

The Road to Pandemic Preparedness in Singapore

Singapore's pandemic preparedness is inseparably linked to its history of infectious diseases and efforts to overcome them. The diseases that most affected the nation in the early 20th century were mainly associated with overcrowding, poor living conditions, and lack of public hygiene.

INFECTIOUS DISEASE OUTBREAKS AND PANDEMICS THROUGH THE EARLY YEARS

The infectious disease outbreaks in Singapore's early years included cholera, typhoid fever and tuberculosis; and diseases affecting children such as smallpox, poliomyelitis (polio) and measles. Other tropical diseases included plague and malaria.¹

The country experienced its first cholera outbreak in 1841, followed by a second outbreak in 1851.² Subsequent years saw Singapore having periodic cholera epidemics.

Polio was a common childhood disease during the post-war period. The virus is highly contagious and can cause paralysis and even death. A major polio outbreak occurred between August and December 1958 causing the death of 12 and crippling 404 infants and children.³ After the outbreak, the government convened a committee to address the problem. It

recommended vaccinating all children from birth to school-entry age.

Measles, diphtheria and tuberculosis were other common infectious diseases in the early years of nationhood. For example, the high incidence of tuberculosis made it the number one killer disease right up to the 1960s.⁴

Singapore experienced three major influenza pandemics in the last century.⁵ The first was the 1918 Spanish flu which hit Singapore during May to June 1918 followed by a second wave from October to November in the same year. During these periods, the pandemic claimed at least 2,870 lives in Singapore.⁶ The Asian flu, thought to have originated in Guizhou, China, reached Singapore in April 1957. By the time the epidemic abated at the end of May, an estimated 680 people had died.⁷ The 1968 pandemic – or Hong Kong flu – was believed to have spread to Singapore in early August from a major outbreak in Hong Kong.⁸ It lasted a few weeks here and caused 540 deaths.

INFECTIOUS DISEASES REMAIN A THREAT IN THE 21ST CENTURY

As we transition to the 21st century, infectious diseases continue to be a threat to public health. In the past two decades, Singapore went through the severe acute respiratory syndrome (SARS) outbreak in 2003. The first case was detected on 1 March 2003 and the last case was isolated on 11 May 2003. During the outbreak, 238 cases and 33 deaths were reported.⁹

On 11 June 2009, the World Health Organization declared the outbreak of influenza A (H1N1) in the USA as the first pandemic of this century. Singapore detected its first case of H1N1 on 26 May 2009. By the end of September 2009, an estimated 270,000 people had been infected with the disease.¹⁰

Since 23 January 2020, Singapore has been battling an unprecedented pandemic, SARS-CoV-2 (COVID-19), including its successive waves of

infection from the Delta and Omicron variants. As of 31 December 2021, Singapore had recorded 279,405 COVID-19 cases since the start of the pandemic, with 828 deaths from coronavirus complications.

BUILDING PREPAREDNESS CAPABILITIES

There are important lessons to be drawn from each public health crisis. The successful control of the SARS epidemic in 2003 remains one of the defining moments in Singapore's history of infectious diseases. Following the SARS outbreak, the Ministry of Health (MOH) put in place the National Influenza Pandemic Preparedness and Response Plan (PPRP), incorporating the Disease Outbreak Response System Condition (DORSCON) framework.¹¹ In addition, IT-enabled surveillance measures were developed including Infectious Disease Alert and Clinical Database System, the Health Check System, the Contact Tracing System and e-Quarantine Management System. A more extensive surveillance framework involving the community, healthcare institutions, research and laboratories was also established. The conduct of several nationwide drills simulating a pandemic to test the PPRP further refined operation plans and enhanced preparedness. These efforts have

paid off. When the H1N1 pandemic reached Singapore in 2009, the PPRP was implemented for the first time under a real-life scenario.

