitals – the healthcare machinery worked doubly hard to ensure there was sufficient manpower and operational capacity to fight this battle.

But it was a mountainous feat with the Delta variant as the number of cases spiked to over 1,000 a day – sometimes even reaching more than 5,000. Coordination was required across clusters, which led to the formation of MOH's Case Management Task Group.

Work shifts for healthcare staff were reorganised or even extended, while recruitment practices were overhauled to fill the manpower gaps faster. To further ease overburdened hospitals, alternative care centres called COVID-19 Treatment Facilities (CTFs) were set up.

Pandemic protocols were also eased, allowing people with mild or no symptoms to recover at home instead of the hospital or healthcare facilities. Quarantine was no longer necessary for close contacts.

The changes, however, went beyond the hospitals and healthcare systems to how everyone lived with the virus. A fundamental shift in strategy – from zero-COVID to endemicity – was necessary. This was the most significant shift, and also the hardest.

6 AUG 21
MTF co-chair Minister Ong Ye Kung outlines a four-stage transition plan to live with COVID-19.

24 SEP 21
MTF announces a Stabilisation Period, a continuation of tight safe management measures.

9 OCT 21
Prime Minister Lee Hsien Loong addresses the nation, explaining to Singaporeans the shift from the zero-COVID strategy to living with the virus.

22 NOV 21
Singapore exits the Stablisation Period into a Transition Phase, with gradual easing of measures and more activities to resume.

STRATEGY PIVOT: FROM ZERO-COVID TO LIVING WITH COVID

As readers flipped through The Straits Times on June 24, 2021, the opinion pages might have caught their eyes. In an atypical move, there was a commentary co-authored by three ministers from the Multi-Ministry Taskforce (MTF).

"Our people are battle-weary," penned ministers Gan Kim Yong, Lawrence Wong and Ong Ye Kung. "All are asking: when and how will the pandemic end?"

Titled "Living normally, with COVID-19", the commentary was one of the first public hints that the country would pivot from a zero-COVID strategy to one that treated the virus as endemic.

"I think the Cabinet knew that we needed to put it out. In terms of the need to signal a change, I don't think there were disagreements, but there were always very diverse ideas and suggestions," said Minister for Health Mr Ong Ye Kung.

When asked about the origins of the piece, he shared that the first speech he made as Health Minister was at a closed-door workplan seminar in May to stakeholders like hospital chief executive officers, emphasising the need to accept COVID-19 as endemic, as well as ensure that healthcare remained affordable, efficient and effective.

Minister Ong Ye Kung who took over as Minister for Health on May 15, 2021 was an early advocate for living with COVID-19, which garnered the support of the medical and scientific communities.

PUTTING FORTH THE SCIENCE AND NUMBERS TO PEOPLE WAS KEY TO "SHAPING SOCIAL PSYCHOLOGY".

The science, he said, pointed in the direction of treating the virus like influenza, especially since vaccinations reduced the incidence of COVID-19 deaths to half that of influenza.

"From day one, we always thought at some point we had to live with COVID-19," he said. However, it was still crucial for Singapore to take a more stringent approach at the start.

"We were lucky our starting point was SARS," he said, noting that countries in the West that treated COVID-19 like influenza from the start suffered millions of deaths. Limiting the spread in the community here bought Singapore time as vaccines were developed.

While the medical community and the science supported the "living with COVID-19" approach, Mr Ong said the public still had to be convinced. The commentary would give society an early indication of the nation's impending shift.

Vaccinations provided assurance to the shift in strategy. It meant that the population would be more resistant to the virus and infections would be less severe. As a result, the healthcare system would less likely be overloaded if restrictions were eased on the road to living with the virus.

Putting forth the science and numbers to people was key to "shaping social psychology". "Over time, this matter-of-fact way of explaining things and the logic – I think it convinced people," observed Mr Ong.

"And gradually, people who were worried about opening, they see friends recover well, and that is very powerful. More and more people started saying: 'It seems to be like the flu, once you take the vaccine.' And gradually, one by one, we start to convert people."

Professor Kenneth Mak, Director of Medical Services at MOH, pointed out that the move to living with COVID-19 was also necessitated by a healthcare system under stress. "We could ill afford having too many people staying in hospital all the time – we were worried we might not have had enough nurses and doctors to look after them in the hospital," he explained.

In early August, Mr Ong unveiled a four-stage plan to achieve the "living with COVID-19" strategy:

1. **PREPARATORY STAGE**
   (August 10 to early September 2021)
   Adjust healthcare protocols and rules on social activities and travel
2. **TRANSITION STAGE A**
   Open up the economy further and resume social activities and travel
3. **TRANSITION STAGE B**
   Further opening up
4. **COVID-19-RESILIENT NATION**
   Living with COVID as endemic

PHOTO: NATIONAL CENTRE FOR INFECTIOUS DISEASES

Extra beds were brought into the National Centre for Infectious Diseases.

At the start, more COVID-19 cases and deaths ensued, prompting many Singaporeans to question the feasibility of endemicity. On October 9, 2021, Prime Minister Lee Hsien Loong stepped up to address and assure the nation.

Acknowledging the public's unease, PM Lee explained how the Delta wave necessitated a change towards "living with COVID-19", especially since vaccinations made infections less dangerous for most.

"I want to share my thoughts and concerns with you, because unity of purpose and hearts is crucial to get us through the next few months," he said. "We must press on with our strategy of 'living with COVID-19'."

As the vision shifted on a national scale, preparations were already in the works from months ago as hospitals enlarged capacities.

OPERATIONS PIVOT: SCALING UP AND DECENTRALISATION

The streets of Novena were quiet. Within the modern façade of the brightly-lit National Centre for Infectious Diseases (NCID), however, was a flurry of activity – to increase the hospital bed capacity following the Delta wave.

The NCID, officially opened on September 7, 2019, was designed to expand its bed capacity from 330 to more than 500 in times of an outbreak. But beds still needed to be brought in.

Operations and nursing staff were enlisted to wheel beds into wards. One by one, dozens of beds glided across the corridors of the 17 wards.

Single-bed wards were converted to double-bedders, while twin wards accommodated three beds. Existing infrastructure, such as additional headboards with the requisite power connections, allowed for such instant retrofits.

"We had to borrow beds from Tan Tock Seng Hospital (TTSH)," said Professor Leo Yee Sin, NCID's Executive Director.

NCID was also equipped with the best hardware. Not only did it have expansion capacity, but also a large screening centre, isolation wards and negative pressure rooms to prevent room-to-room contamination.

The software was equally important. "It was easier to house three patients in a cubicle, but not as easy to find three times the number of doctors. This meant longer working hours, more responsibilities and being doubly alert to not make mistakes," said Dr Tay Woo Chiao, who worked at

NCID while he was a resident with the National Healthcare Group's Internal Medicine Residency Programme.

Dr Juanita Lestari was also right in the mix at NCID as a trainee doctor on her senior residency training during the pandemic.

"Everyone asked me why I chose to train in respiratory and critical care medicine," she said. "I love this field as it equips me with the right skillset to take care of some of the sickest patients and their families in the intensive care unit. I see this opportunity as a privilege."

To shift patients away from overburdened hospitals like NCID, alternative care centres called COVID-19 Treatment Facilities (CTFs) were set up by October.

These were community care facilities meant for the recovery of elderly patients who were stable and mildly symptomatic but had underlying chronic illnesses that could render them more vulnerable to a potential worsening of the illness.

Such groups required close observation but did not need to be hospitalised. Mr Ong said at a press conference on October 2, 2021 that the CTFs were crucial in easing the "biggest crunch" at the hospitals.

"The reason why we are facing the biggest crunch is because our hospitals are admitting many patients for close observation, even though their conditions do not require acute hospital care," he said.

"And that is why we need to set up CTFs, increase the capacity of CTFs, and CTFs have the medical capabilities and resources, including oxygen supplementation, to safely manage such patients who have a potentially higher risk of developing severe illnesses."

Besides supplementing existing medical facilities, it was also vital to ensure there was sufficient manpower to run these operations.

At the peak of the Delta wave, the National Centre for Infectious Diseases (NCID), Singapore's stronghold against COVID-19, had to expand its bed capacity and even borrow beds from Tan Tock Seng Hospital, recalled **Professor Leo Yee Sin**.

BUILDING A COVID-19 TREATMENT FACILITY

PHOTOS: TAN TOCK SENG HOSPITAL

Tan Tock Seng Hospital (TTSH) staff and Singapore Armed Forces (SAF) medics participating in a multidisciplinary resuscitation drill (left); TTSH staff and SAF medics organising rehabilitation activities for patients in the COVID-19 Treatment Facility at TTSH Wards @ Ren Ci (above).

THE IMAGE OF A YOUNG SINGAPORE ARMED FORCES (SAF) FULL-TIME SERVICEMAN gently tending to an elderly COVID-19 patient would remain as one of the most poignant images for Tan Tock Seng Hospital's (TTSH) Senior Nurse Ms Hasfizah Mohd Hanef during the pandemic.

"For us nurses, it's an everyday thing, but it was inspiring to see them communicate with the elderly and hold their hands with that level of care and concern," said Ms Hasfizah, known in the wards as Sister Has.

Before the pandemic, the nursing veteran of 24 years was stationed at Ren Ci Community Hospital (RCCH), which houses TTSH sub-acute wards in close collaboration with neighbouring TTSH.

When the Delta wave hit, many of Ms Hasfizah's team were deployed to supplement manpower needs at TTSH and the Communicable Disease Centre, both nearby within the Novena medical cluster.

Ms Hasfizah was to stay at the TTSH Wards @ Ren Ci – not just to helm the fort, but to build it. She was entrusted with setting up COVID-19 Treatment Facilities (CTF) at the institution in September 2021.

This brought her in contact with SAF medics who bolstered the manpower required to attend to 70 beds at the CTF. "We all felt this was a national service for all," she said.

There were many changes needed for the TTSH Wards @ Ren Ci to function as a CTF, such as plotting different entry and exit routes. This was complicated by the need to run business-as-usual functions, with Ms Hasfizah having to oversee two separate teams.

The team comprised about 100 members: 40 nurses from RCCH, 40 SAF medics and the rest from the National Healthcare Group, National Skin Centre, and private agencies such as Pancare.

One way they kept morale up was to send motivational messages to one another via an electronic dashboard. For example, Ms Hasfizah would praise the young soldiers – who were only given bedside training at the CTF – when they did well.

The team spirit was crucial in carrying them to the finishing line in April 2022 when the CTF stood down. "Although the situation was tough, we had each other's backs during this period," she said.

From experienced nurses to soldier medics, it required a team effort for the CTFs to succeed.

Tan Tock Seng Hospital's (TTSH) Senior Nurse **Ms Hasfizah Mohd Hanef**, a nursing veteran of 24 years, played a key role in setting up COVID-19 Treatment Facilities (CTFs) at the TTSH Wards @ Ren Ci Community Hospital during the Delta wave.

A BOLD SHIFT

MS PAULIN KOH, MOH's Chief Nursing Officer, had an idea to alleviate the manpower crunch: introduce 12-hour shifts in hospitals in place of the usual eight-hour shifts. Typically after every two consecutive days of 12-hour shifts, they will rest for two days – offering nurses a longer break.

She aimed to share her plan with chief nurses from public hospitals across Singapore in an online meeting in April 2021.

Drawing a deep breath, she unmuted her laptop microphone and explained her idea to about 30 attendees of the Zoom meeting. Not surprisingly, there was significant pushback, with some chief nurses concerned about the extra hours working in the stuffy personal protective equipment.

"Some of them were outspoken and felt it would not be sustainable. This was a good point for discussion," said Ms Koh, who acknowledged the challenges involved and decided that it would be best for the chief nurses to decide if they wanted to adopt a 12-hour shift.

She would continue to monitor manpower requirements as hospital capacity expanded in the months that followed, knowing that she might have to put her foot down on the extended shift if manpower was short.

"As Chief Nursing Officer, I need to evaluate and consider measures at the macro level, and the cooperation of chief nurses was essential. Sometimes, I have to make a stronger statement and tell them to 'please collaborate'," said the soft-spoken veteran nurse with 30 years of experience.

Thankfully, the hospitals were able to tide through the toughest of times, with some units adopting the 12-hour shifts eventually. These were complemented by some other initiatives adopted at the hospitals, such as looking out for the morale and welfare of the nurses, bringing back nurses who had left the workforce, and recruiting more foreign nurses.

Shifts could go up to 12 hours for nurses during the Delta wave due to the manpower crunch in Singapore, though this was complemented by mental health initiatives and efforts to recruit more foreign nurses.

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

Fatigue among nurses was a real concern, and attrition rates rose significantly compared to before the pandemic.

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

RECRUITMENT PIVOT: CASTING NETS FURTHER

The severity of the Delta wave meant that Singapore would soon have to increase the number of beds for COVID-19 patients, putting further strain on an already stretched nursing force.

One solution was to tweak the length of the shifts, which was proposed by MOH's Chief Nursing Officer Ms Paulin Koh.

However, this option was not to be easily taken as that would mean nurses would have to bear with the longer working hours of each shift, and the discomfort of wearing the PPE for longer hours.

But tweaking rosters was just one part of the solution. The nursing workforce was about to face more challenges. Beyond the TTSH cluster, many more healthcare staff – nurses and doctors – were also succumbing to the virulent Delta strain.

With more of them down with COVID-19, it meant less care was available for patients. In effect, it was equivalent to having fewer hospital beds, noted Prof Mak.

"When we started seeing our case numbers going up and our healthcare workers calling in sick, that became a concern for us. The trend was a big worry," he shared.

At the same time, many healthcare workers were also feeling fatigued – mentally and physically – from a prolonged pandemic that had lasted over 18 months, with not much rest in between.

From early 2020 until the ebbing of the Delta wave in late 2021, healthcare workers were not able to take annual leave, unless there were exceptional circumstances. In 2021, over nine in 10 were not able to clear their accumulated leave from 2020.

Burnout became a real issue, said Ms Koh. "Fatigue showed through people calling in sick. At certain points, the number of those on medical leave was quite high because people were tired. Some started telling us they need a break or no-pay leave."

And some eventually left. In November 2021, it was revealed in Parliament that 1,500 healthcare workers had resigned in the first half of the year, compared with 2,000 annually before the pandemic.

Besides the push factor, there was also a pull factor offered by other countries. This was especially so for foreign nurses here, who were drawn by better pay and opportunities and the relative ease of obtaining residency in other countries. In 2021, the attrition rate among foreign nurses in the public sector more than doubled to 14.8 per cent.

Professor Chin Jing Jih, Chairman of the Medical Board at TTSH, said the global competition for healthcare manpower was heightened during the pandemic and Singapore felt the loss of foreign nurses keenly when they left to work in other countries.

"The contribution of the staff does not depend on where they come from," he said.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Global competition for nurses was heightened during the pandemic, and many nursing students had their clinical attachments with healthcare facilities extended or brought forward to boost manpower.

NURSING CRUNCH: REINFORCEMENTS FROM OVERSEAS

WITH A BELEAGUERED LOCAL WORKFORCE and closed borders restricting the entry of new foreign nurses, coupled with an increasing demand for healthcare, the nursing manpower situation looked dire during the Delta wave.

A global pandemic also meant that nurses were in demand worldwide. Singapore had to make unprecedented decisions in its healthcare recruitment to effectively address the manpower shortage.

Ms Paulin Koh, in her other role as Registrar of the Singapore Nursing Board (SNB), made the call to expedite the process of bringing in foreign nurses. "As leaders, times of crisis call for us to be courageous and agile to meet new needs with new solutions," she said.

As Delta added more pressure on the manpower situation, multiple schemes were quickly put in place to bring in foreign nurses in a frictionless manner while still ensuring licensing requirements were met.

"These healthcare workers are very well-trained soldiers who are excellent assets during a very tough, prolonged war. To lose them during a crisis is a terrible hit – not just in numbers but also to morale."

It was clear that changes were vital to retain valuable healthcare workers. Besides recognising their contributions with appropriate awards and offering career counselling, another way was to review if foreign nurses could obtain Permanent Resident status in Singapore more easily to settle down here.

Beyond retention, there was still a need to further expand the current workforce. An option was to bring in more nurses from beyond these shores, on top of solutions such as tapping nursing students.

For many nursing students, their clinical attachments with healthcare facilities were extended or brought forward to boost the healthcare force. For example, Nanyang Polytechnic and Ngee Ann Polytechnic brought forward clinical training in November 2021 for about 1,200 diploma-level nursing students, while the Singapore Institute of Technology extended its clinical training by two weeks in end-2021 for about 200 degree-level nursing students.

