

# The forgotten pandemic: Hong Kong influenza in Australia (1968–1970)

As Australia emerges from the coronavirus disease 2019 (COVID-19) pandemic, and H5 avian influenza approaches global spread, it is instructive to reflect on past Australian pandemic experiences. This is underscored by the recent Australian Government's *COVID-19 Response Inquiry Report*.<sup>1</sup>

Within just over a century Australia has been affected by five respiratory virus pandemics: four influenza pandemics and the recent coronavirus pandemic. The deadliest was the Spanish influenza pandemic (1918), followed by the moderately severe Asian (1957) and Hong Kong (1968) influenza pandemics, the mild influenza pandemic originating in North America (2009), and then the COVID-19 pandemic (2020).

The Hong Kong influenza pandemic arose midway between the Spanish influenza and COVID-19 pandemics, during the momentous events of the late 1960s. It spanned Vietnam War protests and Woodstock, and affected United States presidents and Apollo astronauts. However, there are relatively few published accounts of Australia's experiences. This article reviews historical literature and contemporaneous news reports to extract insights for future pandemic responses. This forgotten pandemic has some notable similarities and differences to Australian experiences of the Spanish influenza and COVID-19 pandemics (Box 1).

## Classification of influenza

Only type A viruses cause pandemic influenza, and they are defined by the two surface antigens haemagglutinin (H) and neuraminidase (N). Both undergo antigenic variation, which sustains virus epidemic potential, and serve as targets for the protective antibody response, with haemagglutinin being the major and more significant antigen. Pandemic influenza is associated with a virus possessing a novel haemagglutinin. Influenza A viruses were initially subtyped as A0, A1 and A2 (H0, H1 and H2) based on haemagglutination-inhibition tests.

The revised 1971 World Health Organization nomenclature recognised distinct antigenic forms of neuraminidase, retrospectively designating the Hong Kong virus as A(H3N2) and its A2 predecessor as A(H2N2), with distinct haemagglutinin but shared neuraminidase. Genomic sequencing now supplements antigenic tests in characterising these viruses. Antigenic variants of the initial A(H3N2) virus continue to circulate alongside A(H1N1) and type B viruses and result in the highest rates of influenza-related morbidity and mortality.<sup>2,3</sup>

## Chronology of the pandemic

The Hong Kong influenza virus probably originated in China in early 1968 during the Cultural Revolution,

with unclear reports of an epidemic involving Chinese cities including Wuhan, Shanghai and Guiyang.<sup>4</sup> In July 1968, a respiratory illness outbreak was identified in Hong Kong, with about half a million cases reported by the end of that month.<sup>5</sup>

On 16 August 1968, the Hong Kong epidemic was attributed to an influenza virus significantly different from previous strains. Initial antigenic tests suggested a low level of relatedness to the pre-existing A2 Asian influenza virus family, and it was referred to as a major variant of that virus.<sup>6</sup> However, subsequent testing indicated a distinct haemagglutinin subtype.<sup>6,7</sup> By the end of August 1968, the virus had spread to Singapore, Vietnam, Taiwan, the Philippines and Australia.<sup>5,8</sup>

In Australia, the 1968 winter seasonal influenza epidemic was notably severe in Sydney. In a newspaper report on 11 August 1968, Dr H Kramer (Director of the Institute of Clinical Pathology at Lidcombe) identified the cause as the Asian A2 strain,<sup>9</sup> and Dr RW Lane (Director of the Commonwealth Serum Laboratories [CSL]) described it as "the worst outbreak since 1957".<sup>9</sup> Outbreaks of the Asian A2 virus were also recorded in Victoria,<sup>10</sup> South Australia,<sup>11</sup> and Western Australia, where the Premier, Deputy Premier and two state ministers were among those afflicted.<sup>12</sup> The world's last isolation of Asian influenza is said to have occurred in Australia in August 1968.<sup>11,13</sup>