On the part of NCID, it also built on lessons learnt from each outbreak handled by its predecessors, Middleton Hospital and Communicable Disease Centre (CDC). Over the years, investments and improvements made to clinical and research capabilities, infection control, as well as training and education have shored up overall expertise in managing patients with infectious diseases. The introduction of new measures such as a triage station to separate 'suspect' patients with infectious diseases from non-infectious disease cases reduces the risk of cross-infection. These proved invaluable in tackling the subsequent outbreak of Monkeypox.



Front entrance of the Administration Block (804) of Communicable Disease Centre

EVOLUTION OF INFECTIOUS DISEASE FACILITIES

During Singapore's early years, there was no hospital or dedicated facility or integrated healthcare system for managing contagious diseases. There were a few small and inadequate facilities such as the Quarantine Station on St. John's Island that screened immigrants arriving in Singapore, the privately-run Chinese Pauper Hospital (now Tan Tock Seng Hospital) which had a small ward for infectious diseases and the Infectious Diseases Hospital and Quarantine Camp at Balestier Road.¹² The need for a dedicated infectious disease hospital was dire but its establishment was difficult due to funding issues and lack of unity between the then municipal commission and the colonial government.¹³

EVOLUTION OF INFECTIOUS DISEASE FACILITIES

BEFORE 1913

A few facilities isolated and treated patients with infectious diseases, like the infectious disease wards at the General Hospital, the Quarantine Camp at Balestier and the Quarantine Station on St John's Island

1913

Isolation Hospital

1985

Communicable Disease Centre

1920

Middleton Hospital

2019

National Centre for Infectious Diseases

Finally, in 1913, the 172-bed Isolation Hospital, better known by the locals as 'Or Sai' because of the black lion emblem at the gate, was built on a 25-acre site at Moulmein, providing isolation facilities for treating the 'Big 3' diseases of the time, bubonic plague, cholera and smallpox. The hospital's capacity was subsequently expanded to handle the surge in patients caused by the Spanish flu which hit Singapore in 1918. In 1920, the hospital was named Middleton Hospital after Dr William R C Middleton, the tireless advocate for the establishment of the hospital. In the following decades, Middleton Hospital steadily strengthened its capabilities and was pivotal in Singapore's success in reducing cases of the plague, cholera and smallpox, and successfully managing other diseases such as typhoid and diphtheria.

In the 1970s, Middleton Hospital took on the treatment of skin conditions and sexually transmitted diseases (STDs). The Hospital became part of Tan Tock Seng Hospital and was renamed the Communicable Disease Centre (CDC) in 1985, the same year when the first cases of human immunodeficiency virus (HIV) infection were detected in Singapore. Subsequently, CDC became the primary institution for providing HIV patient care.

Working together and building trust are also critical for pandemic preparedness. The whole-of-government effort in battling COVID-19 attests to it, and has enabled Singapore to respond quickly and decisively, as well as to calibrate its measures to protect public health and lives.

The 2003 SARS outbreak highlighted the need for a dedicated infectious diseases hospital for handling outbreaks. A critical decision, made in 2013, was to replace CDC with the National Centre for Infectious Diseases (NCID). Lessons learnt from SARS, H1N1 influenza and other infectious disease outbreaks were incorporated into the design and development of the new facility. In 2014, then-Minister for Health, Mr Gan Kim Yong broke ground for the new NCID. It officially opened in September 2019 with purpose-built wards and laboratories, just a few months before COVID-19 hit the world. NCID has been at the forefront of Singapore's COVID-19 pandemic efforts – caring for patients, doing critical research and using the results to guide national response strategies. The Centre's design is

flexible, allowing for fast scale-up of capacity and capability, according to the surge and ebb of infections.

BUILDING TRUST AND STANDING UNITED

Working together and building trust are also critical for pandemic preparedness. The whole-of-government effort in battling COVID-19 attests to it, and has enabled Singapore to respond quickly and decisively, as well as to calibrate its measures to protect public health and lives. The trust and support received from all stakeholders have brought the nation closer to living with COVID-19, further defining the people's courage and resilience in facing "the crisis of this generation".

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