While Singapore made these decisive pivots in the three areas of national strategy, operations and recruitment, the pandemic was far from over. The public healthcare system needed the private sector to join the fight.

1

HIRING OF FOREIGN NURSES AS HEALTHCARE ASSISTANTS

With this scheme, institutions were able to bring in foreign-trained nurses quickly as they were not required to undergo the SNB Licensure Examination, and SNB did not need to conduct direct source verification checks of their documents.

2

SNB TEMPORARY REGISTRATION/ENROLMENT (TRAINING) SCHEME

Introduced in April 2021, it allowed foreign nurses to enter Singapore on an approved training plan without having to take the Licensure Examination in their home countries. During this period, these "trainee nurses" would work under supervision before sitting for the Examination in Singapore. Upon passing, they would practise as full-fledged nurses here.

3

SNB TEMPORARY REGISTRATION/ENROLMENT (EMERGENCY RESPONSE) SCHEME

Introduced in October 2021, it is a step up on the Training scheme to meet the further increase in demand for nursing services due to the pandemic. This scheme allowed foreign nurses to practise here under a strict supervision framework while they prepared to sit for the Licensure Examination.

The scheme was opened to eligible candidates from countries beyond the usual sources such as Taiwan, Indonesia, Sri Lanka, Bangladesh, Bhutan and Vietnam.

These schemes provided a much-needed boost to manpower here, bringing in more than 450 nurses as of September 2022.

KEEPING MORALE UP

"IF HEALTHCARE WORKERS DON'T FEEL THEY ARE SUPPORTED, MORALE WILL DIP."

– PROF KENNETH MAK,
DIRECTOR OF MEDICAL SERVICES AT THE MINISTRY OF HEALTH

AS MOH'S DIRECTOR OF MEDICAL SERVICES THEN, Professor Kenneth Mak was the face that the public saw regularly, giving updates on the COVID-19 situation.

While he attended to the health of the nation, he also had to tend to the well-being of another key group – his colleagues toiling in hospitals and healthcare facilities.

"It was important to let healthcare workers know that people at the Ministry were aware of what's happening on the ground and we were fully supporting them," said Prof Mak, sharing that there were many ground engagements with the staff.

It was vital that such efforts ran parallel to the public communication done during the Multi-Ministry Taskforce press conferences, which Prof Mak was a part of.

"Otherwise, the healthcare staff wouldn't understand why they were being thrown into the deep end and the relevance of what they were doing in the larger scheme of things," he added.

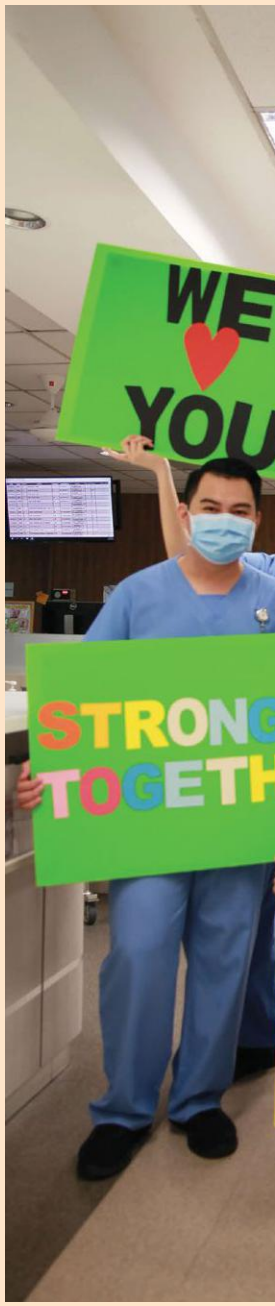
As the circuit breaker limited face-to-face interaction, it was critical to tap on online mediums such as Telegram to reach out to healthcare workers. Most doctors had existing chat groups set up with their medical school cohort, so MOH could engage them on these platforms.

It was all the more important to show support to healthcare workers as incidents of discrimination against healthcare workers increased. For example, in the early days of COVID-19, passengers on public transport would avoid medical workers in uniform. Some were asked to move out of their homes by landlords.

"When we identified this was happening, it became a whole-of-government mission to signal support for healthcare workers," said Prof Mak. "If healthcare workers don't feel they are supported, morale will dip."

The nation had to back its heroes on the frontline, and a strong rallying call was made by Prime Minister Lee Hsien Loong. In a Facebook post on May 7, 2021, he called the discrimination faced by medical workers at Tan Tock Seng Hospital (TTSH) "distressing", while urging the public to send words of encouragement to TTSH staff.

"It would be a thoughtful gesture to cheer them up and urge them on," he wrote. "Don't lose heart, TTSH. Singapore is with you!"

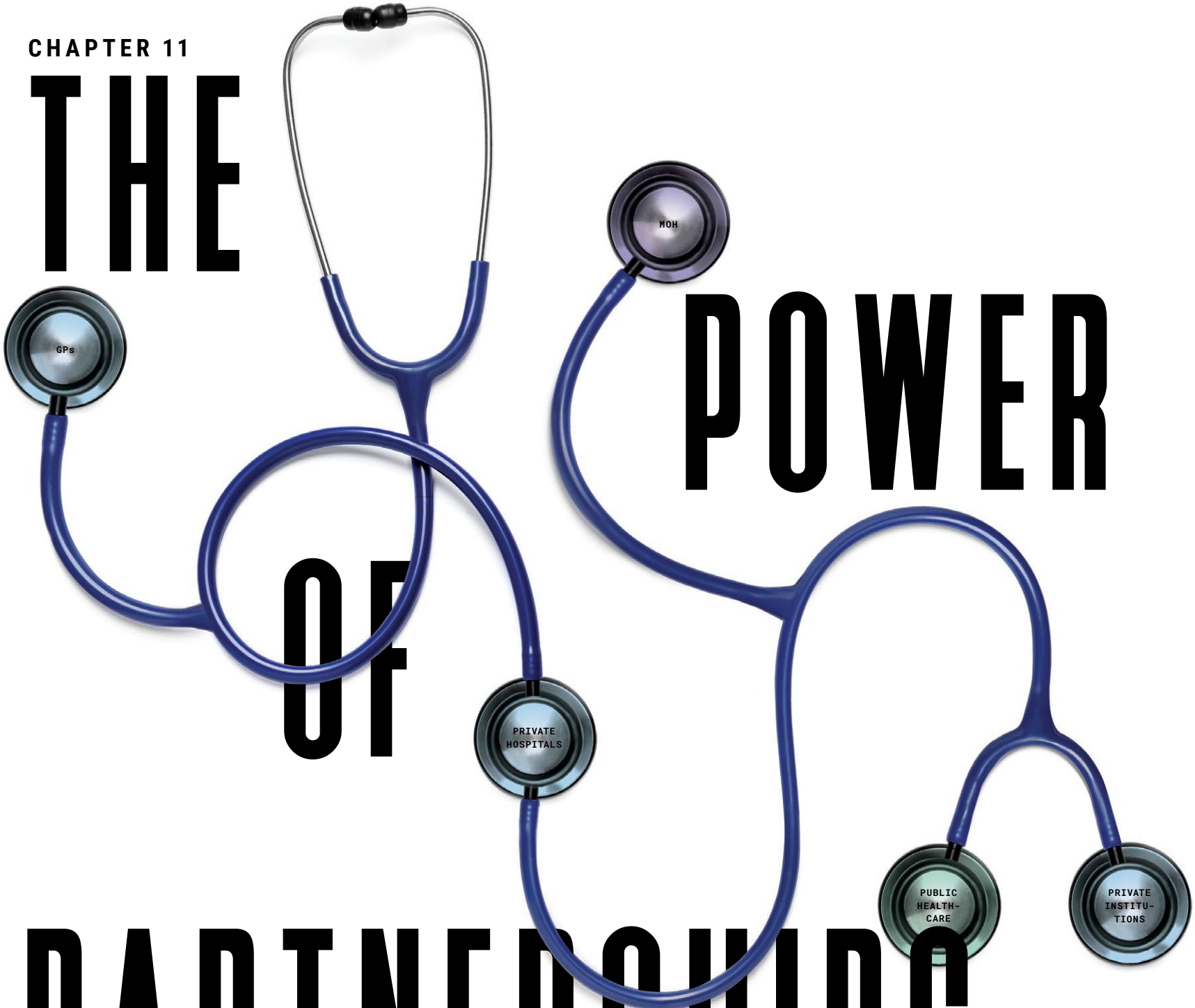


PHOTOS: TAN TOCK SENG HOSPITAL

The public sent words of encouragement to staff from Tan Tock Seng Hospital and the National Centre for Infectious Diseases, to boost the morale of healthcare workers as the battle against COVID-19 dragged on.

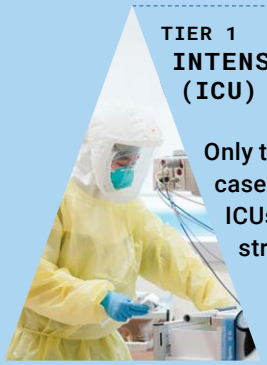
CHAPTER 11

THE POWER OF PARTNERSHIPS



FOUR-TIER SYSTEM

AS THE NUMBER OF CASES surged to 3,000 a day during the Delta wave, Singapore adopted a four-tier system to cope with the high volume of patients.



TIER 1
INTENSIVE CARE UNIT (ICU)

Only the most severe cases were sent to ICUs to reduce the strain on hospitals.

TIER 2
COVID-19 TREATMENT FACILITIES (CTFs)

CTFs took in patients at risk of developing severe illness, and had medical capabilities such as oxygen supplementation. There were nine CTFs with a combined capacity of 3,700 beds by end-October 2021.

TIER 3
COMMUNITY CARE FACILITIES (CCFs)

CCFs house patients who were mostly well but needed to be isolated. By October 2021, there were 4,300 CCF beds.

Examples of locations of CCFs and CTFs were Connect@Changi at the Singapore Expo, D'Resort NTUC, Tuas South, former Ang Mo Kio Institute of Technical Education, Village Hotel Sentosa, Civil Service Club @ Loyang and Bright Vision Hospital.

In April 2022, there were 31 CTFs and CCFs islandwide with a capacity to accommodate about 13,500 patients in total.

TIER 4
HOME RECOVERY

At the height of the Delta wave, about half of COVID-19 patients recovered at home.

PHOTOS: NATIONAL UNIVERSITY HEALTH SYSTEM (TOP); INTEGRATED HEALTH INFORMATION SYSTEMS PTE LTD (THIRD FROM TOP); STOCK.ADOBE.COM/STEVE LOVEGROVE (BOTTOM)

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

IT was a phone call that Professor Fong Kok Yong remembers clearly. On the other end of the line was Professor Kenneth Mak, Director of Medical Services at the Ministry of Health (MOH), asking if he could help set up Community Care Facilities (CCF).

Prof Fong agreed without hesitation. But the sobering reality soon hit. "The moment I put down the phone, I realised there were no prior models of the CCF. We had to start from scratch," said SingHealth's Deputy Group Chief Executive for Medical and Clinical Services.

It was early April 2020, and there were no such facilities that provided clinical care to COVID-19 patients who were stable or had mild symptoms. They still required medical monitoring, but did not necessarily need to be in hospitals. The CCF was the ideal solution, and also helped to free up hospital space for urgent cases.

While no one really knew how to start a CCF, everyone could count on each other. When MOH announced on April 5 the setting up of the first CCF at the EXPO Convention Hall in Changi, hundreds of people from various agencies were brought together to work on the project. Working around the clock, they turned an empty hall into one that could care for 480 COVID-19 patients within five days. For Prof Fong, he focused on three things at the start:

1. Providing appropriate care to patients with proper governance
2. Protecting the welfare of people in the CCF, and treating them all equally
3. Ensuring adequate protection for staff in an infectious environment

The process was further refined when more CCFs were launched across the island. Another example was Big Box in Jurong East, which started operations in July 2020. This CCF was set up in the vacant warehouse mall by representatives

The Changi Exhibition Centre, repurposed as a CCF to house patients with mild symptoms.

IT WAS EARLY APRIL 2020, AND THERE WERE NO SUCH FACILITIES THAT PROVIDED CLINICAL CARE TO COVID-19 PATIENTS WHO WERE STABLE OR HAD MILD SYMPTOMS...

THE CCF WAS THE IDEAL SOLUTION.

from the clinical, operations and nursing teams, including Ms Clarice Wee, Assistant Director, Nursing Administration, at Ng Teng Fong General Hospital (NTFGH).

In two months, Ms Wee and her team planned the entire layout for the CCF. But they faced numerous difficulties. "The number one challenge was that the situation was quite fluid. We could set up protocols and workflows according to instructions and they might change next week, so we had to adapt accordingly and communicate the changes to the team as well," she said.

With the CCF blueprint drawn up by the public sector, the private sector would later use it to build more facilities. The industry's support was crucial, especially when the highly contagious Delta wave hit a year later.

Never before had Singapore's public health system been stretched to this extent. Without the private sector stepping in to lend help, the healthcare system could have been overwhelmed. Many private hospitals opened up their beds to COVID-19 patients, while others set up and led care and treatment facilities to alleviate the burden on the public healthcare system.

General practitioners (GPs) were also roped in as important eyes and ears on the ground – not just as first responders and telemedicine providers but also in relaying community feedback to MOH.

The pandemic sparked a national response made possible through the power of public-private partnerships, setting up alternative healthcare facilities that eased the strain on public hospitals.

COMING HOME TO A PANDEMIC

A BIG PART OF DR TAN'S WORRY WAS RECRUITING ENOUGH MANPOWER... THE FACILITY WAS TO BE SET UP IN JUST TWO WEEKS.

A YEAR BEFORE COVID-19 turned lives upside down, Dr Tan Joo Peng was enjoying his sabbatical in Brisbane as a "house-husband". But in mid-March 2020, his wife received an urgent message from SingHealth to return to Singapore.

The family physician had relocated with his family to Australia for a year as his wife was pursuing her subspecialty training. But eight months in, the couple was urgently needed back home.

In a "burst of action", Dr Tan described how they broke their home lease, sold the car and hopped on the last flight back to Singapore on March 28, 2020, before the borders closed. For him, it was simply a matter of duty calling and the reason why he became a doctor.

He was immediately thrust into the thick of the action when he touched down in Singapore, working as one of the airport doctors involved in border screening, helping out with swabbing in dormitories during the migrant worker outbreak, before carrying out more swabs at the Marina Bay Cruise Centre.

As Director of Operations at Raffles Medical Group (RMG) then, he was tasked to run Connect@Changi, which was meant to be a business traveller's hotel, but was turned into a Community Care Facility (CCF) in just two weeks in August 2021.

"The leadership at Raffles concurred that it was a very meaningful project to serve the nation," said Dr Tan, who is now RMG's Assistant General Manager. But it soon dawned on him that he had to plan for a capacity of 1,200 patients – that was larger than the private hospitals in Singapore, with the bigger ones having a capacity of about 400 beds.

"There was a lot of trepidation," he revealed. A big part of his worry was recruiting enough manpower. This was especially pressing as the facility was to be set up in just two weeks. He had to scour the company's resources to find 16 doctors and 320 healthcare workers to tend to the patients.

But even with such resources at hand, he said the virus always seemed to be "one step ahead". The onslaught of cases during Delta meant that what was supposed to be a CCF taking in low-risk patients slowly evolved to cater to older patients with existing health conditions, or what was called Stepped-Up CCFs.

This required a ramping up of staff numbers. At the peak of the Delta wave in September and October 2021, there were eight to 12 emergency cases daily at his CCF. Dr Tan and his staff had to be on constant high alert for critical cases which needed to be transferred to Changi General Hospital for more intensive care.

The manpower was so stretched that even operations managers – who were tasked to run the administrative side of things like stocking protective supplies – also voluntarily gowned up and entered the "red zones" where the patients were.

"In the job description, I had told them they would be in the back room, but in the tough times they went into the red zone with us," said Dr Tan. He shared that these managers, who were healthcare-trained, would even step in to help change patients' diapers.

As the numbers continued swelling when the Omicron wave hit, Dr Tan was also tasked to set up a COVID-19 Treatment Facility (CTF) at Hall 9 and 10 of the EXPO Convention Hall in Changi. While CCFs catered to patients who were mostly well, CTFs were for those with potentially severe symptoms.

RMG worked with infrastructure consultancy Surbana Jurong, whose architects and engineers supervised the conversion of the halls into a medical facility. The CTF at EXPO eventually became the largest in Singapore, with over 2,500 beds.

At meetings with MOH and leaders of the public hospitals, Dr Tan said he was given feedback that RMG was able to help relieve the public system with the CTF. This encouraged him.