On 30 August 1968, Australia's first confirmation of Hong Kong influenza occurred when CSL isolated and identified the strain from a patient in the Northern Territory who had returned from Hong Kong.<sup>8</sup> Around the same time, Dr Peter Arnold (a Sydney general practitioner based in Bellevue Hill) identified five cases that were confirmed as Hong Kong influenza via a collaboration with the Institute of Clinical Pathology. Four of these cases had returned from Bowral in New South Wales with reports of a "generalised outbreak of an influenza-like illness at their hotel".<sup>14</sup> Curiously, the new Hong Kong influenza virus did not cause a significant epidemic wave in Australia in 1968.

During September and October 1968, there were 295 cases of Hong Kong influenza clinically diagnosed on board a cruise ship from Sydney as part of its voyage to Honolulu (United States), continental North America, Japan and Hong Kong. Dr BD Apthorp, who described the outbreak, reported the onset of illness was "identical in nearly every case", with a headache, which patients frequently described as "it feels as if the top of my head is lifting off". Despite these observations, only a small number of patients developed signs suggestive of pneumonia and the author did not report any deaths.<sup>15</sup>

In 1968, Australia had sovereign capacity to mass produce influenza vaccines at CSL. By November, it started to send 1.3 million Hong Kong influenza vaccine doses to Britain to help with the expected

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## 1 Search strategy

We searched the scientific literature using keywords including “Hong Kong flu”, “Hong Kong influenza”, “pandemic influenza”, “pandemic”, “influenza”, and “h3n2”. Additional searches, including subsearches of the above, used terms such as “Australia” and the names of its states and territories, as well as the years 1968–1974. Databases and sources searched included PubMed, Google Scholar, the *Medical Journal of Australia*, *The British Medical Journal (BMJ)*, *The Lancet*, *The New England Journal of Medicine*, the *Journal of the American Medical Association (JAMA)*, the Australian Institute of Health and Welfare, and archives of various Australian media outlets. In addition, we searched the National Archives of Australia and the National Library of Australia (Trove) for contemporaneous media reports, and conducted general internet searches.

winter surge.<sup>16</sup> CSL assumed the novel influenza virus would follow a conventional seasonal pattern and that Australia would not require vaccine for several months — a significant gamble by current standards given the unpredictable nature of other influenza pandemic outbreaks.<sup>17</sup> Subsequently, CSL produced over 6 million vaccine doses in Australia for the 1969 winter.<sup>16,18</sup>

The first case in the US was identified in a soldier returning from Vietnam in early September 1968. Subsequent cases were detected in military bases in California, Hawaii and Alaska.<sup>19</sup> During the US winter of 1968–69 the virus spread rapidly, affecting President Lyndon Johnson, Vice President Hubert Humphrey, and President-elect Richard Nixon. Apollo 8 astronauts together with 1200 personnel at Cape Kennedy were vaccinated to reduce disruption to the following year's planned moon landing. The first wave of Hong Kong influenza in the US was declared over in February 1969 with more than 100 000 deaths.<sup>20</sup> By mid-1969, mass gatherings such as Woodstock and the Moratorium March (the largest anti-war protest in US history) occurred without apparent mention of the pandemic.<sup>21</sup>

Unlike the US, much of the world experienced a delayed impact from Hong Kong influenza. As with Australia's experience in 1968, this has been attributed to population immunity from recent exposure to H2N2 Asian influenza and mediated by antibody to the shared N2 neuraminidase.<sup>13</sup> Although outbreaks occurred in the United Kingdom and continental Europe during the northern winter of 1968–69, in contrast to the US, the illness was mostly reported as mild.<sup>13</sup> Many northern hemisphere countries outside North America experienced their worst season during the following winter of 1969–70. In England and Wales, for example, all cause excess mortality in the 1969–70 pandemic season (77.0 per 100 000 population) was almost twice that of the previous season (43.0 per 100 000 population) even though the Hong Kong influenza virus had first arrived there in 1968.<sup>13</sup>