"I saw the importance of public-private partnerships in a national crisis," he said. "No one can do it alone. I saw the spirit of Singapore and how we showed this insidious enemy we could stand up to it."

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The typical layout of a CCF.

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Orange zones at CCFs are where patients have alighted from or were waiting to be picked up by ambulances.

Fully staffed and equipped with medical facilities, CCFs were touted as the ideal solution to free up hospitals for more severe or urgent cases.

CCFs were organised by zones, and the blueprint drawn up by the public sector was later used by the private sector to build more facilities.

PHOTO: MOUNT ALVERNIA HOSPITAL

Dr James Lam, Chief Executive of Mount Alvernia Hospital, received a request from the Ministry of Health to take in COVID-19 patients in mid-2021.

PARTNERING TO FREE UP PUBLIC HOSPITAL BEDS

Dr James Lam, Chief Executive of Mount Alvernia Hospital, recalled the surreal experience of watching the first batch of COVID-19 patients enter the private hospital in mid-2021.

"We were in the lobby watching the movement," he said, describing how the patients, partially hidden by hoardings, made their way to St Clare Ward on Level 5, which was chosen due to its isolated location.

Just two weeks before, Mount Alvernia had received a request from MOH to take in COVID-19 patients. "When the call came, our first reaction was 'yes, we must do our part. Let's jump in'," said Dr Lam. "But after the excitement, worries kicked in."

First, the hospital had to make sure it was operationally ready in its ventilation and patient routing to ensure the safety of other patients. Second, Dr Lam had concerns that his manpower and costs might be stretched.

Dedicating dozens of beds – up to 86 at one point, or almost one-third of its 300 beds – to COVID-19 patients could have impacted the hospital's revenue, especially with the increase in costs due to regular cleaning and disinfection as well as the deployment of more manpower at entry points and regular tests.

He understood the strain his workforce was under. Yet he also made sure that at-risk nurses, such as older ones with health conditions, were not at the frontline wards.

Over at Mount Elizabeth Hospital, which is run by IHH Healthcare Singapore, wards were also being converted into

COVID-19 facilities to house patients with less severe symptoms. This was done from March 2021, to free up capacity at public hospitals.

Ms Lee Ann Aquino Carino was a nurse at Ward 5E, which received the first 29 patients. For her, it meant a different workflow, such as having to don and remove her personal protective equipment (PPE) each time she tended to another patient to prevent cross-infection. Also, the ward's manpower was split into two teams to ensure continuity of care in the event of an outbreak.

Keeping the N95 masks and face shields on also made it onerous to even take a sip of water, but Ms Lee Ann was determined to be hydrated. "I still tried to take care of myself. I'd rather repeat the process of gowning up and drinking water so I can take care of my patients well," she said.

Besides taking in patients from the National Centre for Infection Diseases (NCID) and public hospitals, IHH Healthcare Singapore also ramped up capacity at its Parkway Laboratories, the first private laboratory approved by MOH to process Polymerase Chain Reaction (PCR) tests for COVID-19. In the first eight months, it had processed more than 350,000 PCR tests and close to 16,000 serology tests.

For Dr Noel Yeo, then-Chief Operating Officer of IHH Healthcare Singapore, it showed the importance of unity. "The pandemic taught me there is no need for division between private and public healthcare. This is how we got through it," he observed.

"The camaraderie we have built with MOH and other providers has made us stronger. It is far easier for me now to pick up the phone to call someone from the public system or another private provider."

But it was not enough for public and private healthcare institutions to have smooth working relationships. There was another crucial group who would prove pivotal in the battle against COVID-19: GPs. They were relied on to relay policies to the community as well as reflect their concerns.

"THE PANDEMIC TAUGHT ME THERE IS NO NEED FOR DIVISION BETWEEN PRIVATE AND PUBLIC HEALTHCARE. THIS IS HOW WE GOT THROUGH IT."

– DR NOEL YEO,
FORMER CHIEF OPERATING OFFICER
OF IHH HEALTHCARE SINGAPORE

Dr Noel Yeo, then-Chief Operating Officer of IHH Healthcare Singapore, said that the pandemic underscored the importance of unity and collaboration between public and private healthcare.

PHOTO: IHH HEALTHCARE SINGAPORE

PHOTO: CHINESE MEDIA GROUP © SPH MEDIA LIMITED

The Ministry of Health activated about 900 Public Health Preparedness Clinics (PHPCs) through the pandemic to provide subsidised treatment and medication for people with respiratory symptoms.

PARTNERING TO SERVE THE COMMUNITY

With her infant child just a few months old, Dr Elaine Chua, a GP, was determined not to bring any germs home. To do this, she was meticulous in maintaining strict safety precautions when she opened her doors for testing COVID-19 patients at her clinic along Bedok South Road.

The irony of keeping things clean and sanitised was that she looked like "a rubbish bag the whole day", she jested, as she was "fully gowned up" and "wearing double gloves".

With a nurse for her mother-in-law and an anesthetist as her sister-in-law, her family was supportive of her soldiering on even at the height of the pandemic during the Delta wave. "I don't think we considered not doing it," she said matter-of-factly.

With her clinic, Bedok Medical Centre, on the Public Health Preparedness Clinic (PHPC) scheme, Dr Chua knew she was someday going to be at the frontline in the event of a pandemic.

It was for such events that MOH introduced the PHPC scheme, where clinics under the scheme would provide treatment and medication to infected patients during outbreaks. PHPC clinics provided swab tests for eligible symptomatic patients during COVID-19 at no charge.

Through the pandemic, about 900 PHPCs were activated and took on roles such as administering vaccinations and testing. This meant that doctors at PHPC clinics were spearheading vaccination and testing efforts. About 300 clinics also participated in the Home Recovery Programme.

More importantly, GPs like Dr Chua were a primary source of assurance and information for the community. Patients with medical conditions, who were unsure if they could get vaccinated and had queries that could not be answered at vaccination centres, felt assured when they could discuss their concerns with doctors they trusted.

Dr Chua recalled how she took a year to convince an 85-year-old woman to get vaccinated, just before safe distancing measures were relaxed. When the senior did get infected, her condition was less severe. "We were in constant contact with her; her questions could not be addressed in one sitting," she shared.

MOH's Primary and Community Care Division (PCC), which oversees the primary care providers such as GPs and

polyclinics, knew the importance of getting them to offer ground support.

The groundwork was laid in 2018 when the Primary Care Network (PCN) scheme was introduced, and built on earlier primary care transformation efforts in the past decade. The aim was to organise GPs into networks to support more holistic care closer to the community, especially for those with chronic conditions. All PCN clinics were a part of the PHPC scheme, also allowing MOH to better support GPs in funding and administration.

This network proved timely and useful for the pandemic, which required closer communication than ever. MOH's interactions with PCNs deepened through COVID-19.

Dr Ruth Lim, Director of PCC, said the PCNs enabled MOH to quickly reach out to the dozen or so leaders of the various networks, easily transmitting messages to around 600 clinics. This allowed the Ministry to quickly relay changes in protocols and also receive feedback on them.

Dr Tham Tat Yean, Chief Executive Officer of Frontier Healthcare, which runs 17 clinics, said the PCN made a big difference in providing timely information and guidance compared to during the SARS outbreak. "There was peer leadership, support and coordination," he said.

Doctors even used the PCN platforms, whether via WhatsApp or Telegram groups, as an outlet when they felt overwhelmed. "It was therapeutic – to use a medical term – to 'ventilate' and discuss things in the chat group. It was helpful to face the crisis as a community," added Dr Tham.

Such close collaboration, not just among GPs but between MOH and GPs, would prove crucial for clinical outcomes as well.

The efficacy of testing kits was another area where MOH required results on a mass scale. The primary care space would provide that, especially through GPs who would also give patients the results of their tests.

Dr Chua from Bedok Medical Centre recalled an instance when MOH reacted quickly to her feedback. She pointed out to the Ministry that there were some patients in the neighbourhood who were isolated due to the virus, and were living alone and not able to buy food.

In response, the People's Association was roped in to deliver food to such individuals. "GPs play many different roles,

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

General practitioners (GPs) were vital in providing frontline care to the public. They extended operation hours for two weeks amid surging COVID-19 cases during the Omicron wave.

and my priority is being a friend in the neighbourhood," said Dr Chua.

Dr Lim from PCC said that MOH was also keen to support GPs, especially as queues outside clinics started to form during the Delta wave. "A GP texted me and described it as a Toto queue," she quipped, referring to the lines that sometimes snake around lottery establishments.

Her department organised webinars to address concerns GPs had, set up IT systems, helped them procure protective equipment like N95 masks, and provided grants to help with different COVID-19 initiatives. "We had to send the troops out with the right defence and equipment to reassure them," she said.

Dr Tham from Frontier Healthcare added, "My number one concern was to get MOH's support in equipping GPs. Our MOH colleagues took these comments very seriously, which I'm grateful for. It was almost as if we were on the same team without barriers."

Reflecting on the collaboration with primary care providers, Dr Lim shared, "We hope they have seen MOH as good partners. We could not have tackled COVID-19 if we had just the hospitals."

From external care facilities to GPs, the substantial involvement of the private sector during the pandemic has paved the way for future deeper collaborations.

HOPE FOR HOSPITALS, WITH GPs PROVIDING FRONTLINE CARE

FOR VETERAN CLINICIAN Dr Tham Tat Yean, COVID-19 was the greatest challenge he faced in more than 20 years of managing his group practice, Frontier Healthcare.

"The pandemic surely ranks as the most stressful period in my career," said Dr Tham, who oversees a workforce of about 130. "There were concerns at multiple levels."

The priority was ensuring the health of his co-workers, being mindful that they had families waiting for them at home. This meant infection controls at the clinics had to be top-notch and workers had to spend long hours in uncomfortable, tight-fitting protective gear as they went about daily clinical duties.

Dr Tham made the call for mask-wearing to be mandatory at Frontier Healthcare before it became a nationwide requirement.

Still, there were instances when clinical staff had been infected, resulting in manpower issues. "There's a lot of strain on the healthcare ecosystem especially in a small setting. One person makes a lot of difference as there's no army of workers in the clinic," he said.

He also had to be extra sensitive to the well-being of his staff as they clocked long overtime hours during the Delta strain, remaining open at 11pm, up to two hours past closing time.

This was to accommodate the long queues of people that would stretch into neighbouring coffee shops. "At times, you weren't sure if someone was queuing to order food or for the clinic," quipped Dr Tham.

To address manpower issues, he tried to recruit more locums and clinic assistants, but this had varying degrees of success too.

At the same time, the constantly updated circulars on changing protocols complicated things as well.

Ultimately, there was one motivating factor which drove his team to power through the tough times – they had to support their peers in the public system.

"I had colleagues working in the hospitals saying, 'If the GPs cannot provide frontline care, there's no hope for the hospitals'," he said.

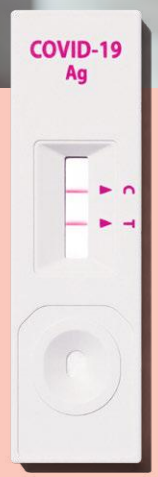
GPs like Dr Tham and many others were instrumental in fighting the viral enemy at the frontlines, holding the fort to keep patients from flooding the emergency departments and hospitals.

Veteran clinician **Dr Tham Tat Yean** found the pandemic to be one of the most stressful periods in his more than 20 years of managing his group practice, Frontier Healthcare.

CHAPTER 12

THE HOME RECOVERY SOLUTION

DAY 1



DAY 2

DAY 3

DAY 4

DAY 5

DAY 6

DAY 7

DAY 8

DAY 9

PHOTO: STOCK.ADOBE.COM/SARAYUTSRIDEE

FOR most people, being infected with COVID-19 meant isolation in hospitals or healthcare facilities while close contacts were quarantined. Until September 15, 2021.

The date marked a turning point in how Singapore dealt with the virus, with vaccinated patients allowed to recuperate at home and close contacts no longer placed in quarantine facilities. It was the start of the Home Recovery Programme (HRP).

This move was critical in Singapore's shift towards living with COVID-19, as over 80 per cent of the population had been vaccinated by then and new cases were mostly asymptomatic or had mild symptoms. It also relieved the burden on an already stretched healthcare system.

The HRP pilot started in August 2021, two months after the idea of endemicity was brought up to the public, with the aim of gradually rolling out the programme and refining it along the way.

But the Delta variant caused an unexpected surge in case numbers, resulting in HRP being ramped up quickly – to some consternation. Transiting to HRP was not so easy. It depended on whether the public was ready to treat COVID-19 as endemic like influenza.

ROLLOUT OF THE HOME RECOVERY PROGRAMME (HRP)

2021

AUG — SEP

30 AUG 21
Pilot begins

PHOTO: CHINESE MEDIA GROUP © SPH MEDIA LIMITED

A vending machine deployed by the Ministry of Health at Block 714 Ang Mo Kio Avenue 6, where people could collect self-test kits.

BOOSTING CONFIDENCE AMID CONCERNS

In mid-2021, Singaporeans were still deeply cautious of the virus, with many unwilling to have patients in their neighbourhoods. The overriding belief was that COVID-19 patients should be confined to the hospitals.

Professor Kenneth Mak, Director of Medical Services at the Ministry of Health (MOH), said this prevalent view among the public was one consideration which delayed the implementation of HRP – an idea mooted as early as the first quarter of 2021 before the Delta wave hit.

"When this idea of home recovery was first floated, a lot of people were very worried, saying they didn't want the patients in their communities," he noted. "There were comments such as 'when my neighbour comes home, how can I be sure he's no longer infectious'. So we didn't move on this at that time, because we felt the public wasn't ready."

This pivotal change was precipitated, ironically, by the emergence of the

SEP

10 SEP 21
Number of daily cases rises from an average of 76 to 288, and is expected to rise to more than 1,000.

15 SEP 21
Home recovery becomes the default care model for fully vaccinated COVID-19 patients aged 12 to 50, who do not have vulnerable household members such as those above 80, pregnant or with a weakened immune response.

18 SEP 21
HRP is further expanded to include fully vaccinated patients aged 51 to 69.

Delta variant and the toll it took on the healthcare system. "That changed our paradigm," said Prof Mak, adding that the shift to HRP was prompted "by the concern that our hospitals would be overburdened".

"It was also driven by the development that many people were vaccinated and infections were not as serious as before. We could therefore make a fundamental change and move towards home recovery."

This shift was effectively a confidence booster for the nation. "HRP was a strong signal to the public that we were in a very different phase of the pandemic and it was not as fearsome as it was initially," said Professor Tan Chorh Chuan, Chief Health Scientist at MOH.

But for some, having to recover at home led to some logistical challenges. For example, a worry was how infected seniors could cope if they were living alone and did not have the digital skills to order meal deliveries online.

"WHEN THIS IDEA OF HOME RECOVERY WAS FIRST FLOATED, A LOT OF PEOPLE WERE VERY WORRIED, SAYING THEY DIDN'T WANT THE PATIENTS IN THEIR COMMUNITIES."

– PROF KENNETH MAK,
DIRECTOR OF MEDICAL SERVICES
AT THE MINISTRY OF HEALTH

A BIRTHDAY SURPRISE AT THE GATE

EVEN AS THE NATION went into home recovery mode, some still required special care and help with accessing essential supplies and services. For example, MOH worked with the People's Association and the Silver Generation Office (SGO), the outreach arm of the Agency for Integrated Care, to attend to the needs of seniors who were on the Home Recovery Programme.

Ms Estty Natalie Lee was one of the SGO officers who sent meals and groceries to their doorstep. Based at the SGO East Coast office in Fengshan, Ms Lee is a familiar face with many elderly residents in the area.

She and her colleagues also went the extra mile to bring cheer during COVID. When they noted from the records that a senior was quarantined on her birthday, they bought a slice of cake for the elderly woman.

"If I couldn't leave home on my birthday, it would be very upsetting. When I showed up with the groceries and cake, she was shocked as she didn't expect anything," said Ms Lee. "I knew a slice of cake would brighten up her day."

23 SEP 21
MOH releases frequently asked questions (FAQs) for home recovery patients.

24 SEP 21
Minister for Health Ong Ye Kung announces plans to prepare for 5,000 daily new cases, following consecutive days of record-high new cases of 1,457 and 1,504.

29 SEP 21
The Singapore Armed Forces (SAF) sets up the Home Recovery Task Group to scale up and bolster HRP, deploying more than 450 personnel.

The Ministry of Health's COVID-19 hotline received as many as 7,000 calls per day at the peak of the Delta wave.

There was another challenge. Not everyone understood HRP instructions. This, and other concerns such as long wait times between testing positive and being brought to recovery facilities if they were not eligible for HRP, led to many callers inundating the COVID-19 hotline.

Some callers, for instance, were scratching their heads over the instructions in the home recovery pamphlet they had received. What if the room had no attached toilet? What if they had vulnerable individuals at home?

At the peak of the Delta wave, MOH's COVID-19 hotline handled a whopping 6,000 to 7,000 calls a day. The number of agents tripled to 250 at its peak to handle the volume.

HANDLING HALF-A-MILLION PUBLIC QUERIES

THE MINISTRY saw a more than tenfold increase in feedback volume as compared to before the pandemic. Prior to COVID-19, questions centred on policies such as MediShield. During HRP, most queries were related to the implementation of the programme.

VOLUME OF FEEDBACK RECEIVED BY MOH:

2019
27,000

2020
250,000

2021
500,000

OCT

9 OCT 21
Prime Minister Lee Hsien Loong addresses the nation and cites HRP as central to Singapore's "path forward to a new normal".

11 OCT 21
Simplified protocols for HRP are rolled out.

"WE NEVER CONSIDERED STOPPING THE HOME RECOVERY PROGRAMME, OR OUR HOSPITALS COULD NOT HAVE COPED."

– ADJ ASSOC PROF RAYMOND CHUA, DEPUTY DIRECTOR OF MEDICAL SERVICES (HEALTH REGULATION GROUP) AT THE MINISTRY OF HEALTH

"Indeed, this was a paradigm shift, and so people were worried and asked many questions on what they needed to do to monitor themselves or their loved ones at home. Some would even say 'wait, my father or sister wants to talk to you too', and the hotline became more like a hotline for families to ask their questions," said Adjunct Associate Professor Raymond Chua, Deputy Director of Medical Services (Health Regulation Group) at MOH.

"But we never considered stopping HRP, or our hospitals could not have coped. Our priority was to avoid going into a circuit breaker and a standstill again."

However, more effort was needed to regain the confidence of the public, which was affected by the confusion around HRP. Some may say it took an army.

Adj Assoc Prof Raymond Chua, Deputy Director of Medical Services (Health Regulation Group) at the Ministry of Health, saw the move to home recovery as a paradigm shift that would cause considerable concern among the public, but was significant nonetheless in ensuring that hospitals could cope and preventing another circuit breaker from happening again.

27 OCT 21
Singapore's daily new cases reach 5,000 for the first time, with 10 dying from virus complications, bringing the total death toll to 349. A total of 20,895 patients, or 74.3 per cent of COVID-19 community cases, are in home recovery.

IT TAKES A CALLING

WITH THOUSANDS OF CALLS AND EMAILS flooding in daily, how did the MOH Service Excellence team cope?

Leading the team was MOH Service Excellence Department's Senior Assistant Director Mr Max Liew, who had never witnessed feedback numbers of such scale in his more than 20 years of experience.

Queries that came in could be on the government's mask policies, whether children could go to their grandparents' home during the circuit breaker, or appeals to get vaccinated earlier before travelling overseas for work or studies.

The increase in volume of public queries prompted him to beef up his team of five at the start of 2020. Besides bringing in temporary staff and enlisting MOH colleagues from other divisions to respond to email queries, he also sought manpower support from other government agencies.

When the lines were overwhelmed during HRP, the Singapore Armed Forces stepped in to help man the Home Recovery Hotline, offloading some of the calls that would otherwise be directed to the MOH General Hotline, COVID-19 Hotline and Quality Service Manager Hotline.

Ms Lam Wy-ning, Director for Case Management Contact Centre at MOH's Crisis Strategy Operations Group said the surge in cases required a change in the training regime for about 250 people who might not have the necessary skills to support the call centre operations.

The training programme was reduced from five to two days to expedite operations. "Instead of ensuring each agent knew everything, we focused on each agent being well-versed with the most important and common questions," she said. "This worked as our customer satisfaction score went up."

Still, more manpower was required. Bolstering the manpower were personnel from the Public Service Division (PSD). Mr Mohammed Jalees, Director of the Access to Justice Programme at the Singapore Judiciary, was leading the PSD team then.

He helped to set up a call centre with about 15 experienced operators from the Central Provident Fund Board. Supplementing the team were volunteers from other public agencies. The centre started with about 50 agents, with numbers increasing to about 90, handling roughly 1,200 calls a day.

"Everyone in the team knew there was a crisis and wanted to get the job done," he said. "They were all very willing to chip in and learn without complaints."

At the same time, Mr Liew was looking to hire for the Service Excellence team, but recruitment was challenging. "Some were hesitant to join because of the high workload," he said.

Eventually, he managed to increase his team's size from five to 10. One of the staff he recruited then was Senior Manager Ms Lim Shi Ping, who came from the private sector.

Ms Lim had said she was prepared to work after office hours when she took up the

NOV

24 NOV 21
SAF announces that it will return management of HRP to MOH.

job. “It was expected. We just had to tide over that demanding period, and the team really bonded in the course of it.”

For Mr Liew, there were many trying times, especially during the circuit breaker period when he had to supervise his children in their home-based learning while clocking hours on weekends to clear his backlog of work.

“Even while trying to fall asleep, I had thoughts of how to handle a case better,” he shared.

At times, some cases and situations were heart-wrenching when he had to reject appeals from the public to visit critically ill loved ones. “You could sense their distress. But sometimes difficult decisions had to be made in the interest of public health,” he noted.

“But we would always see how best we could help our members of public by looking at alternatives such as video calls with their loved ones, which was a compromise that still aligned with public health objectives,” he added.

Apart from calls, the MOH team also received a peak of 1,000 emails daily. MOH Service Excellence Department’s Senior Manager Mr Daniel James Koh was tasked to oversee the team responding to emails.

“It was hard to explain the Home Recovery Programme sometimes,” he revealed, adding that they also had to explain to people how to isolate themselves from their family members within the confines of a small flat. “But this had to be done so that the country could transition from COVID-19 being almost taboo when you got it, to one where it was normal for people to recover at home.”

(From left) **Mr Lee Jie Fei**, **Ms Vanessa Pang**, **Mr Daniel James Koh**, **Ms Yusnita Helmi**, **Ms Lim Shi Ping** and **Mr Max Liew**.

Senior Assistant Director of the Ministry of Health’s Service Excellence Department **Mr Max Liew** had to beef up his original team of five (pictured) when the volume of public queries escalated at an unprecedented rate since the start of the pandemic.

Group Director of the Ministry of Health's Crisis Strategy and Operations Group **Mr Dinesh Vasu Dash** sought help from Singapore Armed Forces personnel to plug gaps in the delivery of the Home Recovery Programme, such as handling phone calls.

DEC

27 DEC 21
Cases with mild or no symptoms are allowed to recover under HRP.

REINFORCEMENTS ARRIVE

A week after HRP was implemented, social gatherings were restricted to two and work-from-home became the default practice once again starting from September 27. That period was termed the Stabilisation Phase, a response to the Delta variant that was infecting exponentially more people than before.

"We got counter-attacked," exclaimed Mr Dinesh Vasu Dash, a former Brigadier-General who had spent 27 years in the military before joining MOH as Group Director of the Crisis Strategy and Operations Group in July 2020.

"We thought that with high levels of vaccinations, there shouldn't have been a spike of that magnitude."

To fight back, Singapore Armed Forces (SAF) troops were rallied. In total, more than 450 SAF personnel, most of them full-time national servicemen, were roped in to plug gaps in the delivery of HRP as cases rose exponentially.

Mr Chan Yeng Kit, Permanent Secretary for Health, who was previously the Permanent Secretary for Defence, knew that the SAF was up to the task. "SAF did not just have the manpower, but a whole command structure. I could give them an assignment, and they could take it and run," he said.

The SAF Commander for the Home Recovery Task Group, Colonel Tong Yi Chuen, remembers the call from the then-Chief of Army on the evening of September 24. He agreed to activate the Combat Engineers Formation to assist MOH.

"At that point, I was somewhat apprehensive given the mammoth

tasking," said Col Tong. "We hoped that our involvement would provide fresh perspectives, energy and much-needed relief."

His team laid out a four-point battle plan. First, the rules for home recovery were streamlined to sort out patients eligible for home recovery.

Second, rapid onboarding was conducted, to promptly establish touchpoints to assist patients.

Third, patients were assigned to care managers, who were single points of contact to provide end-to-end support.

Fourth, the SAF set up more phone lines and helped to coordinate with telemedicine providers and grassroots volunteers, giving assurance to residents that they had ready and quick access to help.

As the patients' first line of contact, the soldiers worked 12-hour shifts from 9am to 9pm, with one rest day every two working days. The training included

"WE HOPED THAT OUR INVOLVEMENT WOULD PROVIDE FRESH PERSPECTIVES, ENERGY AND MUCH-NEEDED RELIEF."

– COLONEL TONG YI CHUEN, SINGAPORE ARMED FORCES COMMANDER FOR THE HOME RECOVERY TASK GROUP

PHOTO: MINISTRY OF DEFENCE

Colonel Tong Yi Chuen from the Singapore Armed Forces chairing a meeting of the Home Recovery Task Group, set up to augment the Home Recovery Programme.

PHOTO: MINISTRY OF DEFENCE

Corporal Luth Danish Bin Zani was one of the personnel deployed by the Singapore Armed Forces to man hotlines that provided information to home recovery patients.

familiarising themselves with the HRP protocols, handling phone calls as well as a cloud-based workflow system to manage cases.

"These 18- or 19-year-old soldiers went through rigorous training to be call operators. Their level of maturity was quite amazing and everyone knew the mission," recounted Mr Dinesh.

Alongside the SAF, the People's Association would also send necessities like groceries to HRP patients in need, while the Silver Generation Office, part of the Agency for Integrated Care, would visit and call elderly patients too.

It was with much effort that 90 per cent of HRP patients could be contacted within 24 hours of submitting their details online, before being assigned a Home Recovery Buddy and guided step by step till they were well again. Yet, more had to be done.

"THE HEALTHCARE PROTOCOLS BEFORE PROTOCOLS 1-2-3 WERE COMPLICATED BECAUSE THE COURSE OF THE DISEASE DEPENDED ON FACTORS SUCH AS A PATIENT'S VACCINATION STATUS AND AGE.

IT WAS NOT POSSIBLE TO ADVISE THE PUBLIC ON THOSE TERMS."

– MR NG HOW YUE,
PERMANENT SECRETARY
FOR HEALTH DEVELOPMENT
AT THE MINISTRY OF HEALTH

AS SIMPLE AS 1-2-3

Apart from enlisting help from the army, the HRP protocols also had to be clarified. Many became more afraid of the rules and repercussions than the virus itself.

Ms Lim Siok Peng, Director of Corporate Communications at MOH, recalled how the general approach from the start of the pandemic in early 2020 was to tweak the protocols incrementally, even if that made the directives more befuddling during HRP.

It required someone with a macro view to unknot the twists and turns. That person was Minister for Health Mr Ong Ye Kung, who had just assumed the role a few months before in May 2021.

"He decided to just dismantle the old structure of protocols," said Ms Lim. "That helped a lot. You have to credit him with coming up with the new idea, he simplified it and made it very elegant."

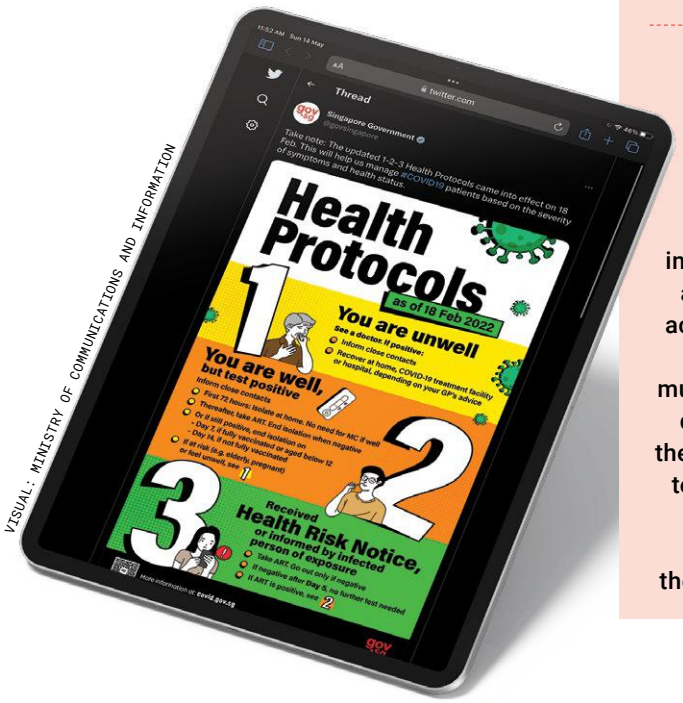
Mr Ong introduced Protocols 1-2-3 on October 9 at a Multi-Ministry Taskforce press conference. The protocols, presented in the form of a flowchart, gave clear directions on what individuals should do if they were unwell (Protocol 1), or well but tested positive (Protocol 2), or were identified as a close contact (Protocol 3).

This brought greater clarity to the public, as compared to initial protocols that were more complicated and difficult to remember and navigate.

By the end of October, a month since the SAF started steering the operations, HRP was running smoothly without the hiccups that plagued its initial stages.

When Singapore's daily new cases reached 5,000 on October 27, 2021, 20,895 patients – or 74.3 per cent of COVID-19 community cases – were in home recovery, significantly lightening the burden on the healthcare system.

Another month later, SAF handed over management of HRP back to MOH. The mission of stabilising the situation was accomplished.



VISUAL: MINISTRY OF COMMUNICATIONS AND INFORMATION

PROTOCOLS 1-2-3

1

INDIVIDUALS WHO ARE UNWELL

These individuals are to see a doctor to get tested. If they are tested positive, they are to stay at home and isolate themselves from others.

2

INDIVIDUALS WHO ARE WELL BUT TESTED POSITIVE

These individuals have to stay at home and isolate themselves for 72 hours. If they test negative on their ART tests after that, they can end their isolation.

If they feel unwell at any point in time, they should see a doctor.

3

INDIVIDUALS WHO ARE IDENTIFIED AS A CLOSE CONTACT

Close contacts must immediately take an ART test, and can continue with daily activities if they test negative. For the next five days, they must test negative on the same day if they wish to go about their daily activities, after which testing is no longer required.

If they test positive, they should refer to Protocol 2.

PRESSING THE RESET BUTTON

IN CHINESE MYTHOLOGY, there is a character named Zhou Chu, a gangster greatly feared by the people. However, there were two other "evils" which terrified villagers: a fierce tiger in the mountains and a ferocious dragon in the seas.

After Zhou Chu eliminated these two dangers, he realised he was also a threat feared by the people, and decided to turn over a new leaf. The same could be said of the complicated COVID-19 protocols in Singapore. While they were meant to eradicate the virus, they were also a source of frustration at times.

Drawing the parallels between the ancient Chinese parable and the COVID-19 battle in the modern Republic, Minister for Health Ong Ye Kung said that people had perhaps come to view the restrictive quarantine measures and complicated protocols almost as enemies – or "evil" – even as they helped to rid the virus.

If those were the first two evils, the third evil of Zhou Chu reforming himself was akin to MOH doing away with restrictive quarantine protocols due to the changing situation.

"Zhou Chu killed all three disasters and when it was all done, the villagers all heaved a huge sigh of relief," said Mr Ong, comparing it to the day Singapore pivoted towards home recovery and thousands were released from their isolation.

"Everyone just felt 'phew, I will no longer get an SMS and lose my freedom for 14 days'," he said, referring to the isolation notification COVID-19 patients would receive.

As for the "evil" of complicated protocols, Mr Ong also sought to remove it. He had earlier acknowledged in Parliament the confusion and delay surrounding HRP in terms of conveyancing and contacting patients.

He subsequently shared how his staff recommended tweaks to the home recovery policy in the transition to living with COVID.

"I said, 'No, that's not good enough.' We needed to press the reset button, forget about the SARS playbook," he shared.

He scribbled four initial rules on a piece of paper which would be the first early draft of the 1-2-3 health protocols, and handed it to MOH staff.

"They came back and said, 'Minister, your rules are too complicated. We only need three rules.' So that is how Protocols 1-2-3 came about," he disclosed with a smile.