In Australia, where the delay was most pronounced, tracing the early epidemiology of the new virus was complicated by the contemporaneous occurrence of the last recorded epidemic of the Asian A2 (H2N2) subtype and the new Hong Kong virus. Initial labelling of the new virus as an A2 variant may also have influenced reporting. Like in the UK and other parts of Europe, the 1969 pandemic wave in Australia

was relatively mild. The influenza mortality rate (17 per 100 000 population) was considerably lower than the rate during the A2 epidemic in 1968 (27 per 100 000 population).<sup>22</sup> However, in New Guinea the impact of Hong Kong influenza in 1969 was devastating. There were at least 2000 deaths, with possibly as many as 10 000. The army and air force were called in to assist with the response, including 200 soldiers of the Pacific Islands Regiment.<sup>23</sup>

Again mirroring the European experience, 1970 was the worst year for Hong Kong influenza in Australia. Remarkably, two years after the virus first arrived, Australian mortality reached 64 per 100 000 population.<sup>13</sup> This was the highest influenza mortality since the Asian influenza pandemic. The 1970 epidemic appears to have started in Queensland in June with outbreaks among Aboriginal and Torres Strait Islander peoples in Cape York and the Torres Strait, spreading to Brisbane and then the rest of Australia.<sup>24</sup> The NSW Premier became sick with it, George Johnson (author of *My brother Jack*) died of it, schools battled staff illness and crowding in classes, and Melbourne's city mortuary became full.<sup>25–28</sup> In an echo of the US experience, over 200 000 people attended anti-war protests across the country from May to September 1970,<sup>29</sup> without apparent mention of the pandemic.

## Impact

Our review of local and international medical literature, and search of media print publications, found only limited descriptions of the epidemiology, public health and societal impact of Hong Kong influenza in Australia.

Hong Kong influenza established the classical 12-month seasonal cycle, with peaks of varying severity in different years and locations. For Spanish influenza there were three waves within 12 months before adopting a seasonal pattern, whereas COVID-19 was initially experienced as synchronous global waves every three months after the emergence of the Omicron variant. The determinants of seasonality for respiratory viruses are incompletely understood but may include host innate immunity, environmental and/or climatic factors, and season-dependent human behaviour. In addition, not all respiratory viruses have a winter seasonality.<sup>30</sup> Pre-existing partial immunity from H2N2 Asian influenza likely played a significant role in the behaviour of Hong Kong influenza.

When comparing the severity of Hong Kong influenza and COVID-19 pandemics in Australia, it is important to note that there were delays in the peak of both pandemics, and, by this time, vaccines against both viruses were available. In the case of Hong Kong influenza, this was most likely due to naturally acquired antineuraminidase immunity;<sup>13</sup> for COVID-19, it was most likely due to non-pharmaceutical interventions. Based on around 6 million doses distributed for Hong Kong influenza and uncertainty around whether a single or double dose was administered, this resulted in a much lower

vaccination rate than the more than 90% rate achieved for COVID-19. It would, however, likely complement any naturally acquired immunity.

Excess mortality is a common measure of epidemic and pandemic severity.<sup>2,13,17</sup> Retrospective assessment of excess mortality for Australia across two seasons of the Hong Kong influenza pandemic approaches that of COVID-19 from 2020 to 2023 (87.3 v 91.4 per 100 000 population).<sup>13,31</sup> However, a smaller proportion of young people died of COVID-19 compared with Hong Kong influenza. About 30% of Hong Kong influenza deaths occurred in Australians under 65 years old,<sup>13</sup> compared with about 11% of COVID-19 deaths reported among Australians less than 70 years old.<sup>32</sup>

Of course, the impact of the COVID-19 pandemic was much greater in countries that experienced widespread transmission before the availability of effective vaccines. For example, the excess death rate was about 4.5 times higher in the US than in Australia (408 v 91.4 per 100 000 population),<sup>33</sup> second only to Spanish influenza in terms of pandemic mortality in the modern era.