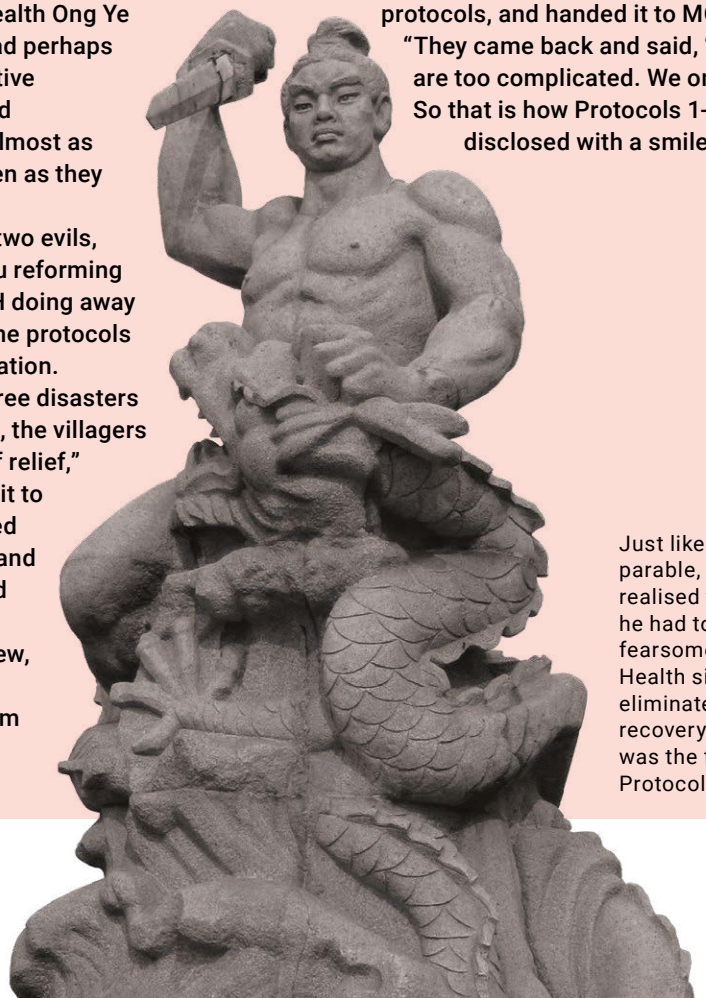


PHOTO: 猫猫的日记本, CC BY-SA 3.0, VIA WIKIMEDIA COMMONS

Just like in the ancient Chinese parable, where Zhou Chu realised that the third scourge he had to eradicate was his own fearsome behaviour, the Ministry of Health similarly sought to eliminate its complicated home recovery protocols. The result was the familiar, and simplified, Protocols 1-2-3.

PHOTO: DREAMSTIME.COM/KANDLSTOCK

Individuals on the home recovery programme could self-test at home, enabling precious healthcare resources to be diverted to those in urgent need.

NOT A SOLO EFFORT

After a shaky start, HRP got on steady ground with help from partners like SAF, the Silver Generation Office, and the hospitality sector when hotels were used as isolation and quarantine facilities.

For Adj Assoc Prof Chua, MOH's Deputy Director of Medical Services (Health Regulation Group), it was such partnerships and camaraderie that fuelled MOH through the extra laps.

"Looking back, I never expected to work hand-in-hand with someone from the airline or hotel industry," he said. "Some of them now joke that they can be pseudo-doctors asking medical questions as they helped with the 'triaging' of patients at the call centre." Triaging refers to the preliminary assessment of patients or individuals to determine if they are eligible for HRP or should be conveyed to a care facility.

In return, MOH staff "learnt service skills from them – how to deal with complaints, exercising patience in adversity and remaining calm during a crisis".

Besides underscoring the importance of partnerships, HRP was also a step in the right direction ensuring that the nation's healthcare system would not be overwhelmed.

By mid-December 2021, Delta cases were reduced from a peak of over 5,000 to below 500 a day, with numbers gradually falling further. Hospital beds and COVID-19 treatment facilities could finally operate within a healthy capacity.

Announcing this in Parliament then, Mr Ong said: "Right-siting COVID-19 patients is important, so that acute healthcare resources are kept available to those who truly need them. That is why we implemented HRP."

It was based on the ability to adapt and collaborate that Singapore would improve its healthcare system and become more pandemic-resilient.

After learning to live with COVID-19, it was now time for

Singapore to turn the page on the pandemic and exit the acute phase.

UNITY

THE COMMUNITY QUILT WHICH WAS A PROJECT INITIATED BY TEMASEK POLYTECHNIC SCHOOL OF DESIGN IN COLLABORATION WITH BERNINA (SINGAPORE) PTE LTD, COMPRISES DESIGNS AND MESSAGES OF ENCOURAGEMENT AND GRATITUDE FROM MEMBERS OF THE PUBLIC INCLUDING SOME SCHOOLS, THE SWISS EMBASSY, AND TEMASEK POLYTECHNIC STAFF, STUDENTS AND ALUMNI TO FRONTLINE HEALTHCARE WORKERS AT THE NATIONAL CENTRE FOR INFECTIOUS DISEASES (NCID). IT IS NOW DISPLAYED AT THE NCID GALLERY.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

CHAPTER 13

LIVING WITH COVID

NEARING midnight on March 31, 2022, the traffic was building up at Woodlands Checkpoint, with vehicles waiting to enter Malaysia under the new Vaccinated Travel Framework. COVID-19 arrival tests and quarantine were no longer mandated for fully vaccinated travellers between countries with the same open border regulations, such as Singapore and Malaysia.

At 11:59pm, vehicles revved to action and tooted their horns, as the crowd cheered, clapped and shouted their thank-yous into the air. Normalcy had returned to the Singapore-Johor Causeway, after more than two years of restricted movements.

Over the next three days, more than 176,000 people would cross the land border at Woodlands and Tuas. Thousands more took to the skies, jetting off for their long-delayed vacations, leading to record-long queues for passport renewals.

Singaporeans were not only relishing their regained freedom for travel, but also reclaiming many parts of their lives – from dining in a big group to socialising at events and weddings – that were lost to the pandemic. The virus, which had mutated into the Omicron and XBB strains, was still circulating, but there was a sense that COVID-19 seemed under control.

Along with refreshed travel frameworks, community restrictions were loosened too. The five-person cap on gatherings was raised to 10, and mask-wearing, while still mandatory indoors, became optional at outdoors settings.

PHOTO: REUTERS/EDGAR SU

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

(Clockwise) People dining in at Marina Bay Sands on Apr 11, 2022; Motorists and motorcyclists at Tuas Checkpoint cheer, welcoming the reopening of the land borders between Singapore and Malaysia on Apr 1, 2022, after a two-year closure due to COVID-19; Office workers go for lunch at the central business district on Apr 26, 2022, the first day of Singapore lifting most of its COVID-19 restrictions.

When announcing the easing of rules in March 2022, Prime Minister Lee Hsien Loong said Singapore had reached a "major milestone" in its COVID-19 journey – with most of the population vaccinated, or recovered from the virus.

"Taking all things into consideration, we believe that we are now ready to take a decisive step forward towards living with COVID-19," said PM Lee in a televised speech on March 24.

Over the next few weeks, more rules were eased. By the end of March 2022, the Ministry of Health (MOH) had removed the cap on group sizes and the safe distancing rule between individuals and groups. Workers were also able to resume on-site work fully.

A month later, on April 26, 2022, the Disease Outbreak Response System Condition, or DORSCON, was lowered from orange to yellow, as the disease was assessed to be mild, and being contained. It took over two years to stand down the alert that was first raised to orange in February 2020.

This was what MOH and the whole healthcare family were working tirelessly towards – for the pandemic to transition to endemicity.

THANKFUL FOR THE TEAM EFFORT

ASK MR NG HOW YUE which were the low points in the three years of fighting COVID-19, and he would name without hesitation: the outbreak at foreign worker dormitories, the circuit breaker and the Delta wave.

Looking back, the Permanent Secretary for Health Development is thankful that everyone went beyond the call of duty.

"I know all the teams were working past midnight. So I'm quite proud that at the darkest moments, people were doing their best," he said, his voice cracking with emotion and his eyes tearing up.

After a short pause to regain his composure, he shared how the team beat a "cunning foe" that continuously evolved, forcing everyone to constantly adapt their response in this long-drawn war with the virus.

"COVID-19 continuously changed in different directions," said Mr Ng. "The focus was more on how we could respond as the adversary changed its tactics."

For Mr Ng, fighting COVID-19 challenged all his multi-tasking skills.

Since the virus made landfall in January 2020, his task tray was constantly filled to the brim, from conducting global surveillance of the virus to assessing the national stockpile of medical equipment to preparing isolation facilities.

"Every day, there was something new, there was something to respond to," he said. "The virus changes daily. The situation changes daily. There were teams that were responding and needed guidance and action."

There were also endless meetings with the different teams to discuss operations and assess the healthcare situation on the ground. Regular meetings, which took place every day – weekends and public holidays included – started at 4pm, and could last for more than eight hours.

"It's a battle cycle – intelligence, operations, supplies and public communications," he explained. "But it was not too bad for myself, I could get five hours of sleep daily."

While there were dark days and challenges, especially when the case numbers spiked and hospitals were under strain, he was heartened to see the healthcare system and its people still trudging on and working well. "People were all cooperating, and the frontlines were holding up."

At the peak of the pandemic, MOH's Contingency Task Force, which Mr Ng co-chaired, met up to three times a day, with some meetings dragging on for hours due to the sheer number of plans and policies to work through.

While the pace of work was punishing, the teamwork was inspiring, as members from different departments and ministries contributed unstintingly to keep Singapore safe.

Mr Ng How Yue was the co-chair of the Ministry of Health's Contingency Task Force, which met regularly to assess the COVID-19 situation on the ground and discuss operations. These meetings happened as frequently as three times a day, with some sessions dragging on for hours due to the sheer volume of work.

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

Schools were largely kept open in the early phases of the pandemic, with the exception of circuit breaker.

KEEP CALM AND REMAIN OPEN

Throughout the pandemic, Minister for Health Mr Ong Ye Kung was convinced of one thing, staying open instead of shutting down, unless the situation called for stricter measures such as a lockdown.

"I suppose it is a survival instinct," he explained about his conviction. Pandemics have occurred before, and time and again, they have ended either with medicine or when fear of the disease wanes.

"At some point, society will recover, it will. It is how you recover. So your starting point must be that you will recover and be restored, the question is how," he added.

His guiding framework was simple: to avoid shutting down unnecessarily. As the Minister for Education during the start of the pandemic, he did not close schools for a prolonged period by creatively bringing forward the school holiday in June by a month.

While schools were suspended during the circuit breaker, select groups of students who needed additional support continued to return to school. The decision to keep schools largely open was informed by scientific evidence that the initial virus strain typically affected children less severely, he said.

When he moved to helm the Ministry of Transport in July 2020, he sought to retain Singapore's connectivity by proposing an air travel bubble with Hong Kong. The experimental project would allow people to travel between the two cities freely. But it was ultimately scrapped when both sides decided on different strategies to manage COVID-19.

"I was very determined that we must find a way to open up our aviation sector. If not, then at least, we tell the world that we are determined to open up. That's very important," he said.

And when he took over the reins at MOH during the Delta wave, Mr Ong did not give up his conviction to open up. He was a firm believer in mapping out a blueprint for living with COVID-19.

As the Minister for Health, **Mr Ong Ye Kung** was convinced that Singapore had to gradually move towards living with COVID-19. To do so, everyone would have to exercise social responsibility by adhering to safe management measures and getting vaccinated to achieve minimum protection against the virus.

"I suppose whoever decided that I should come to MOH might have taken my inclinations into account. They should know that if I landed here, I would be quite determined to open up," he shared with a wry smile.

These decisions were not leaps of faith, but were calculated risks. He was also clear that should things not go according to plan, there would be consequences, both for the country and himself.

"In MOE, I was determined to keep schools open. But if the virus had spread amongst children and unfortunately they fall very sick or die, I was prepared to lose my job. I was very clear about that," he said bluntly.

"It was the same thing here in MOH. If our process of transitioning to endemicity was like what the United States or Britain had to go through, and if our people were unable to accept it, I would lose my job."

Fortunately, Singapore did not succumb to the virus. As the Delta strain was replaced by the more contagious Omicron variant at the end of 2021, the nation plodded on without adding more tightening measures. It was on its road to treating COVID-19 as endemic.

For a country to live with COVID-19 successfully, it requires trust that everyone will do the right thing. "In a crisis, you can't handle everything," said Mr Ong. "Instead you tell people: 'This is it. These are the considerations, this is how you keep yourself safe, I'm putting it to you as simply as possible. Do your part, help each other'."

Healthcare personnel were deployed to help battle the COVID-19 clusters that sprang up in migrant worker dormitories (above); Elderly folks, identified as a vulnerable group, were among the first in Singapore to get vaccinated (right).

LOOKING FOR LIGHT AT THE END OF THE TUNNEL NOT ONCE OR TWICE, BUT THRICE

PHOTO: NATIONAL UNIVERSITY HEALTH SYSTEM

IN EARLY 2020, when Singapore was still grappling with the first wave of COVID-19, Permanent Secretary for Health Mr Chan Yeng Kit had harboured hopes that the novel coronavirus would play out like how SARS did. Things would be intense, but in a few months' time, the worst should be over.

So in townhall meetings with his colleagues at MOH, he rallied them to push on for the next couple of months. "I tried to encourage them that things would be over soon, there would be light at the end of the tunnel," he said.

That light never quite came. Singapore went out to battle multiple COVID-19 clusters in migrant workers' dormitories around the island, and even instituted a circuit breaker to stem community spread.

Furthermore, by the end of the year, Singapore had procured its first batch of vaccines, and was kickstarting its nationwide campaign to vaccinate as many people as possible, beginning with frontline healthcare workers and elderly folks.

"The first light didn't quite materialise, but vaccines were the next light at the end of the tunnel," said Mr Chan.

He sent out email notes to colleagues sketching out Singapore's plan to vaccinate everyone and build immunity against the virus.

"The concept of herd immunity was still there then, and it boosted people's hopes that COVID-19 was not a never-ending journey. There was an endpoint to look forward to."

Yet, despite the nationwide vaccination exercise, the Delta wave swept across the country, leading to a surge in cases and COVID-19 hospitalisations.

"The virus was smarter than we had hoped for and it kept mutating. Eventually, the concept of living with COVID-19 became our third light at the end of the tunnel."

"There is no one silver bullet, but with vaccines, with safe management measures, we can depress the transmission and infection rates. That was the last light at the end of the tunnel," he said.

Moving from pandemic to endemic seemed to be the best way out for the nation.

THE MENTAL TOLL OF LIVING THROUGH COVID-19

> "IN THE PANDEMIC, WE SAW THE MENTAL HEALTH OF MANY DETERIORATING."
>
> – MS VOON YEN SING,
> SENIOR ASSISTANT DIRECTOR OF CLINICAL SERVICES
> AT THE SINGAPORE ASSOCIATION FOR MENTAL HEALTH

CALLS TO THE HELPLINE run by the Singapore Association for Mental Health (SAMH) peaked during the circuit breaker, which started on April 7, 2020.

There was about 50 per cent increase in calls between April and June in 2020, compared to the same period a year before, going by estimates of staff at the non-profit social service organisation, which promotes mental wellbeing through creative, outreach and rehabilitation services.

But callers do not always call to talk about the pandemic, said Ms Voon Yen Sing, Senior Assistant Director of Clinical Services at SAMH. "They say they are highly stressed and anxious, experiencing anxiety and/or depression. Some were able to identify certain stressors that they were experiencing, while others were unsure," she said.

"Then at some point in the conversation, they talk about how COVID-19 has affected them. It disrupted their routines. They can't go out, they can't go to work, they feel stuck and unsure of what's going to happen next."

Beyond being a public health crisis, the pandemic has also been viewed as a mental health crisis. As the pandemic dragged on, some felt themselves sinking even deeper into despair. Even those who were physically healthy and with no mental illnesses found themselves languishing and feeling unsettled.

"We have been educating the public that mental health is a spectrum, and a state of well-being. Just because you have no mental illnesses doesn't mean that you are mentally healthy," said Ms Voon.

"In the pandemic, we saw the mental health of many deteriorating. The concern is that if you don't do anything about your mental health, it may lead to an illness, like depression or anxiety."

The upside, however, was that because so many people shared similar feelings of anxiety and dread, mental health was no longer a taboo topic to be talked about in hushed tones. More people were also seeking help.

SAMH received 2,719 calls in 2020, a 27 per cent increase compared to 2,143 in 2019. Other agencies reported a similar rise too. Samaritans of Singapore, a suicide prevention non-profit organisation, logged 39,492 suicide and crisis-related calls in 2020, an 18 per cent increase from the 33,387 calls it got in 2019.

The helpline run by the Institute of Mental Health also received 48 per cent more calls between April and December in 2020, compared to the same period in 2019.

Ms Voon also observed some difference among those seeking help. "Previously, those who called the helpline were generally more ambivalent about going for counselling. But now, when people call, they ask us for a counselling appointment."

"COVID-19 brought the importance of mental health to the fore. There was increased awareness, which is a good thing," said Ms Ngo Lee Yian, Executive Director of SAMH.

Her wish is for the continual growth in awareness and emphasis on mental health, even as life gradually gets back on track.

"I hope people don't become forgetful and relegate mental health to the back burner again, and think that they are powerful. We can't be complacent. There is no health without mental health," said Ms Ngo.

(From left) **Ms Voon Yen Sing** and **Ms Ngo Lee Yian** from the Singapore Association for Mental Health (SAMH).

During the pandemic, many individuals experienced stress, anxiety and sadness, said Ms Voon, Senior Assistant Director of Clinical Services at SAMH.

REBOOTING HEALTHCARE

In the darkest days of Singapore's fight against COVID-19, there were silver linings too. For instance, the pandemic gave healthcare administrators a vision of what an alternative health ecosystem could look like, and provided a test bed for a new, decentralised model of healthcare.

"Our healthcare system is very centralised in that everybody who is ill enough would come to the hospital. With COVID-19, we validated that a decentralised system would work," noted Associate Professor Dan Yock Young, Deputy Director of Medical Services (Health Services Group) at MOH.

"In fact, to keep our hospitals sustainable, and not to have to keep building more and more hospitals, we have to decentralise our care."

The aim of a decentralised model, said Assoc Prof Dan, was to reserve hospital spaces only for those who truly need them.

For this vision to work, it needed a strong ecosystem where individual healthcare components were integrated with one another.

PHOTO: MOMENT VIA GETTY IMAGES/D3SIGN

"In the past, the system was very fragmented. Hospitals, primary care, polyclinics – everybody was operating in their own silos, he added. "But COVID-19 literally brought the whole healthcare system together."

To cope with the healthcare demands of the pandemic, community care facilities, primary care providers such as general practitioners and polyclinics, and even telemedicine were tapped to ease the load on hospitals. Telemedicine in particular, said Assoc Prof Dan, was something the medical fraternity had tried to do for years but there was never an impetus until the pandemic hit.

The pandemic offered this decentralised healthcare system a test run. "During COVID-19, the very sick ones went to hospitals, the moderately ill ones went to COVID-19 treatment facilities, those with mild symptoms to polyclinics, while the rest did teleconsultations. Every unit had a role in this whole system," he noted.

As Singapore emerged from the pandemic, it now had a chance to relook its healthcare model and update it.

It was based on this vision of decentralised care that MOH drafted a White Paper on Healthier SG, a healthcare reform plan that focuses heavily on preventive care. The paper, submitted to Parliament in September 2022, provided Singapore with a blueprint to manage the challenge of an ageing population.

Presenting this plan to Parliament in October 2022, Mr Ong told the House that Singapore's COVID-19 response of vaccinating, testing, and self-isolating were very much preventive in nature. It was proof that preventive care could be integrated with acute care in hospitals and treatment facilities.

If Singapore could replicate this effort in its fight against debilitating chronic illnesses, it would be a crucial step in managing the challenges of an ageing society.

"Ageing is a bigger pandemic than COVID-19, the burden of diseases is far greater than COVID-19," noted Mr Ong. "With COVID-19, it gives us waves. But ageing is an inexorable line and it will just keep going on. It is long term."

Added Assoc Prof Dan: "People always say, 'Oh I wish COVID-19 will go away and we can go back to normal life.' But that will be the biggest mistake. There are so many things we have learned from COVID-19. We must not go back."

PHOTO: CHINESE MEDIA GROUP © SPH MEDIA LIMITED

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

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Bukit Panjang Polyclinic was among six polyclinics that extended operation hours to receive patients with acute respiratory infection symptoms in 2022.

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721 new beds were rolled out at the F1 Pit Building from November 2021 to monitor stable patients who were nonetheless at risk due to chronic conditions.

"I CAN BE COURAGEOUS TOO"

IT WAS EARLY 2020, and Mr Rajendran Rajesh, then a 20-year-old student, had just enrolled in the Diploma in Nursing at Nanyang Polytechnic.

With regard to his career choice, the reactions from people around him were negative initially. His parents warned him that the COVID-19 virus would be here to stay. If he chose to be a nurse, his work would be more than tough.

"My parents had friends asking them 'Why is your son still doing nursing? Why not do something else?'," said Mr Rajesh, now 23. He will continue his journey with a nursing degree later this year.

What caused the concern were the things said in the news and on social media, where nurses and healthcare workers shared stories of how they were shunned in public when they wore their uniforms.

But Mr Rajesh was unfazed. He was inspired to become a nurse whilst serving as a combat medic during his National Service. He found it rewarding to help and care for patients, who are often vulnerable and afraid.

As the number of COVID-19 cases rose, he was further convinced of his decision to join the nursing profession. "I didn't want to be someone who said, 'This is not the right career for me' just as we are battling a pandemic. I wanted to step up and contribute," he maintained.

Still, there were fears. When he was sent to the Institute of Mental Health for on-the-job training, he would attend to a patient and spend time chatting with them, only to find out the next day that the person had tested positive for COVID-19.

"There was always this fear that I was harbouring the virus. I had a lot of mixed feelings – I wanted to do this work, yet I didn't want to fall sick and spread the virus," he shared.

But fears and anxieties aside, he saw resilience and strength in his seniors. "There was this sense of togetherness – these nurses were helping our country, they didn't let COVID-19 beat them up, they were courageous. It made me realise that I could be courageous too," he said.

When **Mr Rajendran Rajesh** decided to pursue a nursing diploma in 2020, many around him reacted negatively to his decision. But he remained unfazed, as he found the career to be meaningful.

TENDING TO THE CHILDREN

APART FROM TREATING CHILDREN WHO WERE ILL, HEALTHCARE WORKERS HAD TO EASE THE FEARS OF PARENTS TOO.

MS SHARIMILA SUBRAMANIAM entered the ward with a COVID-19 test kit. She would perform a nasal swab on the patient and leave – the whole procedure should take no more than five minutes.

Yet when the young child saw the swab stick in Ms Sharimila's hands, he leapt off the bed and ran straight for the toilet, refusing to be tested.

What was meant to be a five-minute affair stretched on for 45 minutes. Ms Sharimila, donned in full PPE and perspiring beneath the layers, had to calm, coax and cajole the child to complete the test. The caregiver, often a parent allowed to accompany the child in the ward, had to step in to help too.

This became an almost-daily affair for Ms Sharimila, Assistant Nurse Clinician at KK Women's and Children's Hospital (KKH), at the height of the Delta and Omicron waves in 2021.

The two COVID-19 variants resulted in sharp increases in the number of infected children who needed to be hospitalised. By January 2022, a total of 17,699 children below the age of 12 had been infected with COVID-19 since the start of the pandemic, with 2,586 hospitalised.

Associate Professor Thoon Koh Cheng, Chairman of the Hospital Infection Control Committee and Senior Consultant of Infectious Disease Service at KKH, noted: "At one point, more than half of our paediatric wards were converted to COVID-19 isolation wards. We set up tents outside the emergency department to house more patients, and even then there was an overflow."

Apart from treating children who were ill, healthcare workers had to ease the fears of parents too.

While some children had more serious complications such as pneumonia, bronchitis and croup, fortunately most were well enough to be discharged within three days. But once the kids felt better, they were fidgety and grew frustrated being cooped up in a tiny room. The doctors and nurses at KKH found themselves having to manage a group of tiny, lively and increasingly restless patients.

"We had to make sure we occupied the children with something, be it paint brushes, Lego sets, toys and crafts. Thank goodness the wards had television sets. We also gave the parents the password to the Wi-Fi – whatever we could give, we gave," said Ms Sharimila.

At times, the staff had to care for parents too. Some parents who had accompanied their child to be isolated in KKH ended up contracting the virus, even developing a high fever.

"Sometimes, parents would be so sick that they were not even able to take care of their child. It was scary for the parents too, to realise that they were falling so sick," she shared.

Caring for adults was a new experience for Ms Sharimila. "As a paediatric nurse, I never expected that I would have to treat adults and even pregnant mums who were isolating together with their child," she said. "But COVID-19 was a learning journey for me. If I was needed, I had to go, even if it was to nurse a profile of patients that I was not familiar with."

The pandemic also gave the public insights into the work of healthcare workers. "Whatever that happens in a hospital often remains there, but COVID-19 was an eye-opener for everyone. People saw what went on in the hospitals, how nurses contributed to the team and provided care to patients," she added.

IT WAS NOW TIME TO TURN THE PAGE ON THE PANDEMIC AND EXIT THE ACUTE PHASE.

PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

In a televised announcement on Feb 9, 2023, Deputy Prime Minister and **Minister for Finance Lawrence Wong**, co-chair of the Multi-Ministry Taskforce, announced that Singapore would step down its COVID-19 measures and exit the acute phase of the pandemic.

ESTABLISHING A NEW NORM

As the world welcomed 2023, the COVID-19 situation had also reached a turning point. In Singapore and across the world, the number of new cases was declining and viral variants of higher severity had not emerged, even with the resumption of travel and tourism.

With vaccinations, the Singapore population had developed a high level of hybrid immunity to the virus. Eight in 10 had received the minimum level of protection of at least three or four doses of vaccines. The risk of COVID-19 infections causing severe illnesses or death was much lower.

After learning to live with COVID, it was now time to turn the page on the pandemic and exit the acute phase.

On February 9, 2023, the Multi-Ministry Taskforce (MTF) made a televised announcement. Co-chair of the MTF, Deputy Prime Minister and Minister for Finance Mr Lawrence Wong, said: “It is time to step down the remaining measures in Singapore and establish an endemic COVID new norm.”

The DORSCON level would be lowered from yellow to green, indicating the mild nature of COVID-19. Protocols 1-2-3, which made home recovery the norm, would be phased out too.

PHOTOS: THE STRAITS TIMES © SPH MEDIA LIMITED

As pandemic measures were phased out, tourist attractions and public gatherings came back to life.

Border measures would also be further eased. Travellers who were not fully vaccinated did not need to produce a negative pre-departure COVID-19 test result, and neither would they be required to buy COVID-19 travel insurance.

Finally, and more importantly, the MTF, which was convened in January 2020, would now be stood down – signalling that the chapter of managing COVID-19 actively was now closing. But it did not mean that the virus was vanquished. Vigilance was still needed, and work must go on to support the country's healthcare structures, systems and workers.

As Singapore set up a new norm in this post-pandemic world, Mr Ong made clear that life was no longer the same and MOH would remain prepared to deal with any new challenges.

"Healthcare workers will largely be masked up at work, a constant reminder that the COVID-19 virus is still with us, and we have to be ready for the next variant of concern, or the next pandemic," he said at an MTF press conference.

"Today's announcement is significant but does not mean that our state of alert and preparedness is over. In fact, the more society stands down, the greater the responsibility for the healthcare system and our healthcare workers."

Like many other countries, Singapore had lived through one of the most devastating pandemics in modern history, a three-year nightmare that forced billions of people across the world to stay home, emptied once-vibrant tourist sites, shut down workplaces and cut off borders.

It had emerged with one of the lowest COVID-19 death rates in the world, and was now bustling back to life. Yet, the nation remained stoic. Singapore was ready to move on, carrying with it crucial lessons from the pandemic that will prepare it for the next crisis.

CHAPTER 14

LOOKING BACK ON THE COVID JOURNEY

PHOTO: TAN TOCK SENG HOSPITAL

Staff from Tan Tock Seng Hospital (TTSH) and the National Centre for Infectious Diseases at the TTSH Helipad while the Republic of Singapore Air Force performed the Roar of Unity as a tribute to frontline fighters and essential workers during the National Day Parade on Aug 9, 2020.

THE COVID-19 pandemic took a toll on everyone – daily routines were disrupted, jobs were displaced, and lives were lost. Never before has the world witnessed such a cataclysmic outbreak that forever changed how people live.

In Singapore, the situation was constantly changing along with the mutating virus, challenging the healthcare system to almost breaking point. If the public were feeling anxious and worried, the healthcare and medical fraternity were even more frazzled and distressed.

They confronted the same unknowns and uncertainties that everyone else was grappling with, harbouring the same fears for their own health and that of their loved ones. But they had to steady their nerves and hold the fort, as they shouldered the responsibility of caring for a country with hundreds of thousands infected with COVID-19. They were at the frontlines battling the virus, while also nursing the rest of the nation back to health.

As Singapore closed the chapter on the pandemic, members of the healthcare community reflected on the arduous journey that the Ministry of Health (MOH) and its partners have taken from January 2020 to May 2023. Many lacked sleep, some were burnt out, and others struggled with anxiety and stress. But somehow everyone pulled through and managed to cope, including the healthcare community – and not just survived, but overcame the crisis of a generation.

TOGETHER WE STAND

PHOTO: NATIONAL HEALTHCARE GROUP

Having all hands on deck across agencies was key to getting Singapore through even the toughest patches during the pandemic, such as the dormitory outbreaks.

MS Lim Siok Peng, Director of Corporate Communications at MOH, recalls meetings where multiple viewpoints from various ministries and agencies were heard, and suggestions tabled. With everyone low on sleep and high on stress, the discussions sometimes got heated.

But even in the difficult moments, the team remained united, knitted together by a shared sense of purpose to help Singapore get through the pandemic. This was WOG in action.

WOG refers to a whole-of-government approach, with seamless inter-agency coordination and planning during an emergency. It was first developed after the Laju ferry hijacking incident in 1974 and continually refined over the years. This approach provides government agencies with a model to resolve a crisis together.

It proved its prowess during the pandemic. Singapore was able to quickly mobilise the different facets of its public healthcare system to respond to the COVID-19 crisis. There was the Multi-Ministry Taskforce (MTF) that took the helm, with its co-chairs – one of them the Minister for Health – signing off on plans and communicating key decisions to the public.

Next was the high-level Homefront Crisis Executive Group (HCEG), with senior representatives from across all ministries coordinating inter-agency cooperation. The MTF and HCEG, together with MOH which refined policies and plans as the pandemic unfolded, rolled out many plans and programmes.

On the ground, polymerase chain reaction (PCR) testing within hospitals was sped up, the genome code of the COVID-19 pathogen studied, contact tracing efforts for infected persons intensified, and quarantine facilities built up.

"You come together and you may not always agree, because every agency has its own stakeholders and agenda. But if the broader objective aligns – in this case, to keep people safe – you have to trust that other people are also working towards the same goal as you," shared Ms Lim.

"The WOG approach is about relationships – the understanding that you are fighting a common enemy, that you are in this together."

WHEN OVERREACTING IS ASTUTE

PHOTO: MINISTRY OF COMMUNICATIONS AND INFORMATION

The Multi-Ministry Taskforce held frequent press conferences to update the public on developments in the COVID-19 situation.

WHEN Professor Kenneth Mak, Director of Medical Services at MOH, first heard of an outbreak of atypical pneumonia spread from animals to humans in Wuhan, China in December 2019, the information was incomplete but alarming.

"It made us concerned that perhaps this outbreak was not like other outbreaks before, and could be something more significant," said Prof Mak, who was just two weeks into his new role as Director of Medical Services Designate at MOH.

His colleague, Permanent Secretary for Health Development Mr Ng How Yue, had the same fears. "The new disease had all the preconditions of turning into a pandemic," he shared. Its infection rate was high, and likewise, the death rate.

Even amid the uncertainty, MOH knew it had to act fast – to overreact rather than underreact. This position of not underestimating the enemy would preempt the virus' arrival to Singapore, triggering early preparatory efforts to ring fence suspected cases and prevent community spread.

It was similar to the containment and elimination strategy adopted in 2003, when Singapore battled the Severe Acute Respiratory Syndrome (SARS).

In a meeting on January 2, 2020 that Prof Mak chaired, a decision was made to ramp up surveillance. Temperature screening stations were to be set up at Changi Airport to screen travellers from Wuhan, China. Doctors across the island were asked to watch out for patients who had been to China, and presented symptoms of pneumonia.

As information gradually emerged about the disease, surveillance and control measures continued to be stepped up. On January 20, 2020, travellers who had been to China in the last 14 days, and who had fallen ill, were isolated.

Two days later, the MTF was formed, and following that, the HCEG. Such swift preparations preceded the first imported case of COVID-19 on Singapore's shores on January 23, 2020.

As the days unfolded, it was clear the government had not overreacted – COVID-19 was unprecedented in the speed and scale of its spread.