## 2 The “flu furore” of early 1969<sup>16</sup>



CSL has won the race against time to produce and issue more than five million doses of influenza vaccine before the threatened onset of Hong Kong influenza by mid-winter.

Five million doses were issued by the end of June and 5.5 million by mid-July. Production is continuing, to meet any further demand this season.

The Director, Dr. W. R. Lane, has praised the efficiency and devotion to duty of all members of the staff concerned with the production, testing, packaging and distribution of the vaccine.

He said, "In every sense this has been a team effort of which we may all be very proud. The laboratories have never been called upon to produce such large quantities of vaccine within such a tight schedule.

"Everyone responded magnificently, and the challenge has been met. I offer my thanks and congratulations to every member of the staff involved in this project. Without your co-operation it could not have been done."

**BIG INCREASE**  
By producing five million doses, CSL has this season increased its normal influenza vaccine output 10-fold. For the past 10 years production has averaged about 500,000 doses.

The previous production peak was achieved in 1957, the year "Asian flu" occurred in an epidemic in Australia, when CSL made a total of 1.6 million doses. Much of this was not available to the public until August of that year, and none was available until June.

During nearly six months of non-stop activity in the Production, Quality Control, Packaging and Dispatch Departments, CSL was subjected to almost continuous publicity and to much ill-informed and thoroughly undeserved

criticism because it could not immediately meet every demand for supplies of vaccine.

**PAINSTAKING WORK**  
Although senior CSL officers explained repeatedly to the Press and to others that it took at least five weeks of painstaking work to manufacture and test each batch of vaccine — and that it could not be produced simply by mixing batches of ingredients and bottling them! — the laboratories were accused by some of "bungling" and "shortcuts".

No one associated with the influenza vaccine production programme knows of any cases of bungling and, because CSL planned well ahead and undertook appropriate action early for large-scale manufacture, the huge list of orders was successfully filled before mid-winter.

The magnitude of CSL's performance is disclosed by a comparison of Hong Kong vaccine production and yield figures recently published by a large American manufacturer of biological products which made a monovalent vaccine for America late last year.

The company reports it used 6,124,000 eggs to produce 4,200,000 doses of vaccine.

**BETTER PROTECTION**  
CSL, to mid-July, had used 3,000,000 eggs to produce 2,500,000 doses of a vaccine giving protection against both A2 Hong Kong and Influenza B viruses.

Thus CSL, using less than half the

number of eggs, produced almost 11 million more doses of a vaccine that gave better protection than the American product.

For the record, here is a sequence of pertinent events—

● August 30, 1969: CSL isolates A2 Hong Kong strain from patient in Australia. Commences detailed studies of the strain, with a view to adapting it for vaccine production.

● September: World Health Organisation warns of likely worldwide influenza epidemic because of new Hong Kong strain.

● October: CSL overcomes many production problems due to character of new virus strain.

● Mid-October: CSL responds to appeal from Britain for vaccine to fight threatened Hong Kong influenza epidemic, undertakes to supply 1.3 million doses.

● November 22: Australian Medical Journal refers for first time to emergence of new strain and consequent likelihood of world pandemic.

● December: CSL, on own initiative sets production figure of two million doses for Australia; seeks information from industries of likely vaccine requirements and begins production for Australia.

● February: Epidemiology Committee of National Health and Medical Research Council meets to consider influenza situation, reports epidemic in winter "highly probable" and recommends immediate use of certain high risk groups.

● CONTINUED ON PAGE 2.

- Here are the facts



● February: CSL increases production target to four million doses by end of May, to be issued in multi-dose and single-dose containers, in proportions established and found acceptable in previous years. Continuous production flow through March, April, May is scheduled.