DON'T FIGHT A NEW WAR WITH AN OLD PLAYBOOK

PHOTO: THE STRAITS TIMES © SPH MEDIA LIMITED

A man getting a swab test done at the Bukit Gombak Sports Hall on Jun 9, 2020, when mass testing and containment were still Singapore's main strategy.

MUCH of Singapore's initial response to COVID-19 was shaped by its fight against SARS in 2003. The focus was on isolation to contain the virus and prevent community spread.

It was partly also because "we didn't know any better", said Permanent Secretary for Health Mr Chan Yeng Kit. "When COVID-19 first started, we had a lot of assumptions that we made from SARS – symptoms, temperature taking, incubation period. The SARS playbook had worked for the Middle East Respiratory Syndrome and H1N1," he noted.

"But there's also this line about how generals are always fighting the last war," he added, referring to how people tend to prepare for old challenges rather than new ones. "But without the SARS playbook, we would have been fumbling around. As we knew better, we adjusted."

By March 2020, COVID-19 clusters had formed across migrant workers' dormitories. As the healthcare workforce bore the onslaught of increasing cases, Singapore needed a new strategy to prevent a systemic collapse.

COVID-19 was clearly not like SARS, and containment was no longer sufficient. The key was to drive down Rt, or the effective reproduction number, to break the chains of transmission. The value represents the average number of people that a single infected person is expected to transmit the disease to at a particular point in time. Rt could be lowered with actions such as isolation and vaccination.

On April 7, 2020, the country entered the circuit breaker – a decision that came at a great cost to the economy, yet necessary to break the chains of infection and save lives. The circuit breaker ended on June 1.

"We go into a crisis in good faith, fighting it to the best of our ability, based on our understanding of what is there. But we need to be nimble and agile," said Mr Chan. "We must always remind ourselves that what worked in the last pandemic may or may not work for the next one."

Every crisis is different, and requires fresh strategies. The key lies in planning ahead and knowing when to change tactics.

TAILORING RULES TO A FAST-CHANGING SITUATION

PHOTO: BLOOMBERG VIA GETTY IMAGES/WEI LENG TAY

People order takeaway at a food center in the Ang Mo Kio area of Singapore on May 16, 2021.

AS Singapore sought to make sense of COVID-19, authorities had to quickly identify pressing threats, trial solutions based on assumptions derived from data it had at that time, and tweak the approaches as they went along. In short, risks had to be taken.

Following the end of the circuit breaker on June 1, 2020, Singapore took a gradual approach to reopening. Dining in, which was prohibited during the circuit breaker, was allowed with up to five people per table.

This rule remained till December 2020, when the government allowed up to eight people per table as COVID-19 cases declined.

But rules quickly changed in May 2021. When the Delta strain brought on a new wave of cases and more clusters grew, the eight-person rule was reduced to five, and subsequently, down to two. By July that year, dine-in was banned again.

The swing between easing and tightening rules prompted several to question the rationale of the government's responses and its understanding of the situation. But this was how Singapore executed the hammer and dance strategy – enforcing strict measures to control the virus while accelerating vaccination rollout, then gradually entering a refreshed phase where life could resume, guided by specific measures.

"In our minds, we felt that if we were going to relax our COVID-19 rules, it had to be paced, it had to be gradual," said Prof Mak. "We needed the public to understand that they had to do their bit as well, because the responsibility for protecting each and every one of us cannot be held only by the government."

"That sort of big-bang reopening that took place in some other countries, we always knew that that was not for us."

SHORE UP SUPPLY LINES

Stockpiling resources like masks and other medical equipment was crucial to ensuring that Singapore would be prepared not just for a single drawn-out battle against COVID-19, but also for possible future pandemics.

IT is often said that battles are fought not so much at the frontlines, but at the supply lines. In every war, the critical factor determining how a fight turns out is often logistics.

The supplies needed by healthcare workers fighting this long-drawn COVID-19 battle included necessities like fresh medical gloves, medical gowns, surgical masks, goggles and hair nets. For patients receiving treatment, they need fresh syringes, testing kits, hospital beds, ventilators and isolation spaces.

With the healthcare infrastructure already strained under the cumulative toll of every previous COVID-19 surge, a shortage in any single item would disrupt the entire chain of operations and services. Waiting times at hospitals would surge, tests for patients delayed.

This was not a table-top drill for worst-case scenario planning. This exact script played out time and again in real-time in countries around the world, as new COVID-19 variants drove surges.

Throughout the COVID-19 fight, MOH had ensured a stockpile of resources and helped in setting up community treatment facilities and isolation facilities to alleviate the load on hospitals.

A SHORTAGE IN ANY SINGLE ITEM WOULD DISRUPT THE ENTIRE CHAIN OF OPERATIONS AND SERVICES. WAITING TIMES AT HOSPITALS WOULD SURGE, TESTS FOR PATIENTS DELAYED.

HAVING THE COURAGE TO CHANGE

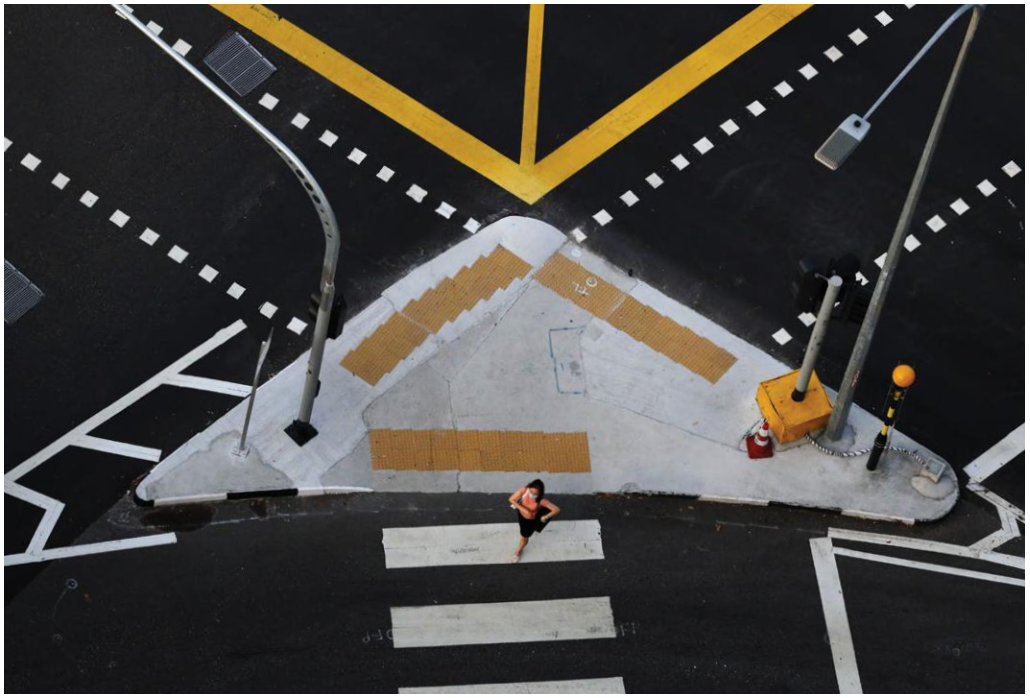


PHOTO: NURPHOTO VIA GETTY IMAGES/SUHAIMI ABDULLAH

Singapore had to adapt to living with COVID-19 and stay responsive to change.

AFTER months of chasing a zero-COVID strategy, the MTF eventually began making preparations for the country to accept COVID-19 as endemic.

It was simply not sustainable for the country's borders and economy to swing repeatedly between closing and reopening. And it had also become clearer, as time passed, that wiping out COVID-19 completely from the country, even with vaccination, was mission impossible.

"If vaccination alone is not enough to get rid of the virus, then we need a strategy to live with it," noted Mr Chan.

The road to recovery was not eradicating the virus, but learning to live with it. But two key factors had to be in place to pivot successfully.

First, and the most crucial, the population had to be vaccinated. While getting vaccinated did not mean immunity to COVID-19, the jabs significantly reduced the severity of symptoms.

Second, systems had to be put in place to allow people with COVID-19 to isolate and recover at home, to free up hospital resources for severe cases, and to resume treatment of patients that had been delayed because of the pandemic. The protocols for home recovery, named simply as Protocols 1-2-3, were part of the answer.

For Prof Mak, the critical point is knowing how to embrace change. "We must be honest with ourselves, be mindful that we won't always get it right, but yet have the gumption and willingness to pivot, to change, and do the right thing subsequently," he said.

With COVID-19 evolving, leaders also had to be prepared to respond and move quickly, said Mr Gan Kim Yong, Minister for Health until May 2021, and co-chair of the MTF.

"These are things you must be prepared to do in a pandemic: be nimble, be prepared to change and respond quickly, and to also acknowledge the times when you have made a mistake and do something else," he said.

Associate Professor Dan Yock Young, Deputy Director of Medical Services (Health Services Group) at MOH, said the pandemic "opened our eyes to the fact that every time we planned something, things wouldn't go according to plan, but that is fine".

"In the initial days, some people asked 'Why do you keep flipping your directives?' But COVID-19 is a new disease. If you are not nimble enough to adapt, flip and move on the fly, you are doomed to failure," he said.

BUILDING TRUST WITH TRANSPARENCY

PHOTO: NURPHOTO VIA GETTY IMAGES/FOO CHUAN WEI

Safe distancing measures were clearly communicated to the public, alongside other policies, to avoid confusion and build trust and transparency.

IN times of crisis, especially on a global scale, it is futile to hide the bad news. With the proliferation of social media sites and online news platforms, nothing can be kept under wraps – for long.

What was more important was to ensure that people had access to the right information backed by science and facts.

"We tried, from Day One, to be as open and transparent as possible," said Mr Chan. "We tried to push out as much information as we could, and maintain public trust. Whatever information we have, we try to share and show Singaporeans that we have your back, we are doing what we can to keep you safe."

Presented with science-backed data, Singaporeans would then be better able to protect themselves and guard against the virus.

It was why the first tranche of press releases issued by MOH in the initial period contained specific details about positive cases – where these people had been to, whom they had met, and the activities they had taken part in.

The MOH website was also revamped to push out COVID-19 related news upfront, including updated statistics of cases, and information about the many measures Singapore was adopting to keep people safe.

"COVID-19 was not just a Singapore phenomenon, you have reports in the international media too. Rather than letting people hear about COVID-19 from somewhere else, it is better for the government to come out and say something," said Ms Lim, MOH's Corporate Communications Director.

Under her watch, a team of clinicians, scientists and infectious diseases experts took turns to give media interviews to help people make sense of the complex new disease. Over time, these experts built up the public's knowledge of the virus, while becoming familiar and trusted faces of scientific authority.

The communications team at MOH also began to issue daily, and even twice-daily, press releases to provide timely and detailed updates. Within the Ministry, there were jokes that Ms Lim held the record for being the communications director to issue the most number of press releases in the last 50 years.

"The trust we have built over the years is precious. You have to maintain it. And you do so by being upfront and presenting the facts as they are," said Ms Lim.

Added Prof Mak: "People trusted the government, and trusted that the taskforce would do the right thing for them. But we were not under any pretense that we could depend on this ad infinitum. We needed to have a clear and consistent plan."

SAYING NO TO COMPLACENCY

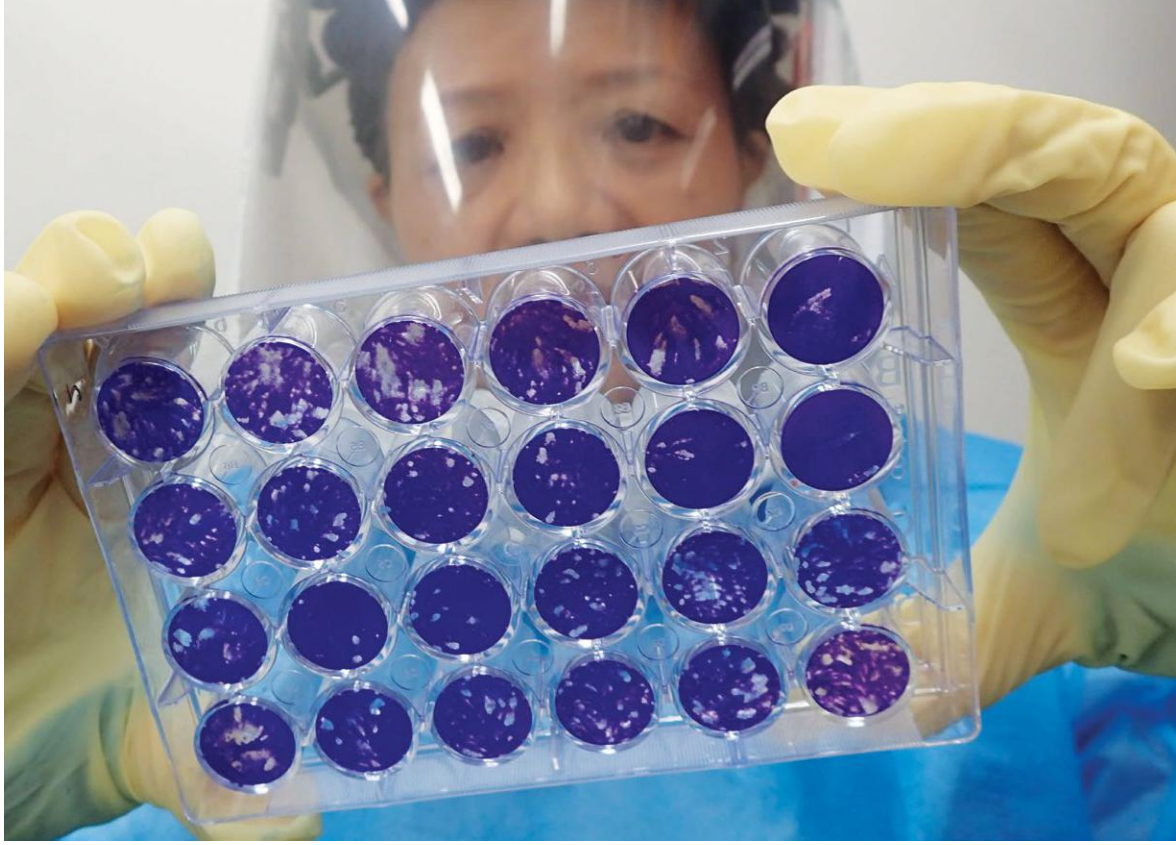


PHOTO: DUKE-NUS MEDICAL SCHOOL/BENSON NG

A researcher analysing the result of a plaque assay, used to measure infectious virus particles.

BY the end of February 2023, life had generally returned to normal for most countries, and for Singapore.

The MTF announced earlier in the month that Singapore would lower its Disease Outbreak Response System Condition (DORSCON) from yellow to green – the lowest alert status in the framework – indicating that COVID-19 was now a mild disease posing minimal disruptions to daily life. Masking-up was no longer mandatory on public transport. The MTF would also stand down, and the Protocols 1-2-3 phased out.

The announcement marked a milestone in Singapore's living-with-COVID journey. It was easy to think that COVID-19 was over, but doing so would mean falling into the trap of complacency, and risk forgetting the lessons learnt over the last three years.

The COVID-19 experience has put Singapore in a better place to deal with the next crisis. The country has emerged from the pandemic more prepared and resilient, and with its people more united. Now is the time for reflection – to review the experience of the last three years, to take stock of gains and losses, to learn and to look ahead.

In a Facebook post on February 9, 2023, Minister for Health Ong Ye Kung wrote: "We are at ease now, but always stand ready. *Senang diri* (drill command in Malay for stand at ease), but not *keluar baris* (drill command in Malay meaning to fall out)."

Personal and social responsibility remain critical, as vaccinations continue to be Singapore's first line of defence; and people should be aware that some COVID-19 measures such as mandatory mask-wearing may have to be reinstated when the situation calls for it. MOH will also keep its eye on the global COVID-19 situation, paying attention to new variants. Singapore will continue to build up its defence to the disease, both physically and psychologically.

COVID-19 will not be the last pandemic known to mankind. Preparations for the next pandemic, or what the World Health Organization has named Disease X, have already begun – and the world remains vigilant. Singapore too.

PHOTOS: NATIONAL UNIVERSITY HEALTH SYSTEM, NATIONAL HEALTHCARE GROUP, SINGAPORE HEALTH SERVICES

"WE WRITE THE STORY TO RECORD SUFFERING AND SACRIFICE, BUT ALSO THE STRENGTHS AND REMARKABLE COMMITMENT ON THE PART OF SO MANY TO SUCCESSFULLY OVERCOME THE CRISIS.