● March 2: Minister for Health announces that influenza vaccine will become a pensioner benefit under National Health Scheme from April 1, with vaccine being issued in single-dose ampoules. CSL is instructed to make minimum of 900,000 single dose ampoules available by the end of March.

The decision to supply pensioner vaccine in single dose ampoules completely altered the anticipated ratio of single and multi-dose dispensing. Because 800,000 doses was almost an entire month's supply, it meant that issues of vaccine during March —

when orders were being received in very large numbers — were reduced to a very small number of multi-dose containers.

Doctors, chemists and others who had placed early orders and had arranged immunisation programmes could not obtain vaccine until May, when CSL's production had been returned long enough, and in sufficient volume, to overcome the backlog which had accumulated during March.

**INCREASED PRODUCTION**  
CSL, the public, chemists and doctors throughout Australia clamoured for the vaccine, we at CSL took the only course open to us — we increased production to the maximum limits of available equipment, raw materials and trained staff.

Double shifts were worked, seven days a week, and the consumption of embry-

onated hen eggs rose to more than 100,000 a week.

Gradually, week by week, the tempo was made up. Production continued to rise, and the incredible target of five million doses was met, and was achieved.

The critics became silent as the vaccine supplies eventually got to every chemist and every medical man who had placed orders. More Australians than ever before were vaccinated, and, at the time of writing this report, some cases of Hong Kong influenza virus had occurred, but there had not been an epidemic.

It is significant that Britain, which, too, received the Australian sub-unit vaccine, also escaped an epidemic — but the United States and Russia, which had different type of vaccine, suffered widespread epidemics?

## 3 Lessons for future pandemic preparedness

- Any novel highly communicable viral respiratory pathogen is likely to arrive and spread in Australia within weeks of its first recognition overseas.
- A respiratory virus pandemic is experienced as a series of waves over a period of several years, but the severity and frequency of these waves may be impossible to predict.
- The ability to plan a specific pandemic response is limited without advance knowledge of the virulence and behaviour of a novel pathogen.
- Secure vaccine supply is a priority as uncertainty creates significant community concern.
- There was a notable difference between the public health response to the Hong Kong influenza and coronavirus disease 2019 (COVID-19) pandemics. The response to the next pandemic is likely to be influenced by factors including the pathogen's behaviour, vaccine supply, political environment, media, and community risk perception.

We note with interest that early outbreaks on cruise ships departing Sydney were reported for both pandemics. Of 907 COVID-19 cases diagnosed on the Ruby Princess, 29 died (case fatality rate of 3.2%).<sup>34</sup> In contrast, Dr Apthorp reported no deaths among 295 Hong Kong influenza cases on the Sydney cruise ship in spring 1968.<sup>15</sup>

Compared with the response to COVID-19, there were no border closures, contact tracing, lockdowns, social distancing, or school closures. Yet these measures allowed the Australian population to be vaccinated against COVID-19 before infection was widespread. Both pandemics shared media and public concerns about vaccine supplies. The “flu furore” of early 1969 related to initial concerns over the availability of vaccines ahead of an expected epidemic of Hong Kong influenza that winter (Box 2).<sup>16</sup> This illustrates the public's sensitivity to vaccine supply issues, which was also noted in the COVID-19 Response Inquiry Report.<sup>1</sup>

Although vaccination is a cornerstone of pandemic response, one critical lesson from both the Hong Kong influenza and COVID-19 experiences is that effective vaccination programs are shaped by timely deployment, public acceptance, and the unpredictable nature of viral spread. The Hong Kong influenza pandemic confirmed that even with vaccination and some degree of pre-existing immunity, the timing and severity of outbreaks can be unpredictable (Box 3).

Australia's ability to manage future pandemics will depend not only on robust scientific and health care systems but also on fostering public trust and resilience, especially when balancing scientific uncertainty with the need for decisive action. By learning from these experiences, Australia can better anticipate and mitigate the complex social, economic and health impacts of future global health emergencies.

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