WE WRITE IT TO REMEMBER BUT ALSO TO LEARN. IF WE DO, THEN IN THE NEXT CHAPTER, OUR HOSPITALS AND HEALTHCARE SYSTEMS WILL BE BETTER, OUR LAWS MORE COMPLETE, OUR VACCINES AND MEDICAL SUPPLIES MORE SECURE.

AND SO, WE WRITE OUR NEXT CHAPTER, NOT KNOWING WHETHER THE WORLD WILL DAWN BRIGHT OR DARK, HOSTILE OR FRIENDLY, BUT CONFIDENT IN OURSELVES THAT SINGAPORE HAS BECOME STRONGER THROUGH THIS CRISIS, AND CAN STAND TALLER TO MEET THE NEXT ONE."

– MR ONG YE KUNG, MINISTER FOR HEALTH
PARLIAMENTARY DEBATE ON SINGAPORE'S RESPONSE TO COVID-19
MARCH 21, 2023

EPILOGUE

IT is hard to quantify the impact of the pandemic. Officially, Singapore recorded 1,711 deaths as of December 2022 due to COVID-19 infections. But the Ministry of Health estimates that another 2,000 deaths were due to undiagnosed infections, or complications arising from COVID-19 infections.

Beyond the death toll, there were other losses: children who missed out on in-person interactions with their peers and teachers in schools; businesses that shuttered; employees who were furloughed. Across the board, mental health took a major dip.

But amid the losses, there were gains too. There is greater resilience and resolve to do better the next round – because there will be a next round. The preparation work has already begun.

It started with a national programme in November 2022 to support and strengthen Singapore's key research capabilities to detect and contain future infectious disease outbreaks. Called the Programme for Research in Epidemic Preparedness and Response, or PREPARE, it is led by Professors Wang Linfa from the Duke-NUS Medical School and David Lye from the National Centre for Infectious Diseases (NCID).

Through PREPARE, Singapore will be able to tap on pandemic researchers around the world to expand on the knowledge on emerging pathogens.

Other initiatives are also starting. More facilities to ease the load on the public hospitals will be built, with these Transitional Care Facilities receiving medically stable patients who are waiting for care arrangements such as nursing home care.

The Crisis Strategy and Operations Group which was established during the pandemic and undertook much of the pandemic-related operations such as contact tracing, quarantine, testing, vaccinations and home recovery, is now a permanent feature in MOH. A new Communicable Diseases Agency to oversee disease preparedness, prevention, control, surveillance, risk assessment and outbreak response has also been established.

But the most important shift is the introduction of Healthier SG, a substantial long-term reform of Singapore's healthcare landscape that focuses on preventive care. This was helped by the close partnerships forged between private and public healthcare providers during the pandemic, and the increasing awareness of the importance of preventive healthcare.

The Healthier SG strategy was "born out of crisis and will profoundly change the landscape for healthcare in Singapore," Minister for Health Mr Ong Ye Kung said in a parliamentary debate on Singapore's response to COVID-19 on March 21, 2023.

This strategy seeks to improve the health of the population by urging Singaporeans to take charge of their health. Residents enrolled into the programme will have a regular doctor who will work with them on a personalised health plan to help them stay on track in meeting their health goals. They can also access a wide range of community programmes to stay active, socially connected and physically fit and healthy.

As people become more diligent about staying healthy, and ailments are identified and managed early, the overall strength and resilience of the country's healthcare system will improve.

It has been said that what does not kill you will only make you stronger. Singapore has survived the pandemic to live and fight another day, with battle scars reminding us what not to do in future. There is hope that the city-state has not only emerged healthier and stronger after the pandemic, but also more prepared to meet new crises and challenges ahead.

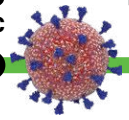
3 YEARS OF PANDEMIC

SINGAPORE'S COVID-19 TIMELINE

2019 DEC

2020 JAN

FEB



DEC 19
Local health authorities in Wuhan, China detect cases of an unknown, severe pneumonia in hospitals.

11 JAN 20
Chinese scientists publish the genome sequence of the virus on an open-access site, allowing the National Centre for Infectious Diseases' (NCID) National Public Health Laboratory (NPHL) to develop a polymerase chain reaction (PCR) test to detect the new coronavirus.

21 JAN 20
Singapore raises its Disease Outbreak Response System Condition (DORSCON) from green to yellow.

22 JAN 20
The Multi-Ministry Taskforce (MTF) is set up and chaired by then-Minister for Health, Mr Gan Kim Yong.

23 JAN 20
Singapore diagnoses its first COVID-19 case, a 66-year-old tourist from China.

28 JAN 20
MOH's first contact tracing centre, with about 40 to 50 contact tracers, begins operations.

30 JAN 20
The World Health Organization declares the pandemic a "Public Health Emergency of International Concern".

The MTF says that all households in Singapore will receive four surgical masks each.

Local airline Scoot embarks on its first evacuation flight from Wuhan, carrying 92 Singaporean passengers.

4 FEB 20
MOH announces the first transmission, four women with no travel history to Wuhan.

7 FEB 20
Mr Gan announces at a press conference that the DORSCON level will be raised from yellow to orange, spurring panic buying at supermarkets.

9 FEB 20
The second evacuation flight out of Wuhan lands at Changi Airport. More flights are chartered in the following weeks to evacuate Singaporeans from other countries, including the United States and parts of Europe.

11 FEB 20
WHO names the virus SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2).

17 FEB 20
Stay-home notice (SHN) is introduced. MOH reactivates its network of more than 900 general practitioner (GP) clinics to provide subsidised treatment, investigations and medications for patients with respiratory symptoms.

11 MAR 20
WHO officially declares COVID-19 a pandemic.

21 MAR 20
Singapore reports its first two deaths, both being patients at NCID.

26 MAR 20
Stricter measures to limit group sizes to 10 are introduced.

Bars and entertainment outlets are ordered to close. Religious services are suspended. F&B outlets must limit dine-in group sizes to 10.

30 MAR 20
Four confirmed cases have emerged at S11 Dormitory @ Punggol, forming the first dormitory cluster.

31 MAR 20
Lee Ah Mooi Old Age Home becomes the first nursing home to have confirmed COVID-19 cases.

5 APR 20
Two migrant worker dormitories are gazetted as isolation areas.

The Joint Task Force (Assurance) is formed to manage the dorm outbreaks.

7 APR 20
Circuit breaker measures officially kick in.

Most workplace premises are closed, home-based learning is introduced for students and all social gatherings are banned.

3 APR 20
Prime Minister Lee Hsien Loong appears on national television to announce that a one-month "circuit breaker" will be imposed.

13 APR 20
The Therapeutics and Vaccines Expert Panel (TxVax) is set up to source for and assess promising vaccines to procure for Singapore.

MAR

APR

2020

APR

14 APR 20
A mask mandate is implemented to curb the spread of the virus, with the exception of those doing strenuous exercise and children under two. Previously, masks were only mandatory for healthcare and frontline workers.

20 APR 20
Singapore reports 1,397 new cases in the dorms.

21 APR 20
PM Lee announces that the circuit breaker will be extended for another four weeks to 1 June.

Further closure of workplaces are implemented, including service providers like hairdressers, confectionery and beverage outlets.

28 APR 20
Swab isolation facilities comprising over 4,000 beds have been set up to house patients awaiting the results of their swab test, easing the strain on medical facilities.

MAY

12 MAY 20
SafeEntry is made mandatory for all operating businesses.

MOH also makes the decision to test all migrant workers through a combination of PCR and serological tests to weed the virus out of the dorms, regardless of whether they are symptomatic. More than 3,000 migrant workers are tested daily over the next two months.

19 MAY 20
The MTF confirms that the circuit breaker will end on 1 June, and that Singapore will gradually reopen in three phases. Phase 1 will begin on 2 June.

JUN

2 JUN 20
The circuit breaker is lifted, and Phase 1 begins.

Households can receive two visitors per day, who must be children or grandchildren from the same household.

Work from home remains the default. Dining in is still disallowed.

19 JUN 20
Phase 2 begins. People are allowed to gather in groups of five, malls can reopen and dining in is permitted again.

JUL

1 JUL 20
All individuals aged 13 and above are required to be tested for COVID-19 if they display signs of respiratory infection.

19 AUG 20
The Ministry of Manpower declares all dormitories cleared of COVID-19, including the standalone blocks in purpose-built dormitories serving as isolation or quarantine facilities.

22 AUG 20
The Joint Task Force (Assurance) stands down from dormitory operations.

5 OCT 20
The Expert Committee on COVID-19 Vaccination (EC19V) is formed to advise the government on how to best deploy vaccines safely across the population.

13 OCT 20
Singapore sees zero local cases for the first time since March.

AUG | SEP | OCT | NOV

17 SEP 20
The number of daily cases fall to 18, the lowest figure recorded since March 2020.

30 SEP 20
In September 2020, Singapore conducts an average of 27,200 PCR tests a day.

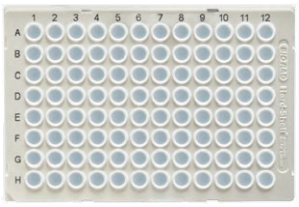


PHOTO: NATIONAL LIBRARY BOARD, SINGAPORE, COVID-19 COLLECTION/ NURULHUDA SALIM

21 DEC 20
The first batch of Pfizer-BioNTech vaccines arrives at Changi Airport.

28 DEC 20
Singapore enters Phase 3. Group sizes are increased from five to eight, the capacity of premises and worship services are increased and large-scale live performances can now be piloted.

30 DEC 20
Then-senior staff nurse at NCID's Clinic J, Ms Sarah Lim, becomes the first person in Singapore to be vaccinated.

28 APR 21
Senior staff nurse Ms Jennilyn Angeles tests positive for COVID-19, becoming the first case of Singapore's first hospital cluster at Tan Tock Seng Hospital (TTSH).

17 FEB 21
The first batch of Moderna vaccines arrive.

2020 DEC

2021 JAN FEB MAR APR

14 DEC 20
PM Lee announces that Singapore is ready for Phase 3 of its reopening, which will begin on 28 December. He also promises that Singapore will have enough vaccines for everyone by the third quarter of 2021.

8 JAN 21
PM Lee becomes the first member of Singapore's Cabinet to take the Pfizer-BioNTech vaccine, along with Prof Mak.

16 MAR 21
24 vaccination centres are in operation.

5 MAY 21
A cleaner at Changi Airport 3 tests positive for COVID-19, and the Changi cluster grows to 26 cases in a week.

16 MAY 21
Singapore reverts to tightened restrictions under Phase 2 (Heightened Alert). People are only allowed to gather in groups of two, dining in is ceased and work from home becomes the default once more.

17 MAY 21
TraceTogether is made mandatory for checking into malls and schools.

6 JUN 21
The TTSH cluster is officially closed, with no new cases linked to it after 28 days.

11 JUN 21
Singaporeans between the ages of 12 to 39 can now book vaccination appointments.

14 JUN 21
Singapore moves back to Phase 3 (Heightened Alert), where groups of five are allowed to gather. Dining in is not yet allowed.

21 JUN 21
Dining-in resumes in groups of two.

24 JUN 21
The three MTF co-chairs publish an op-ed piece in The Straits Times titled, "Living normally, with COVID-19", on how Singapore is drawing a road map to transit to this new normal.

16 JUL 21
Another cluster at Jurong Fishery Port forms. It is discovered to be linked to the KTV cluster, and quickly becomes the largest active cluster, with 1,155 cases linked to it at its peak.

12 JUL 21
A new Delta cluster at KTV lounges is announced by MOH.

22 JUL 21
Singapore returns to Phase 2 (Heightened Alert) due to the growing number of cases.

8 AUG 21
National vaccination rate hits 70%.

Fully-vaccinated individuals can now dine out in groups of five.

30 AUG 21
The pilot for the Home Recovery Programme (HRP) begins.

15 SEP 21
HRP becomes the default care model for fully vaccinated COVID-19 patients aged 12 to 50. Protocols 1-2-3 come into effect.

17 SEP 21
Health Minister Mr Ong cautions in a press conference that with the Delta wave, Singapore's daily cases could hit 1,000 soon, as numbers doubled every week.

18 SEP 21
1,009 new cases are reported.

HRP is further expanded to fully vaccinated patients aged 51 to 69.

MAY JUN JUL AUG SEP

24 SEP 21
Health Minister Mr Ong announces plans to prepare for 5,000 new daily cases, following consecutive days of record-high new cases of 1,457 and 1,504.

29 SEP 21
The Singapore Armed Forces (SAF) sets up the Home Recovery Task Group to scale up and bolster HRP, deploying more than 450 personnel.

27 SEP 21
Singapore enters the Stabilisation Phase to slow the rate of transmission due to the deadly Delta variant.

Social gatherings are restricted to two and work-from-home becomes the default again.

9 OCT 21
PM Lee explains the shift from zero-COVID to endemic living in a nationwide address, citing HRP as central to Singapore's "path forward to a new normal."

11 OCT 21
Streamlined protocols for HRP are introduced amid complaints of public confusion.

27 OCT 21
Singapore's daily new cases top 5,000 for the first time, with 10 dying from virus complications, bringing the total death toll to 349.

A total of 20,895 patients, or 74.3 per cent of COVID-19 community cases, are in home recovery.

31 OCT 21
Singapore has set up a total of nine COVID-19 Treatment Facilities (CTFs) with a combined capacity of 3,700 beds by end-October. Community Care Facilities (CCFs) also hit a combined capacity of 4,300 beds.

29 MAR 22
Mask-wearing is now optional in outdoor settings, though it remains the default in indoor settings.

Homes can now have up to 10 visitors at any one time, up from five.

Live performances and busking are allowed to resume too.

2021 SEP OCT NOV DEC 2022 JAN FEB MAR

4 APR 22
MOH resumes in-person visits to all hospital wards and residential care homes.

22 APR 22
Singapore announces that it will adjust its Disease Outbreak Response System Condition (DORSCON) from orange to yellow.

MOH also removes the group size limit for mask-off activities, as well as the cap on number of visitors to a household. All workers are now allowed to return to their workplaces, and safe distancing is no longer needed between individuals and groups.

21 JUN 22
MOH reports a rise in COVID-19 community infections owing to the Omicron subvariants BA.4 and BA.5.

21 SEP 22
MOH releases its Healthier SG white paper, a healthcare reform plan that emphasises preventive care instead of curative care in response to Singapore's ageing population.

14 OCT 22
Singapore begins offering the bivalent vaccine, which offers protection against the original wildtype virus as well as the newer subvariants.

The Omicron XBB is now the predominant subvariant circulating in the community.

10 OCT 22
All vaccination-differentiated measures are fully lifted. Individuals who are not vaccinated no longer face restrictions when dining in, entering nightlife establishments and participating in large-scale events.

APR MAY JUN AUG SEP OCT NOV

1 APR 22
Fully vaccinated travellers are allowed quarantine-free entry into Singapore under the Vaccinated Travel Framework, without having to complete any COVID-19 tests.

15 MAY 22
MOH detects two local COVID-19 cases infected with the BA.4 variant, and one case infected with the BA.5 variant.

29 AUG 22
Mask-wearing is no longer required in indoor settings, except on public transport, healthcare facilities and residential care homes.

25 OCT 22
Singapore starts offering COVID-19 vaccinations for children aged between six months and four years.

2023

FEB

13 FEB 23
Singapore exits the acute phase of the pandemic and lowers DORSCON to green from yellow.

Masks are no longer mandatory on public transport. Protocols 1-2-3, as well as the MTF, are stood down.

EDITORIAL ADVISORS
Ministry of Health, Singapore
Saw Swee Hock School of Public Health,
National University of Singapore

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The Nutgraf
Editor: Sue-Ann Chia
Project leads: Pearl Lee, Samantha Boh
Writers: Pearl Lee, Samantha Boh, Justin Kor,
Derek Wong, Jaime Niam

DESIGN
Couple

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A VERY BIG

THA YO

THANK YOU

TO
ALL
WHO CONTRIBUTED TO
SINGAPORE'S HEALTHCARE
EFFORTS AGAINST COVID-19

BEHIND THE MASK

OUR HEALTHCARE STORY

After more than three years,
the virus has indelibly changed reality,
but what did it take to be able to see
the world with fresh eyes again?

This book chronicles the Ministry of Health's coordinated response to the COVID-19 crisis, from before the first case was detected in Singapore to a time when safe distancing and masking up were no longer mandated.

It tells the lesser-known stories of the people holding the fort in this long-drawn battle: doctors, nurses, and all the other workers in the healthcare industry. Often hidden from the public eye, but no doubt intertwined with our lives, these are the narratives that have laid the foundation for new beginnings.

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NUS National University of Singapore
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